INTERLINK

WP5 EVALUATION AND ASSESSMENT

D5.3 – Use-case deployment and operation report v1

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Glossary

ENTRY	DEFINITION
INTERLINKERs	Common building blocks, provided as software tools or in the form of knowledge offered digitally, that represent interoperable, re-usable, EU-compliant, standardized functionality for the co-production of public services
Public Service	Services that are publicly available and are provided by the government or on behalf of the government's residence in the interest of its citizens. In INTERLINK we focus not only on the software services (i.e., the services delivered digitally) but also the services that rely on digital technologies.

Acronyms

ABBREVIATED	EXTENDED
CSC	Unified State and Municipal Customer Service Centres in Latvia
G2C	Government to Citizen
G2G	Government to Government
GA	Grant Agreement
KPI	Key Performance Indicator
MEF	Ministry of Economy and Finance - Italy
VARAM	Ministry of Environmental Protection and Regional Development - Latvia
ZGZ	Zaragoza, capital city of the Zaragoza province - Spain

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Executive summary

This document is the result of **Task 5.4. "Use-case operation, monitoring and evaluation**" and **contains INTERLINK platform evaluation results obtained after the first iteration of use-cases or pilots**. It reports on the effort and strategy used for the deployment and the running of use-case operations. This deliverable addresses the following objectives of "*WP5 – Evaluation and assessment*":

- *O5.3 – Operate and monitoring the INTERLINK platform during the 2 phases of validation in the three use-cases considered: VARAM, MEF and ZARAGOZA*
- *O5.4 – Evaluate the INTERLINK solution on the three use-cases, in terms of its impact on user community, civil servants and other stakeholders and in terms of the efficiency/effectiveness of the technical solutions.*

Task T5.4 ensures a seamless operation of the use-case-specific systems deployed in "T4.5 Instantiation for the use-cases". To this extent, T5.4 has monitored the trial operation in iteration 1 and promptly detected and analysed problems or missing features that prevented a successful execution and, hence, reported them to the appropriate project WP. During the first pilot iteration, these activities have been triggered by PA-specific problems, but their management has ensured project-level coordination for those aspects that have cross-site relevance (as result of "Task T5.1 Coordination of the use-cases").

Furthermore, this task has evaluated the system on the three use-cases. The aim of the evaluation is twofold:

- *evaluating the effectiveness of the proposed INTERLINK solutions and at collecting information to improve the system (formative evaluation);*
- *assessing the level of achievement of the KPIs (defined in "T4.1 Socio-technical requirements") and at identifying improvement actions towards their achievement (summative evaluation).*

The evaluation does not only cover technical aspects, but it also investigates the social implications of the adoption of the INTERLINK solutions. It investigates the impact of the INTERLINK solution on the lives of the users, companies, and civil servants to detect its strengths and the barriers/obstacles to its wider adoption. Finally, T5.4 is also responsible for collecting operational best practices and know-how from the different PA experiments and making them available to the other PAs. These activities will be repeated for the two iterations of the PA use-cases.

In essence, in this deliverable "**D5.3 Use-case deployment and operation report v1**", the results of performing the evaluation of the INTERLINK platform in iteration 1 are compiled. Another version of this deliverable, namely "*D5.5 Use-case deployment and operation report v2*" will be produced in M33 after pilots' execution in iteration 2 (see iterations and timings in Figure 1).

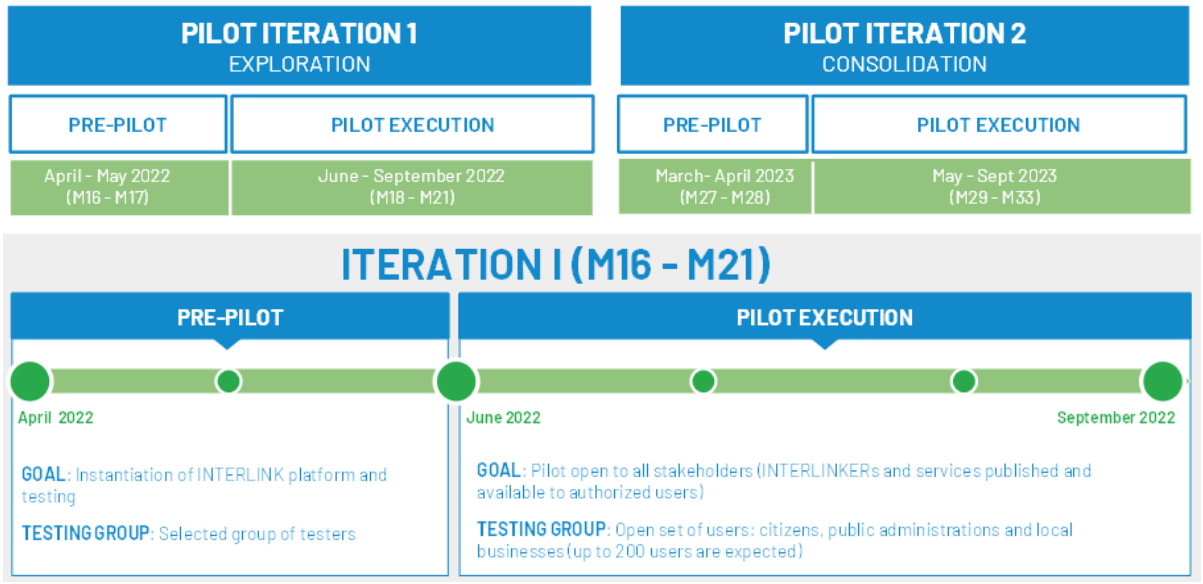

Figure 1. INTERLINK piloting framework, with a focus on pilot iteration 1 (M16-M21)

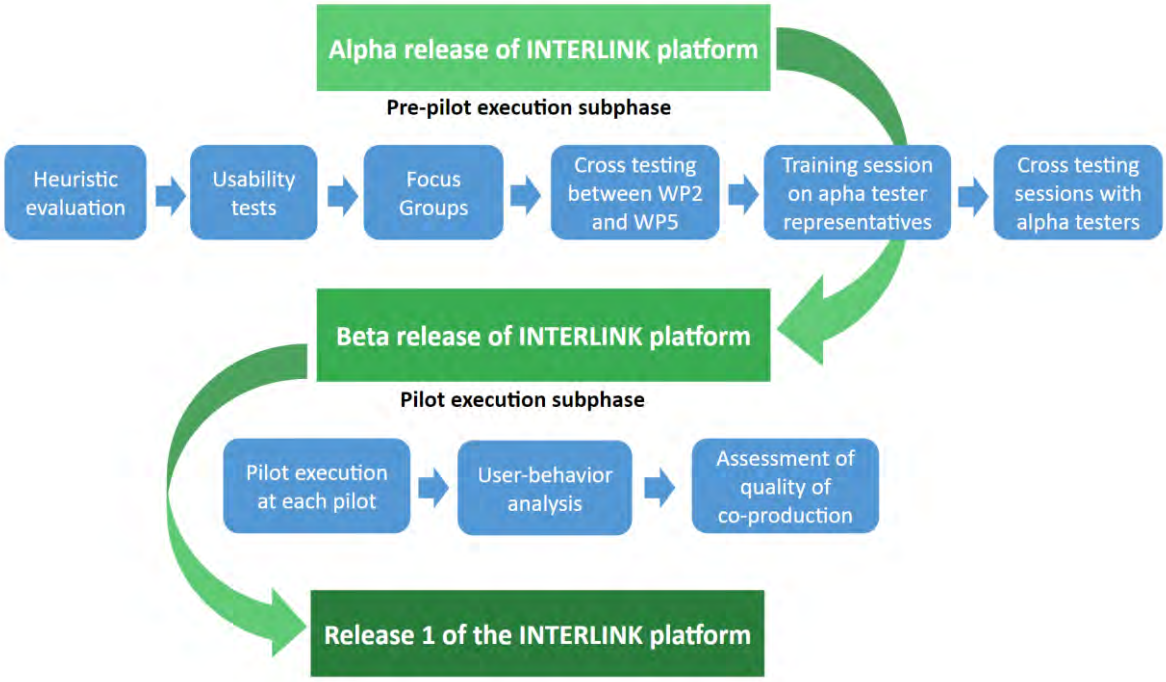

Figure 2. INTERLINK's iteration 1' evaluation journey.

1 Introduction

The INTERLINK platform has been installed and operated in three different use-case sites with different operational settings, background, user maturity levels. For this reason, careful coordination of these different use-case sites has been considered to ensure a successful validation of the INTERLINK solution. Detailed plans for use-case pilot activities were prepared in advance (as described in Deliverable D5.1 [1]), together with guidelines for community building and engagement (collected in Deliverable D5.2 [2]) and a methodology for evaluation and for measuring pilot specific KPIs (Section 4 of Deliverable D5.1[1]).

This chapter provides a summary of the pilot execution methodology and strategy (goals, dimensions, measurement instruments, evaluation journey) devised together with showcasing the co-production enabling tools made available for pilots. Besides, it provides evidence about the materials prepared and actions executed for the proper pilot's operation and monitoring.

1.1. Methodology for Pilot Execution

According to the methodology defined in D5.1, a plan of action was prepared that prescribed that each pilot use-case (i.e., MEF, VARAM, ZGZ) was to be divided into two sub-phases: a *pre-pilot launch subphase* and a *pilot execution subphase (Figure 1).* This section briefly summarises the different steps in which each subphase was articulated. Figure 3 graphically illustrates the planned types of activities that each pilot was suggested to undertake for the execution and evaluation of their own pilot objectives.

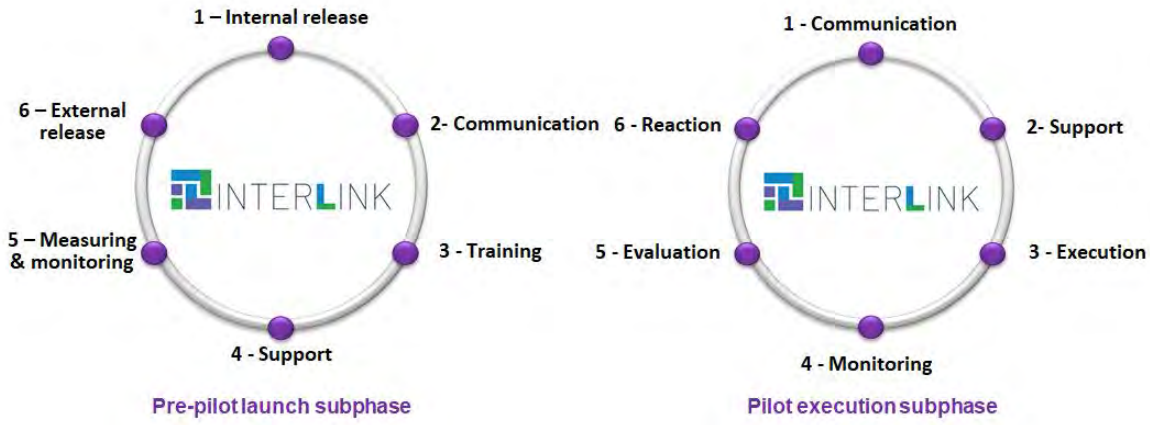

Figure 3. Activity types in Pilots Iteration I subphases

Next, we summarise the plan of action that was passed to pilot owners to guide their activities (as a brief excerpt taken from D5.1 [1]). Notice that in section 1.4. Pilot's

operation and monitoring management details about the actual actions executed at each pilot are reported.

Planning of pre-pilot sub-phase (From April 2022 – M16 to May 2022 – M17). It consists of the following actions in the given logical order, although iterations among them are possible.

- *Internal release*: the Collaborative Environment and a set of enablers (knowledge and software INTERLINKERs) are made available in alpha mode.
- *Communication*: INTERLINK public administrations (pilot owners) identify and select an internal group of potential alpha-testers (suggested number is between 5 to 10 users per pilot site). For that purpose, the public administrations announce the INTERLINK powered Collaborative Environment and INTERLINKERs, internally.
- *Training*: supporting documentation about the INTERLINK components are made available to the alpha testers. The alpha testers groups are convened in training workshops where they are invited to use the framework and access the Collaborative Environment and INTERLINK resources (knowledge and software INTERLINKER).
- *Support*: the different support channels are established and presented to the alpha-testers during the training workshop. Technical issues are reported to consortium members by the different technical mechanisms and support tools provided by the project.
- *Measuring & Monitoring*: Variables to be measured in pilot trials are established. Monitoring of the early testers of the INTERLINK ecosystem is carried out; gathering of evaluation metrics starts. Some of the early testers are staff from the public administrations or the INTERLINK consortium partners. Technical, procedural or ethical deficiencies are identified and addressed by the INTERLINK support team during M16 and M17.
- *External Release*: Once the support team solves the most critical reported issues (presumably technical mainly), updated versions (if required) of the framework components, INTERLINK collaborative environment and INTERLINKERs are updated. Users from engaged public administrations are free to access all of these components in release mode.

Planning of pilot execution sub-phase (From June 2022 – M18 to September 2022 – M21). It consists of the following action plan which is iterated through the whole pilot execution:

- *Communication*: an intensive dissemination must be carried out across different channels to mark the kick-off of the pilot execution sub-phase. Targeted user groups for each trial are reminded that the INTERLINK collaborative environment, reusable INTERLINKERs and co-produced specific public services built for each pilot site are now officially rolled-out urging and incentivizing them to use the INTERLINK ecosystem.

- *Support*: technical, legal and co-production model support services are maintained across the execution of the pilot.
- *Execution*: INTERLINK framework components are redeployed, after tuning them because of the pre-pilot sub-phase and are made ready for massive access and execution. This activity ensures that the individual deployment per pilot site is kept operative on a 24x7 basis.
- *Monitoring*: monitoring of the actual pilot users interacting with the INTERLINK ecosystem to co-produce new public services or consume and reuse the co-produced ones. The feedback retrieval during the pilot execution serves to sense the user perception of the services deployed and co-production approach.
- *Evaluation*: actual data about the usage of the tools by the different users is gathered, aggregated, and analysed. Every month usage statistics and KPIs are generated, and feedback analysis carried out.
- *Reaction*: Early conclusions are driven, and corrective actions are taken in case the pilot is not progressing as expected, monthly. Based on the monthly evaluations some of the following actions are triggered: new communication actions, launch of contests to incentivize usage or modification of available INTERLINK resources to solve issues that may be impeding a bigger adoption.

In addition to the action plan above, a list of potential risks that could hamper the pilots execution was identified, so that risks have been carefully monitored throughout pilot iteration 1 (see Table 1). Some of the corrective actions in Table 1 were directly integrated into the action plan, like the creation of a specific pre-pilot phase to manage more effectively possible software problems.

Table 1. Identified Pilot risks

Risk ID	Probability	Impact	Description	Corrective action
R1	Medium	High	Critical mass problem	Motivate INTERLINK usage through campaigns and incentives. Campaigns have been carried out, no incentives have been used.
R2	Medium	High	Pilot users only use the deployed co-produced services and not leverage the INTERLINK co-production model and supporting collaborative environment	Engagement activities should not be only focused on the public services promotion but also on showing the main features and benefits of the INTERLINK framework components. As a matter of fact extensive communication on the co-production methodology and INTERLINK supporting tools has been carried out.
R3	Low	High	Low involvement of citizens and public administrations	Engagement plans should describe activities to motivate other stakeholders, e.g. citizens and public administrations and local businesses.

R4	Low	Medium	INTERLINK pilots do not successfully develop co-production projects with the support of INTERLINK	Document usage and provide examples of co-produced projects. Motivate INTERLINK framework usage through further engagement activities.
R5	Low	High	General SW failures	A pre-pilot phase has been planned for detecting and solving these kinds of failures. General support tools and procedures for the pilot phases are available.
R6	Low	High	Platform and Services usability	A pre-pilot phase has been planned for detecting and solving these kinds of failures
R7	Medium	Medium	Pilot phase during summer vacation might result in a scarce number of users because July and August is a typical vacation time.	Reinforce engagement activities targeting September and plan well in advance with the different stakeholders the schedule of events/sessions. Involve crucial stakeholders as early as possible. Activities have been extended during the whole of September.

1.2. Co-production enabling tools deployed at pilots

This section describes the three different instances of the Collaborative Environment that were prepared to be used at the three pilot sites. During the pre-pilot subphase an internal release of the platform (called as *alpha release*) was used by alpha testers to refine its operation. As result of the usability, heuristic and training undertaken, an external release open to beta testers in pilots was made open in early June 2022 (*beta release*). The full source code of the software assets prepared by the project is available under the interlink-project organisation in GitHub.

Notably, the **INTERLINK Collaborative Environment** has been designed to promote the following two design goals:

- **COLLABORATION & RE-USE**. The INTERLINK platform offers a digital environment that facilitates collaboration between Public Administrations, private stakeholders and citizens and promotes the re-use of software for delivery of public services.
- **CO-DESIGN & CO-DELIVERY**. INTERLINK provides a step-by-step guidance for the co-design and co-delivery of public services along with guidelines, tips and templates that facilitate the contribution of different actors.

A key outcome of the project is a set of knowledge or software building blocks or enablers, namely **INTERLINKER**s, that a co-production team can re-use and customize to deliver services (see Deliverable D3.1 [3] for a detailed description of INTERLINKERs).

Based on these design goals and concepts, the **INTERLINK Collaborative Environment** has been produced to support the co-production methodology of INTERLINK and

facilitate its adoption and application in the co-production of novel public services. It offers the following core functionalities:

- Co-producers' organization, team and project (process) management.
- Guide for co-production process;
- Recommendation of INTERLINKERs most suitable to the problem profiles represented by the chosen co-production task.
- Selection and registry of use (displaying result of using the enabler, e.g. instantiation of a Business Plan) and
- Access to INTERLINKERs catalogue.

The **INTERLINK Collaborative Environment** is designed **to maximize extensibility, adaptation and reusability** by making use of **declarative models for INTERLINKERs and co-production schemas.** (Deliverable D4.3 [4] provides a detailed, technical description of the developed software platform and user interface.)

A flavoured version of the INTERLINK's Collaborative Environment has been deployed which can be encountered at the URLs shown below. The customization has consisted of adapting each environment to the colour palettes used by the pilot owners of the pilots (two central and one local Public Administrations), introducing their logos, adapting the contents to their local languages and populating the catalogue with pilot specific INTERLINKERs, e.g. the Booking one in Zaragoza.

- MEF: https://mef.interlink-project.eu/ (see Figure 4)
- VARAM: https://varam.interlink-project.eu/ (see Figure 5)
- ZGZ: https://zgz.interlink-project.eu/ (see Figure 6)

Figure 4. MEF's customized version of Collaborative Environment

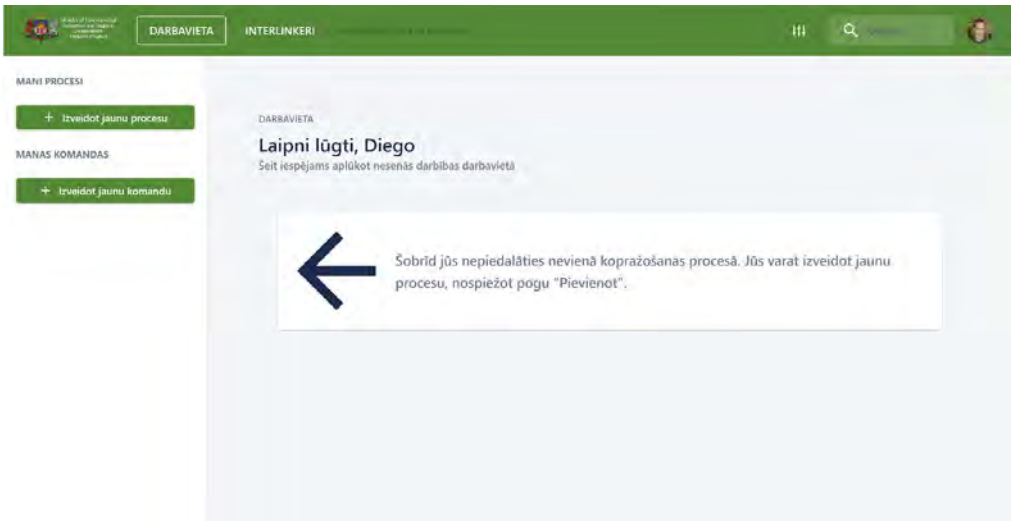

Figure 5. VARAM's customized version of Collaborative Environment

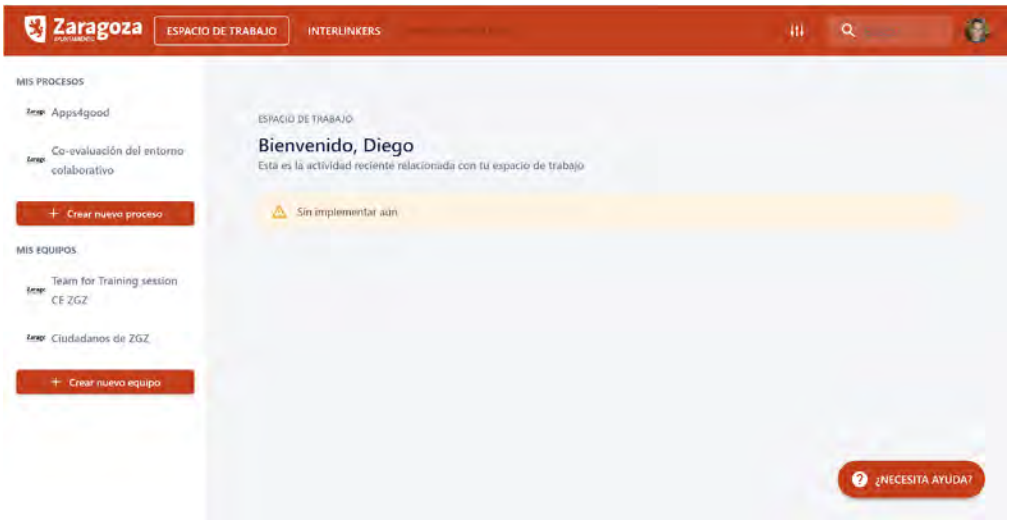

Figure 6. Zaragoza's customized version of Collaborative Environment

A range of generic software and knowledge INTERLINKERs has been produced, a total of 62 INTERLINKERs have been made available in release resulting of iteration 1 of the platform. Some examples of software INTERLINKERs for co-production are: a) Tools for ideas crowdsourcing and collaborative decision making; b) Tools for surveys; c) Tools for team management; d) Document sharing and File management tool. On the other hand, some exemplary knowledge INTERLINKERs for co-production are: a) Guidelines and canvas to perform stakeholders analysis; b) Templates for stakeholders' engagement plan; c) Templates for surveys for problem refinement; d) Guidelines and materials for workshops for service design or e) Templates for Business Plans. Some exemplary knowledge INTERLINKERs to build capacity are: a) Guidelines on GDPR for Data Protection; b) Information sheets and consent forms; c) Guidelines on the acquisition and reuse of software for public administrations. Some exemplary software

INTERLINKERs supporting service building are a) Registration and authentication component or b) Collaborative Editor for public service descriptions.

Notice that a total of 33 internal knowledge INTERLINKERs have been made available for pilots. In Figure 7 provides details of 2 of them. Additionally, a total of 12 external knowledge INTELINKERs have been made available. Some examples are: W3C Web Content Accessibility Guidelines or Open API specification, among others.

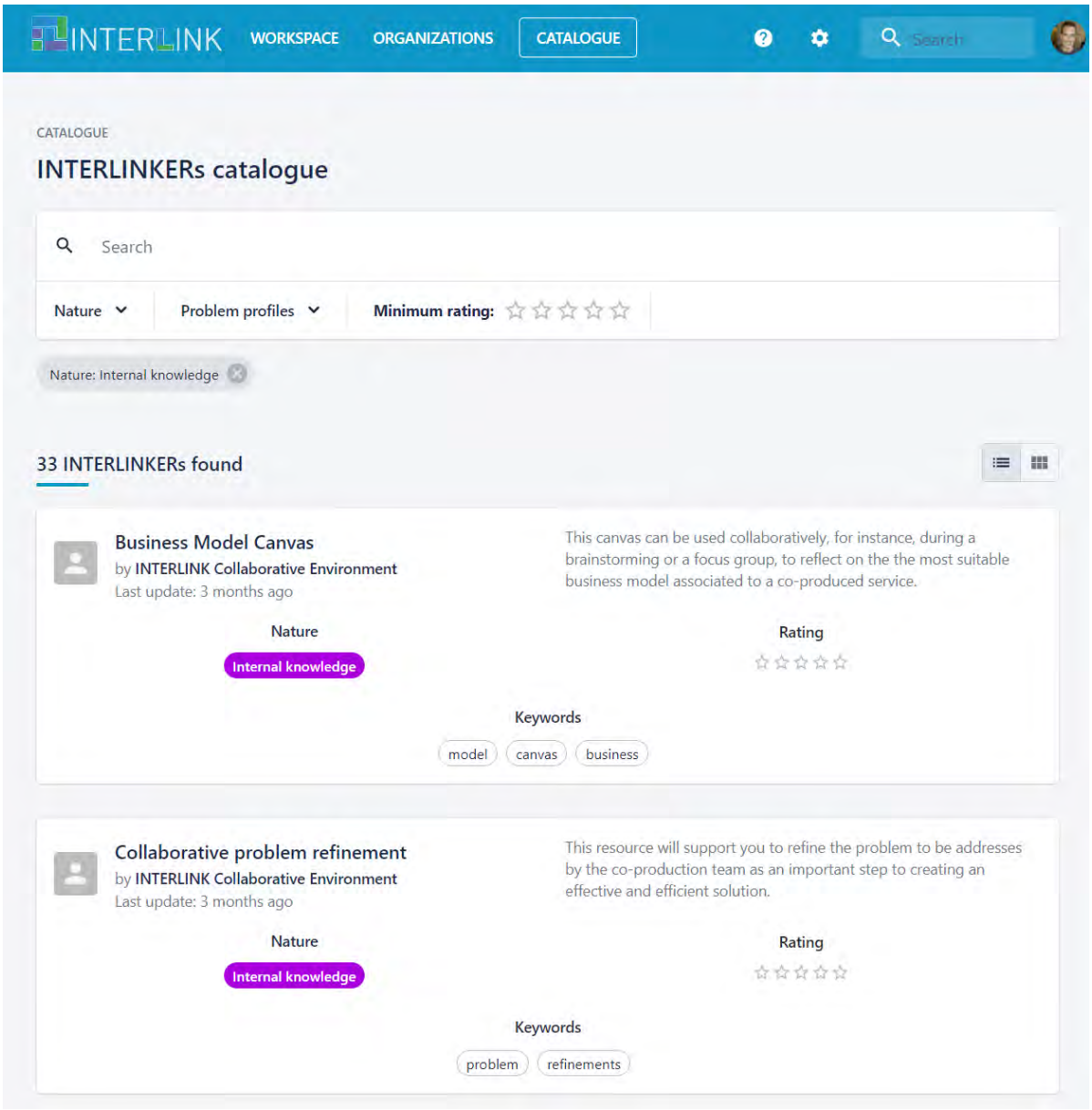

Figure 7. Catalogue list view showing some internal knowledge INTERLINKERs.

Furthermore, some specific software INTERLINKERs were created for the VARAM and Zaragoza pilots' case, namely:

- **Augmenter** is an internal Open-Source software INTERLINKER developed by DEUSTO for VARAM that offers the possibility of creating and improving public services descriptions. In the workspace users can share terms, questions and feedbacks, finally an assigned moderator will decide whether to approve or not a suggestion. With Augmenter it is possible to create and improve public service descriptions, organize discussions and keep record of participation and involvement; manage moderator decisions over the improvements; and generate a final improvement report. For more details, check Augmenter's catalogue entry within INTERLINK Collaborative's environment Catalogue component. +
- **Event Organiser** (also known as the "**Booking**") is an external software INTERLINKER developed for Zaragoza by CNS which enables co-producing new public events. It offers a calendar view to design the schedule of proposed new events (Figure 8) and tools to specify required resources, write documentation, assign tasks to co-production team members, and co-evaluate different aspects of the proposal. In addition, the tool includes administrative views to manage available resources and select the proposals which can be accepted for production. For more information, check the Event Organizer description available in the INTERLINK Collaborative Environment.

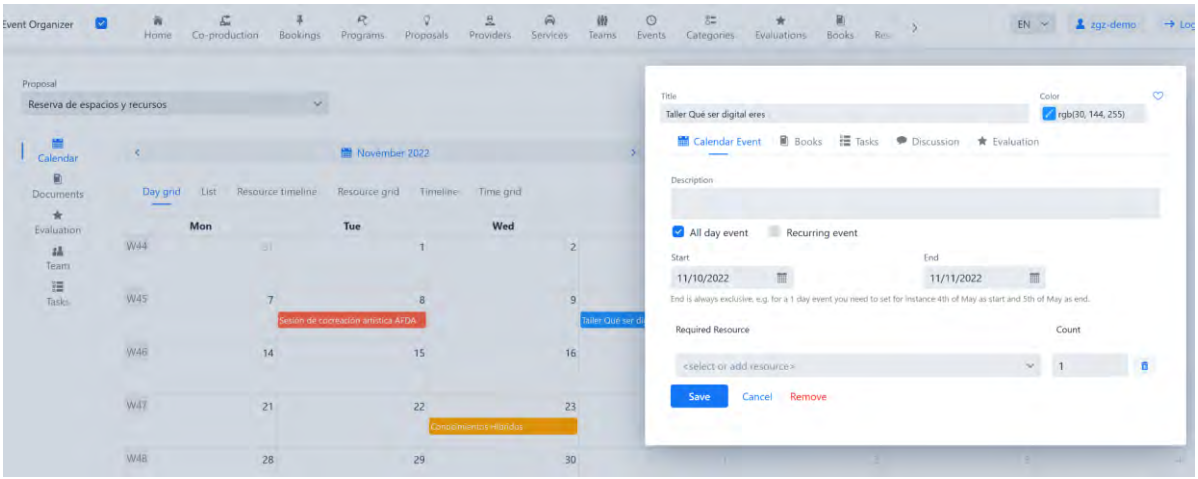

Figure 8. Event Organizer calendar view

In summary, a total of 5 internal software INTERLINKERs (see Figure 9) and 1 external software INTERLINKER (Event Organizer, which is not directly integrated in the Collaborative Environment) have been made available for pilots, namely, Augmenter, Collaborative Editor, Google Drive, Loomio and Survey Editor. Readers interested may click on the provided links for further information provided at INTERLINK's Catalogue on this internal software INTERLINKERs and the mentioned external one. Notably, a

total of 12 external software INTERLINKERs have been published in the catalogue, e.g. Doodle or Trello.

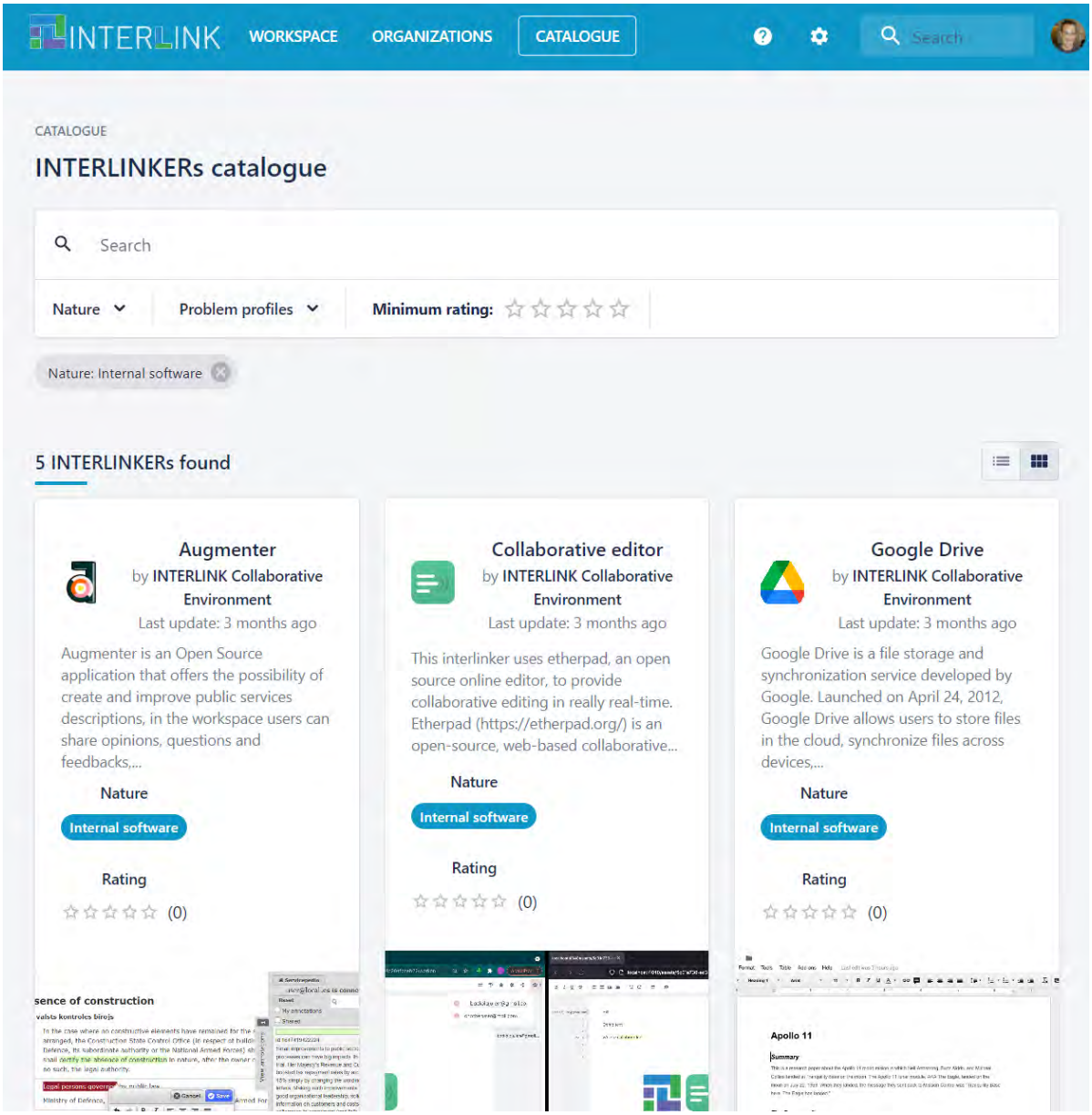

Figure 9. Catalogue's grid view showing some internal software INTERLINKERs.

Finally, the INTERLINK Collaborative Environment has been populated with different co-production schemas, i.e., process models that can be adopted to undertake from generic co-production projects to more specific ones, e.g., organization of a hackathon for Zaragoza or refinement of the descriptions of e-services for the case of VARAM. The INTERLINK Collaborative Environment is flexible to allow the selection of the most suitable co-production schema (see Figure 10 for the default INTERLINK co-production schema and Figure 11 for the wizard through which users may select one of the available co-production schemas) for the co-production process sought or even to customise an

existing schema by adding/removing schema elements [5][1]). Table 2 provides a summary of the currently available co-production trees/schemas. It is assumed that a schema is chosen and personalized during co-production process setup. However, it is still possible to change the co-production schema associated to a process during its lifetime, or to modify/add/remove some of the phases, objectives or tasks of a given co-production process.

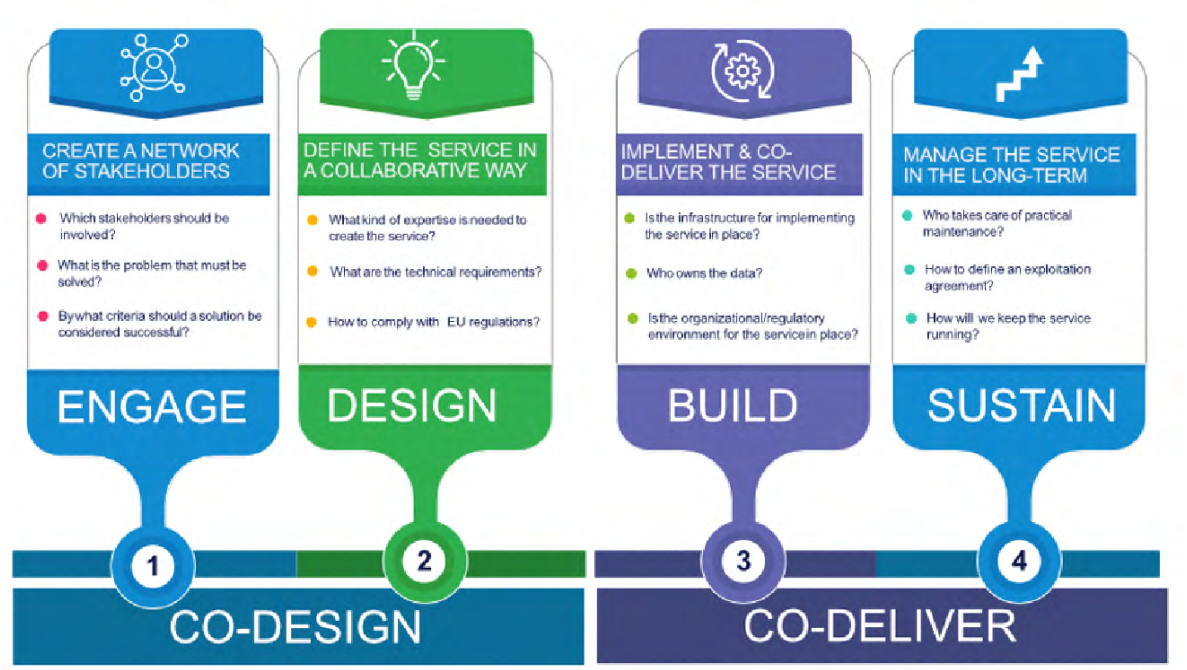

Figure 10. INTERLINK's default co-production schema.

Table 2. INTERLINK's currently available co-production schemas.

CO-PRODUCTION SCHEMA	DESCRIPTION
Default schema for co-production	This schema support generic co-production process which can accommodate any co-production endeavour. It is composed of four main phases to be followed by co-producers: a) Engage stakeholders b) Design the solution c) Build the service d) Sustain the co-created service
Co-production schema to support co-refinement of public	Specific co-production process developed for co-refinement of public service descriptions where citizens, civil servants

[1] Diego López-de-Ipiña, Julen Badiola, Daniel Lauzurica, Daniel Silva, Roberto Carballedo, Diego Casado-Mansilla, Elena Not, Chiara Leonardi, Pauli Misikangas. Fostering multi-stakeholder collaboration through co-production and rewarding. Accepted to UCAml 2022, 14th International Conference on Ubiquitous Computing and Ambient Intelligence, November 29th to December 2nd, 2022 Córdoba (Spain) – In press

service descriptions	managing public service infrastructure and civil servants working at specific departments cooperate.
Hackathon creation process	This co-production schema is designed to guide ideation, preparation, launch and exploitation of a Hackathon devised to address some societal challenges in cooperation between public administrations, citizenry and other PA's stakeholders, namely, SMEs, academia or non-profit organizations.

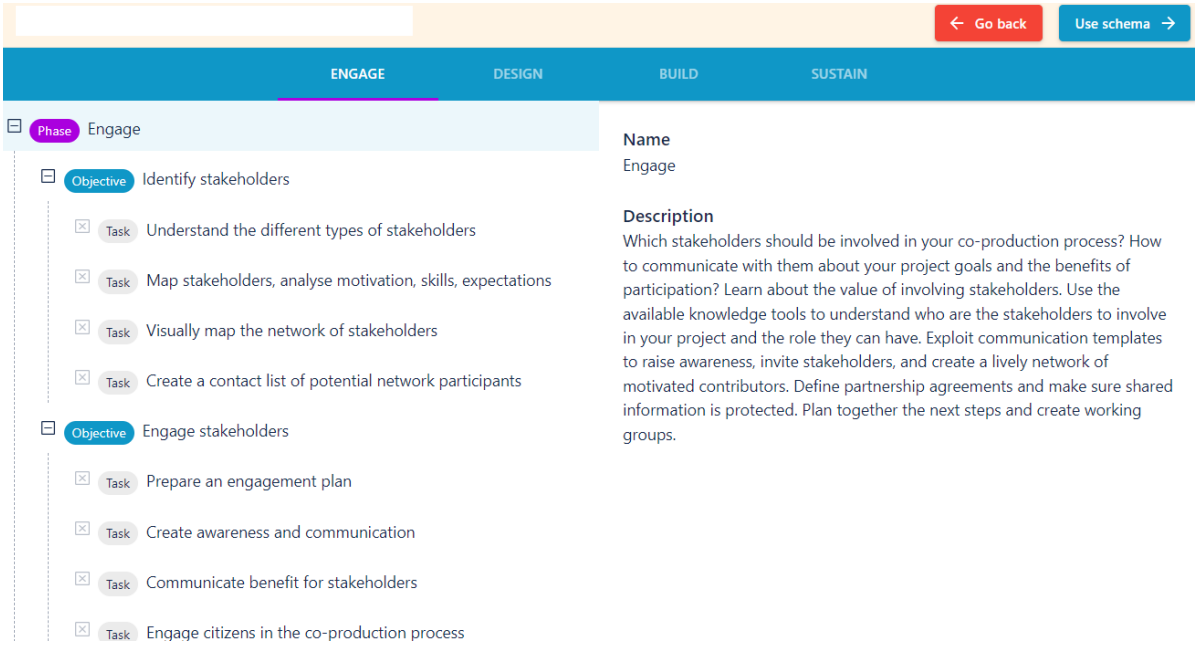

Figure 11. View of ENGAGE phase within Default schema for co-production.

1.3. Pilots' evaluation strategy

The evaluation and assessment strategy followed is depicted in Figure 12:

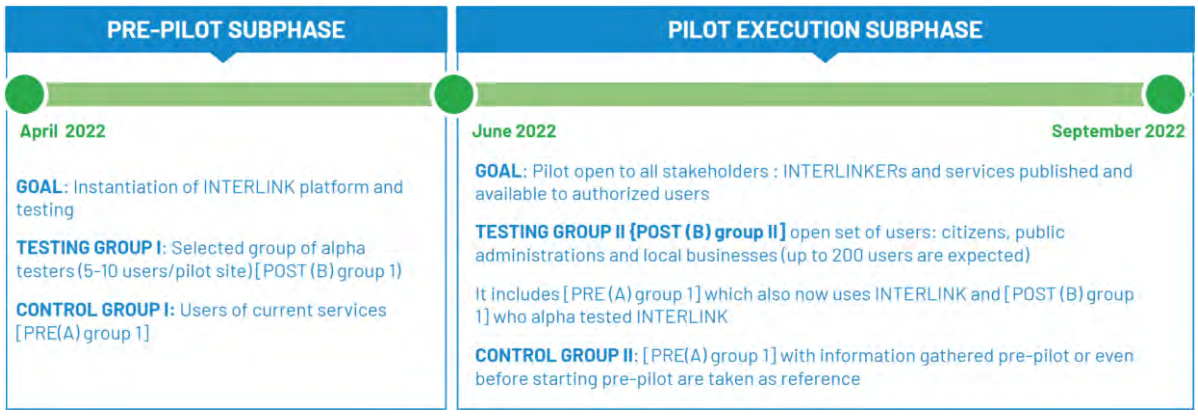

Figure 12. Evaluation and assessment strategy

The following subsections summarize the approach followed to undertake the evaluation of pilots' execution, together with the instruments used for it.

1.3.1. Evaluation goals

The evaluation goals of INTERLINK's iteration 1 can be divided into:

- **Global or pilot-agnostic goals**, including the following dimensions:
  A. **INTERLINK USE and CO-PRODUCTION of SERVICES**. In this respect, the evaluation considers the number of INTERLINKERs in use, stakeholders involved with the INTERLINK solution during the two Pilots, as well as the co-production of services enabled by INTERLINK, which correspond to the KPIs specified in the proposal and their targets.
  B. **THE VALUE PROVIDED by INTERLINK**. Along this dimension, the evaluation measures the value improvements provided by the INTERLINK solution. It tries to answer the following questions:
     a. INTERLINK decreases the PA's administrative and management costs.
     b. INTERLINK increases the number and quality of co-produced initiatives.
     c. INTERLINK increases the participation of citizens and private entities in the customization and co-delivery of services.
  C. **THE USERS' PERCEPTIONS of INTERLINK**. This evaluation goal addresses users' perceptions of INTERLINK regarding acceptance, usability, and trust.
- **Local or pilot-specific goals** focusing on:
  D. **PILOT SPECIFIC KPIs**. This evaluation goal considers key performance indicators that are custom made at each pilot site.

"Appendix A – KPIs for pilots' evaluation" shows the KPIs that were defined in deliverable "D5.1 – Use-case plans and guidelines v1" [1]. Notice that in section 3. Pilot's execution subphase it will be indicated what were the specified KPIs that have been eventually evaluated in the pilots for iteration 1. Notice that there were some few miss definitions at specification time, planning time, that once the project has been deployed, operated, and monitored have resulted in a few changes to the original set list of KPIs.

USER ACCEPTANCE TESTING TEST CASE FOR COLLABORATIVE ENVIRONMENT

STEP2: Organization and team management to initiate co-production process				
1	Create a new organization	Click on ORGANIZATION top menu and then on button "+Create new organization"	"Create a new organization" pops up with form to complete organization details	x
2		Fill in form details: name (e.g. "Organization A"), description, logo, whether the organization details can be accessed by any user or not, who can create teams, i.e. only administrators or any member of a team within an organization, default team type or role, e.g. Citizens, public administration, non-profit organization, for-profit organization)	Organizations view shows in the table of Organization a new row with the details of the newly created organization.	x
3	Create a new team	Click on a row depicting an Organization in the table shown in ORGANIZATION view and click on "+Create new team" button which appears when expanding view of an organization	"Team creation" window pops up with form to complete team details	x
4		Fill in form details: name (e.g. "Team A"), description, logo, type of team (role of its users, e.g. Citizens, public administration, non-profit organization or for-profit organization) add emails of those already logged in users who should be part of the team (introduce email address and when validated, click on button Add user). Notice that now when you type the name of a user belonging to at least one team in a organization, its name is automatically suggested	A new team appears in view of ORGANIZATION, counter of Teams should be incremented.	x
5	Manage existing team	Click on the team name within one of the shown organizations, all within ORGANIZATION (https://dev.interlink-project.eu/dashboard/organizations) view to manage the team	New pop-up window shows up, displaying team details, including its members	x
6		Click on PENCIL ICON to edit team details: you may modify name, description, logo and list of members (adding new ones or removing existing ones). Click on DISK ICON to save changes	You should be back at the ORGANIZATION view, still being selected the ORGANIZATION where changes have been performed https://dev.interlink-project.eu/dashboard/organizations	x
7	Verify right documentation is shown	Click on "?" menu icon on top hand side menu of screen. Click on "Open user manual"	A new tab should be shown with all user manual documentation	x

UserAcceptance Testing TestCase - Disclaimer -

Figure 13. Snapshot of user acceptance testing created to validate Product-based quality.

1.3.2. Evaluation dimensions and constructs

The evaluation dimensions and constructs defined for INTERLINK are shown in Figure 14. INTERLINK pilots aim to assess whether the co-production model and supporting tools and co-produced assets put forward by the project will enhance the quality, quantity, and reuse of public services among European public administrations (PAs) or not. Consequently, we aim to answer to the following question:

Will INTERLINK co-production model and its supporting tools and co-production enablers (INTERLINKERs) enhance the quality, quantity, and reuse of public services?

This explains that we have decided to measure the "quality" associated to the "co-production approach" and the tools and INTERLINKERs supporting co-production produced by INTERLINK, looking at the following dimensions, as shown in Figure 14:

- **Product-based quality**: based on ISO/IEC 25010:2011 [6] quality model, this dimension indicates the degree to which a particular service or product conforms to its specification. The quality model determines which quality characteristics will be considered when evaluating the properties of a computer system or software product. The quality of a system is the degree to which the system satisfies the stated and implied needs of its various stakeholders, and thus provides value. Those stakeholders' needs (functionality, performance, security, maintainability, etc.) are precisely what is represented in the quality model, which categorizes the product quality into characteristics and sub-characteristics. The product quality model defined in ISO/IEC 25010 [7] comprises the eight quality characteristics shown in Figure 14 (box on the left). In order to be able to measure the product quality a script to manually check whether the Collaborative Environment meets INTERLINK'S functional and non-functional user requirements was devised. Such script has been bundled as the User Acceptance Testing template knowledge INTERLINKER published in the INTERLINK's Collaborative Environment's Catalogue, see Figure 13. The product-based quality is measured in INTERLINK by calculating the percentage of requirements correctly met by the implementation. For a release of Collaborative Environment to be considered acceptable, we established that the percentage of requirements fulfilment should be 90% or higher.
- **User-based quality**: based again on ISO/IEC 25010:2011 [6] quality model, this evaluation dimension means that the attributes of a product meet the customer's requirements (in the public sector this is very important due to the need for public accountability). The "quality in use" model is composed of five characteristics that relate to the outcome of interaction when a product, process or service is used in a particular context of use.
  a. **Effectiveness**: accuracy and completeness with which users achieve specified goals. In INTERLINK case, we want to measure the "extend to which INTERLINK collaborative tools help me to achieve the desired results of the co-production process".
  b. **Efficiency**: resources expended in relation to the accuracy and completeness with which users achieve goals. In INTERLINK case, we want to measure the "extend to which INTERLINK collaborative tools allow me to perform the steps involved in co-producing a public service in a faster and more resource-efficient manner".
  c. **Usefulness**: degree to which a user is satisfied with their perceived achievement of pragmatic goals, including the results of use and the consequences of use. In INTERLINK case, we want to measure the "extend to which INTERLINK collaborative tools allow one to better engage in the process of co-producing public services".
  d. **Ease of use**: understood as the combination of comfort, pleasure and usability perceived by a user resulting in her physical comfort, pleasure from fulfilling their personal needs and satisfaction in a specified context of use. In

INTERLINK case, we want to measure the "extend to which INTERLINK collaborative tools are easily graspable and intuitively used".

e. **Flexibility**: degree to which a process, product or system can be used in contexts beyond those initially specified in the requirements. In INTERLINK case, we want to measure the "extend to which INTERLINK collaborative tools can be accommodated to the co-production of different types of public services and used in an ubiquitous manner".

Note that Usability is defined as a subset of quality in use consisting of effectiveness, efficiency, and satisfaction. Usability can either be specified or measured as a product quality characteristic in terms of its sub-characteristics or specified or measured directly by measures that are a subset of quality in use. Besides, we have integrated quality in use from ISO/IEC 25010:2011 [16] with SERVQUAL[18], an approach for measuring customers' subjective assessment of service quality. By means of this approach, through a survey you ask your customers to rate the **delivered service compared to their expectations** [19]. This is precisely the approach followed in INTERLINK, where an evaluation questionnaire has been devised to ask about listed constructs.

- **Value-based quality**: this third evaluation dimension measures whether services are in line with requirements of public services (e.g., legal treatment) and broader societal notions (e.g. democratic values). The following quality characteristics are considered (as also discussed in deliverable D2.3 [8]):
  a. **Inclusiveness** refers to citizens' perception that the e-government system increases the accessibility of public services and makes service delivery more egalitarian. In INTERLINK case, we want to measure the "extend to which INTERLINK co-production approach is sensitive to digital literacy, people with disabilities (e.g., visual impairment), people with a language barrier (e.g. immigrants) or Internet access demand (offline possibilities to engage with the co-production).

  b. **Perceived privacy protection effect on customer satisfaction**: Perceived privacy protection is a critical element in evaluating online and offline services. The autonomy of consumers, e.g. to control the use of data might be a further important point in contrast to dependency and subordination (it is thus linked to enabling citizens). In INTERLINK case, we want to measure the "extend to which INTERLINK is compliant to personal data regulations".

  c. **Democracy**: citizens' perception that e-government systems empower the public. In INTERLINK case, we want to measure the "extend to which INTERLINK allows stakeholders to co-design and co-produce public services".

  d. **Public service relevant Weberian principles**: Impartiality/Neutrality, Rule-boundedness, Script ability (existence of "files") or Professionalism. In INTERLINK case, we want to measure the "extend to which INTERLINK is

based on transparent rules and regulations and allow for an equal treatment of all people collaborating".

- **Satisfaction** degree to which user needs are satisfied when a product or system is used in a specified context of use. In INTERLINK case, we want to measure the "extend to which INTERLINK methodology and tools satisfy your needs and expectations regarding co-production".
- **Trust** is defined as the belief that a public body will contribute to people's wellbeing through their interaction or actions. In INTERLINK's case, by means of the provision of a co-production model, supporting tools for co-production and co-produced artefacts.
- **Acceptance** whilst acceptability refers to one's perception of a system before use, acceptance is one's perception of the system after use. Whilst being similar to adoption, acceptance refers to an attitude or perception after using a specific tool or system. IT researchers pay limited attention to the process towards acceptance or the adoption process as a whole, as they tend to focus on the factors influencing the ultimate acceptance. Various 'technology acceptance models' propose a set of factors that are assumed to determine the attitude or perception of users regarding the acceptance of a certain technology [9]. Even though these acceptance models are acknowledged and validated within the field of Information Science, they do not fit the purpose of the INTERLINK project given their limited focus in relation to the process towards acceptance.
- **Adoption** is a multi-phase process starting with "deciding to adopt (selecting, purchasing or committing to use it) and then achieving persistent use".

Notice that all the value-based constructs, together with satisfaction, trust and acceptance have also been measured through a thorough evaluation survey as reported in 1.3.3. Measurement instruments to populate KPIs.

In summary, INTERLINK project's hypothesis is that **combining product-, user- and value-based quality allows a comprehensive account of the quality associated to the co-production process and the resulting e-government artefacts**. This may lead to higher **satisfaction** on INTERLINK proposed co-production approach and its supporting tools, **trust** on the resulting co-produced public services, which may enhance **acceptance** and, hence, ultimately, aid the **adoption** of co-production results among PA stakeholders. Notice that trust (in technology/government/e-government) is necessary for citizens to participate and at the same time, participation may lead to enhanced levels of trust (in e-government services). More details on the multi-dimensional approach to quality evaluation are collected in deliverable D2.3 - "Governance performance indicators" [8].

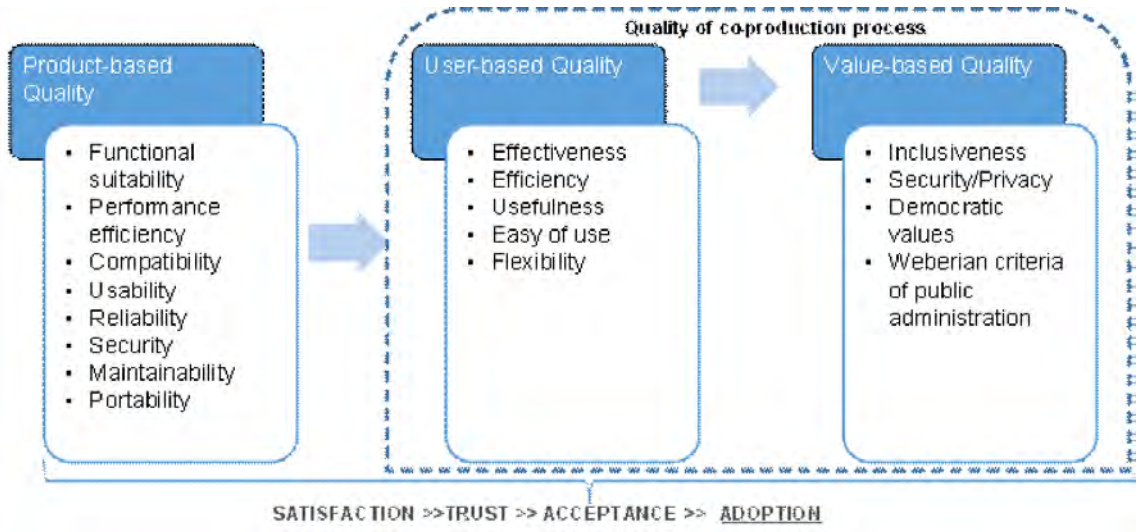

Figure 14. Evaluation and assessment strategy (source D5.1 [2])

1.3.3. Measurement instruments to populate KPIs

Several **quantitative and qualitative measurement instruments** have been produced to be able to assess the **quality associated with the co-production process and the resulting e-government artefacts**. Besides, the impact achieved by the project is measured by the set of KPIs designed and reported in section "1.3.1. Evaluation goals". As a matter of fact, there is a direct link between the dimensions used to assess "quality of the co-production process" and the KPIs devised.

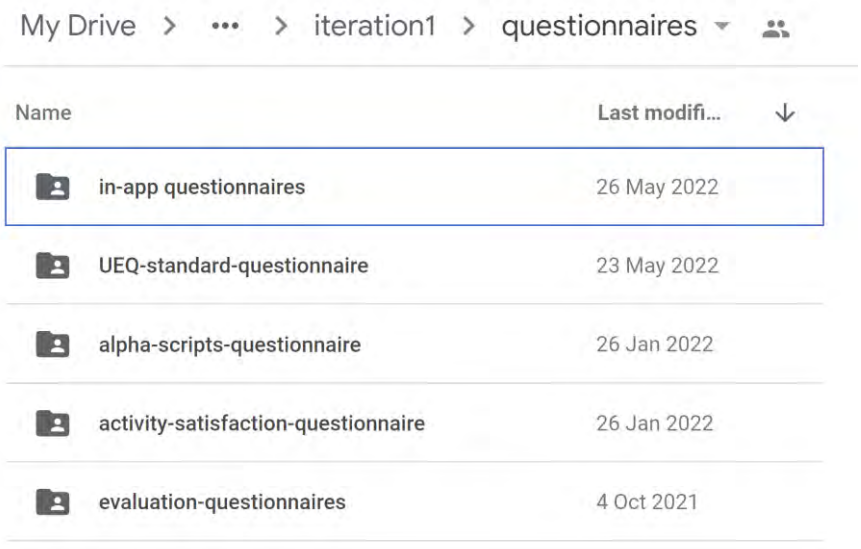

Figure 15. Folder with evaluation questionnaires

To populate the KPIs, the following quantitative measurement systems have been put in place:

- **Data model population exploitation**. The data models associated to the co-production process and catalogue of INTERLINKERs are available at "Appendix B – Data models of INTERLINK". As can be depicted in those entity relationship diagrams, all the entities involved in the co-production process and catalogue management are involved. They are used internally by the collaborative environment, but they can be exploited to understand the nature of the co-production process. This formal data model was also essential to implement automatic methods for selected KPIs calculation (as explained in subsection 1.3.4 below).
- **Current questionnaires**. Apart from platform usage logs and queries to the Data Model, KPIs per pilot are populated by processing questionnaires. The following questionnaires have been used during iteration 1 of the pilots. Notice that each questionnaire type listed is hyperlinked to a publicly accessible PDF version of the designed questionnaires:
  a. **Questionnaires for alpha testers**. The following were made available and translated to all the languages used in the pilots, namely: Italian, Latvian, Spanish and English.
     - *Alpha scripts* which were used to gather feedback from alpha testers on the functionalities of the Collaborative Environment
     - *Activity satisfaction and demographics questionnaire*, useful to analyse the participants in pilots' activities and to understand the usefulness of the activity promoting co-production and INTERLINK.
     - *User Experience Questionnaire (UEQ)*, useful to understand overall user experience of the tools made available for pilots participants in terms of attractiveness, perspicuity, efficiency, dependability, stimulation and novelty. Interesting to complement usability sessions and to make comparison to benchmark scores.
     - *Feedback* and *Support* questionnaires, embedded in the Collaborative Environment have been used to provide quick feedback for continuous improvement of the environment.

  b. **Questionnaires for beta testers**. The following were made available:
     - *Activity satisfaction and demographics questionnaire*, again for those activities used during the pilot execution subphase.
     - *Evaluation questionnaires for co-producers and end-users*. These questionnaires have been specially designed to be able to cover all the evaluation dimensions and constructs that feed the assessment of quality of service of the co-production process. For example, they include a couple of questions for each measurement dimension such as Usefulness, Effectiveness, Satisfaction or Democratic values. The designed questionnaires have different questions depending on whether

participants belong to the citizens group or to the public servants, non-profit organizations, for-profit-organizations group. The specific questionnaire for those participants playing a coproducer role was extended with a set of questions to reflect about the co-production-process, covering the following areas associated to co-production: a) experience; b) motivation; c) reason or d) inspiration.

Notice some specific new questions were defined in some pilots to be able to answer certain pilot specific KPIs.

Accordingly, the following qualitative measurement instruments have been used in the pilots' execution's monitoring.

- *Heuristic evaluation*. This is a method in which experts in user interface design and development independently use an interface and identify possible interaction problems according to certain rules of thumb (heuristics) that characterise the usability of the system. It was used with the Collaborative Environment during the pre-pilot phase to identify, in a systematic way, major interaction issues that might impact on the user experience, before the system was further tested by end-users.
- *Usability analysis*. This is a method for evaluating a product or service by testing it with representative users. During a test, participants try to complete a list of tasks following a scenario, while observers watch, listen, and take notes on emerging issues.
- *Evaluation questionnaires*. Similar to research questions in academic research projects, guide the methods and tools used to collect data to understand the problem under investigation.
- *Focus groups*. A group interview involving a small number of demographically similar people or participants who have other common traits/experiences. Their reactions to specific researcher/evaluator-posed questions are studied.
- *In-depth interviews*. It is a qualitative research technique that involves conducting intensive individual interviews with a small number of respondents to explore their perspectives on a particular idea, program, or situation.
- *Final reflection questionnaire*. This is a list of questions which has the purpose to help pilot owners to reflect, during the post-pilot phase, about how the Collaborative Environment and the INTERLINKERs have been used by the pilot coordinating team and the engaged stakeholders to support the co-production process they have been involved in.

1.3.4. Automation of KPIs collection

Given the richness of the evaluation dimensions and the possible complexity for pilot owners to distil related KPIs manually, it was deemed interesting to put in place two mechanisms to automatically gather KPI values for each of the pilots:

1. A spreadsheet named "KPI results", which is updated every hour, shows the latest values for the KPIs (belonging to the evaluation goals *"A. INTERLINK USE and CO-PRODUCTION of SERVICES"* and *"B. THE VALUE PROVIDED BY INTERLINK"* mentioned in previous Section 1.3.1) that can be automatically gathered by formulating queries to the databases of the project, namely Catalogue and Co-production services relational databases. Their data models (entities that they model and their relationships) are viewable in an online INTERLINK Technical Documentation page[2] and in appendix "Appendix B - Data models of INTERLINK" at the end of this deliverable. Besides, we have also gathered logs every time a user interacts with the Collaborative Environment. Those logs go to an ElasticSearch database[10]. Thanks to the tool Dremio Community Edition [11] we have been able to issue cross-database SQL queries and joins so that data in the two relational databases (Catalogue and Co-production) and the document-oriented one (ElasticSearch), where usage logs are delivered, can be correlated. An interface for Dremio is deployed at https://dremio.demo.interlink-project.eu/ (login required to guarantee protected access to project data). What can be seen in the "KPI results" spreadsheet is the result of executing queries through Dremio. A specific Python script[3] contains the queries that are posted to Dremio to calculate the KPIs, including notation used in the spreadsheet of the KPIs, according to the specification of KPIs shown in "Appendix A – KPIs for pilots' evaluation" at the end of this deliverable. In summary, the "KPI results" spreadsheet contains all the KPIs that we can calculate automatically[4].

2. We have also automated the collection of KPI values for KPIs of category "C. The Users' Perceptions of INTERLINK" mentioned in previous Section 1.3.1. For that, the spreadsheet "questionnaire_summary", goes through the evaluation questionnaires completed at each pilot, that should be left in a specific pilot-named subfolder of the shared project repository. The spreadsheet "questionnaire_summary", through a bespoke script, developed in App Script, retrieves all the files with answers to questionnaires and populates tab "Files" and then with spreadsheet formulas populates tab "Responses". The results of this process can be seen in file questionnaire_summary segmented by month and pilot use case.

The following example, see Figure 14, shows one of the sophisticated queries that have been automatically executed to exploit the Data Models. In this case, it corresponds to

[2] INTERLINK Technical documentation page for Data Model in github: link (verified as active on 12 October 2022).

[3] Python script with queries to calculate KPIs from Dremio data can be consulted at this link (verified as active on 12 October 2022).

[4] For KPIs automatic calculation, a specific analysis was done in advance, as reported in the KPIs_iteration1_calculation table. We then had to adapt the interpretation of some of the KPIs defined in the master sheet and add some complementary additional ones as reflected in the analysis table Verification KPIs. (access to links verified on 12 October 2022)

the query answering KPI *"A13. Number of processes with teams of different stakeholders"*.

Figure 16. SQL query to return co-production processes with teams of different stakeholder types.

```
SELECT
  SUM(counted_coprods)
FROM
  (
    SELECT
      COUNT(DISTINCT coprod_id) AS counted_coprods
    FROM
      (
        SELECT
          DISTINCT coproductionprocess.id as coprod_id,
          team.id as team_id,
          team.type as team_type
        FROM
          coproduction.public.coproductionprocess,
          coproduction.public.team
          INNER JOIN coproduction.public.permission ON permission
              .coproductionprocess_id = coproductionprocess.id
          AND permission.team_id = team.id
        ORDER BY
          coproductionprocess.id
      )
    GROUP BY
      coprod_id
    HAVING
      COUNT(DISTINCT team_type)> 1
  )
```

1.3.5. Evaluation journey

The following figure shows the whole pilots evaluation process carried out. Departing from the alpha version of the platform, the pre-pilot execution subphase (see full details at chapter 2. Pre-pilot subphase evaluation) was executed, delivering the beta release of the solution. From the beta release the pilot execution subphase (see full details at Section 3. Pilot's execution subphase evaluation) was carried out delivering release 1 of the platform. As observed in Figure 17, different evaluation techniques have been applied with the collaboration of alpha (pre-pilot execution subphase) and beta (pilot execution subphase) testers to increasingly improve the INTERLINK co-production model and its associated supporting tools.

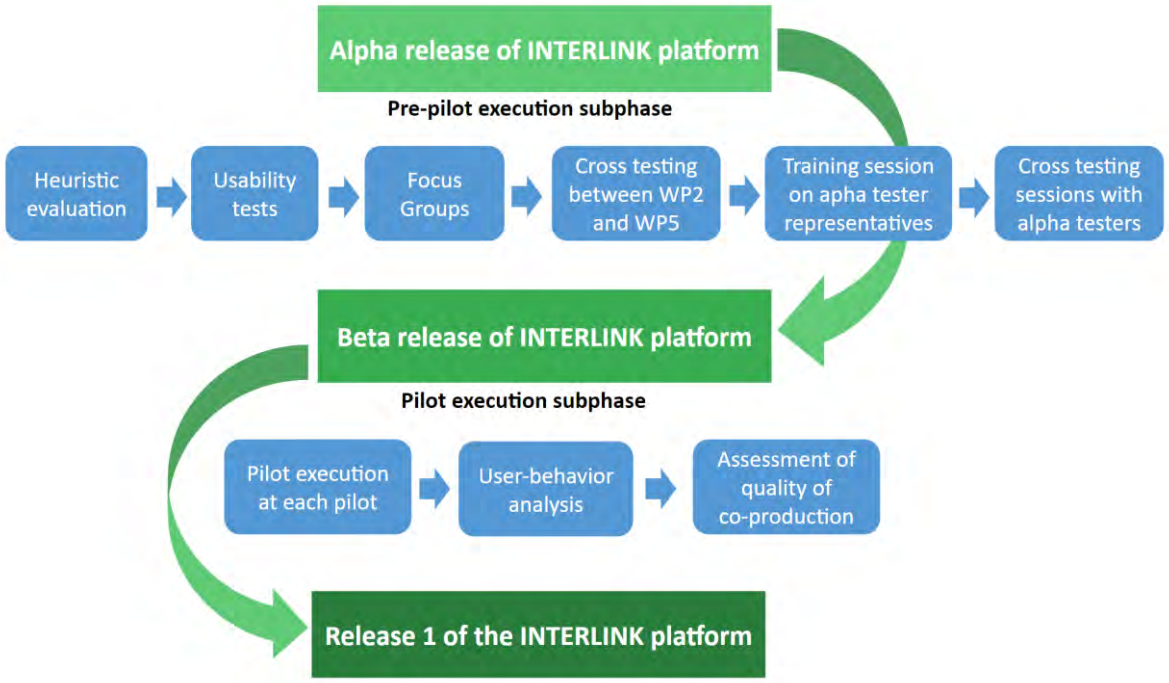

Figure 17. Evaluation process in INTERLINK's iteration 1.

Figure 18 shows the collaborative environment that was made available to alpha testers in April 2022 (see Appendix E – Collaborative Environment Alpha release for more details). Figure 19 shows how such collaborative environment evolved and was improved as result of the insights gathered during the pre-pilot execution subphase (see Appendix F – Collaborative Environment Beta release for more details). Finally, Figure 20 shows the final look and feel of the Collaborative Environment after the pilot execution phase was completed (see Appendix G – Collaborative Environment iteration 1 release for more details). Notice that higher resolution images are available at the commented annexes.

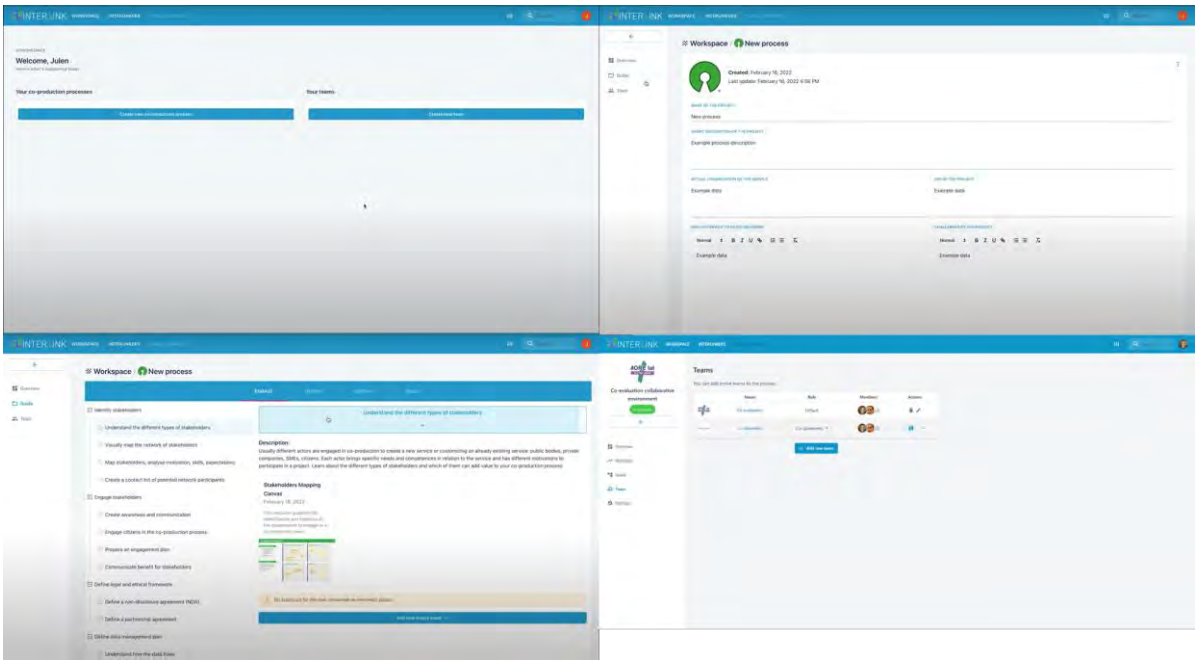

Figure 18. Collaborative Environment alpha release (April-May 2022).

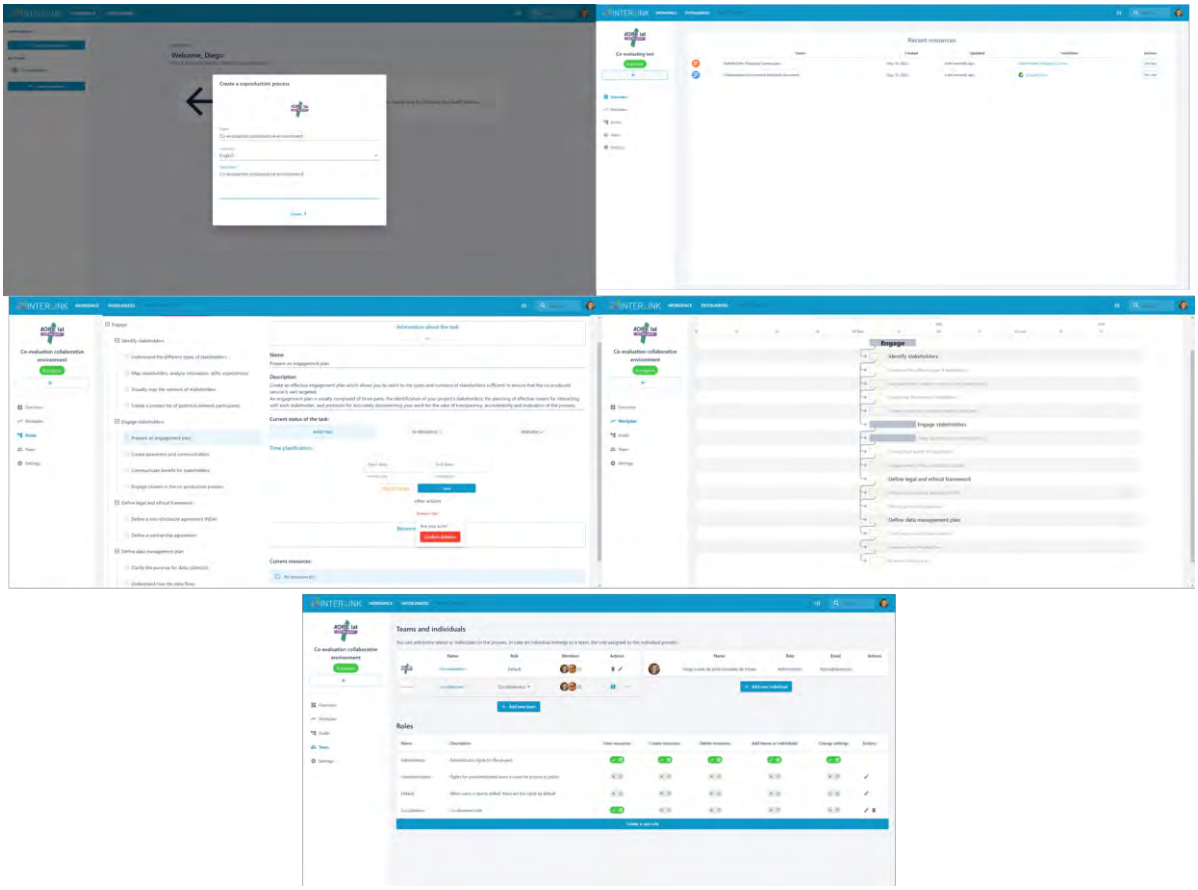

Figure 19. Collaborative Environment beta release (June-September 2022).

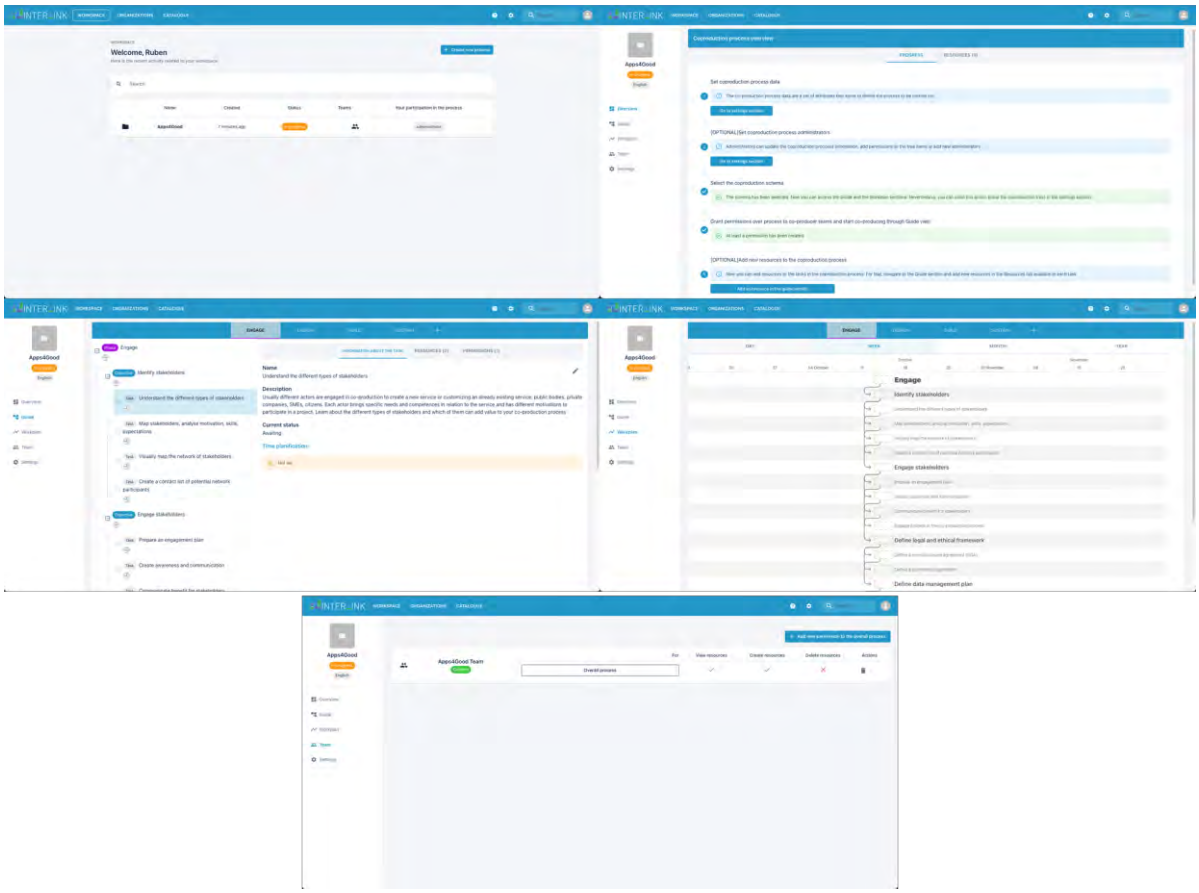

Figure 20. Collaborative Environment release towards end of iteration 1 (15th September 2022).

In chapters 2. Pre-pilot subphase evaluation (*formative* evaluation) and 3. Pilot's execution subphase evaluation (*summative* evaluation), we will detail how the evaluation of pilot iteration 1 has occurred, detailing the dimensions explored and the data collected at each subphase. Overall, in the pre-pilot execution subphase the emphasis was on usability and robustness, while in the execution sub-phase the focus was on understanding whether the co-production models integrated in the platform and the supporting tools provided by INTERLINK (INTERLINKERS) supported pilots to accomplish co-production processes successfully or not.

Table 3. Dimensions explored and data collection techniques used at pilot subphases

	PRE-PILOT SUBPHASE	PILOT EXECUTION SUBPHASE

DIMENSIONS EXPLORED	Usability User experience Product quality	User-based quality Value-based quality Satisfaction Trust Acceptance
DATA COLLECTIONS METHODS EXPLOITED	Data Logs Cognitive walkthrough Heuristic evaluation Alpha questionnaire Interviews	Data logs In-app questionnaire Online survey Think aloud methods Interviews

1.4. Pilot's operation and monitoring management

This section provides evidence about how the pilot execution operation and monitoring took place in the two planned subphases (see Figure 21). Notice the evaluation dimensions and data collection methods used during the operation of the pilots shown at Table 3.

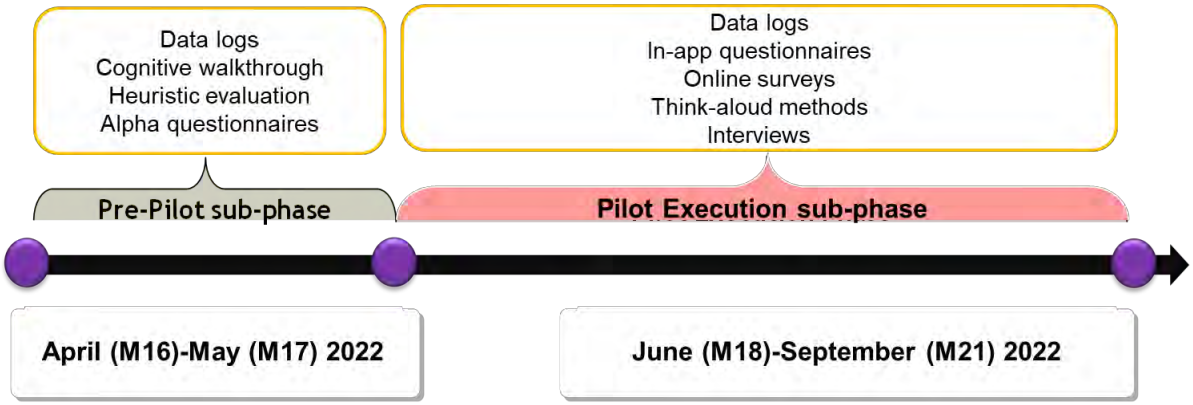

Figure 21. Evaluation process timeline

The two-fold pilot execution and evaluation were divided into:

1. **Pre-pilot subphase**, also known *alpha testing phase*, a controlled set of pilot participants (alpha testers) got access to a preliminary version of the Collaborative Environment and associated INTERLINKERs. This subphase served to refine the co-production supporting tools designed by INTERLINK and the evaluation mechanisms put in place, namely, questionnaires or logs. As result of this subphase pilots were ready to execute the actual execution of the pilot open to a wider audience, i.e., beta testers. The results of the operation of pre-pilot subphase are reported in detail in section 2. Pre-pilot subphase evaluation.

2. **Pilot execution subphase**, also known as *beta testing phase*, the pilots opened the execution of pilots openly. They have, thus, reached a wider audience. They made use of the refined version resulting from pre-pilot subphase. Importantly, as result of this phase, we pursued to assess the quality of the co-production process as we reported at 3. Pilot execution subphase evaluation.

The aim of the execution of this first iteration of INTERLINK's pilot (*Exploration stage*) has been two-fold:

1. Validate INTERLINK co-production approach innovation potential and adoption barriers.
2. Guide the choice of the mature and promising supporting technologies and tools.

1.4.1. Evidence of cross-pilot execution arrangements

The following generic arrangements have been performed and materials prepared on a project wide perspective.

1. **Pre-pilot launch subphase (M16, April 2022) – Milestone 1. Pre-pilot launch subphase (M16 - April 2022).** Communication actions were prepared and executed. Knowledge and software INTERLINKERs were uploaded into INTERLINK catalogue where they have been made publicly available across pilot iteration 1. Alpha testers were identified and informed. Technical Support was launched, mediated by Redmine tool (see Figure 22) for within consortium communication. KPIs identified in D5.1 were carefully reviewed, and if needed updated, per pilot site. INTERLINK framework components and INTERLINKERs logs were specified. The steps carried out during this stage were:
   a. **Internal release**. Alpha version of Collaborative Environment and INTERLINKERs was released, with associated documentation and user acceptance testing script (see Appendix E – Collaborative Environment Alpha release for more details). The resulting co-produced INTERLINKERs were uploaded into INTERLINK catalogue (see INTERLINK's public catalogue for more details). This activity took place at the very beginning of M16, i.e. April 2022.
   b. **Communication**. Several activities were carried out before M16 and during the whole pre-pilot launch sub-phase to enhance awareness of INTERLINK among its stakeholders. In this subphase alpha testers, i.e. a controlled and reduced set of users were recruited at each pilot site.

      These communication activities made use email, videoconference aided and physical meetings to provide the following information to pilot participants:

      - Presentation of the INTERLINK project and its objectives.
      - Presentation of the Use Case and goals.

- Introduction to the activities they're going to be involved in.
- Explanation of the participation benefits.
- Detailed program of the "next steps".
- Link to the INTERLINK platform.

These communication actions took place BEFORE and DURING the pre-pilot execution. The goal was to ensure that a sufficient number of alpha testers was ready to receive training and then perform alpha testing in M17. Besides, diverse communication actions, channels and contents were developed to prepare for external release of the INTERLINK platform by M18, i.e. June 2022.

Test users were informed about trial privacy procedures and policies. All test users had to accept the INTERLINK terms of use before accessing the INTERLINK ecosystem tools. Those users who collaborated for assessing the ecosystem also had to sign a consent form after careful read of an information sheet (see Figure 23) informing about the purpose of INTERLINK and the data collected in its activities and by its tools. In addition, anonymized information on customer feedback provided by the INTERLINK system was made available to project partners for research purposes by means of the alpha testing scripts and activity satisfaction and demographic questionnaires used in this subphase.

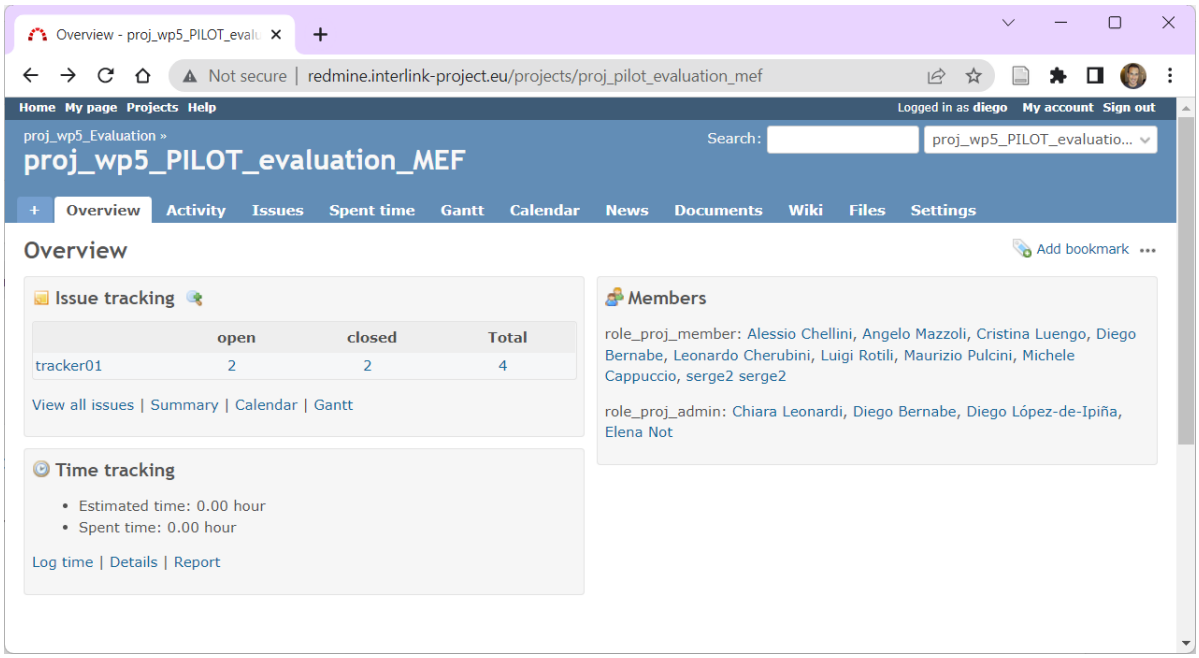

Figure 22. Redmine front-end used by pilot participants to manage issues.

INTERLINK

INTERLINK Informed Consent Form

Project: "INTERLINK: Innovating goverNment and ciTizen co-dEliveRy for the digitaL sINgle marKet"

1	I am 18 years or older and I am competent to provide consent.
2	I confirm that I have read and understand the INTERLINK information sheet explaining the above research project. I have been fully informed about the aims and purposes of the Project INTERLINK. I have had the opportunity to ask questions and/or read FAQs about the project.
3	I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without there being any negative consequences.
4	I understand that I have the right of data portability, i.e. the right for people not just to obtain and reuse their data, but also to transmit the data they have provided to another service provider.
5	I understand that my data will be kept strictly confidential. I give permission for members of the research team to have access to my personal information. I consent to photographs and videos being taken of the engagement sessions. Information may be shared between any of the other researcher(s) and partners participating in this project. I understand that my name will not be linked with the research materials, and I will not be identified or identifiable in the publications that result from the research. I have no objection that my data is published in a way that does not reveal my identity, without my explicit consent. The researcher(s) will ensure to preserve my anonymity.
6	I understand that, subject to the constraints above, no recordings will be replayed in any public forum or made available to any audience other than the INTERLINK research team.
7	I agree to take part in the above research project.
8	I have received a copy of this agreement.

I do hereby agree and give my consent for the treatment of my personal data within the INTERLINK project.

☐

_____	_____	_____
Name of Participant	Date	Signature
_____	_____	_____
Lead Researcher	Date	Signature

INTERLINK - 959201
Informed consent form
Page 1 of 1

Figure 23. Information consent form INTERLINK.

2. **Pre-pilot launch subphase (M17, May 2022) – Milestone 2. Pre-pilot launch subphase (M17 - May 2022).** Training actions (see 2.6. Training sessions with alpha testers (MEF, VARAM, ZGZ) to target alpha tester groups were executed. Alpha testers started using the tools available in the INTERLINK ecosystem. Measuring and corrective actions were undertaken to ensure a successful trial execution, as shown in the evolution of the Collaborative Environment from alpha (see Appendix E – Collaborative Environment Alpha release) to beta release (see Appendix F – Collaborative Environment Beta release).
   a. **Training**. A physical and/or an online workshop was organized to illustrate what INTERLINK is about, how co-production can enhance e-government practices and how INTERLINK tools and powered public services can be leveraged by civil servants, companies and citizens. The presentation used to inform the Advisory Board on 2nd March 2022, was then used to inform and train about INTERLINK and its supporting tools across pilots. Thus, INTERLINK platform components, the collaborative environment and knowledge and technology enablers were showcased to all alpha users through several workshops, walking them through the tools in case that it was needed, and providing them with basic information about how problems could be resolved using the helpdesk. Test users were also informed about the planned pilot duration and subsequent surveys. Actual trainings carried out per pilot are reported at 2.6. Training sessions with alpha testers (MEF, VARAM, ZGZ).
   b. **Support**. Technical, methodological, and ethical support was provided to alpha testers to guarantee the highest possible adoption and acceptance of INTERLINK. Support requests were used to enhance user documentation and refine the tools supporting co-production offered to users. It was assured that the trial support team received appropriate training and had access to technical documentation and that basic problem resolving procedures have been explained and are in place. Technical issues were reported to consortium members by the different technical mechanisms and support tools provided by the project, namely, a support web form and a dedicated instance of the Redmine tool (see screenshot at Figure 22). The provided links to these two support mechanisms allow the reader to find more details. Besides a feedback web form (see Figure 24) was made available to enable alpha testers in this subphase and beta testers in the following subphase to provide enhancement suggestions. Such questionnaires were devised to adjust to the corresponding pilot site language.
   c. **Measuring & monitoring**. Alpha testers were provided with guidelines regarding usage scenarios that they need to explore with INTERLINK tools. Internal pre-testing (face-to-face cross-testing session), including INTERLINK project members and a set of alpha testers (5 to 10 people) from each pilot, were performed of the INTERLINK ecosystem – the whole functionality required for the Pilots Iteration I. Details about the concrete activities carried out are given in sections 2.7. Cross testing sessions with alpha testers (MEF,

VARAM, ZGZ). During users' testing logs were generated. Besides, after the testing they were requested to fill in a alpha script questionnaire (see Figure 24). Logs collected and questionnaires received were analysed to verify whether the pilot data capture needs to ensure good validation were achieved. This is, we made sure that with the gathered data we could answer to the project's KPIs (see Appendix A – KPIs for pilots' evaluation and also respond to the project's evaluation dimensions, described in 1.3.2. Evaluation dimensions and constructs). These activities contributed to the pre-testing of the logging functionality and the tools to be used for collecting and gathering end-users' feedback.

d. **External release**. All testing activities performed by alpha testers were scheduled to conclude by mid of M17 so that the second half of May 2022 was used to correct possible mistakes in INTERLINK platform and co-produced services. As a result, an external release of the INTERLINK platform, INTERLINKERs and other needed services was produced on 4th May 2022, as indicated by the interlink project repo tag v1.0.0. Some snapshots of the beta release of Collaborative Environment produced considering the feedback received during pre-pilot execution subphase can be encountered at Appendix F – Collaborative Environment Beta release.

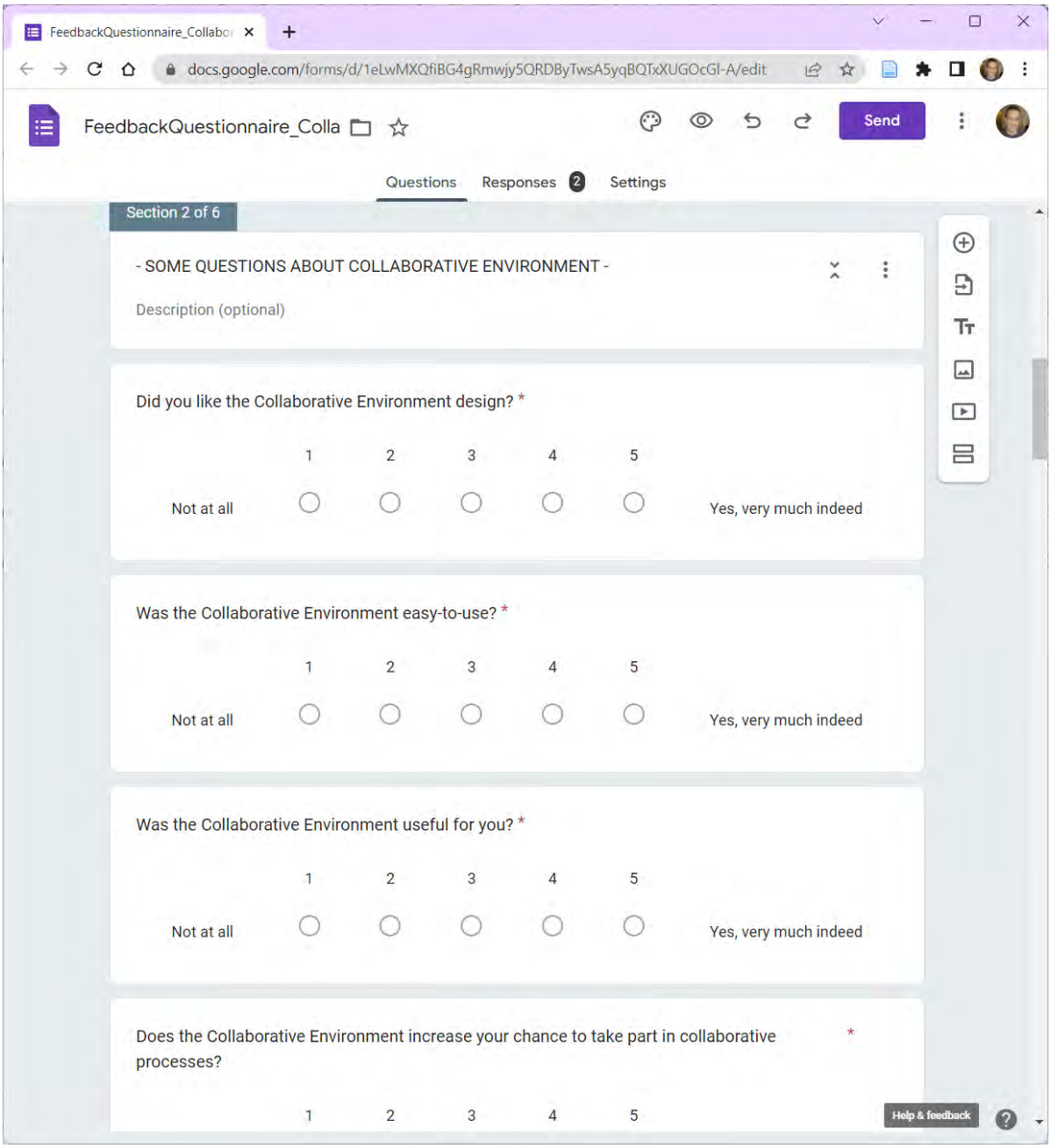

Figure 24. Feedback (in app) questionnaire designed for the Collaborative Environment.

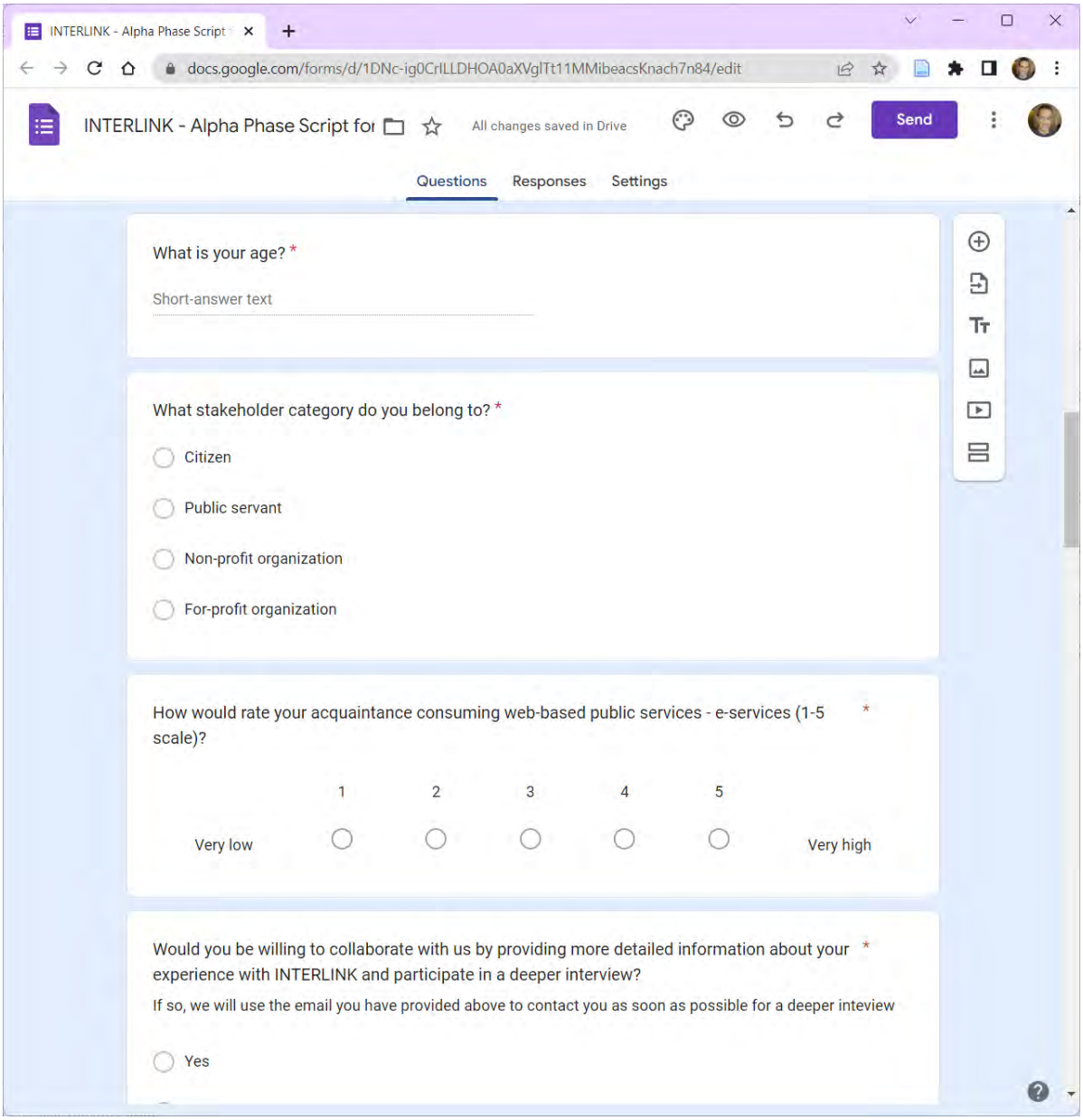

Figure 25. Alpha script questionnaire filled in by alpha testers after pre-evaluation subphase's activities.

3. **Pilot execution sub-phase (M18-M21 - June-September 2022 – Milestone 3. Pilot execution subphase (M18-M21 - June-September 2022).** Intensive communication campaigns were addressed to target groups (beta testers) of the trials. Iteratively the communication, support, execution, monitoring, evaluation, and reaction steps of the trial executions were undertaken. Monthly check meetings and evaluations' measurements were undertaken, and corrective actions taken in case there was a need, e.g., update of a given tool to address a common reported issue. Regularly and according to the engagement plan of D5.2

"Community building and preliminary use-cases activities" [2], communication actions were undertaken.

a. **Communication**. Communication campaigns for engaging civil servants, end-users and ensuring the participation of citizens and other local stakeholders was critical for a successful evaluation of INTERLINK potential. Iterative communication activities were arranged to ensure build-up of the pilot's community.
b. **Support**. Basic problem resolving procedures were tackled as described in D5.1's section "1.4. Help Desk: problem resolving approach and support mechanism".
c. **Execution**. Activities were organized to encourage contribution from different civil servants and citizens. For instance, workshop with public servants, gamified sessions were moderated to intensify the usage of the INTERLINK co-production model and assets.
d. **Monitoring**. Pilot owner progress was analysed in the pilots by reviewing associated quantitative and qualitative measures".
e. **Evaluation**. Assessment of pilot objectives was performed halfway and at the end of the piloting stage. The idea was to ensure that positive progress of the pilot evaluation was checked with time to react.
f. **Reaction**. When as result of the monitoring or intermediary evaluation issues were detected, the corresponding pilot owner in collaboration with the pilot task force undertook further actions to ensure that eventually the pilot's objectives were met. For instance, the organization of additional workshops with civil servants to ensure further service description enhancement suggestions are received.

The contents of chapter 3. Pilot execution subphase evaluation described in detail the different activities belonging to the types above listed, carried out during pilot execution subphase spanning from June to September 2022.

1.4.2. Engagement strategy applied

Motivated by principles of the IAP2 Public Participation Spectrum [12] and based on our previous experience in the WeLive project [13] where a co-creation methodology was created, INTERLINK came up with the following categorization of community building activities suitable for the INTERLINK objectives. These are the different types of activities that can be carried out to attain the participation objective:

1. **INFORM ME**: creates awareness using traditional communication methods and channels.
2. **GUIDE ME**: assists end-user stakeholders and gives them guidance for how to use the INTERLINK platform.

3. **CONSULT ME**: obtains end-user stakeholders' feedback on the INTERLINK platform and associated co-production process.
4. **WORK WITH ME**: considers end-user stakeholders' concerns and aspirations on the INTERLINK platform and associated co-production process, as well as end-user stakeholders' participation within the co-production process enabled by the INTERLINK. For that, the objective is not only to involve users but also to empower them with co-production support tools and guidelines.

All pilots were requested to elaborate a planning both for engagement activities and pilot execution which were detailed in D5.2. Community Building and Preliminary Use-Cases Activities [2]. As a reminder, Figure 26 shows the timeline of community building and engagement activities of the VARAM use-case. As already mentioned, chapters 2. Pre-pilot subphase evaluation and 3. Pilot execution subphase evaluation describe each stage and activity in more detail. This chapter finishes by reminding what kind of engagement activities plans each pilot was requested to realize before the start of piloting.

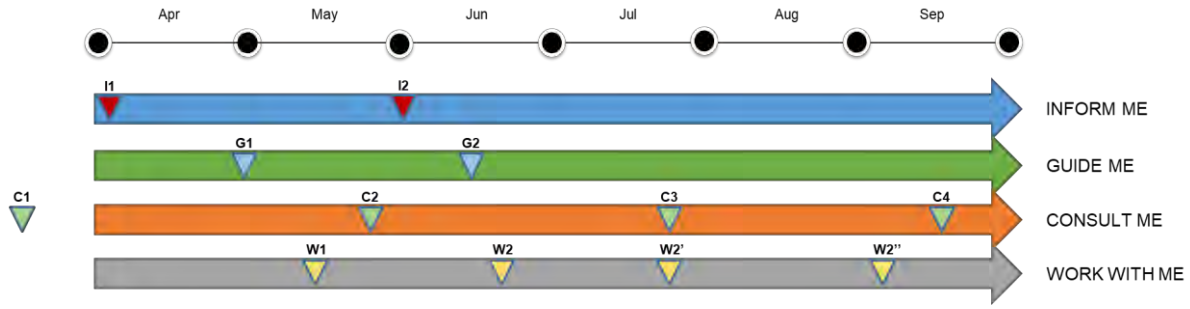

Figure 26. Community Building Plan for VARAM

On the other hand, Figure 27 shows the activities planned by MEF for the two sub-phases of pilot iteration 1. Notice that through the activities' ID the time when each activity is scheduled can be traced in the Gantt chart (Figure 27).

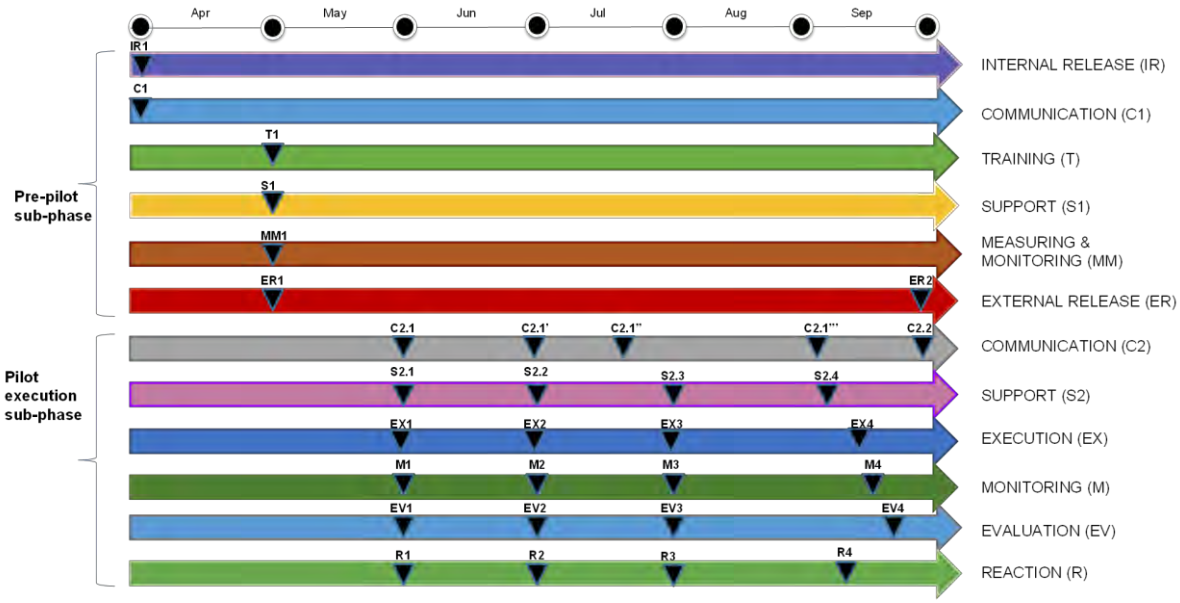

Figure 27. Gantt detailing workplan of MEF pilot from April to September 2022.

2 Pre-pilot subphase evaluation

This section describes the evaluation activities that were carried out immediately before or during the pre-pilot subphase of the first iteration of use case pilots with the first prototype of the INTERLINK Collaborative Environment in alpha mode. Next, some snapshots of the first version of the project can be seen.

This section, as shown in Figure 28, describes in particular (i) the results of a Heuristic Evaluation session that was performed in May 2022 on the first stable version of the Collaborative Environment prototype, (ii) the preparation of the protocols and the execution of the controlled usability tests performed with pilot owners and other representatives of end-users during the pre-pilot phase (alpha tests), in May 2022, (iii) the methods and results of the evaluation of the co-production concepts featured by the first prototype of the Collaborative Environment, (iv) the results of the training sessions with representatives of each pilot site and (v) the actual cross-testing, i.e. mixing within consortium partner members with pilots' alpha testers, carried out at each pilot site. This sequential process enabled us to improve the co-production tools devised by INTERLINK. As result of it, departing from the alpha release of INTERLINK

platform[5] (see Appendix E – Collaborative Environment Alpha release), its beta release[6] was produced (see Appendix F – Collaborative Environment Beta release).

Figure 28. Evaluation process followed in pre-pilot subphase within iteration 1.

2.1. Approach followed in evaluation of pre-pilot subphase

Table 4 summarises the activities that were arranged during the pre-pilot execution subphase. Notice that it includes activities that are generic, i.e., cross-pilot, and those that are specific to a given pilot, during pilot iteration 1's pre-pilot subphase.

Table 4. Summary of activities carried out during pre-pilot execution subphase

TYPE	DATE	ORGANIZER	PURPOSE	PARTICIPANTS (number & stakeholders)
Cross pilot Heuristic evaluation	5 April 2022	FBK	Test the user interface against the 10 usability heuristics of Nielsen	3 experienced usability experts from FBK
Cross pilot Usability testing	31 May 2022	FBK	Usability testing with pilot owners	6 representatives of pilot owners (2 per pilot MEF, VARAM, ZGZ) 6 technical partners (3 from FBK, 3 from DEUSTO)
Cross pilot Alpha test of co-production concepts	29 April 2022	Deusto & RU	Contrast RU devised INTERLINK co-production model with Deusto's implementation of Collaborative environment	6 representatives (3 from RU and 3 from DEUSTO)
Cross pilot Focus groups	1 June 2022	RU	Investigation of the story of the co-production initiative, validation and	5 representatives of pilot owners (2 for MEF, 1 for VARAM, 2 for ZGZ)

[5] Alpha release of INTERLINK platform stored in Github repository at this link (v1.0.0).
[6] Beta release of INTERLINK platform stored in Github repository at this link (v1.0.14).

			refinement of the Preliminary Governance model (project start and engagement), investigation of the inhibiting and promoting factors encountered (or expected) in the co-production process, regarding the actors involved, the institutional framework and the technology	3 governance researchers from RU 2 HCI researchers from FBK
In-depth interviews	June & July 2022	RU	Investigation of conceptions of digital collaboration, perceptions on its quality, and the influencing institutional, actor-centred and technological factors	4 representatives of pilot owners (VARAM), 1 governance researcher from RU
Training sessions	27/04/2022	MEF	Showcase Collaborative Environment to whole team	3 members from Deusto, 2 from FBK and 6 from MEF
Training sessions	02/05/2022	VARAM	Showcase Collaborative Environment & Augmenter/Servicepedia + preparation of cross-testing	3 members from DEUSTO team and 2 members from VARAM
Training sessions	29/04/2022	ZGZ	Showcase Collaborative Environment	3 members from DEUSTO team and 2 members from ZGZ
Cross-testing session	23-25/05/2022	MEF	Usability testing with enlarged group of end-users	4 representatives of MEF team and 5 representatives from other MEF departments 1 researcher from FBK 1 researcher from DEUSTO
Cross-testing session	06/05/2022	VARAM	Comparison of Collaborative Environment vs Servicepedia, and of generic co-production trees vs pilot specific co-production trees	7 civil servants from VARAM 3 representatives from DEUSTO

Cross-testing session	23/05/2022	ZGZ	User acceptability script executed in session with alpha testers	2 members from DEUSTO team 6 representatives from ZGA

The following sections describe in detail each of the activities summarized in Table 4. Notice that all activities within the prefix "*Cross-pilot*" have been organized for all the pilots simultaneously whilst the other activities correspond to specific sessions between consortium's technical partners and either with the pilots or Radboud university. In all activities, technical support was provided either by DEUSTO, CNS, TREE TK and/or FBK team

2.2. Heuristic Evaluation of the Collaborative Environment prototype v1

After the release of the first stable prototype (milestone at M16, April 2022) an expert usability testing was performed in May 2022 to identify, in a systematic way, pending interaction issues that might impact on the user experience, before the system is further tested by end-users. The issues that were identified were grouped according to the section of the interface where they appeared and were assigned a priority for their fixing. The Heuristic Evaluation methodology was applied, as explained below.

2.2.1. The Heuristic Evaluation method

Heuristic Evaluation of a user interface is a process in which experts in user interface design and development independently use the interface and identify possible interaction problems according to certain rules of thumb (heuristics) that characterise the usability of the system. Research studies on the usability of user interfaces of digital systems have demonstrated that several usability experts ranging from 3to 5 is able to discover from 60 to 75% of usability problems.

Heuristic evaluation is not just about testing that the implemented functionalities work (i.e., there are no bugs) or that initial requirements have been satisfied (e.g., everything has been implemented). In performing the test, usability experts maintain the perspective of the end-user and try to understand which elements could confuse them, favour errors or unnecessary complex interactions, demand heavy cognitive load, require further help and guidance.

The heuristics proposed in [14] and further refined and consolidated in [15] have become a de facto standard for the evaluation of user graphical interfaces. Here below we list the well-known 10 evaluation criteria that were used also in INTERLINK (credits to the NNGroup https://www.nngroup.com/articles/ten-usability-heuristics/).

#1 Visibility of system status	The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.
#2 Match between system and the real world	The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.
#3 User control and freedom	Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.
#4 Consistency and standards	Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.
#5 Error prevention	Even better than good error messages is a careful design which prevents a problem from occurring in the first place. Either eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action.
#6 Recognition rather than recall	Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.
#7 Flexibility and efficiency of use	Accelerators — unseen by the novice user — may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.
#8 Aesthetic and minimalist design	Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.
#9 Help users recognize, diagnose, and recover from errors	Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.
#10 Help and documentation	Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.

2.2.2. Results

A Heuristic Evaluation of the first prototype of the INTERLINK Collaborative Environment was organised on the 5th of May 2022. Three usability experts from FBK gathered in the same room, agreed on the version of the system to test (staging environment, with preselected English language, on Windows operating system) and performed a two-hour extensive test of the interface functionalities. The experts worked independently but consulted with each other in case there was any doubt on how to record or classify the found issues. A schema for issues description was agreed in advance. The following information was collected for each identified problem:

- Section of the interface where the usability issue occurred
- Task that the user was trying to accomplish
- Subject, i.e. a very brief description of the problem
- Detailed description of the problem, with sufficient information for designers and developers to understand what happens during the user interaction with the system
- Usability heuristic which was violated
- Severity of the problem, which corresponds to the priority with which the issue should be fixed

In total, **79 usability problems were found by the three experts**. An initial analysis was performed to merge similar items, which led to a consolidated list of 70 usability problems.

By grouping problems according to the usability heuristic, they violate, as shown in Figure 29, it was observed that most often problems are related to:

- weak consistency of terms and interaction across the platform and the compliance to standard behaviour in user interfaces (heuristic #4, 20% of the total number of issues), like for example the lack of a functionality for deleting a co-production project created by users;
- insufficient visibility of the system status (heuristic #1, 17%), like the lack of notification to people who have been added to a co-production work group;
- the difficulty for the user to remember or recognize the functioning of interface elements (heuristic #6, 16%), like the lack of introductory content that explains what the catalogue of INTERLINKERs is and what the user can do in that interface section;
- some technical terms that may not be familiar to end-users (heuristic #2, 14%), like the presence of a button named "Go to dashboard".

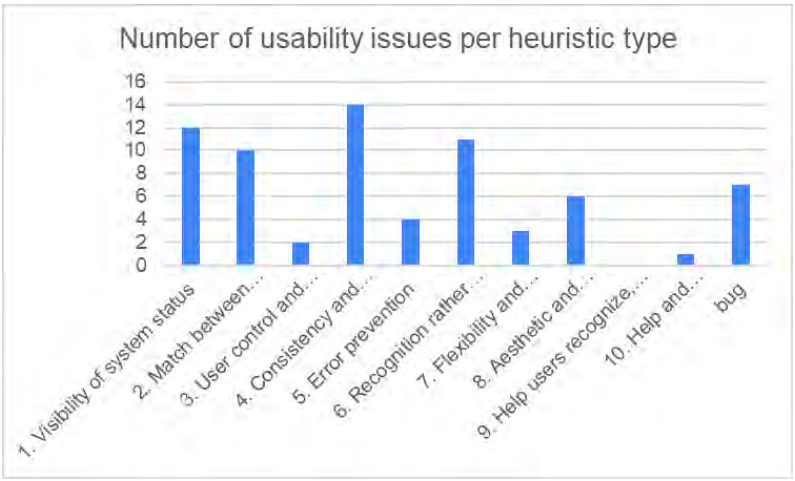

Figure 29. Number of usability issues found during the Heuristic Evaluation segmented by type of the heuristic they violate.

However, not all the issues were considered critical at the same level of severity for the user experience, as summarised in Table 5. For example, numerous usability problems under heuristics #4 related to consistency and standards do not impact heavily on the user's cognitive load. At the opposite, heuristics #1, #2, #5 and #6 helped identify more severe problems, that may make the user struggle in trying to understand what the system is doing (#1), the meaning of words (#2), how to avoid errors (#5), how interface elements work (#6).

Table 5. Number of usability issues segmented by heuristic and severity level.

	LOW	MEDIUM	HIGH	Total
1. Visibility of system status	3	6	3	12
2. Match between system and the real world	3	4	3	10
3. User control and freedom	1	1		2
4. Consistency and standards	9	3	2	14
5. Error prevention			4	4
6. Recognition rather than recall	3	6	2	11
7. Flexibility and efficiency of use	2	1		3
8. Aesthetic and minimalist design	5	1		6
9. Help users recognize, diagnose, and recover from errors				0
10. Help and documentation			1	1
bug	2	2	3	7
Total	**28**	**24**	**18**	**70**

Usability issues concentrated particularly in the area of the interface where guidance on the exploration of the co-production tree is provided (28% of the total number of issues) and in the navigation of the INTERLINKERs catalogue (21%), as summarised in Figure 30. The low number of issues discovered in the Workplan section of the interface is partly motivated by the fact that, during this cycle of heuristic evaluation, the Workplan functionality was not tested extensively. In fact, this aspect was meant to be further investigated with end-users in a dedicated formative evaluation focus group.

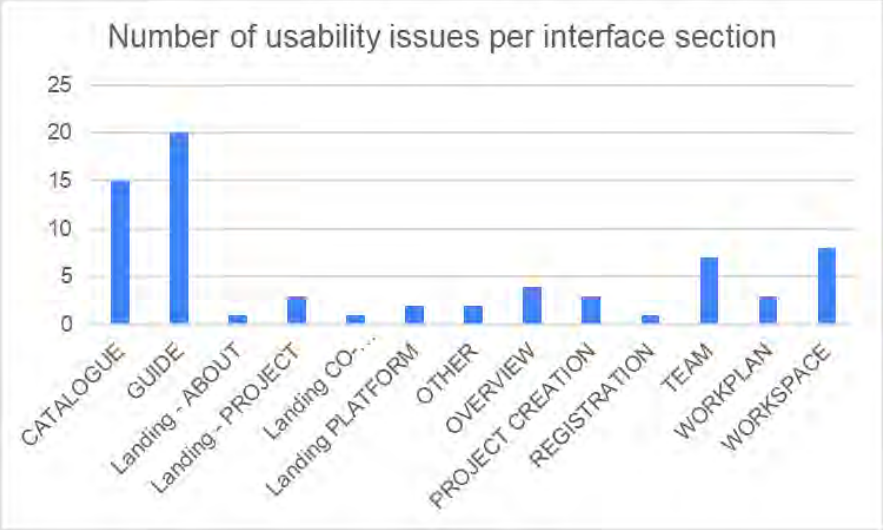

Figure 30. Number of usability issues found during the Heuristic Evaluation,segmented by section of the Collaborative Environment interface where they occurred.

About half of the problems found in the INTERLINKERs catalogue and in the GUIDE section of the interface have been considered severe at a medium to high level. Within the section where users can manage their personal workspace and the work teams, a lower number of issues was found but almost all of them should be addressed carefully with priority (Table 6).

Table 6. Number of usability issues segmented by interface section and severity level.

	LOW	MEDIUM	HIGH	Total
CATALOGUE	7	4	4	15
GUIDE	9	8	3	20
Landing - ABOUT	1			1
Landing - PROJECT	1	1	1	3
Landing CO-PRODUCTION	1			1
Landing PLATFORM	1	1		2
OTHER		2		2
OVERVIEW	2	2		4
PROJECT CREATION	2		1	3
REGISTRATION	1			1
TEAM	2	2	3	7
WORKPLAN		1	2	3
WORKSPACE	1	3	4	8
Total	**28**	**24**	**18**	**70**

SECTION	TASK (what the user aimed to do)	SUBJECT (brief description of problem)	DETAILED DESCRIPTION OF PROBLEM	HEURISTIC VIOLATED	SEVERITY (will correspond to priority in Redmine)
Landing - PROJECT	initial browsing of portal	The button the user sees "GO to dashboard" is not clear	The users have no idea of what the dashboard is, and this it the first thing they see. This is almost the only point from which to access the personal space.A different term should be used and a description should be added to explain what the user will find	2. Match between system and the real world	prio_HIGH
Landing - PROJECT	initial browsing of portal	Link to "Platform" section	The second section "Are you a Public Administration, a company ..." should have a button that directs the user to the "Platform" section	6. Recognition rather than recall	prio_medium
Landing - PROJECT	go to dashboard	what is a dashboard?	it is not clear why an anonymous user should click on "dasboard"	2. Match between system and the real world	prio_low
Landing PLATFORM	initial browsing of portal	Button "Go to the dashboard"	The button "Go to the platform" should be available in the "Platform" section too (otherwise the user should go back to the home)	6. Recognition rather than recall	prio_medium
Landing CO-PRODUCTI	initial browsing of portal	Missing figure of the process- "co-deliver"	The figure related to the "co-deliver" phase is not present	6. Recognition rather than recall	prio_low
Landing PLATFORM	download the platform manual	Platform manual download	download of manual in platform section does not work (no dowload starts)	bug	prio_low
Landing - ABOUT	exploring the About section	Pilot brochures are not directly downloadable	The button to download the brochure of one pilot redirects to a Google Drive	4. Consistency and standards	prio_low
REGISTRATION	request form in different language	the request form is in "default language"	I have all setting in english but request form is in italian	4. Consistency and standards	prio_low
CATALOGUE	first exploration of the catalogue. from home page (no registered user)	The catague does not have an explanation of what it is and how to use it	The user who first accesses the catalogue (from the public pages) has no idea of what it collects and what they can do with the available resources.	10. Help and documentation OTHER	prio_HIGH

Figure 31. Heuristic analysis results' spreadsheet.

At the end of the Heuristic Evaluation, the list of prioritised usability issues was reviewed by the development team, who devised proper design or implementation solutions to solve the issues. The outcomes of the usability study and its reaction by performing changes to the Collaborative Environment were gathered at the following table.

2.3. Alpha usability tests with pilot owners

Usability Testing is a method for evaluating a product or service by testing it with representative users. Through Usability testing it is possible to: i) identify problems in the design of the product or service, ii) discover opportunities to improve the designed solution, iii) learn about the target user's behaviour with ICT. Usually during a test, participants try to complete a list of tasks following a scenario, while observers watch, listen, and take notes.

2.3.1. Methods of the alpha tests in Bologna

A workshop was organised during the INTERLINK Plenary Meeting in Bologna (31 May-1st June 2022) to engage Pilots representatives in the testing activities of the Collaborative Environment as part of the pre-pilot activities involving Alpha testers.

The goal was to identify any usability problems, collect data and determine the participant's satisfaction with the product in order to improve it.

The whole testing session lasted approximately 90 minutes and included both plenary and individual activities. Overall, 6 participants took part in the usability testing, two representatives for each of the pilots.

The structure of the working session was the following:

INTRODUCTION. The goal and the method used were explained to participants. Consent forms were distributed and signed by participants.

INDIVIDUAL TESTING. Six parallel sessions were organised to collect focused and structured feedback. In each session a moderator/note-keeper followed the "Usability Testing Guidelines" INTERLINKER (available from the platform catalogue[7]) to perform the test with a pilot representative. A set of more operative instructions and materials to support the activities were also circulated in advance by FBK to all moderators[8].

During the session, participants were asked to perform a number of tasks using the Collaborative Environment on their PC[9]. During the completion of the tasks, participants were asked to "think-aloud" while interacting with the Collaborative Workspace. This gave the opportunity to understand the participant's cognitive processes. If the participant struggled to verbalise, the moderator could encourage him/her to express his/her doubts and feelings. The sessions were audio recorded and notes were taken by the moderator in a shared file for further comparison and analysis. At the end of each task, the note-keeper asked the participant to rate the perceived difficulty in completing the task (Question: How easy or difficult did you find this task? Ask the user to rate it on a 7-point Likert scale: (1= very easy – 7= very difficult).

BRAINSTORMING. A final collective reflection was organised to share the main issues encountered by testers and collect more general impressions about the Collaborative Environment. The following questions were identified to trigger reflection and promote discussion among partners, based on their opinions:

1. Which are the strong points of the INTERLINK Collaborative Environment?
2. Which are the major weak aspects?
3. What would you like to add to the system?
4. What views of the collaborative environment you find most useful?
5. Can you imagine yourself using the system in your daily work?

[7] "Usability Testing Guidelines" Knowledge INTERLINKER, INTERLINK H2020 Project, #959201, publicly available from the system platform from this link.

[8] "Usability Test Instructions, Bologna | Alpha testing - May 2022" Internal Report, INTERLINK H2020 Project, #959201. Available internally to the consortium from this link.

[9] "Usability Test. Suggested list of tasks, Test of the Collaborative Environment, May 2022" Internal Report, INTERLINK H2020 Project, #959201. Available internally to the consortium from this link.

The questions were printed on separate sheets and hung on the wall. Participants were asked to elicit their opinion both verbally and writing on post-it notes, in order to collect feedback from all the 6 participants.

Figure 32. Brainstorming session during usability testing in Bologna

2.3.2. Results

Results from the individual testing sessions

Individual testing results highlighted a number of usability issues regarding specific sections of the interface. Looking at the scores related to "Task completion" (the average of scores given by the note-keepers in relation to the observed difficulty of the testers to perform the tasks) and the scores related to "Perceived difficulty " (the average of scores given by testers themselves in relation to the difficulty to perform a

specific task), they both suggest that the most critical issues are related to the following functionalities (see scores in Table 3):

1. Team creation,
2. Schema selection,
3. Knowledge and Software INTERLINKERs exploration and usage,
4. Project description editing.

Table 7. Usability issues scores related to 1) Task completion (scores given by the note-keeper-observers) and 2) Perceived difficulty (scored assigned by the testers)

TASKS	TASK COMPLETION (Scores: 1=completed without struggle – 5=not completed, a lot of struggle)	PERCEIVED DIFFICULTY (Scores: 1= very easy -- 7= very difficult)
1. Landing page exploration	1.5	1.8
2. Registration	1.6	2
3. Project creation	1.5	1.8
4. Team creation	3	3.5
5. Schema selection	3	2.8
6. Knowledge INTERLINKERs explorations, usage	3.3	3
7. Co-production INTERLINKERs explorations, usage	2	2.4
8. Software INTERLINKERs explorations and usage	2.6	2
9. Project description editing	2.3	3.5
10. Catalogue exploration	1	1.3

We summarise in the following the main issues encountered considering the tasks with higher scores in terms of observed and perceived difficulty, that are: team creation, schema selection, knowledge and co-production INTERLINKERs' usage.

The insights coming from this activity set the ground for the improvement of the Collaborative Environment used for the Pilot Iteration 1.

Team creation. The procedure to create a team and to assign different roles was considered quite complex because of the lack of feedback (e.g. notifications and communication to invited users are not available) and lack of visibility of the system status (e.g. the relevant information related to users, roles and teams are not available

in a dedicated space). Besides, the two options provided by the system to add members to a process ("add individual" and "add an individual to a team") were not totally clear for testers that did not understand the action triggered by the two options provided by the system.

Schema selection. In the tested version of the system, users could select different schemas associated with different types of co-production processes (e.g. default schema, etc). This decision impacts on the type of guidance that the user receives throughout the co-production process (through the "Guide" functionality) and on the work plan. These dependencies were not clear for the user and the vocabulary used to support users in selecting the most appropriate schema was considered not clear. Some testers got lost during this activity and could not understand how to progress in the activity. Since the selection of a given schema will impact on the whole experience within the Collaborative Environment, more guidance is needed to support users in setting and managing the most appropriate Schema. Finally, testers asked for procedures to recover from errors (e.g. wrong selection of a schema) and to change the schema (e.g. after an initial testing phase of the schema, users could decide to change the schema).

Knowledge INTERLINKERs explorations and usage. Testers reported some issues in navigating in the co-production three in order to find the correct task. After the selection of the schema and of the team, users couldn't understand how to proceed in the navigation of the system. Some of them misunderstood, for instance, the role of the Overview section and expected to find there the resources needed to carry out a co-production process. Other issues were reported once the user accessed the tree that provided guidance and resources for conducting co-production. A user, for instance, expected to find information on how to create a network of stakeholders before the selection of a schema, because this is often a collaborative task. Concerning the Knowledge INTERLINKERs suggested by the system, users complained about the fact that too many INTERLINKERs are suggested for each task. They suggested to better select the resources to present to the users or to have more guidance in order to select the most appropriate INTERLINKERs (e.g. number of stars to communicate the degree of coherence between the Task selected (e.g. Stakeholders mapping) and the Knowledge INTERLINKERs associated (e.g. Stakeholders mapping canvas).

Co-production INTERLINKERs explorations and usage. Co-production INTERLINKERs are transversal collaborative resources associated to all the nodes of the co-production tree (e.g. creation of documents, surveys, discussions, etc.). These resources are crucial to engage in collaborative activities yet they were considered a little hidden in the interface. Several testers could not easily understand how to find these resources

and needed support to find the button to activate them. Some minor errors were also found in relation to each single co-production INTERLINKER activated.

Results from the brainstorming session

After the usability testing, pilots' representatives were prompted with some more general questions to explore the value and the weakness of the Collaborative Environment. We report in the following the main aspects emerged during the brainstorming.

1. *Strong points of the Collaborative Environment.* Pilot owners identified the following aspects as a strong value of the INTERLINK platform:
   - *Co-design approach and governance model:* participants appreciated the innovative approach offered by the system to co-design and co-deliver services and the possibility to exploit pre-defined schemas for co-production that can be customised and adapted to meet contextual needs. Moreover, the governance framework provided by the system is expected to systematise efficiency and help automate "boring" tasks along the co-production process.
   - *Knowledge and software resources available (INTERLINKERs):* participants appreciated the quality and the amount of collaboration tools available in the platform that provide, as a participant said, "a complete range of tools to support almost any kind of co-production process".
   - *Simplicity of some parts of the interface that guarantee accessibility and usability:* in particular the simple access and registration and the simple and informative landing page of the workspace were appreciated.
2. *Weakness of the Collaborative Workspace.* Among the identified weaknesses, participants mentioned the fact that the system could be too ambitious and that several usability issues might hinder users from fully taking advantage of the platform. For instance, participants complained that the user flow and the sequence of the construction of the process are not clear: there are several places in which users can get lost and that require a lot of effort (e.g. defining a personalised co-production process). Participants suggested that guidance in the process page should be improved, and that visual communication could help users in better understanding the flow. A participant suggested, for instance, to visually represent the process (the co-production tree) to make it easier to follow.
3. *Features to be added to the system.* Concerning the new features that participants suggested to release, the following were highlighted: a more compact and homogeneous interface UX with a visual guide with examples on how to manage co-production processes, a personal dashboard where to find data about processes ongoing and important information, more options to modify process or create a new process from scratch, improve the number of collaboration tools and

release the platform as a plug-in for WordPress to better integrate the platform within already existing digital ecosystems.

4. *Most useful views of the Collaborative Environment*. Participants reported that the most useful views were those that support users in understanding the ongoing process and the whole process flow at a glance: 1) Overview page, 2) Process overview, 3) Guide. A participant reported that a better view that connects tasks and INTERLINKERs should be provided to facilitate tasks.
5. *Adoption of the Collaborative Environment*. Participants were asked if they could imagine themselves using the system in their daily work and under which conditions. Participants reported that they recognize the value of the Collaborative Environment, but more training is needed to learn how to integrate the system into the organisational practices. For instance, workshops and other communication initiatives could enhance the adoption of the system within the Public Administrations.

SECTION	TASK	SUBJECT	DETAILED DESCRIPTION OF PROBLEM	HEURISTIC VIOLATED	SEVERITY	SOLUTION PROPOSAL
REGISTRATION	Tring to register as new user	Restration with user and passw says "invalid password"	The user tried to register as a new user with name, corporate email and password. The system tells that the password is incorrect and provides no information about what the user could do to proceed or how the password should be like. (no notification email was sent to the provided email address)	1. Visibility of system status	prio_medium	
PROJECT CREATION	Creating a new co-production project	Not completely clear where to create a new "project", current terminology a bit confusing	Users were asked to create "a new co-production project". Some of them reported a bit of confusion because the button in the interface is called "create new process" and they were unsure of whether "process" and "project" meant the same thing.	2. Match between system and the real world	prio_low	Some brainstorming on terminology would be beneficial with use case owners (in the different languages) to make sure the terms used in the interface have a straightforward meaning for them
PROJECT CREATION	creating a new project vs. creating a new group	Different users have different preferences: some of them would create the work team first and then the project; others viceversa	The participants involved in the MEF test had mixed preference on this aspect. It seems to depend on personal work practices and on the role in the organization. It was commented that some times employees are assigned to work on specific projects (so they cannot choose or create new projects); in other cases users are those who coordinate the project	7. Flexibility and efficiency of use	prio_low	It seems good that the interface does not force users to follow a precinbed order of action (e.g. first create project, then create group or viceversa). Still come suggestion on how to proceed may be useful for novice users. What emerges very important is that the profile of users (e.g. their expertise, their role, their responsibility) may be quite different. This aspect might suggest the utility to design some possible personalization features for the second version of the system
PROJECT CREATION	selection of language for the process	Selection of language of process was evaluated as not useful	The user thought that the language of the process under creation and the language selected for the overall interface were the same, so the usefulness of this option was not clear.	2. Match between system and the real world	prio_low	When the creator of the process selects the language, s/he also decides how this will be seen in the future. This maybe too rigid. It may be the case that multilinguality is desired also at the schema level. This would help in international team where each participant would be able to read the information in the schema in their own language. This aspect could be further investigated with pilot owners
PROJECT CREATION	after new process creation	Information overload in the first screen that appears after having created the process	After the first creation of a new process, the user is redirected to the screen which has a lot of information in it (main vertical menù on the left, progress of co-production process in the centre, recent resources on the right). This was evaluated as too much for a new user. Users have a lot of information to digest.	8. Aesthetic and minimalist design	prio_medium	Part of this problem is due to the fact that in this case users had not received an exhaustive training on the platform. So they needed time to digest what was displayed. Still, however, this comment about information overload was remarked by different users.
PROJECT CREATION	after new process creation	The "recent resources" section that appears after new project creation (and that is empty) is not clear	What is shown in this area is not comprehensible to a novel user	6. Recognition rather than recall	prio_medium	
PROJECT CREATION	selection of a new schema	the selection of a new schema is not intuitive	The user is not completely aware of how the mechanism of schema selection works. The desired flow of interaction was not clear. Users made some random attempts. Someone mentioned that the "green" button with the "Use Schema" command was a useful clue. (actually the button is not green, but blue... maybe the text was determinant in giving this impression, or the fact that the other button is red)	6. Recognition rather than recall	prio_HIGH	We will add an alert window to ensure that the users realize of the impact of selecting a given schema
PROJECT CREATION	selection of a new schema	not sufficient feedback is provided after schema selection	After the schema is selected with "use schema" the user has no real confirmation of what has happened	1. Visibility of system status	prio_HIGH	Users suggested a pop up of confirmation after the association with the schema has been made
PROJECT CREATION	selection of a new schema	information overload in the screen for schema previews	Users commented that the mixture of vertical element (menu on the left) and horizontal tabs (the phases of the schema) and the vertical unfolding of the tree are a bit confusing (too much information to evaluate)	8. Aesthetic and minimalist design	prio_medium	Not sure how to simplify it, any suggestions? more textual explainations in the window? further alert dialogues?
PROJECT CREATION	selection of a new schema	difference between the three alternative schemas is not evident	The benefit of using one schema instead of another is not clear and this makes the decision making difficult	6. Recognition rather than recall	prio_medium	We need to show when somebody pre-selects a schema a list of succes cases that would inform the user the goodness of such schema. This is difficult to implement now. We should currently rely on the description of the schema already shown so that users make their choice based on it.

https://docs.google.com/spreadsheets/d/15mAKKOJMH160XCYzTF7MrSr18oJpIZNb/edit - gid=953445392

Figure 33. Usability study spreadsheet.

2.4. Alpha tests related to co-production concepts: Focus Groups

A focus group[16] is a group interview involving a small number of demographically similar people or participants who have other common traits/experiences. Their reactions to specific researcher/evaluator-posed questions are studied. A Focus Group around co-production topic was organized on 1st June 2022 in the plenary meeting celebrated in Bologna, Italy.

2.4.1. Methods

The methodological approach was threefold: 1) introduction meetings for a first exploration of the empirical field in our three use cases and 2) focus groups with all use cases. Furthermore, starting to 3) conduct in-depth interviews to already produce results for the VARAM case.

The Radboud team organized introduction meetings during the pre-piloting phase with MEF (12/04/2022), VARAM (12/05/2022), and ZARAGOZA (18/05/2022), in relation to the use-case analysis and the integration between the Advanced Governance model and the use cases. The aim of these meetings was to learn more about the status of the use cases, as well as gather initial feedback on the Preliminary Governance model (see Figure 10). In addition, agreements were made on future collaboration, especially regarding the use case analysis (i.e., the in-depth, expert interviews).

During the meetings, the subsequent agenda was followed:

1. Current status of the use case (e.g. crucial questions/issues within the collaborative process)
2. Feedback on the Preliminary Governance model (e.g. how can it be developed in order to be more helpful?).
3. Discussion on current governance mode (i.e. Governance as a Platform or Citizen Sourcing)
4. Outlook: further collaboration this year (e.g. interviews for the in-depth case study analysis foreseen in the proposal)

Secondly, focus groups with the use case owners were organized at the Bologna meeting (01/06/2022). The objective of organizing the focus groups in Bologna was for the Radboud team to (1) understand the story of the co-production initiative to the current status quo of the realization, (2) validate and refine the Preliminary Governance model described in deliverable D2.1 [17], based on the experiences of use cases for the start of the project and the engagement phase, and finally (3) to learn more about the inhibiting and promoting factors encountered (or expected) in the co-production process, regarding the actors involved, the institutional framework and finally, technological factors.

After the focus groups organized during the Bologna meeting, the Radboud team conducted in-depth interviews with public employees from the Latvian Ministry (VARAM). In the following months, in-depth interviews will also be conducted with public employees from the Italian Ministry (MEF) and Zaragoza. The in-depth interviews with VARAM (organized online at 17/06; 21/06; 05/07; 18/07) focused on three themes: (1) conceptions of digital collaboration, (2) perceptions on quality of digital collaboration,

and lastly, (3) institutional, actor-centred and technological factors influencing digital collaboration.

2.4.2. Results

VARAM

The introduction meeting with the VARAM team focused on the discussion on the current governance mode, which turned out to be Citizen sourcing[10]. There was an agreement during the meeting that the current status of the use case, as well as the initial objectives, can be linked to this type of co-production (i.e. citizen sourcing). However, more generally speaking, the VARAM team also considers Government as a Platform [18] as an applicable mode of governance, based on their activities. During the focus group and interviews, several aspects were further discussed in-depth.

Conceptions of digital collaboration

Within the Latvian ministry, digital collaboration is overall understood as working together with different stakeholders using digital technologies in order to achieve a certain objective (Interview 1). The public officials include internal stakeholders (i.e., government-to- government) as well as external stakeholders (i.e., government-to-business/organizations and government-to-citizens) in their understanding of digital collaboration, which hints at a rather broad conceptualization. While the officials make no distinction between different technologies or collaboration practices, they emphasize that digital collaboration should yield results (Interview 1-3). This suggests that the (perceived) benefits of digital collaboration play a central role within the Ministry when reflecting on digital collaboration. Moreover, Latvian public officials indicate that they do not have any difference in their notion of digital and non-digital/analogue collaboration processes, besides the use of digital technologies (Interview 1-2). In their view, the main goal of collaboration remains the same, only the means are different. However, the risks and challenges that come with digital collaboration can be quite different.

During the COVID-19 pandemic, the internal use of digital technologies has increased remarkably within the ministry. Digital technologies are now at the centre of everyday activities, such as remote communication and sharing files online. While these technologies enable/facilitate digital collaboration within the organization (i.e.

[10] Citizen sourcing is the government adoption of crowdsourcing techniques for the purposes of (1) enlisting citizens in the design and execution of government services and (2) tapping into the citizenry's collective intelligence for solutions and situational awareness.

between sub-units), they have a lesser amount of experience with digital collaboration focusing on external stakeholders. The ministry appears to be most familiar with digital collaboration in the area of government-to-government collaboration. They are, however, increasingly exploring options to engage citizens via digital technologies, in order to strengthen government-to-citizen collaboration. This interest is based on their rather broad conceptualization/understanding of digital collaboration and fuelled by the underlying assumption that a higher level of stakeholder engagement will lead to a better outcome (Interview 1-2).

In addition, the public officials expect that digital collaboration has certain benefits in contrast to non-digital collaboration. Digital collaboration is expected to reduce the amount of manual work and thus the administrative burden for officials coordinating the collaboration process (Interview 2). This might improve the quality of the gathered data and the following data analysis. Moreover, digital technologies allow for specific elements and information linked to collaboration processes to be stored digitally and re-used. This decreases the risk of losing relevant information (e.g. information on how a process was previously organized) when public officials change jobs.

Perceptions on quality of digital collaboration

In order to investigate digital collaboration in our cases, it is important to understand on which basis public officials judge the quality thereof. The analysis is based on our three pillars of quality of digital collaboration outlined in the theoretical framework.

The VARAM team emphasizes a user-based understanding of the quality of digital collaboration. The public officials in the Latvian ministry agree that the usefulness of digital collaboration should hereby play a central role, as public organizations should yield results in their opinion (Interview 1-3). Furthermore, one use-case owner emphasizes that the outcome of the process should be in line with the expectations of stakeholders (Interview 2). "Even if we do everything right, according to methodology, some people are still not satisfied because it was not what they expected" (Interview 2). This suggests that when stakeholders have different expectations towards digital collaboration, the actual quality might sometimes be overlooked, which shows that stakeholders' perceptions of quality might differ from the perceptions of public officials. This makes judgements on the overall quality of digital collaboration difficult. Next to usefulness, flexibility, and the quality of access to the digital collaboration process are also deemed important by the public officials, since these processes should be open to everyone willing to participate (Interview 4). Moreover, efficiency is

perceived as the least important aspect of user-based quality. One use-case owner, however, noted that efficiency should automatically come with ease of use (Interview 1). This suggests that efficiency might not be considered unimportant but is perceived as incorporated in other aspects of quality.

VARAM furthermore stresses the importance of a value-based perspective on digital collaboration, i.e. the extent to which collaboration processes are in line with normative expectations and broader societal norms. All use-case owners acknowledge that the inclusiveness of digital collaboration processes is the most important aspect of value-based quality (Interview 1-3). Even though the ministry experiences difficulties with motivating people to engage, they try to include as many diverse voices as possible (Interview 1-2). The public officials perceive that this is very much in line with democratic values (Interview 1), suggesting that this aspect is also deemed important.

Considering quality perceptions and possible challenges immanent to digital collaboration, the public officials raise some concerns regarding the involvement of citizens within the processes (Interview 1-4). These concerns often relate to certain elements of user-based and value-based quality, such as inclusiveness and access. One of the main challenges of digital collaboration concerns the lack of digital skills. This lack of digital skills results in some citizens not being able to join digital collaboration processes. Furthermore, some people have no access to the internet or computers, which makes it impossible to engage in digital collaboration processes (Interview 1-2).

Institutional, actor-centred, and technological factors influencing digital collaboration
For the Latvian ministry, the findings show that several institutional factors appear to play a central role in the eyes of public officials: 1) the administrative culture and attitudes towards digital collaboration, 2) the organizational resources and 3) the interplay between the two.

Input from external stakeholders is largely considered as valuable for the development of services or ICT solutions (Interview 1-3). Some use-case owners even believe that citizen input is a crucial aspect of public policymaking (Interview 1). Regarding usability, one public official states that "usability can only be achieved by approaching the end-users" (Interview 2). Within the ministry, it is therefore believed that relevant external stakeholders (mostly concerning citizens) should be involved, especially on the sub-national and local levels (Interview 2). However, the present-day/prevailing work ethic within the Latvian ministry is not particularly based on collaboration. In practice, since the ministry operates on the conceptual level (mostly developing guidelines), they often

do not directly engage with external stakeholders. Reaching out to stakeholders within the ministry (i.e. internal collaboration) only happens occasionally, given the independence of departments/sub-units (Interview 2). Taking into account the general work ethic, the step towards external collaboration, more specifically citizen engagement (i.e. government-to-citizen collaboration), can be viewed as quite revolutionary (Interview 1). In order to realize this, it is aimed to reach and engage citizens via municipalities or local communities as this level has a longer tradition of an administrative culture that includes citizens and other external stakeholders.

Furthermore, it is recognized that citizen input does not automatically lead to better results. According to one use-case owner, "you don't have the assurance that the input will be valuable" (Interview 1). Involving stakeholders means reaching out to citizens and organizing some kind of process, which can be messy and time-consuming. The attitude towards citizen involvement is, therefore, still reserved at the national level. Furthermore, the involvement of citizens is often viewed as impracticable and therewith a waste of financial resources (Interview 1-2).

Besides, there are some doubts regarding the willingness of external stakeholders to get engaged. These doubts might enhance the general, reserved attitude toward citizen involvement in digital collaboration processes. Nevertheless, it is believed within the ministry that citizens must be encouraged in order to get involved (Interview 2). In response, the public officials are now considering rewarding citizens for their participation (e.g. with presents). The perceived lack of interest also encourages the ministry to ensure that participating in digital collaboration processes will be worthwhile for stakeholders. However, since they lack experience, this proves to be a challenge.

In addition to the administrative culture and the organizational resources, the current practices and procedures are also perceived as influential in relation to the quality of digital collaboration. Hereby it is important to note that the current practices and procedures are linked to the organizational resources. For example, the amount of available financial resources determines the scope of current practices and procedures within an organization. Although the Ministry strives for inclusive stakeholder engagement, currently the situation is such that only a handful of experts(-citizens) are involved in respective processes. It is less time-consuming and thus cheaper to talk with experts, even though it is less in line with democratic values (Interview 1). Furthermore, public officials are used to the existing procedures

regarding working with external stakeholders. This might make it difficult to introduce new stakeholder engagement practices, focused on extending the scope of stakeholders.

Lastly, the capabilities of public officials are also believed to influence the quality of digital collaboration processes. Even though digital tools are considered to enhance collaboration with external stakeholders, there are also some doubts that relate to the digital skills of some public officials, which tend to be rather divergent. Whilst almost every public official knows how to work with a computer or browse on the Internet, it appears to be very difficult to attract actual IT professionals within the Ministry (Interview 1). As a result, officials involved in digital collaboration processes do often not understand the system/digital tool they are working with. This might lead to a situation in which they are unable to effectively facilitate digital collaboration processes or involve external stakeholders.

MEF

During the introduction meeting with the MEF team, it became clear that they could use support regarding stakeholder engagement. It was, therefore, agreed that the results of the literature review and thus the state-of-the-art-based knowledge on stakeholder engagement (included in Deliverable 2.1: Preliminary Governance model [17]) would be summarized and shared with the MEF team. Hereby, the academic results will be translated into points for practitioners. In addition, all MEF team members agreed that this use case can be categorized as Government as a Platform [18]. The agreement on this is taken up as an objective for the exploratory use case analysis.

Co-production is understood to involve stakeholders and to collect needs and requirements from them, in order to co-design services. Within this use case, stakeholders entail employees of various Public Administrations (PA) and managers of other public bodies. Hereby a distinction is made between internal and external stakeholders.

Regarding the story of the co-production initiative, the MEF team joined the INTERLINK project because they considered it as an opportunity to find a methodological and technical solution for managing co-production. The aim of MEF is to be among the first Italian PAs that can share their lessons learned with others, regarding how to better provide public services. While the Italian Ministry sometimes manages co-production initiatives itself, it is also possible to delegate the leadership to external consultants. In addition, IT is provided by an in-house company called SOGEI. The Italian Ministry hopes

to foster more initiatives and eventually involve more stakeholders. On the one hand, it was relatively easy to identify internal stakeholders. The internal group consisted of colleagues who are interested in the project. A few obstacles were hereby met (e.g. time resources of staff involved). On the other hand, it was more difficult to identify and involve external stakeholders. MEF asked for participation from other directorates, wanting to reach people who manage IT solutions of other PAs or people who manage HR processes. First, potential participants were reached via a top-down approach (official letter), then they reached potential participants via a more bottom-up approach, by using direct contacts of friends to encourage more replies.

Considering the mode of governance, MEF agreed that by making services available to other PAs, their governance process can be categorized as Government as a Platform. The Italian Ministry emphasizes that they are not responsible for the resulting activities, only for realizing the Participatory Strategic Planning Module (PSPM). In addition, since there are no citizens involved, co-production within this use case can be explained as an example of Government-to-Government collaboration.

In the focus group session during the Bologna meeting, several aspects were further discussed in-depth.

Perceptions of digital collaboration

Digital tools are seen as a way to strengthen the overall collaboration of public administrations. According to the use case respondents, it means to involve users and stakeholders and to collect from them needs and requirements for the co-design of services. In their understanding, collaboration is seen as connecting better different levels and units within the public sector. Being a case of Government as platform means at the moment a focus on government-to-government collaboration. Among the respondents it was discussed that the introduction of digital tools might mean a change of long-established structures and routines. It must thus be considered a quite fundamental change. It was furthermore stated that the introduction of digital tools for collaboration is still in an early stage, especially regarding connections across organizational borders both horizontally and vertically. Also in this use case, the pandemic was seen as an accelerating phenomenon. In this context, new digital tools were used and formed the grounds of a willingness to further search for new tools that might enhance collaboration.

Digital collaboration is overall rather positively connotated. It is seen as a way to increase the coordination of information, decisions and actions. However, it is aimed to go beyond simple coordination by using digital tools for collaborative decision-making. This is what the current project on designing an online Participatory Strategic Planning Module (PSPM) is set-up to achieve. It is supposed to allow the active participation of administrative stakeholders, i.e. other public bodies, in the ministry's strategic planning. Although collaboration is not new to the ministry, they hope to foster more initiatives and to have the opportunity to involve more stakeholders by leveraging the use of digital tools. The overall aim is to also become a role model within the Italian public sector. They would like to become one of the first Italian public administrations that can share with others the lessons learned on how to better provide public services based on digital collaboration.

Perceptions on quality of digital collaboration

For MEF, the value-based pillar seems to be the most important. In the establishment of services, it is important for them to meet the requirements, especially in the public sector context. That is why they engage the top management level of public organizations in the development of digital collaboration. They sometimes organize presentations and events to share with the top management of other PAs the fact that they are going to create new services so that they can provide us with feedback and requirements. Respondents stress that it is also important to talk about responsibilities and accountability in a value-perspective on digital collaboration. Whereas the ministry sees its mandate in the development of services of digital collaboration, they do not want to be seen as responsible for the resulting activities. The respondents also stress the importance of the user-based quality perspective on digital collaboration. Usefulness is hereby stressed as the most important factor. For example, there is agreement that there should always be an assessment phase before starting a collaborative initiative to understand whether and in which way collaboration in general and digital collaboration in particular is really fit for purpose. Therefore, they would find it very useful if there was the development of an 'assessment methodology' for those pre-development processes. To ensure the usefulness of digital collaboration, active stakeholder engagement in the process of the development of a new service is deemed important by the respondents.

Institutional, actor-centred, and technological factors influencing digital collaboration

Many inhibiting or promoting factors identified in theory were recognized by the MEF team. Starting with the actors involved and institutional factors, the attitude of managers appears to be very important. This relates to the culture of collaboration,

which also plays a central role. In general, there is no culture of collaboration since the majority still prefers working in the traditional way. Furthermore, co-production is seen as time-consuming and expensive ("not worth the investment", which is also considered a cultural issue. Hereby, it is important to match hopes with what will happen. A lot of distrust is caused by a mismatch between high hopes and what is delivered. In general, trust within the public sector is low in Italy. It is, therefore, extra important to manage expectations.

Finally, focusing on the technological factors, it appears to be crucial that a platform is easy to use. In addition, sufficient training is viewed as important. At this moment, the way in which the process is built is not very understandable. It would greatly help the MEF team if there was a guide available. However, the Italian Ministry feels that the INTERLINK platform can help by initiating or improving co-production processes.

ZARAGOZA

During the introduction with the Zaragoza team, it became apparent that they are experienced with initiating processes of co-design and co-delivery, for which they have launched living Etopia. INTERLINK is meant to be the technological part of this process. Since Living Etopia is already launched, they cannot wait too long on INTERLINK. It is, therefore, important that the project catches up in terms of technology. Otherwise, it will be difficult to align the technology with what is happening in practice.

The main objective appears to be the systematization of the co-creation process as a whole. The Collaborative Environment has a lot of tools that can be helpful to improve co-creation processes. According to the Zaragoza use-case owners, the city hall cannot do everything by itself (public organization), they need input from other institutions to do their day-to-day programming in Etopia. Not surprisingly, this use case is quite familiar with co-creation and co-delivery with citizens or other stakeholders. This suggests that the governance mode 'Public-Civic Partnership' [19] is most applicable for them. However, citizens do not enter the collaborative environment, yet. At this moment, citizens do not even need to know that INTERLINK exists for this use case.

The Zaragoza team emphasized that the end-users of technology (such as citizens) should play a guiding role and should be the central focus. However, this is often not the case in practice, where technology is guiding and central at the moment. It would be

helpful if the project could focus more on the social side (i.e. the people), in order to understand how co-production processes go in practice and start from there.

In Bologna we further discussed the Zaragoza case. In this case, it is clear that the organizers consider the current state of affairs in the project, also regarding the development of technology, too premature in order for citizens to already be involved. In the current phase, there are five stakeholders involved (ZGZ City Hall, ZGZ City Knowledge Foundation, University, Business Incubation). This, however, does not mean that the decisions so far are taken by these stakeholders. In fact, most of the stakeholders have their own programs and use the Etopia building. The ambition is to sit together in the future and to co-create the program. A big question mark is: how to orchestrate this as there is not yet a director to bring people around a table and develop a shared program?

The lack of coordination and direction also partly explains why there are still no citizens involved. Currently, open calls are used to find parties that might provide the best solutions. Subsequently, local partners (public administrators) and local councils are involved to further develop the best idea and there Etopia comes in to implement a first prototype. As of this moment, the Zaragoza team aims to raise interest and to get a more diverse group of people involved in Etopia.

The expectation is to involve citizens in the second phase of the INTERLINK project because citizens should be sure about their role and expected participation within the process. This all has to do with the awareness that citizens' expectations need to be managed and well understood. In the long run, it is expected that the role of citizens will evolve over time. First, they have to come to Etopia as kind of passive end-users. Later on, they can become more active actors, if they are willing to invest more time. Then they will also get more experience and build expertise. So, there might be a need to develop a kind of reward system, in order to get actors to become more involved.

Having said all this, there is still the question of the suitable governance model that fits this practice. The initial idea was that the Zaragoza use case represented a 'Public-Civic Partnership' mode of governance. However, the lack of citizen involvement has implications for the co-production practices and indicates a different mode of governance (e.g., 'Government as a Platform').

The current plan for INTERLINK is to co-create "Habitar Etopia", an internal process of co-creation among the 5 stakeholders. Examples of activities are co-creating spaces in Etopia (Cafeteria, etc), co-creating signals, and co-creating a park. For the second iteration, sessions with citizens will be organized and performed in order to co-create the program for 2023.

2.5. Cross-testing between WP2 and WP5

This activity took place on 29th April 2022. It was a 90' long meeting, 2 members from Radboud team and 3 members from Deusto team attended. This session was devised to perform an additional cross-testing session, but, this time, with the consortium members that devised the default co-production model of INTERLINK, namely Radboud University, i.e. those that are experts in Open Government and political sciences. The main aim of this session was the following:

> ***Assess how suitably the Collaborative Environment enables to realize the INTERLINK co-production model***

2.5.1. Methods

Throughout the cross-testing session, DEUSTO presented the functionalities of the Collaborative Environment in an interactive manner. The goals of the session were to showcase the Collaborative Environment to the Radboud team (1), propose an evaluation exercise (2) and gather feedback (3) on how well the 'technical people' have interpreted and adopted the devised co-production model produced by the Radboud team into the Collaborative Environment. Dr. Marlies Honingh and Noortje Hoevens were the alpha testers of the Radboud Team.

In order to provide context for the subjective assessment session, Radboud was requested to reflect on how co-production is being carried out by a co-production team within the Collaborative Environment by proposing them to follow the reflection document Focus Group Template Co-production Investigation. However, because of the short duration of the session, we decided to skip this part after the explanation of its purpose.

Next, Radboud's team was reminded about the functionalities of the Collaborative Environment, at that time during alpha release, by showcasing its functionalities through the following steps:

1. Participants were requested to login with their google credentials or create their own credentials at https://demo.interlink-project.eu/. Only previously logged in users are able to be added to a team.
2. Create a team for those willing to take part in a co-production process
3. Create a new co-production process where the artefact to co-create is specified, designed, built and its sustainability defined.
4. Choose a co-production process guide (flexibility to choose the best fitting schema). There were several co-production trees available, some generic other specific to a pilot, e.g. co-refinement schema for VARAM, at the time. Customization of them was only possible by enabling deletion of tasks.
5. Create new roles and new teams with different rights than the core co-producers' team (role scoping is not yet considered)
6. Use the guide to co-produce an artefact, e.g. project to co-assess the implementation of the co-production methodology of INTERLINK through the collaborative environment
   a. For each of the tasks in the co-production phases you may select any of the recommended INTERLINKERs or instantiate a new one based on the generic software INTERLINKERs available at the bottom of the screen shown when selecting a co-production task
7. Review progress of project in OVERVIEW view of Collaborative Environment.
8. Browse and select INTERLINKERs by accessing the Collaborative Environment's catalogue
9. Provide feedback: alpha questionnaire or semi-structured interview

After the demonstration of the solution, Radboud team was asked to experiment/work with the Collaborative Environment. Hence, Radboud co-evaluation team created a co-production process to perform an evaluation of its collaborative environment. They followed these steps:

1. Ensure that team members have logged in at least once at https://demo.interlink-project.eu/
2. Create a team "*Radboud co-production team for co-evaluation of collaborative environment*" to jointly generate an assessment of the environment and its capabilities to carry out collaborative processes. Add at least 2 members to the team.
3. Create a co-production project, namely "*Co-evaluation of the co-production process*"
4. Go to settings and ensure that the project has a good logo. Click on the pencil icon and then SAVE.
5. Click on "Team" left hand side menu and add the created Team to the project. Click on hyperlink of the Team view to modify team composition if wished.
6. Click on "Overview" and select the co-production schema (tree) to use. Choose "Default schema"

7. Hit on "Guide" and start as a team co-evaluating the collaborative environment
8. Browse through the different phases of the co-production guide
9. Select objectives within a phase
10. Select tasks within an objective
11. Instantiate a generic INTERLINKER, where feedback with your observations can be gathered in a shared Google Docs with the rest of the co-evaluators
    a. Select BUILD > Technical Implementation > Technical implementation
    b. Hit on "*Initiate Procedure*" > "*Create a Google Drive document*" > create asset "*Feedback about usage of Collaborative Environment*"
    c. Ensure that all team members edit and insert their comments in such shared document
12. Explore navigation between "*Guide*" view and "*Workplan*" view by hitting on "*Time planification*". Test changing the Time planification of a task, by hitting on the pencil and selecting start and end period.
13. Explore navigation between "Overview" view and "Guide" view by hitting on "See Task"
14. Pick one of the recommended INTERLINKERs
    a. Engage > Identify Stakeholders > Stakeholders Mapping Canvas
    b. Click on button "Instantiate as resource to use in the project"
        - Check the newly created resource at the bottom of the page under "Current resources"
    c. Open the presentation and add some modifications
15. Continue inspecting the different tasks and INTERLINKERs that are recommended for 5'
16. During the whole process PLEASE GATHER YOUR IMPRESSIONS / FEEDBACK on the shared document entitled "*Feedback about usage of Collaborative Environment*". From OVERVIEW you can simply click on the resource title to be able to open it.
17. Answer the alpha questionnaire cloned for Radboud testing. You can record its location by creating a generic INTERLINKER of type "Link an external resource". Please produce an answer to the questionnaire per co-evaluator

Finally, the following questions were posed to trigger the discussion:

1. Do you feel that the Collaborative Environment has reflected well the INTERLINK co-production model?
2. What do you think about the possibility of customizing co-production trees to adequate it to specific scenarios / use cases in pilots?
3. Would you use this collaborative environment to organize collaborative activities in your team?
4. What about creating a specific process to co-evaluate the co-production model?

2.5.2. Results

During the cross-testing session, the first task was to create a team that wants to take part in a co-production process. Subsequently, a co-production project was created and a co-production process guide was chosen. The process guide is based on several co-production trees and can be customized to fit the specific needs and requirements of a unique co-production process.

Here it is crucial to note that it might be difficult for coproducers to make a decision on the co-production process guide since they often do not know which phase is relevant for them. In addition, who gets to (eventually) decide which phase is relevant? It would be helpful if the Collaborative Environment offers guidance with regard to this aspect.

Then, new roles and new teams were created. This activity led to a discussion on the need for the coordination of co-production activities/processes. The Radboud Team assumes that coproducing via the Collaborative Environment requires coordination, for example by a project manager. In other words, someone is needed who (amongst other things) initiates the tasks, creates shared folders, responds to comments, initiates voting activities and decides when to move on to the next phase.

Overall, the cross-testing session raised several questions and concerns. The most important ones are listed here:

- How do coproducers find the Collaborative Environment in the first place?
- Who initiates the co-production process? And thereby the use of the Collaborative Environment?
- Is someone in charge (also for inviting people to a specific project/team)?
- And who decides how the roles are assigned?
- Can all team members initiate and/or remove tasks on their own?
- How does the (design of the) Collaborative Environment take the digital divide into account?
- How does the (design of the) Collaborative Environment take visual impairments into account?
- If you have questions regarding the environment, is there an option for help? Or are there possibilities to provide feedback?

Several questions and concerns were already addressed accordingly by DEUSTO during the cross-testing session.

Finally, the Radboud team expressed their concerns regarding the possibility that the Collaborative Environment will guide and determine co-production processes, instead

of the other way around. This might lead to a focus on the possibilities in terms of software design, instead of the requirements of good governance in relation to coproducing public service provision.

Some recommendations issued by Radboud team were:

- Enhance flexibility of the roles scope, in phases. A solution could be to assign scope, i.e. phases, objectives, task where a given role applies.
- Classify schemas according to difference governance models (citizen sourcing, government as platform). More guidance on the choice of schema should be provided.
- Resolve the issue that communication feedback loops are not possible right now. A possible solution is to stress usage of Loomio INTERLINKER Forum option on the left-hand side menu could also be considered.
- Management of co-production should be improved, i.e. tackle the governance issues immanent to the co-production process. This entails answering questions such: Who starts? Why somebody is the admin or initiator of the co-production process? Who does what and why?
- Co-production processes and their outcomes have to follow some PA's regulation. Hence, it would be necessary to attach validator or rules that verify that PA regulations and Weberian principals are properly followed. However, it remains open to different interpretations how a correct trade-off between freedom and rules can be obtained.

2.6. Training sessions with alpha testers (MEF, VARAM, ZGZ)

A range of training sessions were organized to get pilot owners familiarized with INTERLINK co-production methodology and its supporting tools. The aim of these training sessions was to present what Collaborative Environment and Augmenter INTERLINKER (in the case of VARAM) do.

2.6.1. Methods

After a short presentation about the features of the INTERLINK platform provided by DEUSTO team, representatives of each pilot were given the following script with steps to carry out, on their own, when having a first go with the Collaborative Environment and the Augmenter INTERLINKER (for the case of VARAM), i.e. when embarking in a co-production process supported by INTERLINK. Next, the instructions that were provided to trainees:

1. You should all be able to use it by supplying at login in time, google credentials or define your own login credentials. Notice that to add members to a team they must have logged into the platform previously

2. Create a team and a co-production process
3. Choose a co-production process guide
   a. You may customize such tree to the specific needs of your co-production process
   b. Observe that specific co-production trees can be defined (see VARAM's co-refinement process tree or hackathon arrangement and operation process tree)
4. Use the guide to co-produce SOMETHING by instantiating INTERLINKERs
   a. For each of the tasks in the co-production phases you may select any of the recommended INTERLINKERs or instantiate a new one based on the generic ones available
5. Review progress of project in OVERVIEW
6. Browse and select INTERLINKERs by accessing the Catalogue
7. Never forget to fill in the alpha questionnaire

As we can see, essentially the same script as the one offered to Radboud consortium colleagues as shown in 2.7. Cross testing sessions with alpha testers (MEF, VARAM, ZGZ), was offered to pilots' alpha testing participants to test the Collaborative Environment potential for managing co-production processes. The key mechanism of gathering feedback was to request them to fill in the alpha questionnaire. When time allowed in, an informal conversation between the chairing team, from DEUSTO and often with the support of FBK, of the training session and the participants was held, to be able to gather extra feedback.

2.6.2. Results

Table 8 shows the details of the training sessions arranged in the three pilots.

Table 8. Training sessions.

TYPE	DATE	ORGANIZER	PURPOSE	PARTICIPANTS (number & stakeholders)
Training sessions	27/04/2022	MEF	Showcase Collaborative Environment to whole team	3 members from Deusto, 2 from FBK and 6 from MEF
Training sessions	02/05/2022	VARAM	Showcase Collaborative Environment & Augmenter/ Servicepedia + preparation of cross-testing	3 members from DEUSTO team and 2 members from VARAM

Training sessions	29/04/2022	ZGZ	Showcase Collaborative Environment	3 members from DEUSTO team and 2 members from ZGZ

These sessions served to check whether the Collaborative Environment was usable or acceptable for those pilot representatives that should push its usage from its pilot's site. It was understood that the environment had a certain learning curve. As a response, a user manual was created to facilitate the process, see

Figure 34. The main outcome of realizing these sessions was to get pilot owners trained to guide other alpha testers and future beta testers (for pilot execution subphase) in the evaluation of INTERLINK co-production model and supporting tools. Apart from the user manual for Collaborative Environment publicly available at https://demo.interlink-project.eu/docs/en/, attendees to training sessions were informed about other support mechanisms made available by the project, namely: a) support questionnaire available from Collaborative Environment; b) feedback questionnaire available from Collaborative Environment; and c) Redmine deployment for INTERLINK support tool. Whilst the latter tool is devised for more advanced users, the first two instruments can be used by any pilot participant, being alpha or beta tester.

Figure 34 shows how these support mechanisms can be accessed from Collaborative Environment.

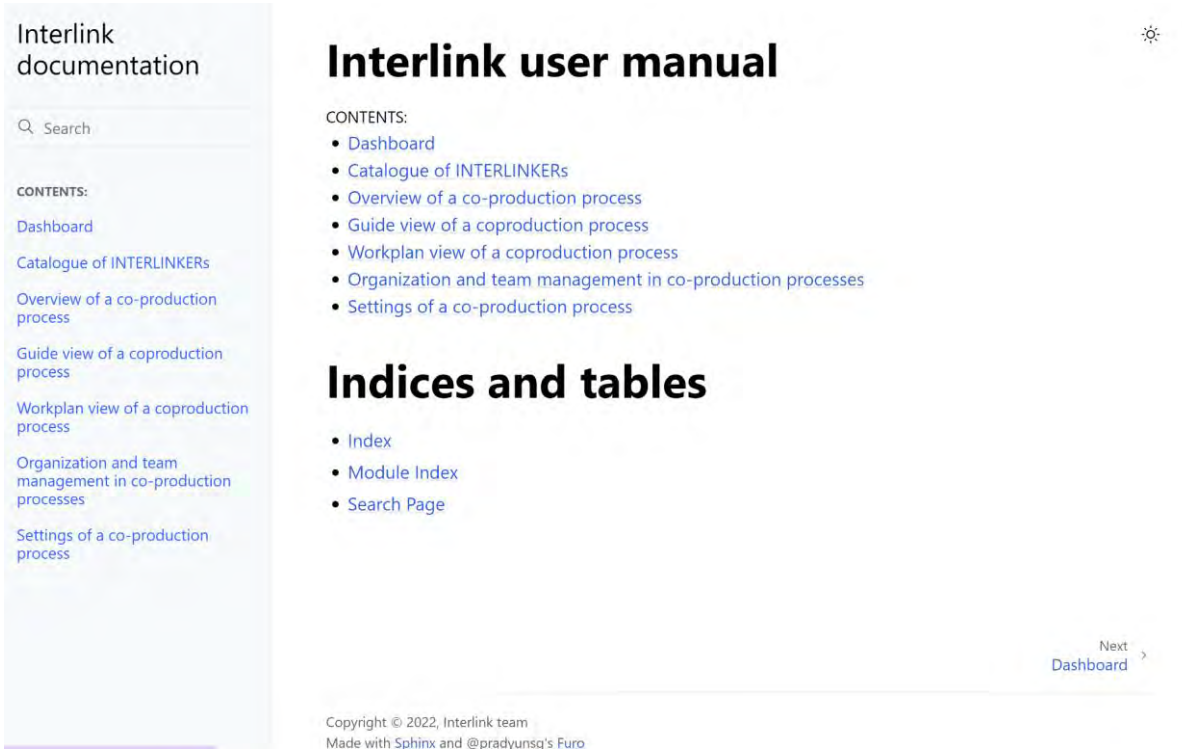

Figure 34. INTERLINK's Collaborative Environment User Manual.

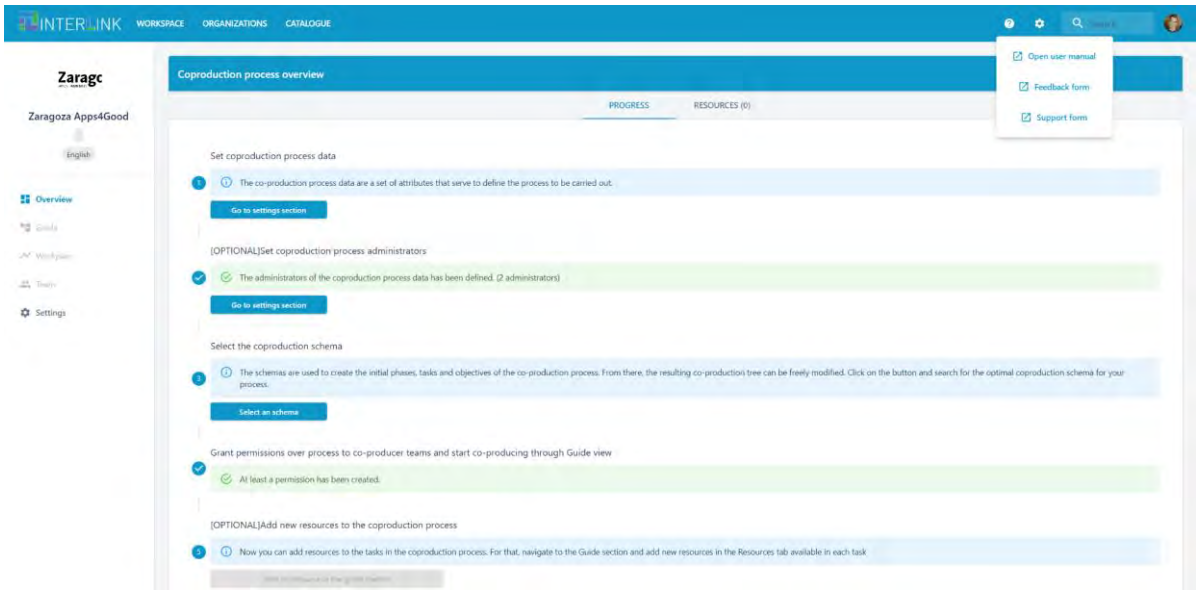

Figure 35. Access to support mechanisms from Collaborative Environment.

2.7. Cross testing sessions with alpha testers (MEF, VARAM, ZGZ)

These sessions aimed to organize cross-testing sessions involving INTERLINK consortium members and a set of alpha testers (5 to 10 people) at each pilot to assess the whole functionality required for the Pilots Iteration I, pilot case by pilot case. This cross-testing sessions followed the training sessions, so that at each pilot there was already a small group of users that were familiarized with the environment and that could aid other fellow alpha testers at their pilot.

The setup of these sessions was as follows:

1. Technical partners (DEUSTO and/or FBK) offered an introduction to INTERLINK, its tools and the objectives of the cross-testing session.
2. Participants got access to the testing environment https://demo.interlink-project.eu/
3. Participants completed an alpha questionnaire through which they may report back any issues identified during scenario-based testing sessions.

Table 9 shows the details about the cross-testing sessions arranged at the different pilots.

Table 9. Cross-testing sessions in pilots.

TYPE	DATE	ORGANIZER	PURPOSE	PARTICIPANTS (number & stakeholders)
Cross-testing session	23-25/05/2022	MEF	Usability testing with enlarged group of end-users	4 representatives of MEF team and 5 representatives from other MEF departments 1 researcher from FBK 1 researcher from DEUSTO
Cross-testing session	06/05/2022	VARAM	Comparison of Collaborative Environment vs Servicepedia, and of generic co-production trees vs pilot specific co-production trees	7 civil servants from VARAM 3 representatives from DEUSTO
Cross-testing session	23/05/2022	ZGZ	User acceptability script executed in session with alpha testers	2 members from DEUSTO team 6 representatives from ZGA

2.7.1. Cross testing session with MEF pilot

Besides the usability testing in presence at the INTERLINK consortium meeting in Bologna (2 participants from MEF), the MEF partner organised an online usability evaluation of the INTERLINK Collaborative Environment with a group of 9 alpha testers.

The alpha testers group included: INTERLINK-MEF internal team members (4 participants), and employees of other MEF departments that sometimes collaborate in joint projects (5 participants). For the latter type of participants, it was the first time that participants saw the interface.

The goal of the evaluation was to identify major usability problems from the end-user point of view and to investigate which functionalities seem to be missing and what in general should be improved.

The usability evaluation was structured in two workshops held online on different days.

During the first workshop (23 May 2022), one researcher from FBK moderated the meeting and one researcher from Deusto participated as an observer. Participants were asked to perform several tasks using the Collaborative Environment on their PC

[20]. They were not offered a specific training session on the environment in advance, as one of the objectives was also to evaluate the learnability of the system, i.e., how easy it is for novice users to understand the overall concept of the platform, whether the structure of the graphical layout is clear, and functionalities are put in places and work as users would expect. Given the fact that the test session was held online and in a group work setting, the think aloud methodology was not applicable. For each task that participants were asked to perform, the moderator provided a description in simple terms. Some time was then allowed for participants to try and execute the task and a short discussion followed each task. The moderator kept notes on paper on the usability issues that were mentioned by participants.

A second workshop was organised two days after (25 May 2022). The same group of alpha testers were invited to participate. But this time the group worked more freely at exploring the Collaborative Environment, without specific guidance.

At the end of the workshops, participants were asked to fill out the specific alpha phase script questionnaire to collect further comments and usability issues [21]. (The questionnaire is included in the evaluation protocol described in project deliverable D5.2 [2]).

2.7.1.1. Results

Results from the group testing sessions

The detailed list of all the usability issues emerged during the workshops was passed to the platform developers for prioritisation and identification of possible design refinements and implementation solutions. We summarise in the following the main issues by concentrating on those aspects that pertain to the co-production workflow and on user's expectations about guidance.

Order of tasks for project and team creation. The participants involved in the MEF test had mixed preference on this aspect: some of them would create the work team first and then the project; others vice versa. Preference seems to depend on personal work practices and on the user role in the organisation. It was commented that sometimes employees are assigned to work on specific projects by their manager (so they cannot choose or create the projects they work on); in other cases, users are those who coordinate the project. What emerges as very important is that the profile of users (e.g. their expertise, their role, their responsibility) may be quite different. This aspect might suggest the utility to refine the design of the Collaborative Environment to include possible personalization features or alternative views based on the user's role.

Risk of information overload. Some sections of the alpha release prototype were very rich in the information that was shown to users. This was the case, for example, for the Overview page of a co-production process, showing at the same time both the current advancement status of the process (at the centre of the screen) as well as a summary list of the created resources (in the right area of the screen). Furthermore, not all the information may be relevant for all the users: this is a consequence of the different roles that users of the platform may have (e.g., coordinators of a co-production project vs. external stakeholders being consulted). This comment was immediately taken up by developers, who divided information in different tabs and simplified what is shown to users who do not hold coordinating roles.

Selection of the schema. The procedure to select the schema of co-production that is used to build the backbone of the guidance process was not clear to users. Apart from the usability issues that emerged also in the Bologna test sessions and mentioned above in Section 2.3. Alpha usability tests with pilot owners participants said that the benefit of using one schema instead of another is not clear and this makes the decision very difficult. For the future, this issue points to the need to provide more help and elements of comparison to support the decision making. Co-production schemas should be associated with stories of usage that would better inform users on schemas' purpose and goodness of fit.

Guidance to co-production. Even though the co-production schema determines the creation of a set of ordered phases, objectives and tasks that users can visualise in the "Guide" section, some participants felt that this was not the only guidance that is needed. The information offered in the Overview section on the advancement state of the process was commented as a good place to show what to do next. For the system prototype to be prepared for iteration 2 the possibility to partially merge the functionalities in Overview and in Guide section could be considered for a re-design of the guidance process.

More structure to the catalogue of INTERLINKERs. In the initial information pages of the portal (landing pages), users learn that there are different co-production phases (e.g. engagement, co-design, etc.). Alpha phase evaluators commented that they expected to be able to filter the catalogue of INTERLINKERs also by phase, to see what are the resources that support specific phases. More in general, the current filter mechanism available in the catalogue should be improved to provide a more user-friendly navigation.

Language preferences. In prototype v1, users are offered the possibility to choose the language for the content displayed in the interface and, as a separate choice, the language for the description of phases, objectives, and tasks of a certain co-production

schema. Once the language for the schema has been selected at co-production process creation time, it cannot be changed. This system behaviour reflects an implementation choice that creates a clone of the schema data model, in a specific language, for each new co-production process to allow for possible customizations (both (A) in the structure of the co-production tree as well as (B) in the nodes descriptions) decided by the project team. Alpha testers from MEF commented that two separate language choices, one for the overall interface and one the schema description, seemed redundant and counterintuitive. They expected that a unique choice was available to command the display of all the contents in the interface. This would also help in international teams, where each participant would be able to read the information in the schema in their own language. This aspect could be further investigated with pilot owners during the fine tuning of the system prototype for iteration 2 to understand how important it is for end-users to make changes to the texts describing co-production nodes (point (B) mentioned above).

Results from the questionnaire

The questionnaire that participants were asked to fill in at the end of the group usability testing contained the following general questions: What works well? What does not work? What should be added? What is missing? What should be improved?

Some of the issues mentioned by participants in their answers remark aspects that have already been described in the previous sections of this report. It is worth mentioning here a couple of additional suggestions that participants felt as important:

1. An additional form of personalisation could be introduced by adding a tab/section with "preferred INTERLINKERs";
2. A tight integration inside the platform of INTERLINKERs that provide essential collaboration functions would be desirable, like for example the possibility of having Loomio completely integrated with the Collaborative Environment. In particular, the need (in alpha release) to create separate teams both in Loomio and in the Collaborative Environment was considered an unnecessary duplication.

2.7.2. Cross testing session with VARAM

The aim of this cross-testing session was to "*compare in parallel alpha testers groups trying to co-refine public Service descriptions, using different co-production trees on Collaborative Environment vs using a specific tool for web page augmentation (Augmenter/Servicepedia)*". This activity was designed to engage VARAM staff in the first test of INTERLINK collaborative environment and Servicepedia/Augmenter INTERLINKER.

Impressions of participants were recorded in order to make some last improvements and changes of the collaborative environment before releasing it for beta testing.

As a matter of fact, this activity merged training (demonstration) and feedback session. After completion of tasks, alpha testers filled in questionnaires specifically designed for alpha test as well as provided oral feedback which was recorded in a separate shared file.

All participants were employees of VARAM Project Management Department (people not associated with INTERLINK project) who engaged in co-production in the role of a citizen. INTERLINK-associated employees moderated the task together with representatives from DEUSTO.

The process followed in the organization of this session was as follows:

1. Candidate participants to take part in alpha test were sent an invitation by email with the text appearing in the first part of the following public accessible document.
2. A videoconference link was sent to all those that showed interest. Attendees were arranged in 2 groups, once they joined the call.
3. Before starting the working session, attendees were offered a live demo guided by presentations of Augmenter INTELINKER and the Collaborative Environment possible use for service description augmentation.
4. Both teams were invited to undertake the following two tasks:
    - **Task 1: Refinement of "Academic recognition of educational documents" service description**: Refinement of a service description using Augmenter and INTERLINK: compare the process using a stand-alone tool (Augmenter) and the platform (INTERLINK). During the first task, team 1 followed the Augmenter/Servicepedia route whilst team 2 followed the Collaborative Enviroment route.
    - **Task 2: Refinement of "My Data in Cadastre" service description using different co-production models**: Refinement of a service description using different co-production models: compare the process using a generic co-production model and specific model for VARAM purposes. During the second task, team 1 - Collaborative environment used the "*Default co-production schema*", whilst team 2 - Collaborative environment used the "*Co-production schema to support co-refinement of* public service descriptions" of INTERLINK. All activities lasted 20' each.
5. Users completed an alpha questionnaire at the end of the two sessions that they were engaged in.

The outline of the whole session, celebrated on 6th May 2022, 12.00 - 14.00 EEST (11.00 - 13.00 CEST), is summarized in the following table:

Table 10. Outline of VARAM's cross-testing session

12.00 - 12.05	Introduction to the project
12.05 - 12.20	Introduction to the platform
12.20 - 12.50	Task 1: Refinement of a service description using Servicepedia (Augmenter) and INTERLINK - Compare the process using a stand alone tool (Servicepedia) and the platform (INTERLINK) - Find usability blockers and bugs. Provide feedback by filling alpha questionnaire in the last 5' of this session. Academic recognition of educational documents acquired abroad https://latvija.lv/en/PPK/dzives-situacija/apakssituacija/p11899/ProcesaApraksts
12.50 - 13.00	Feedback session reflecting about findings on Task 1.
13.00 - 13.30	Task 2: Refinement of a service description using different co-production models - Compare the process using a generic co-production model and specific model for VARAM purposes - Find phases, objectives, tasks and possible INTERLINKERs for an ideal co-refinement process. Provide feedback by filling alpha questionnaire in the last 5' of this session. My data in Cadastre: https://latvija.lv/en/Epakalpojumi/EP32/Apraksts
13.30 - 14.00	Feedback session reflecting about finding on Task 2 and Task 1.

As can be seen, feedback through two mechanisms was obtained:

- By fostering discussion and feedback from attendees to the meeting.
- Through the alpha questionnaires which was analysed offline, i.e. after the session.

The following bullet points summarize the feedback received from VARAM's alpha testers, at the end of the session. All this findings were gathered in a shared feedback document. The following points summarize it:

- The augmented version of public service description, as offered by Augmenter, is a nice environment to crowd-suggest refinements to web pages. It is thought as the most straightforward manner to coordinate refinement of a service description.

- Collaborative refinement process guided by specific purpose designed co-production process for VARAM is definitely useful and helps organizing the collaborative work. Still, Augmenter INTERLINKER being custom-made for this purpose was the preferred tool by cross-testing attendees.
- Augmenter's user experience could be enhanced making fonts, colours and icons more consistent.
- Augmenter's service descriptions' dashboard is useful, flexible but its use not obvious.
- It is hard to see how to link teams to processes in Collaborative Environment
- INTERLINKER, "resource" concept is not well understood, even confusing, new names for task status (TODO, IN-PROGRESS, DONE) should be considered in Collaborative Environment.

On the other hand, the following bullet points summarize the main insights gained by analysing the alpha questionnaires completed by session attendees:

- **What works well?**
  - Descriptions are comprehensive
  - There are ready-made templates for tasks
- **What does not work well?**
  - There are missing links and directions
  - Overall built of the environment is very complicated
- **What could be added?**
  - Steps must include links to concrete actions (e.g., redirect to action document) without vast texts and explanations while activity is running
- **What is missing?**
  - Customer support and contacts (regarding particular use case – whom to contact regarding service descriptions refinement if there is an issue)
  - INTERLINKERs must be renamed to resources, language localization
- **How to improve it?**
  - More user testing

Appendix Appendix D – Detailed feedback from VARAM's cross-testing session in pre-pilot subphase contains a dump of the feedback gathered in this session.

2.7.3 Cross testing session with ZARAGOZA

The aim of this cross-testing was celebrated on 23rd May 2022, where 8 alpha testers from Zaragoza were involved, was to assess whether the INTERLINK co-production

model and supporting tools were usable enough to extend its usage to a bigger number of beta users during pilot execution subphase.

The following bullet list enumerates the steps carried out with the Zaragoza team:

- This was a 1 hour session where representatives attending from Zaragoza were provided by User Acceptance Testing template, see Figure 36[11].
- The instructor from DEUSTO went through the whole process, step by step, involving the 8 Alpha testers from Zaragoza within the same team.
- Alpha testers got the opportunity to familiarize themselves with INTERLINK and to think aloud providing feedback.
- Regretfully 60' session finished without time to gather much feedback

TEST NO.	DESCRIPTION OF TASKS	STEPS TO EXECUTE	EXPECTED RESULTS	PASS	FAIL	DEFECT / COMMENTS / ADDITIONS
STEP1: Verify that users can log in and/or register to access the Collaborative Environment						
1	Log into the Staging Server	Click on "Access to Dashboard" button	DASHBOARD view is rendered: https://demo.interlink-project.eu/dashboard			
2		Click on button "Login" in dashboard page	AAC login/register page appears			
3		Register in the platform by clicking on Register option				
4		Log into the platform using Google login details	DASHBOARD view is presented which offers three main functionalities: a) co-production project management (WORKSPACE top menu option) team management; b) organizations and teams mangagement (ORGANIZATIONS top menu option) and c) CATALOGUE top menu option which provides access to INTERLINKER catalogue browsing, searching and filtering			
5		Log out by clicking on user icon at the top right hand side and then logout button	Pop up window appears asking you to confirm log out			
6						
STEP2: Organization and team management to initiate co-production process						
1	Create a new organization	Click on ORGANIZATION top menu and then on button "+Create new organization"	"Create a new organization" pops up with form to complete organization details			

Figure 36. Snapshot of User Acceptance Testing template.

As main conclusion from this session, Zaragoza alpha testers highlighted that it would be interesting to carry out some existing collaborative processes within eTopia through Collaborative Environment. For this reason, a template to define new co-production processes was made available[12] (see Figure 37). Such template is designed to help pilots declare possible new co-production processes which could be used for address their pilots' interests.

[11] This resource is publicly available in INTERLINK's GitHub repository backend-catalogue

[12] This New Schema Process Specification spreadsheet is also available at INTERLINK's GitHub repositories.

NEW SCHEMA PROCESS SPECIFICATION					
PHASE	OBJECTIVE	TASKS	PROBLEM PROFILES	INTERLINKERs	COMMENTS
Complete phases really needed in your concrete co-production process	Identify the objectives assigned to a phase	Identify the tasks associated to an objective	(They are encountered in https://github.com/interlink-project/interlinkers-data/blob/master/problemprofiles/problemprofiles.json)	(the problem profiles addressed by INTERLINKERS can be seen at https://demo.interlink-project.eu/catal)	Indicate expected behaviour regarding INTERLINKER recommendations, identify need for new INTERLINKERs that would be useful to carry out this task and which are not available currently in catalogue: https://demo.interlink-project.eu/catal

Figure 37. Snapshot of co-production tree template.

2.8. Conclusions pre-pilot subphase

The main outcome of the pre-pilot execution subphase has been the Usability enhancements carried out over the Collaborative Environment as result of pilots' feedback. As a matter of fact, a list of 30 issues was compiled as result of combining the reflections brought forward by carrying out the heuristic analysis, usability tests, cross-testing sessions with pilots' sites and Radboud partner, at the following publicly accessible shared spreadsheet: Usability enhancements for Collaborative Environment as result of pilots' feedback.

Figure 38 shows a snapshot of the spreadsheet where all usability enhancements were compiled. All the changes tagged as having high or medium priority were tackled before beta release of the solution was generated. Below a list of the identified issues ordered by priority is shown:

- Review behaviour in GUIDE view when INTERLINKER is added to task
- Unclear role of individual members in a group, rethink teams, team members and roles section
- Rethink some labels to reduce the difficulty of terms used
- Add some explanatory text to Guide View so that users understand better what they can do in such view
- Update documentation / user manual with new snapshots of environment
- Add support and feedback embedded forms within Collaborative Environment
- Enhance CATALOGUE view, tool tipping the purpose of the different filters available
- SCHEMA selection view usability: modify labels and descriptions in Schema selection view
- Simplify the DASHBOARD, renamed to WORKSPACE, view, it should only show co-production processes which is after all the essence of the environment
- Warning pop up window should be shown when actions with important effect on co-production process takes place
- Enhance and make uniform actions possible over a resource

- Consistency on validation of fields in forms of teams and processes
- Enhance guidance (step-by-step) for co-production process in OVERVIEW view
- Enhancements in WORKSPACE view
- Change logo for team and process image
- Review mappings of INTERLINKERs and tasks
- Reason about the order in which INTERLINKERs should be listed
- Tackle responsiveness issues with smaller screens, some menus disappear, too much horizontal scrolling
- GUIDE and WORKFLOW views interaction: Tree items manipulation and association of time spans
- Customize help to selected language
- Add functionality to publish successful resources
- Email notifications to team members when a task is performed.
- Pop-up closing Xs icon/button should be added
- Introduce tooltips over some critical elements, particularly actions that can be carried out over GUIDE view
- Issues with INTERLINKERs
- Review translations taking into account pilots requests
- Catalogue of best practices/success cases
- Hide email addresses of administrators

DETAILED DESCRIPTION OF PROBLEM	PRIORITY	SOLUTION PROPOSAL (outline of possible solution)	OBSERVATIONS	DONE
Email notifications to team members when a task is performed.	prio_medium	Send emails through SMTP server already configured in the project	Doable before end of July	YES
Review behaviour in GUIDE view when INTERLINKER is added to task	prio_high	- Ensure user giving place to a RESOURCE as result of making use of an INTERLINK notices it. Focus should be switched to newly created INTERLINKER - Ensure behaviour of instantiation of software and knowledge INTERLINKERs is uniform - Highlight the latest instantiated resource to focus user attention - Not too intuitive that you need to click on resource name to be able to open it as a new tab - Should we change states from AWAITING, IN PROGRESS and FINISHED to TODO, IN PROGRESS and DONE? - Rather than saying "Not set" minimalistic message, indicate in that yellow built-in alert box how to solve such situation, e.g. Time planification - Too restrictive to always have to assign a RESOURCE to a task, what if a resource is needed to record progress in an objective or phase. - It would be nice that whenever there are resources associated to task, these can be accessed by clicking on a node hanging from the task - Add one liner indicating that in Guide view to indicate that users can discover what objectives through which tasks enabled by what INTERLINKERs could be used.	To be done before end of June	YES
Pop-up closing Xs icon/button should be added	prio_medium	- A few users have reported that pressing ESC is not entererly intuitive - Help side panel should also have X icon as all pop-up windows	Assess what to do	YES
Unclear role of individual members in a group, rethink teams, team members and roles section	prio_high	- Required to change data model, providing access control at co-production process tree item level	- Improve user and role management, what is the role of unauntheticated users, email notifications when people are added to teams should be sent	YES

Figure 38. Usability enhancements for Collaborative Environment as result of pilots' feedback.

Observe how as result of this pre-pilot execution subphase, the Collaborative Environment evolved from alpha release, snapshots available at Appendix E – Collaborative Environment Alpha release, to beta release, snapshots available at Appendix F – Collaborative Environment Beta release. It is very noticeable that the Team view adding role management, the workspace and guide views were enhanced, taking into account the usability feedback. Besides, the workplan view was introduced. With this update of the INTERLINK platform we proceeded to the actual pilot execution open to beta testers.

3 Pilot execution subphase evaluation

This section describes the evaluation activities that were carried out at the use case pilots with the first beta release of the INTERLINK Collaborative Environment, in the period June 2022 to September 2022.

3.1. Approach followed in pilot execution subphase

As mentioned in section 1.2. Co-production enabling tools deployed at pilots, each of the pilots was equipped with a full deployment of INTERLINK Collaborative Environment, customized to such environment, and populated with the relevant stakeholders.

The departure point of this subphase was a validated environment which had undergone a set of usability improvements are reported in section 2.8. Conclusions pre-pilot subphase. The beta release of the Collaborative Environment was deployed in all pilots. You can have access to some of the snapshots of the beta release in Appendix F – Collaborative Environment Beta release.

Pilot owners at each of the pilots now had to arrange a set of activities conducting towards meeting the objectives at the three pilots. Below, a section is provided per pilot where a summary of the activities carried out towards the pilots' meeting goals are summarized.

This chapter finishes with an evaluation of the user behaviour and an assessment of the quality of the co-production process enabled by INTERLINK co-production model and supporting tools.

Figure 39. Evaluation stages of pilot execution subphase.

3.2. Pilot execution subphase at MEF

3.2.1. MEF pilot goals

MEF's use case goal is to test the INTERLINK's project Platform and its enablers to co-create a Participatory Strategic Planning Module (PSPM) through a co-design experience. As an Italian central Public Body, MEF aims to provide a practical example of collaborative approaches, becoming a hub to adopt bottom-up methodologies that favour user experience.

To this end, MEF/DSII involves various Public Bodies and Civil Servants, identified as key stakeholders, in the collaborative design of the MEF PSPM, through two pilot iterations. The first iteration had the goal of collecting expectations, requirements, and feedback from stakeholders to test the usability of the INTERLINK platform during the co-creation process of the PSPM, and co-design a blueprint of the PSPM, identifying with the stakeholders its core elements and functionalities.

The second iteration will entail further work on the INTERLINK platform, its enablers, and the MEF PSPM alongside some of the same and potentially new stakeholders to gather additional requirements and feedback, and co-design a mock-up of the PSPM.

3.2.2. MEF co-production approach

This section describes how co-production has been applied with the help of INTERLINK in this pilot.

Table 11. Co-production process carried out in MEF.

	STEPS OF CO-PRODUCTION SCENARIO	SUPPORT PROVIDED BY INTERLINK PLATFORM
ENGAGEMENT	MEF launched a communication campaign to make stakeholders aware about the initiative and use case's activities and goals to recruit participants to co-design the MEF PSPM blueprint.	Use of Awareness campaign INTERLINKER; use of Awareness creation INTERLINKER; use of User attraction INTERLINKER
	MEF gathered a network of interested stakeholders (MEF's staff civil servants from MEF as well as from and other Public Bodies; representatives from other Public Bodies)-to co-design a blueprint of the MEF PSPM, to be potentially adopted as best practice of collaborative and user-centred approach.	Tools and INTERLINKERs for stakeholder mapping and engagement as well as for information and data sharing

DESIGN	MEF prepared and organized specific co-design activities on the INTERLINK platform and with the use of specific INTERLINKERs. • For Public Bodies' representatives (MEF and other PAs Directorates), MEF coordination team prepared and shared an on-line survey to gather further inputs and suggestions for the PSPM blueprint co-design. • For Civil Servants, namely, DSII applications' operators and human resources, MEF Department Directors, MEF Data processors, MEF employees and other PAs operators and managers, MEF organized: ○ kick-off meeting ○ onboarding session ○ two online workshops The goal was to stimulate a discussion with the stakeholders engaged to share ideas and collect feedback on different needs and expectations, in order to co-design the MEF PSPM requirements and functionalities.	Service design tools for workshops, focus groups, and on-line surveys; provision of guidelines for co-design; ideas crowdsourcing and e-voting INTERLINKERs; user attraction INTERLINKERs; information and data sharing INTERLINKERs
	MEF, at the end of the pilot 1st iteration created a PSPM blueprint, considering the results of the co-design activities as well as stakeholders' feedback.	Tools: INTERLINKERs made available to support co-production process
EVALUATION	At the end of the pilot's 1st iteration, MEF questionnaires, surveys and interviews have been provided to ask stakeholders their feedback on the INTERLINK Platform and its INTERLINKERs, as well as on the PSPM potential functionalities which will be elaborated and assessed.	Quality of service monitoring to assess the quality of co-design process Templates

IMPLEMENTATION	A blueprint of the PSPM that supports participatory processes of consultation and transparency along the definition and implementation of strategic plans has been produced following the requirements and functional specifications collected during co-design. Two main functionalities have been identified for the PSPM: 1. Interface for Strategic Planning 2. Open Repository of Good Practices	Some building blocks already available in the INTERLINKER catalogue could potentially be re-used to aid some aspects of the implementation

3.2.3. MEF activities during pilot execution subphase

This section describes the list of activities that were carried out in the MEF pilot

Table 12. Engagement activities carried out in MEF pilot.

Date	Engagement phase	Activity type	Description	Participants	Takeaways
16/06/22	Inform Me	Awareness material	Sending of **reminder** of the kick-off meeting to beta testers	Audience: 60 public servants (38 M; 22 F); ICT skills: 1 – basic; 4 - intermediate ; 55 - advanced	Important to keep stakeholders aware of and engaged with pilot's activities
21/06/22	Guide Me	Training	**Kick-off meeting**: · Presentation of the INTERLINK Project and the MEF use case · Presentation of the INTERLINK platform (demo session), including MEF	Attendees: 47 public servants (32 M; 22 F)	Important to stakeholders' engagement and involvement as well as to create awareness about the INTERLINK
21/06/22	Inform Me	Awareness material			

21/06/22	Consult Me	Testing	collaborative environment Used components: INTERLINK collaborative environment; INTERLINKERs		solution and goals
21/06/22	Consult Me	Monitoring & Evaluation			
04/07/22	Inform Me	Awareness material	**Reminder** - Sending of reminders through the INTERLINKER 'Mailchimp'	Audience: 60 public servants (38 M; 22 F); ICT skills: 1 – basic; 4 - intermediate ; 55 - advanced	Important to keep stakeholders engaged with pilot's activities
05/07/22	Guide Me	Training	**Onboarding session:** · Open discussion/support to stakeholders (e.g. in registering to the INTERLINK platform) · Sharing/collecting expectations about co-design and use of INTERLINKERs · Overview of a strategic planning process and expectations about the MEF PSPM co-design · Filling-in of "baseline survey on strategic planning" to collect feedback and better prepare the activities for the next sessions/workshops Used components: INTERLINK	Attendees: 42 public servants (29 M; 13 F). Education*: [MT1] 7- High school diploma; 4- Bachelor degree; 21 - Master degree; 3- PhD ICT skills*: 2 - intermediate ; 35 - advanced	Important to verify stakeholders' successful registration on the INTERLINK platform; share and collect expectations about the co-design process and about the use of the INTERLINK platform and the INTERLINKERs
05/07/22	Work with Me	Testing			
05/07/22	Consult Me	Testing			

05/07/22	Consult Me	Monitoring & Evaluation	collaborative environment; INTERLINKERs		
11/07/22	Inform Me	Awareness material	**Reminder** - Sending of useful links and material through the INTERLINKER Mailchimp. Used components: INTERLINKERs	Audience: 60 public servants (38 M; 22 F); ICT skills: 1 – basic; 4 - intermediate ; 55 - advanced	Important to stakeholders' engagement and involvement as well as to create awareness about the pilot goals and activities
14/07/22	Consult Me	Awareness material	**Reflections** – Sharing of a document for stakeholders with trigger questions and key concepts to stimulate discussion on co-design Used components: INTERLINKERs	Audience: 60 public servants (38 M; 22 F); ICT skills: 1 – basic; 4 - intermediate ; 55 - advanced	Important to prepare the stakeholders, stimulate the discussion and collect feedback during the 1st workshop
21/07/22	Guide Me	Training	**1st co-design workshop:** · Initiate MEF PSPM co-design activities (requirements and potential functionalities) · Presentation of MEF's co-production process in the MEF collaborative environment (phases and steps, tools available) · Brainstorming on key elements/steps needed in the MEF PSPM	Attendees: 33 public servants (23 M; 10 F); Education*: 7- High school diploma; 3- Bachelor degree; 17 - Master degree; 3- PhD ICT skills*: 0- basic; 2 - intermediate	Important to collect feedback on requirements and potential functionalities of the PSPM from open discussion with stakeholders (divided into subgroups to facilitate interactions)
21/07/22	Work with Me	Testing			

21/07/22	Consult Me	Testing	· Brainstorming on users, user journey, functionalities, and accessibility of the PSPM and the INTERLINK platform Used components: INTERLINK collaborative environment; INTERLINKERs	; 30 - advanced	
21/07/22	Consult Me	Monitoring & Evaluation			
08/10/22	Inform Me	Other	**Explore the INTERLINK platform** – Sending of reminder to access the INTERLINK platform, navigate it, and review useful resources uploaded on it Used components: INTERLINK collaborative environment; INTERLINKERs	Audience: 60 public servants (38 M; 22 F); ICT skills: 1 – basic; 4 - intermediate ; 55 - advanced	Important to stakeholders' involvement as well as to share useful information and to get confident with the INTERLINK platform
13/09/22	Guide Me	Training	**2nd co-design workshop:** · Continuation and conclusion of co-design activities · Consolidation of inputs gathered useful for: 1) drafting the MEF PSPM blueprint; 2) improve the INTERLINK platform	Attendees: 31 public servants (20 M; 11 F); Education*: 3- High school diploma; 1- Bachelor degree; 19 - Master	Important to conclude co-design activities; consolidate the feedback received and make stakeholders aware of pilot's next steps
13/09/22	Work with Me	Testing			

13/09/22	Consult Me	Testing	· Presentation of pilot's next steps Used components: INTERLINK collaborative environment; INTERLINKERs	degree; 2- PhD ICT skills*: 0- basic; 2 - intermediate ; 24 - advanced	
13/09/22	Consult Me	Monitoring & Evaluation			
17/10/22	Guide Me	Training	**Interviews** – sending of surveys to a selection of MEF/other PAs Directors to collect further inputs on the MEF PSPM core elements and functionalities; the surveys also include an overview of the INTERLINK project as well as of MEF use case goals and activities	Audience: 8 PA Directors; 4 from MEF; 4 from other PAs (4M and 1F) Education*: all university graduates ICT skills*: all advanced	Important for gathering further inputs and suggestions for MEF PSPM co-design
17/10/22	Work with Me	Testing			
17/10/22	Consult Me	Monitoring & Evaluation			
TBD	Inform Me	Communication	**Blueprint presentation –** Sending of official communication to the stakeholders involved in both pre-pilot and pilot phases (alpha testers and beta testers) to present the PSPM blueprint	Audience: 60 public servants	Important to show the results of the PSPM co-design activities during the 1st iteration and highlight the importance of involved stakeholders' contributions

TBD	Inform Me	Communication	**Thank you email** – Sending of official communication to thank stakeholders for their involvement and to inform them about next steps	Audience: 66 public servants	Important to highlight the importance of involved stakeholders' contributions as well as to inform them about next steps and keep them involved in next pilot's activities

[MT1]* not all the attendees provided this information (we have included a note on this at the end of the table)

Next, a brief analysis of the community building process carried out in MEF is provided.

The following details sum-up **the profile of the stakeholders involved in this pilot activities**:

- Target audience:
  - Total number of stakeholders involved: 68 (60 public servants and 8 representatives of MEF/other PA Directorates)
    - Female (%): 32%
    - Male (%): 68%
  - Stakeholders' types:
    - Citizen (%): 0%
    - Public servant (%): 100%
    - Non-profit organization (%): 0%
    - For-profit organization (%): 0%
- Level of education:
  - Secondary school (%): 0%
  - High school diploma (%): 20.3%
  - Vocational training (%): 0%
  - University degree (%): 79.7%
- Digital tools knowledge level:
  - Basis level (%): 0%
  - Intermediate Level (%): 5.8%
  - Advanced Level (%): 94.2%
- Work status:
  - Unemployed (%): 0%

- Self-employed (%): 0%
- Employed (private sector) (%): 0%
- Employed (public sector) (%): 100%
- Retired (%): 0%

The following details sum-up **the profile of the stakeholders involved in the interviews conducted as part of the pilot activities**:

- Target audience:
  - Total number of stakeholders involved: 6 representatives of MEF/other PA Directorates
    - Female (%): 20%
    - Male (%): 80%
  - Stakeholders types:
    - Citizen (%): 0%
    - Public servant (%): 100%
    - Non-profit organization (%): 0%
    - For-profit organization (%): 0%
- Level of education:
  - Secondary school (%): 0%
  - High school diploma (%): 0%
  - Vocational training (%): 0%
  - University degree (%): 100%
- Digital tools knowledge level:
  - Basis level (%): 0%
  - Intermediate Level (%): 0%
  - Advanced Level (%): 100%
- Work status:
  - Unemployed (%): 0%
  - Self-employed (%): 0%
  - Employed (private sector) (%): 0%
  - Employed (public sector) (%): 100%
  - Retired (%): 0%

To summarize, this pilot's participants were mostly men, belonged to stakeholder group of exclusively Public Servants, an aspect explained by the fact that the pilot is envisaged as a government-to-government collaboration, had high education levels, and advanced digital tools knowledge and were all employed, again, an aspect explained by the fact that all the engaged stakeholders were Public Servants, and hence, already employed.

Table 12 contains the listing of activities carried out by MEF in pilot execution subphase. As a summary, the below table indicates what % of activities in each of the engagement levels defined were achieved.

- Number of activities: 28
- Classification of activities (% activities vs total number of activities):
  - Inform me activities: 29%
  - Guide me activities: 18%
  - Work with me activities: 14%
  - Consult me activities: 39%
- Average satisfaction level in activities: 3.83 (on a scale of 1 to 5)
- Target components:
  - Collaborative environment: 40%
  - INTERLINKERs: 60% (main INTERLINKERs used: Information Sheet for INTERLINK project; Google Drive, Loomio, Mailchimp, Consent Form for INTERLINK project; Demographic and activity satisfaction questionnaire; Final end user's questionnaire- Quality of Service; Guidelines for online-surveys). INTERLINKERs were used slightly more than the Collaborative Environment as some INTERLINKERs were linked to external software and some were used for internal purposes (e.g., Mailchimp for communications and templates / guidelines for the preparation of activities).

In summary, to carry out the co-production process defined in 3.2.2. MEF co-production approach, mix of different activities were carried out.

- **Inform me activities**: these activities were mainly aimed at **creating awareness among the stakeholders** about both (i) the INTERLINK project and MEF use case, and (ii) pilot's phases, actions foreseen and immediate next steps. To this end, information sheets, explanatory emails and useful material were shared with the stakeholders; reminders, communications and "calls-to-actions" were also regularly sent. These proved useful, among others, to establish a common understanding of the goals of the INTERLINK project and of the MEF use case, as well as to keep the stakeholders engaged in pilot activities.

- **Guide me / work with me activities**: the purpose of these activities was to **provide guidance to stakeholders** on how to access and navigate the INTERLINK platform and the MEF collaborative environment, on how to engage in ideas exchange and contribute to the co-design of the PSPM blueprint with the support of the INTERLINK platform and its enablers. To this end, among others, tutorials, explanatory communications, baseline survey, and guidelines were shared with the stakeholders, and live demo sessions of the INTERLINK platform and the MEF collaborative environment were performed. These proved useful to ensure that

active participation of the stakeholders was not hindered by technical issues or lack of understanding of tasks to be accomplished.

- **Consult me activities:** these actions were mainly aimed at **collecting useful feedback and valuable contributions from stakeholders** before and during the co-design activities of the PSPM blueprint, which was eventually drafted considering and including inputs received from the stakeholders. Open discussions, surveys and interviews, trigger questions and online live voting sessions were used as main tools to gather stakeholders' opinions and ideas. These proved useful to better frame stakeholders' prior experience in strategic planning and co-design as well as current similar activities carried out within their administrations (if any), and to understand the stakeholders' expectations about the PSPM.

3.2.4. MEF KPIs

This section describes the KPIs that were defined to measure the achievement of the goals of this pilot. Do remember that section "1.3.1. Evaluation goals" explains the different categories of KPIs that have been defined in INTERLINK.

Notice that annexes 6.1. INTERLINK global KPIs and 6.2. INTERLINK local KPIs gather the KPIs that were designed in D5.1 [1]. Some adaptations over the KPIs originally designed have been performed, which are commented under the "Comments" heading. Please also be aware that KPI numbering that includes a second numbering level, e.g. A1.2 are additional KPIs, not declared at specification time in D5.1, that have been defined to provide further information about the outcomes of the evaluation.

Table 13. KPIs for MEF pilot

A	INTERLINK Use and Co-production of Services	Objective	MEF	Comments
A1	**Number of INTERLINKERs used in an actual public service**	3	62	The large numbers of INTERLINKERs used relates to the iterative process of testing the collaborative environment and its INTERLINKERs to find the most suitable ones and test them before using them with external stakeholders.
A1.1	Number of software INTERLINKERs		5	
A1.2	Used software INTERLINKERs		Google Drive, Loomio Awareness	

			campaign tool	
A1.3	Number of used software INTERLINKERs		3	
A1.4	Number of external software INTERLINKERs		12	
A1.5	Number of external knowledge INTERLINKERs		12	
A1.6	Number of external INTERLINKERs		24	
A1.7	Number of knowledge INTERLINKERs		33	
A1.8	Used knowledge INTERLINKERs			
A1.9	Number of used knowledge INTERLINKERs		5	
A2	**Number of citizens involved in service customization**	0	0	This pilot only embarked in CO-DESIGN phase and did not involve citizens in iteration 1
A2.1	Number of citizens involved in co-delivered services		0	
A2.2	Number of citizens involved in co-designed services		0	
A3	**Number of INTERLINKERs with flag is_sustainabilty enabled**	1	5	In D5.1 was defined as "Number of partnership enablers used within INTERLINK service instance". Replaced by counting INTERLINKERs that can support CO-DELIVERY
A4	**Number of citizens registered to INTERLINK platform**	0	0	No citizens were involved in this pilot
A5	**Number of citizens involved in co-delivered services**	0	0	
A6	Number of teams		19	

A6.1	Number of public administration teams		18	
A6.2	Number of public administration teams involved in a co-production process		15	
A6.3	Number of citizen teams		0	
A6.4	Number of citizen teams involved in a co-production process		0	
A6.5	Number of TSO teams		1	
A6.6	Number of TSO teams involved in a co-production process		1	
A7	**Number of TSOs users**	1	4	The unexpected number of TSOs came from the inclusion in the workshop of SOGEI, MEF's in-house company that declared themselves as private sector employees in the surveys, while MEF, considers SOGEI – being a society dependant on a Public Body – part of the broader Public Administrations universe.
A8	**Number of TSO users involved in a co-production process**	1	4	
A9	**Number of public servants**	1	49	
A10	**Number of public servants involved in a co-production process**	1	48	
A11	**Number of new co-production processes**	1	17	The correct number should be 1, as during the pilot's first iterations the work iteratively focused on one unique co-production process. All the other processes are either tests conducted by MEF team or test conducted by MEF's stakeholders.
A11.1	Number of co-production processes in English		7	
A11.2	Number of co-production processes in Latvian		0	
A11.3	Number of co-production processes		10	

	in Italian			
A11.4	Number of co-production processes in Spanish		0	
A12	**Number of active users per month**	100	35	The month where most activity was found was in July, when 35 active users were using the platform.
A13	**Number of processes with teams of different stakeholders**	1	0	Originally defined as "Number and Percentage of shared services between PAs and citizens that were co-produced through INTERLINK platform". In the case of MEF all teams were of type public servants.
A14	**Number of TSO teams involved in a co-production process**		1	Formerly defined as "Number of private companies involved in co-delivered services"
A15	**Number of co-production processes involved in sustainability**		1	Formerly in D5.1 defined as "Self-sustained services (without public expenses)"
A16	**Percentage of users who completed the in-app questionnaires and made improved suggestions**	25%	25/71 = 35%	This value seems is aligned with the number of stakeholders that completed the activities questionnaires, which after all provided feedback about INTERLINK and its tools. 25 out of the 71 participants answered the questionnaires.
A17	**Number of INTERLINKERs reused in more than one co-production process**	1	3	Originally phrased as "Number of INTERLINKERs reused in more than one public service"
A18	**Number of assets**		33	
A18.1	Number of external assets		7	
A18.2	Number of internal assets		26	
A19	Number of organizations		7	
A206	Number of users		71	
A21	Average of members per team		4	
B	**THE VALUE PROVIDED BY INTERLINK**			
B1	Perception of reduction of administrative and management costs	3	5.0	

B2	Quantity of co-produced initiatives (baseline: number of previously co-produced public services)	3	1	While the number of co-production processes is 17, officially MEF conducted only 1 complex and long multi-team process iteratively throughout the first iteration, as it was the plan from the start.
B3	Quality of co-production initiatives	3	3.8	
B4	Increased participation of Public Bodies in customization of public services	3	12	As MEF's pilot did not include citizens or private entities, the KPI had to be modified to refer exclusively to other Public Bodies. The KPI should also consider that participation from other Public Bodies before was not existing and hence the baseline is zero.
B5	Increased participation of citizens and private entities in co-delivery of public services	> 50%	0	There is no increase as citizens or private entities were not the scope of the co-design process carried out by MEF.
C	**The Users' Perceptions of INTERLINK**			
C1.1	Usability assessment of INTERLINK and co-produced artefacts (in a scale 1-5) [Citizens]	4	5.0	
C1.2	Usability assessment of INTERLINK and co-produced artefacts (in a scale 1-5) [Others]	4	4.1	
C2.1	Trust assessment of INTERLINK and co-produced artefacts (in a scale 1-5) [Citizens]	4	3.6	Not achieved the expected trust level but got quite close to iteration 1's goal.
C2.2	Trust assessment of INTERLINK and co-produced artefacts (in a scale 1-5) [Others]	4	3.8	Not achieved the expected trust level but got quite close to iteration 1's goal.
C3.1	Acceptance assessment of INTERLINK and co-produced artefacts (in a scale 1-5) [Citizens]	4	3.0	Not achieved the expected trust level but got quite close to iteration 1's goal.
C3.2	Acceptance assessment of INTERLINK and co-	4	3.0	Not achieved the expected trust level but got quite close to iteration 1's goal.

	produced artefacts (in a scale 1-5) [Others]			
C4.1	Satisfaction level of different stakeholders with INTERLINK tools and INTERLINK-powered public services [Citizens]	80%	80%	
C4.1	Satisfaction level of different stakeholders with INTERLINK tools and INTERLINK-powered public services [Others]	80%	80%	
D	**Pilot specific KPIs**			
D1	Number of Public Bodies involved in co-design of PSPM	>= 3	12	While the original target was lower, MEF committed to engage as many administrations as possible to obtain the expected results.
D2	Number of civil servants involved in co-design of PSPM	>= 45	56	
D3	Number of INTERLINKERs used in the PSPM model	>= 5	14	The number of INTERLINKERs used during the experimentation and testing phases of the platform is larger, but 14 INTERLINKERs, both knowledge and software ones were used during the co-design of the PSPM blueprint.
D4	Number of features contributed by external stakeholders to include into the PSPM model	>= 5	11	The active discussion with stakeholders during the workshops allowed for the integration of their requests and expectations, generating an actual co-design of MEF's PSPM blueprint.
D5	Increased representativeness of stakeholders during the co-testing phase	>=25%	62.5%	Through a specific question to the stakeholders' engaged, 62.5% agreed that an approach like the one used for the co-design of MEF's PSPM blueprint increased the representativeness of stakeholders.
D6	Perceived efficiency gains of the strategic planning process (value creation) thanks to INTERLINKERs	>35%	70.8%	As a result of the co-production questionnaire at the end of the first iteration activities, 70% of respondents agreed that a platform like INTERLINK and its INTERLINKERs could provide an increase in the efficiency of participatory strategic planning procedures.

3.2.5. MEF's reflection on KPIs

This section performs a summary of the obtained results during the pilot's first iteration.

- *"A. INTERLINK Use and Co-production of Services"*. It shows that many INTERLINKERs were used during the testing of the platform and experimenting, while a smaller number was used during the actual activities. On this section, it is important to note that some categories were not applicable to MEF's pilot, and hence the values were zero, like those linked to citizens or third sector organizations. Finally, we noted there might be some incongruence with the numbers automatically collected from the platform and the actual experience of MEF's co-production work; particularly, MEF conducted only one co-production process iteratively during the entire first iteration, however, both MEF's coordination team and stakeholders' trials in the platform were detected.
- *"B. THE VALUE PROVIDED BY INTERLINK"*. INTERLINK proved a valuable approach to engage and co-design a new service alongside stakeholders that enjoyed testing and discovering an innovative platform and approach. It is also worth noting the clear increase in external stakeholders' participation, being originally non-existent on MEF's strategic planning, the new approach allowed us to include 12 other Italian Public Administration in the co-design of a new PSPM blueprint.
- *"C. The Users' Perceptions of INTERLINK"*. Users were consulted through a survey at the end of the last workshop conducted and showed high satisfaction levels (80%) with the platform and that its usability was above our expectations (above 4.0 in a scale of 1-5). We noted, however, some values slightly lower than originally targeted for acceptance (3 instead of 4 in a scale of 1-5) and trust (3.7 instead of 4 in a scale of 1-5). While we cannot speculate on the sentiments behind the responses provided, level of acceptance and trust could be increased moving forward to the second iteration, particularly considering the higher levels of satisfaction and usability.
- *"D. Pilot specific KPIs ..."*. On the pilot specific KPIs, we noted that the quantitative ones were more tangible and hence, more accessible both to calculate and interpret, while the measurement and interpretation of the qualitative ones might need refinement going forward as the means of verification are based exclusively on perception and a single question on a longer questionnaire. In that sense, we managed to engage 9 more Administrations than originally planned as well as 56 Civil Servants instead of 45, due to a high level of effort and commitment to the project. In the same manner, the number of INTERLINKERs used during the experimentation and testing phases of the platform resulted in a larger than planned number (14 instead of 5).

The active discussion with stakeholders during the workshops allowed for the integration of their requests and expectations, generating an actual co-design of MEF's PSPM blueprint.
Finally, to specify the challenges of the qualitative KPIs, we aimed at assessing them through specific questions about stakeholders' perception. 62.5% of stakeholders agreed that an approach like the one used for the co-design of MEF's PSPM blueprint increased the representativeness of stakeholders; and 70% of respondents agreed that a platform like INTERLINK and its INTERLINKERs could provide an increase in the efficiency of participatory strategic planning procedures.

3.2.6. Reflections on MEF's pilot execution subphase

The core of the activities carried out during MEF pilot 1st iteration was the organization of **two online co-design workshops**.

The **goal of the first workshop** was to **initiate the PSPM co-design activities**, focusing on requirements and potential functionalities. The session included a presentation of the MEF co-production process, and the tools available within the MEF collaborative environment. Then, the stakeholders were divided into two subgroups for performing some (3) exercises:

- Brainstorming on the key elements/steps needed in a PSPM
- Brainstorming on potential key users and their involvement in the PSPM
- Brainstorming on functionalities and accessibility of the PSPM and the INTERLINK platform

Each exercise was facilitated by the use of the collaborative tool 'Google Jamboard', where the stakeholders directly included their contributions.

Figure 40. Output of the brainstorming during the first workshop

The main objective of the **second workshop** was to **continue and conclude the co-design activities**, with the aim of **consolidating the inputs gathered** and facilitate (a) the drafting of the MEF PSPM blueprint and (b) the INTERLINK platform improvement. During the meeting, a flow chart showing the main stages of the participatory strategic planning was presented, and selected features were further discussed and voted trough the INTERLINKER **'Loomio'**.

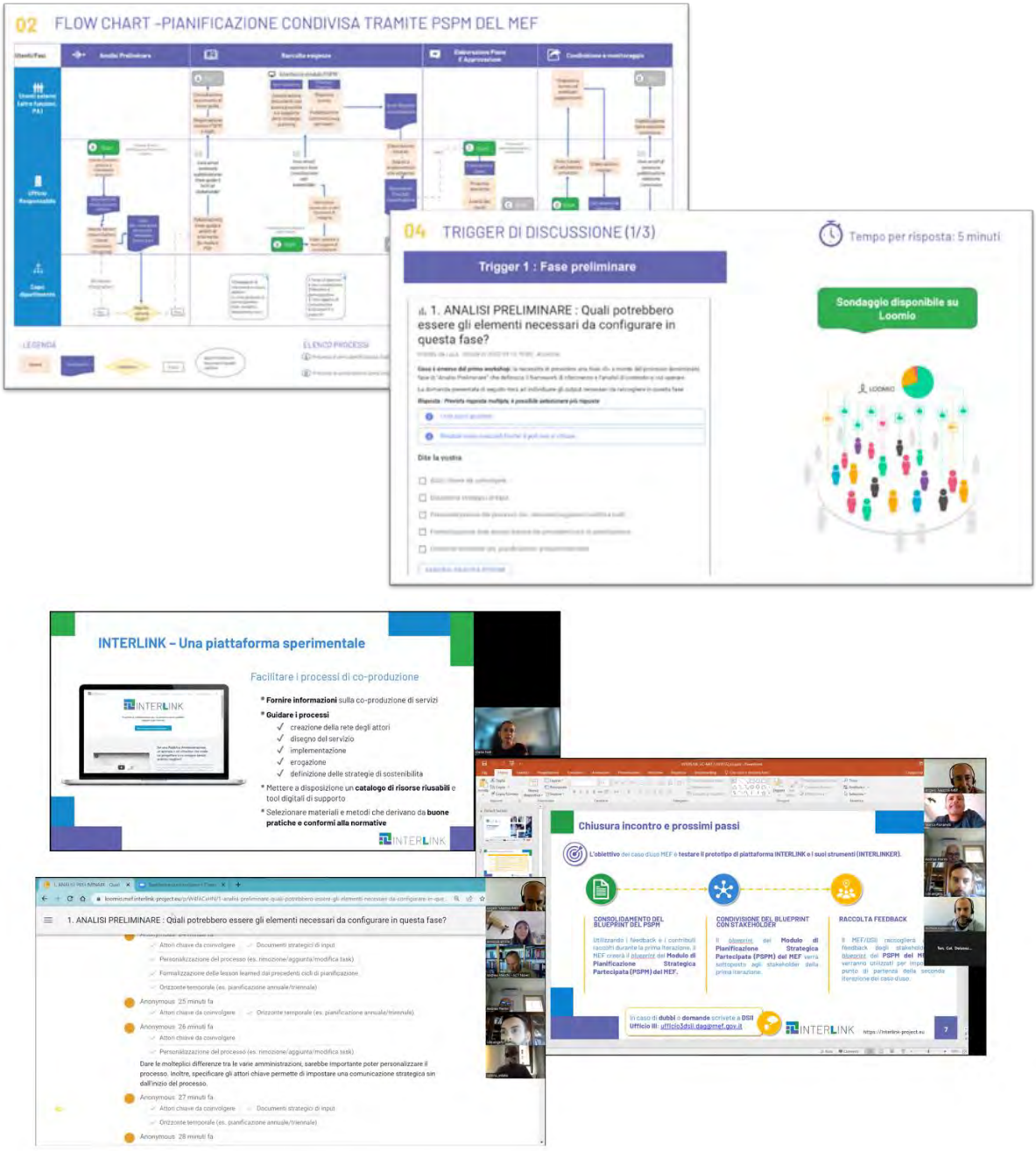

Figure 41. Highlights of the second workshop

Below some success strategies from MEF pilot first iteration, which enabled the co-production process:

- Since the meetings with the stakeholders (and related pilot activities) took place almost entirely during the summer months (June-early September), **sending regular communications and call-to-actions** proved to be useful to ensure

participation and active involvement of the stakeholders. To this end, the INTERLINKER 'Mailchimp' (external software) was particularly valuable, because it allowed sending communications with catching design (e.g. with the INTERLINK project logo and a MEF-representative image) as well as including intuitive direct links to useful materials and to the INTERLINK platform

- Before the two co-design workshops, an **"onboarding session"** was held; among the actions performed, stakeholders were asked to fill-in a "**baseline survey on co-design and strategic planning**" drafted by the MEF UC coordination Team. This activity was helpful in grasping stakeholders' prior experiences and first expectations, and tailor the co-design workshops accordingly
- During the onboarding session, a live, open discussion on PSPM expected requirements and functionalities was organized; to facilitate interaction, the stakeholders were **divided into subgroups**. However, it was noticed that in the various subgroups the discussion was not equally participated or fruitful. Apart from stakeholders' different previous experience with the topics analysed, this could potentially be attributed to three factors: (i) lack of adequate time during the open discussion to formulate opinions and provide contributions; (ii) different personal attitudes of the people involved towards the open discussion setting; or (iii) insufficient collaborative tools supporting the open discussion. Based on the above:
  - A document with keywords, key concepts, and trigger questions on the PSPM was shared with the stakeholders before the first workshop, **to allow them to be better prepared for the upcoming exchange of ideas**, and
    - **The use of online collaborative tools** (including INTERLINKERs for information and data sharing; INTERLINKERs for crowdsourcing of ideas and e-voting) **was incremented** during the two workshops. These tools considerably enabled the discussion and allowed to collect more inputs, visualize, and vote the alternative options previously discussed as well as to find and fix the stakeholders' preferences on selected features.

After the conclusion of the wide-audience workshops, MEF conducted interviews to 3 Manager/Directors of MEF and 3 Manager/Directors of other Italian Public Administration. The goal of the interviews was to collect contributions and suggestions aimed at enriching the co-design of MEF's PSPM blueprint.

The proven experience in strategic planning and co-design of Managers and Directors of the Italian Public Administration allowed for the collection of key insights. Some of these included that technological platforms such as INTERLINK are currently and generally not used to perform strategic participatory planning activities.

Also, that there is a lack of participatory strategic planning culture, as well as a lacking share of vision and objectives. Conversely, the lack of interest of stakeholders and the clear definition of roles do not represent critical elements.

The interviewees agreed on the validity and completeness of a participatory strategic planning flow which includes the following five phases: preliminary analysis, collection of needs, monitoring, elaboration and sharing of the plan, collection of feedback. The interviewees agreed in considering the preliminary analysis and feedback collection phases as the most relevant ones.

All interviewees agreed on the need to provide a phase of gathering the needs of external stakeholders as part of a Participatory Strategic Planning process. Periodic meetings, and in particular focus groups and workshops, are considered the most suitable tools to gather the needs. Similarly, the interviewees agreed on the importance and need to allow external stakeholders to follow the progress of the Participatory Strategic Planning process throughout its implementation phase.

The presence of space suited for collaborating represents the most suitable method, together with the sharing of intermediate and periodic reports. Finally, the interviewees agreed on the importance of including an Open Repository among the functionalities of a Participatory Strategic Planning Module of the MEF, i.e., a tool through which to consult methodologies, approaches, and good practices of strategic planning to support co-design processes. An interesting feature that emerged from the interviews is the possibility of equipping the PSPM with a message/chat feature that can inform stakeholders on the progress and actual completion of certain phases of the process.

3.3. Pilot execution subphase at VARAM

3.3.1. VARAM pilot goals

The aim of this pilot has been to improve the provision of unified municipal services through the improvement of service descriptions available on the Latvian State Portal (https://latvija.lv/EN). Through involvement of various stakeholders in the co-production process VARAM tried to make them more useful and accessible. The need arose from the conclusion provided by Unified State and Municipal Client Service Centres (CSC) which encounter clients who have all means of digital access to public services but choose to do so in person or with CSC assistance due to the complicated service descriptions and confusing instructions.

3.3.2. VARAM co-production approach

This section describes how co-production has been applied with the help of INTERLINK in this pilot. Considering that this pilot iteration was not designed to fully represent all

phases to be carried out digitally. For example, only through the INTERLINK collaborative environment, several steps were performed in a face-to-face environment as VARAM organised on-site workshops in several municipalities.

Table 14. Co-production process carried out in VARAM.

PHASES	STEPS OF CO-PRODUCTION SCENARIO	SUPPORT PROVIDED BY INTERLINK PLATFORM
ENGAGEMENT	• VARAM starts the co-production initiative • Gathers the network of interested stakeholders (local PAs, representatives of CSC employees, representatives of Digital Agents) • VARAM sets the goals of the co-production project and its work plan together with stakeholders • They informally specify current issues with service descriptions to give context to the problem to be solved	Carried outside of INTERLINK collaborative platform through manual arrangement of interested groups, project presentation and introductory discussion of the problem
DESIGN	• They decide to pilot test Augmenter/Servicepedia, one of the reusable INTERLINKERs available inside the INTERLINK platform • They use other INTERLINKERs if they see them beneficial for design phase (typically Google Documents)	Selection of "Augmenter/Servicepedia" INTERLINKER available in the INTERLINKER catalogue
IMPLEMENTATION	• The Augmenter/Servicepedia component is prepared to be used in the VARAM use case context	INTERLINK technological components offer a configuration procedure for their reuse
	• Members of the stakeholders network need to be trained on the use of the Augmenter/Servicepedia	Steps supported by INTERLINK collaborative environment (trained manually by VARAM representatives)
	• VARAM selects a set of services for which description improvements are required • CSCs and Digital Agents can give opinions on which are the candidate services	Steps supported by the INTERLINK collaborative environment
	• When service descriptions are agreed upon, they are uploaded in the Servicepedia • CSC employees, Digital Agents, Citizens, and other interested parties provide their comments and suggestions for service descriptions	Functionalities supported by the "Servicepedia" INTERLINKER
SUSTAINABILITY	• Incentives to encourage contributions to the Servicepedia are put in place	Use of gifts for all participants - gifted manually (normally INTERLINK collaborative

		environment would provide some incentives to be exchanged for a reward)

3.3.3. VARAM activities during pilot execution subphase

This section describes the list of activities that were carried out in the VARAM pilot. Since the VARAM pilot targeted municipal digital services, it was decided to expand activities geographically to include groups from various municipalities in size and location (Figure 42). Total number of beta testing workshops was 11, and the total number of municipalities visited - 10. Each workshop was accompanied with INTERLINK project presentation, short training and demonstration and feedback session after performing tasks and filling surveys. Thus, such activities from categories "guide me", "work with me" and "consult me" were performed together in respective locations visited.

Figure 42. Geographic distribution of VARAM pilot activities (alpha and beta testing workshops) in Latvia (red - big cities; blue - towns; yellow - villages).

Table 15. Engagement activities carried out in VARAM pilot.

Date	Engagement phase	Activity type	Description	Participants	Takeaways
17/06/22	Inform me	Awareness	Announcement of pilot start in Latvia. Press release. Two social media posts on pilot start associated with the press release.	Targeted towards the public.	It legitimised our activities as information was distributed through official VARAM channels.

06/07/22	Guide me Work with me Consult me	Training Testing Evaluation & Monitoring	Beta testing workshop 1 in the town of Preiļi, Latvia. Event consisted of project presentation, INTERLINK demonstration, practical tasks, survey completion, and feedback discussion.	5 participants 5 female / 0 male 3 citizens / 4 PA 3 Bachelor's Degree / 2 Master's Degree 5 Advanced digital skills 5 Employed (public sector)	Small groups are effective for testing functionalities of the technical solution but are limited when it comes to citizen sourcing for service improvement.
07/07/22	Guide me Work with me Consult me	Training Testing Evaluation & Monitoring	Beta testing workshop 2 in the town of Kuldīga, Latvia. Event consisted of project presentation, INTERLINK demonstration, practical tasks, survey completion, and feedback discussion.	11 participants 7 female / 4 male 7 citizens / 7 PA / 1 Private sec / 1 NGO 1 High School / 4 Bachelor's Degree / 6 Master's Degree 10 Advanced / 1 Intermediate digital skills 11 Employed (public sector) / 1 Self-employed	Technically advanced group which showed that people who work with digital platforms daily can intuitively understand also INTERLINK purpose and functionalities. Such people must be trained as administrators of co-production processes.
11/07/22	Inform me	Awareness	Information on first successful pilot workshops. Press release. Two social media posts on celebrated events.	Targeted towards the general public.	Reminding the general public about ongoing pilot study.

12/07/22	Guide me Work with me Consult me	Training Testing Evaluation & Monitoring	Beta testing workshop 3 in the city of Liepāja, Latvia. Event consisted of project presentation, INTERLINK demonstration, practical tasks, survey completion, and feedback discussion.	<u>13 participants</u> 10 female / 3 male 9 citizens / 7 PA / 1 Private sec / 1 High School / 3 Bachelor's Degree / 6 Master's Degree / 1 PhD 7 Advanced / 3 Intermediate / 1 Basic digital skills 9 Employed (public sector)	The group expected technical difficulties with Servicepedia which showed that technical conditions of the infrastructure must be checked before launching co-production initiatives. It reduced the amount of results as the group had a good potential.
20/07/22	Guide me Work with me Consult me	Training Testing Evaluation & Monitoring	Beta testing workshop 4 in the village of Priekuļi, Latvia. Event consisted of project presentation, INTERLINK demonstration, practical tasks, survey completion, and feedback discussion.	<u>4 participants</u> 2 female / 2 male 4 citizens / 1 PA / 1 Private sec / 1 NGO 1 Vocational School / 3 Bachelor's Degree 3 Advanced / 1 Intermediate 4 Employed (public sector) / 2 Self-employed	As with the first workshop, it was successful in exploring INTERLINKERs for various tasks of the co-production process. It was small, thus the group took a lot of initiative.
28/07/22	Guide me Work with me Consult me	Training Testing Evaluation & Monitoring	Beta testing workshop 5 in the village of Pūre, Latvia. Event consisted of project presentation, INTERLINK demonstration, practical tasks, survey completion, and feedback discussion.	<u>10 participants</u> 10 female / 0 male 5 citizens / 2 PA 3 Vocational School / 2 Master's Degree 1 Advanced / 4 Intermediate digital skills	This group consisted mostly of people who have limited digital skills. For them digital co-production seemed more complicated than working in person. Some participants did not proceed with practical

				5 Employed (public sector)	tasks but observed the work of others.
03/08/22	Guide me Work with me Consult me	Training Testing Evaluation & Monitoring	Beta testing workshop 6 in the town of Bauska, Latvia. Event consisted of project presentation, INTERLINK demonstration, practical tasks, survey completion, and feedback discussion.	<u>10 participants</u> 9 female / 1 male 6 citizens / 1 PA 6 Vocational School / 4 Bachelor's Degree 7 Advanced / 2 Intermediate / 1 Basic digital skills 10 Employed (public sector) / 1 Employed (private sector)	The group gathered people from various parts of the municipality (towns and villages) and worked well together. The end result was good, and participants showed interest in sustainability of INTERLINK.
17/08/22	Inform me	Awareness	Two social media posts on events celebrated.	Targeted towards the general public.	Reminding the general public about ongoing pilot study.
24/08/22	Guide me Work with me Consult me	Training Testing Evaluation & Monitoring	Beta testing workshop 7 in the city of Jelgava, Latvia. Event consisted of project presentation, INTERLINK demonstration, practical tasks, survey completion, and feedback discussion.	<u>8 participants</u> 8 female / 0 male 7 citizens / 1 PA / 2 NGO 2 High School / 1 Vocational School / 5 Master's Degree 6 Advanced / 2 Basic digital skills	The group was very active in improving the service description. It is important for others to see a process administrator who is trusted, both personally and as a person with good digital skills.

				3 Employed (public sector) / 2 Employed (private sector) / 4 Retired	
26/08/22	Guide me Work with me Consult me	Training Testing Evaluation & Monitoring	Beta testing workshop 8 in the city of Jūrmala, Latvia. Event consisted of project presentation, INTERLINK demonstration, practical tasks, survey completion, and feedback discussion.	7 participants 6 female / 1 male 6 citizens / 1 PA / 1 Private sec / 1 NGO 4 Bachelor's Degree / 2 Master's Degree 2 Advanced / 2 Intermediate / 2 Basic digital skills 5 Employed (public sector)	The group performed activities in a relaxed manner, more like explorers of a new way of working together. This approach still yielded results but their main interest was in functionalities of INTERLINK and sustainability.
07/09/22	Guide me Work with me Consult me	Training Testing Evaluation & Monitoring	Beta testing workshop 9 in the town of Tukums, Latvia. Event consisted of project presentation, INTERLINK demonstration, practical tasks, survey completion, and feedback discussion.	9 participants 8 female / 1 male 3 citizens / 8 PA 1 High School / 6 Bachelor's Degree / 1 Master's Degree 7 Advanced / 1 Intermediate 8 Employed (public sector)	Specific PA targeted workshop. Enthusiastic group which was happy to see the process from the citizen's perspective, too. The group gave valuable insights about the service description creation process from a PA perspective.

12/09/22	Guide me Work with me Consult me	Training Testing Evaluation & Monitoring	Beta testing workshop 10 in the town of Sigulda, Latvia. Event consisted of project presentation, INTERLINK demonstration, practical tasks, survey completion, and feedback discussion.	<u>8 participants</u> 6 female / 2 male 3 citizens / 6 PA 1 High School / 3 Vocational School / 2 Bachelor's Degree / 1 Master's Degree 6 Advanced / 1 Intermediate digital skills 7 Employed (public sector) / 1 Employed (private sector)	Group with good digital skills and interest in the project. However, they encountered technical problems with Servicepdia, thus not allowing them to perform tasks entirely. It signals the project to work on the reliability of all tools for the second iteration.
14/09/22	Guide me Work with me Consult me	Training Testing Evaluation & Monitoring	Beta testing workshop 11 in the town of Ogre, Latvia. Event consisted of project presentation, INTERLINK demonstration, practical tasks, survey completion, and feedback discussion.	<u>15 participants</u> 14 female / 1 male 6 citizens / 10 PA / 1 NGO 2 Vocational School / 10 Bachelor's Degree/ 2 Master's Degree 14 Advanced digital skills 14 Employed (public sector) / 2 Employed (private sector)	Active group which split into two teams. They worked well on descriptions and expressed interest to participate in the second iteration. Good choice of process administrators proved beneficial also this time.
22/09/22	Inform me	Awareness	Two social media posts on events celebrated.	Targeted towards the general public.	Reminding the general public about ongoing pilot study.

28/09/22	Inform me	Awareness	Final press release and post on VARAM website on successful completion of the pilot study iteration. Two social media posts.	Targeted towards the general public.	Informing on conclusion and reminding the general public of the second iteration in 2023.

Next, a brief analysis of the community building process carried out in VARAM is provided. VARAM notes that 89 participants out of 100 filled demographic data surveys, and percentages are counted taking 100 participants as a basis.

The following details sum-up **the profile of the participants in VARAM's pilot activities**:

- Target audience:
  - Total number of stakeholders involved: 100
    - Female (%): 85 (85%)
    - Male (%): 15 (15%)
  - Stakeholders' types (some of them overlap):
    - Citizen: 59 (59%)
    - Public servant: 48 (48%)
    - Non-profit organization: 6 (6%)
    - For-profit organization: 4 (4%)
- Level of education:
  - Secondary school: 0 (0%)
  - High school diploma: 6 (6%)
  - Vocational training: 16 (16%)
  - University degree: 67 (67%)
- Digital tools knowledge level:
  - Basis level: 6 (6%)
  - Intermediate Level: 15 (15%)
  - Advanced Level: 68 (68%)
- Work status (some of them overlap):
  - Unemployed: 0 (0%)
  - Self-employed: 3 (3%)
  - Employed (private sector): 6 (6%)
  - Employed (public sector): 81 (81%)
  - Retired: 4 (4%)

In summary, this pilot participants had an overwhelming majority of female participants. It can be explained by the fact that women make up a majority of public sector employment and are more active in local communities. Most participants had

university level education and represented both citizens and public administration in a rather balanced ratio. Most of the people possessed advanced digital skills. Participants tended to be employed in the public sector while other forms of employment made up an insignificant part of the participants' pool.

Table 15 contains the listing of activities carried out by VARAM in the pilot execution subphase. As a summary the below table indicates what % of activities in each of the engagement levels defined were achieved.

- Number of activities: 41
- Classification of activities (% activities vs total number of activities):
  - Inform me activities: 8 (19%)
  - Guide me activities: 11 (27%)
  - Work with me activities: 11 (27%)
  - Consult me activities: 11 (27%)
- Average satisfaction level in activities: helpfulness 3,1; interest 3,8; usefulness 3,5; topicality 3,4.
- Target components:
  - Collaborative environment
  - Augmenter INTERLINKER
  - Google Drive

Notice that Loomio and Collaborative Editor were tested but not actually pushed from the pilot.

Overall, in order to facilitate the co-production process and meet KPIs, VARAM decided to organise an extensive number of workshops as shown in Table 15. It helped to reach a diversity of stakeholders and produce a significant amount of feedback, both about co-production process and technical improvements for future releases of INTERLINK collaborative environment. It is reflected in statistics of VARAM pilots. However, due to the nature of the use case and digital tools used, there is no gender balance and people with weak digital skills are excluded, even though they are the ones who would benefit most from the service description improvements.

3.3.4. VARAM KPIs

This section describes the KPIs that were defined to measure the achievement of the goals of this pilot.

Notice that annexes 6.1. INTERLINK global KPIs and 6.2. INTERLINK local KPIs gather the KPIs that were designed in D5.1. Some adaptations over the KPIs originally designed have been performed, which are commented under the "Comments" heading. Please also be aware that KPI numbering that includes a second level, e.g. A1.2 are additional

KPIs that have been defined to provide further information about the outcomes of the evaluation.

Table 16. KPIs for VARAM pilot.

A	INTERLINK Use and Co-production of Services	Objective	VARAM	Comments
A1	**Number of INTERLINKERs used in an actual public service**	3	62	Because each workshop worked with different service descriptions, the number of INTERLINKERs is significantly higher. Participants did not re-use INTERLINKERs used by other teams.
A1.1	Number of software INTERLINKERs	-	5	
A1.2	Used software INTERLINKERs	-	Google Drive, Collaborative editor, Augmenter, Loomio	Augmenter was instantiated 22 times, being the most used INTERLINKER, followed by Google Drive INTERLINKER which was instantiated 9 times, whilst the other two INTERLIKERs were instantiated once.
A1.3	Number of used software INTERLINKERs	-	4	
A1.4	Number of external software INTERLINKERs	-	12	
A1.5	Number of external knowledge INTERLINKERs	-	12	
A1.6	Number of external INTERLINKERs	-	24	
A1.7	Number of knowledge INTERLINKERs	-	33	
A1.8	Used knowledge INTERLINKERs	-	Template for semi structured interview, Template for user journey, Consent Form for INTERLINK project, Information Sheet for INTERLINK project, Stakeholders identification analysis	They were not used often. Only tested in very few processes, once or twice per knowledge INTELINKER.

			template guidelines, Business Model Canvas	
A1.9	Number of used knowledge INTERLINKERs	-	6	
A2	**Number of citizens involved in service customization**	100	51	VARAM considers this KPI to be met because there were 100 participants involved in workshops (they did take part in service customization). Some of them were registered as PA or other types of stakeholders based on administrator's preference. However, first and foremost each participant approached the activity from a citizen's perspective and they were allowed to overlap with PA and other types of stakeholders because VARAM allowed recruitment of participants to be autonomously performed in each location.
A2.1	Number of citizens involved in co-delivered services	-	0	There was no co-delivery intended in the first iteration.
A2.2	Number of citizens involved in co-designed services	-	51	Look at A20 for the overall number of users that connected to INTERLINK.
A3	**Number of INTERLINKERs with flag is_sustainabilty enabled**	3	5	The original KPI was "Number of partnership enablers used within INTERLINK service instance". It was updated to accommodate to what was modelled in the platform.
A4	**Number of citizens registered to INTERLINK platform**	100	53	Actual number of users is at least 107 based on signed consent forms of participation. In here, they are reflected only those that defined themselves as "citizens" according to what users declared. A20 shows the global number of users making use of the Collaborative Environment.
A5	**Number of citizens involved in co-delivered services**	25	51	Same as A2, since in the co-production process specifically defined for VARAM pilot participants also contributed to phase RUN which corresponds to the co-delivery part of a process.
A6	Number of teams	-	25	
A6.1	Number of public administration teams	-	12	
A6.2	Number of public	-	10	

	administration teams involved in a co-production process			
A6.3	Number of citizen teams	-	10	
A6.4	Number of citizen teams involved in a co-production process	-	8	
A6.5	Number of TSO teams	-	3	
A6.6	Number of TSO teams involved in a co-production process	-	3	
A7	**Number of TSOs users**	5	10	
A8	**Number of TSO users involved in a co-production process**	5	10	
A9	**Number of public servants**	5	43	Significant number of local PA stakeholders were attracted as the activity was relevant to them. Local contact points usually were in close touch with the public sector.
A10	**Number of public servants involved in a co-production process**	5	42	Almost all local PA stakeholders managed to be involved in at least a co-production process.
A11	**Number of new co-production processes**	1	59	Relevant number of co-production processes is 12. However, a lot of participants used the opportunity to try out the administrator's role by creating their test process and to see the opportunities provided by the collaborative environment.
A11.1	Number of co-production processes in English	-	7	
A11.2	Number of co-production processes in Latvian	1	52	Relevant number of co-production processes is 12. All the datasets were created in Latvian
A11.3	Number of co-production processes in Italian	-	0	
A11.4	Number of co-production processes in Spanish	-	0	
A12	**Number of active users per month**	100	61	Number of 100 users was reached gradually and it should be the same as registered users (at least 100). Users were active at

				workshop times and it was recorded throughout different times within pilot iteration. The month were most activity was found was in August.
A13	**Number of processes with teams of different stakeholders**	1	2	Users that took part in the pilot activities qualified themselves as public servants and/or citizens
A14	**Number of TSO teams involved in a co-production process**	-	3	
A15	**Number of co-production processes involved in sustainability**	1	0	
A16	**Percentage of users who completed the in-app questionnaires and made improved suggestions**	25%	89%	Percentage of participants who answered the activity satisfaction survey (thus making sure that they stayed until the end of the event) and were present in feedback discussion sessions. Face-to-face discussions were organised as extended versions of in-app questionnaires as VARAM had a possibility to collect feedback directly from participants.
A17	**Number of INTERLINKERs reused in more than one public service**	2	3	
A18	Number of assets	-	33	
A18.1	Number of external assets	-	2	
A18.2	Number of internal assets	-	31	
A19	Number of organizations	-	24	
A20	Number of users	-	111	
A21	Average of members per team	-	5	
B	**THE VALUE PROVIDED BY INTERLINK**			
B1	Perception of reduction of administrative and management costs	3	4.0	In a scale of 1 to 5, it was perceived that INTERLINK helped to reduce administrative and management costs

B2	Quantity of co-produced initiatives (baseline: number of previously co-produced public services)	3	10	There was none. In case of this iteration, it can be perceived as 10 if service descriptions' enhancement is counted.
B3	Quality of co-production initiatives	3	3.7	In a scale of 1 to 5, it was perceived that INTERLINK generally helps to enhance the quality of co-production initiatives.
B4	Increased participation of citizens and private entities in customization of public services	> 50%	> 100 %	There is no baseline as there were no such activities before. KPI is met but without a specific number.
B5	Increased participation of citizens and private entities in co-delivery of public services	> 50%	0	There was no co-delivery in this iteration.
C	**The Users' Perceptions of INTERLINK**			
C1.1	Usability assessment of INTERLINK and co-produced artefacts (in a scale 1-5) [Citizens]	4	4.1	In a scale 1-5, the results indicates that INTERLINK was considered overall usable.
C1.2	Usability assessment of INTERLINK and co-produced artefacts (in a scale 1-5) [Others]	4	3.8	A lot of usability requirements were collected; there is a room for improvement.
C2.1	Trust assessment of INTERLINK and co-produced artefacts (in a scale 1-5) [Citizens]	4	3.3	Participants raised questions about data storage which resulted in lower trust than intended.
C2.2	Trust assessment of INTERLINK and co-produced artefacts (in a scale 1-5) [Others]	4	3.5	Participants raised questions about data storage which resulted in lower trust than intended.
C3.1	Acceptance assessment of INTERLINK and co-produced artefacts (in a scale 1-5) [Citizens]	4	3.5	Participants were slightly confused if this solution is the most effective for co-production tasks
C3.2	Acceptance assessment of INTERLINK and co-	4	3.4	Participants were slightly confused if this solution is the most effective for co-production tasks

	produced artefacts (in a scale 1-5) [Others]			
C4.1	Satisfaction level of different stakeholders with INTERLINK tools and INTERLINK-powered public services [Citizens]	80%	77%	Close to the target, however, based on C1.1 - C3.2 KPIs, there is room for improvement in order to reach the target.
C4.1	Satisfaction level of different stakeholders with INTERLINK tools and INTERLINK-powered public services [Others]	80%	76%	Close to the target, however, based on C1.1 - C3.2 KPIs, there is room for improvement in order to reach the target.
D	**Pilot specific KPIs**			
D1.1	Number of service descriptions improved through INTERLINK	>= 3	10	Almost every location visited by VARAM was representing different municipalities, thus there were 10 different services used for workshops. However, the content of services was based on 4 possibly unifiable municipal services across all municipalities (Social services for disabled; Registration of address; Registration of a kid in the queue for kindergarten; Registration of a kid for educational institution) https://latvija.lv/PPK/dzives-situacija/apakssituacija/p11451.s5902.t289/ProcesaApraksts https://latvija.lv/PPK/dzives-situacija/apakssituacija/p2679.s7936.t12/ProcesaApraksts https://latvija.lv/PPK/izglitiba/pirmsskolas-audzinasana/p4853.s5903.t111/ProcesaApraksts https://latvija.lv/PPK/izglitiba/pirmsskolas-audzinasana/p12147.s5903.t595/ProcesaApraksts https://latvija.lv/PPK/izglitiba/pirmsskolas-audzinasana/p8155.s5903.t89/ProcesaApraksts

				https://latvija.lv/PPK/izglitiba/pirmsskolas-audzinasana/p8478.s5903.t9/ProcesaApraksts https://latvija.lv/PPK/dzives-situacija/apakssituacija/p8064.s5902.t11/ProcesaApraksts https://latvija.lv/lv/PPK/izglitiba/pirmsskolas-audzinasana/p4545/ProcesaApraksts https://latvija.lv/PPK/socialie-pakalpojumi/invaliditates-pakalpojumi/p8394.s7935.t432/ProcesaApraksts One of the services is already removed (no link) and is offered only centrally through state-wide unified service.
D1.2	Perceived improvement in service descriptions thanks to INTERLINK from citizens perspective	>= 50%	56%	Calculated as a share of choices of 4 and 5 in the scale 1-5 of the evaluation of the statement "Due to Augmenter/Servicepedia, the options to consume this service are increased"
D1.3	Perceived improved productivity in collaboratively enhancing public service descriptions	>= 50%	56%	Calculated as a share of choices of 4 and 5 in the scale 1-5 of the evaluation of the statement "The use of INTERLINK collaborative tools reduces the general difficulty in co-producing public services".
D1.4	Municipalities involved in INTERLINK pilot	> 3	10	Almost every location visited by VARAM was representing different municipalities, thus there were 10 different municipalities represented.
D1.5	Digital agents involved in INTERLINK pilot (trained)	>10	24	Digital agents were specifically targeted for events and their turnout was twice as high as expected. Several of them were VARAM contact points for recruitment of participants in workshop locations.

3.3.5. VARAM's reflection on KPIs

Overall, VARAM was able to meet KPIs, and even KPIs which were not met showed only slight deviation. It means that with certain improvements in digital tools (collaborative environments and INTERLINKERs), it is possible to meet them in the second pilot

iteration. Not all KPIs automatically counted could produce the right result (especially KPIs on participants and their profile), thus manual tracking of several KPIs was performed in parallel through collecting participation consent forms and questions in questionnaires. VARAM's reflection on categories of KPIs is as follows:

- *"A. INTERLINK Use and Co-production of Services"*. VARAM managed to include all types of stakeholders it intended. The final number of participants was 107, including alpha testers. There was a higher number of PA representatives, and it can be explained with recruitment practice where local contact persons invited interested parties for workshops, mostly concentrating on the public sector. However, the task set by VARAM was designed to be carried out from a citizen's perspective.
  The processes were not re-used but created every time for each new workshop, thus increasing the number of them. It might be beneficial to try also re-using processes in the next iteration.
  Instead of simply filling out short in-app questionnaires, VARAM opted for deeper conversation at the end of each workshop, to collect more qualitative feedback which is reflected in other parts of this chapter. Detailed feedback was provided to consortium members.
- *"B. The Value Provided by INTERLINK"*. KPIs in this category show that participants see the benefit in such digital solutions, both in reduction of the use of resources and increased quality of co-production initiatives. However, it is hard to assess the level of increase of such opinion as co-production initiatives in the field of digital services were not implemented before the INTERLINK project by VARAM.
- *"C. The User's Perceptions of INTERLINK - Integrate Here Quality"*. Most of the KPIs in this section were not met, however, deviations are small. VARAM was able to indicate several reasons from qualitative discussions why participants hesitated to assign higher scores in these categories. One of the concerns was about data storage and privacy as participants did not understand who stores co-production data where and for how long ("Who's Google Drive is it?"). For some participants face-to-face co-production seemed more effective. Also, there were a lot of usability requirements collected which indicated that usability of the collaborative environment and INTERLINKERS does not meet expectations of users yet.
- *"D. Pilot specific KPIs"*. All KPIs were met, and some of them exceeded expectations. There was a very high activity of digital agents in this pilot iteration which also helped in recruitment of testers. Also, since groups of participants were relatively small, VARAM involved a much higher number of municipalities than intended in the pilot-planning period.

3.3.6. Reflections on VARAM's pilot execution subphase

In summary, VARAM activities carried out in recruitment of participants and organisation of activities in all parts reflected the idea of a co-production process in the INTERLINK collaborative environment. Even though for the most part activities were carried out face-to-face (Figure 43) to get significantly more feedback about the process and future technical improvements, they were equivalent to tasks set out in co-production trees in the collaborative environment.

Figure 43. INTERLINK workshops led by VARAM in various locations in Latvia (from top left: in towns of Bauska, Kuldīga, Sigulda, and Ogre)

VARAM was determined to expand the geography of events, thus contacted several local municipalities, digital centres, and libraries, and introduced the project's idea to a contact person in each location. After that, the local contact person was responsible to gather participants and build a network of stakeholders for the workshop (ENGAGEMENT phase). Workshops consisted of project presentation, training, and demonstration sessions led by VARAM, after which participants worked together in a collaborative environment with service description improvement (DESIGN phase). After that survey and feedback session concluded the event. Although the collaborative environment has no rewards system yet, VARAM rewarded all participants with a gift and representation materials (see Figure 44) physically as it is important to keep them engaged and involve them in awareness building of the project.

VARAM also kept the public engaged about pilot activities by utilising VARAM social media and disseminating press releases, primarily to locations where workshops took place. During the pilot iteration VARAM produced 10 social media posts and 3 press releases[13]. Even though this topic is specific, such an approach together with established stakeholders' networks throughout Latvia in pilot iteration 1 will help VARAM to set up the use case and possible participants' pool for the pilot iteration 2.

Figure 44. INTERLINK representation materials and a gift for VARAM pilot iteration 1 participants (a notebook, a pen and a solar power bank)

Two activities in towns of Kuldīga and Ogre highlighted the importance of administrators with good digital skills. Co-production processes need enthusiastic and skilful facilitators, thus it is a prerequisite for a successful use of a collaborative environment. Regardless of technological complexity, good administrators can

motivate other participants to carry out tasks and reach the group's goals. Also, small groups proved to be more efficient and creative (as seen in workshops of Preiļi and

[13]Press releases disseminated and published on VARAM website. Also, accompanying social media entries were created. https://www.varam.gov.lv/lv/jaunums/sakusies-horizon-2020-projekta-interlink-tehniska-risinajuma-sadarbibas-vides-testesanas-pirma-karta
https://www.varam.gov.lv/lv/jaunums/veiksmigi-noritejusi-interlink-platformas-testesana
https://www.varam.gov.lv/lv/jaunums/noslegusies-horizon-2020-projekta-interlink-tehniska-risinajuma-sadarbibas-vides-testesanas-pirma-karta

Priekuļi). Whenever there is a larger co-production initiative, a small pilot workshop before its launch could be beneficial. It would help the process administrator to find even more ways of reaching the goal besides the intended scenario.

Pain points are mostly related to lack of enthusiastic process administrators. Co-production participants then feel lost and unable to switch between various tasks and interfaces within a collaborative environment. Administrator creates resources and assigns permissions, and people trust them.

Also, the registration process has proven to be complicated. Even though the process itself is a standard procedure, Latvian participants were not informed (within a collaborative environment) in any step that they cannot use diacritics in their names as well as that the password must include a certain set of characters. It created confusion in the very beginning of each workshop, and that was not the right way to start the activity.

3.4. Pilot execution subphase at ZGZ

3.4.1. ZGZ pilot goals

The aim of Zaragoza pilot overall is to:

1. Provide a digital layer to our physical co-creation and co-delivery activities
2. Increase our internal productivity through better reporting, tracking, and booking, also creating a data feedback loop for agile improvement
3. Improve the citizen perception in our brand as a City Making Center through a more accessible and open catalogue of services
4. Promote the transition from users to co-producers and co-deliverers from an agile and "open source" approach.
5. Enhance the engagement and participation level of the communities around Etopia_ including its co-governance through tokenization and gamification.

However, the first iteration of our pilot (now completed) has addressed the two first goals of the above list, since they are the first truly building blocks of what Zaragoza still aims to achieve through INTERLINK.

Specifically, we aimed at testing whether the Collaborative Environment provided by INTERLINK could effectively address the needs of the co-creation, co-design and co-production of Etopia_.

Regarding the activity booking module, the objectives in this first iteration of the project were to test them in parallel with the tool that the centre is currently using, to address gains in productivity and usability.

3.4.2. ZGZ co-production approach

This section describes how co-production has been applied with the help of INTERLINK in this pilot.

Table 17. Co-production process carried out in ZGZ.

	STEPS OF CO-PRODUCTION SCENARIO	SUPPORT PROVIDED BY INTERLINK PLATFORM
ENGAGEMENT	ZGZ launched a new participatory process named "Habitar Etopia" to co-create (with the communities of the "Etopia centre for Arts and Technology") its goals, governance scheme, sustainability model, as well as some of its services and facilities.	INTERLINK provides the technical, methodological and support framework into which the process fits.
	ZGZ gathers a network of interested stakeholders (Etopia's staff and other Public and Private Bodies). These correspond to the institutions and agents involved in running or programming the centre). In this first iteration the agents are mainly those involved in eTOPIA programming, int the second iteration these activities will be opened to the public (or at least to a wider group of stakeholders).	INTERLINK provides the users and stakeholders typology (personas) that allowed Zaragoza to thoroughly address the otherwise complex task of stakeholder mapping and role definition.

DESIGN	ZGZ prepared and organized specific co-design activities on the Collaborative Environment and with the use of specific INTERLINKERs. ● For internal staff, a whole set of activities around the design of the Activity Booking INTERLINKER. ● For internal as well as external stakeholders a set of workshops on the collaborative environment was also organized. The goal is to stimulate a discussion with the stakeholders engaged to share different needs, expectations, and ideas in order to co-design the new module functionalities.	INTERLINK provided for this task: ● service design (canvas) tools for workshop, ● interviews and surveys; ● provision of guidelines for co-design;
	ZGZ, at the end of the pilot 1st iteration and using the stakeholders' feedback, started the co-design of several new public services: 1. Cafetopia: mostly internal 2. Environmental campaigns for kids & schools: external During the next weeks we will closely monitor how the communities respond to both challenges, so we can extract conclusions on the suitability of the collaborative environment to co-creation experiences involving internal and external stakeholders.	Tools: INTERLINKERs collaborative environment.

EVALUATION	At the end of the pilot 1st iteration, questionnaires, surveys and one-to-one interviews were provided to ask stakeholders their feedback on the INTERLINK Platform and its INTERLINKERs, as well as on the new developed tools. For ZGZ the more valuable feedback came from the attendees as experts in collaborative processes.	Users' feedback questionnaires and KPIs monitoring systems.
IMPLEMENTATION	The outcome of this pilot is the implementation of a new tool (the activity booking module) with extensive features to enhance productivity inside Etopia. It is the result of a co-design with internal staff and the technical partners of the project.	As a matter of fact the Event Organizer (accessible in INTERLINK's catalogue) external software INTERLINKER has been created.

3.4.3. ZGZ activities during pilot execution subphase

This section describes the list of activities that were carried out in the ZGZ pilot.

Table 18. Engagement activities carried out in ZGZ pilot.

Date	Engagement phase	Activity type	Description	Participants (*)	Takeaways
14/02/22	Inform me	Communication	Habitar Etopia_ was a first event promoted by Zaragoza City Council to bring together all the agents involved in the innovation ecosystem of Etopia in a co-creation and co-design session to generate and manage new services based on	**Number attendees:** 56 **Target audience:** Citizens & public servant & non-profit organisation & for-profit organisation	Communicate the start of the testing phase of the INTERLINK project to a broad community that involves people who, although not active in this first iteration of the Zaragoza pilot, are part of our community. Some of them will have a more active role in the second iteration of the pilot. Our goal is to

			the existing relationships between them. In this session we presented the possibilities of Interlink.		keep them informed of the progress even when their participation is minimal.
25/03/22	Inform me	Communication	First working session with the group of alpha testers and the development team to present the collaborative platform and discuss its potentials.	**Number attendees:** 12 **Target audience**: Citizens & public servant & non-profit organisation & for-profit organisation	Make the testers feel that they are an important part of the project from the beginning.
20/04/22	Inform me	Communication	Launch of the pilot in Zaragoza - Informal meeting to communicate explain INTERLINK in a practical way to the staff. Hunt for people with different profiles among the staff to be testers.	**Number attendees:** 17 **Target audience:** Citizens & public servant & non-profit organization & for-profit organization	Brief tour of the collaborative environment recalling the use scenarios of Zaragoza and the possible fit of the tool to carry them out.
18/05/22	Guide me	Testing	Onboarding session - First contact of the testers with the collaborative environment. Enabling the collaborative environment for the Zaragoza pilot. (test of credentials and access for some testers).	**Number attendees:** 6 **Target audience:** Citizens & public servant & non-profit organization & for-profit organization	It was important to gather the testers to register and access the platform to familiarize them with the environment and use it to give their impressions on the potential of the collaborative environment as a co-design tool. The testers were also asked to think about features

					that might be missing as well as to report any problems they might find when testing the tool.
23/05/22	Guide me	Testing	Training with Deusto on some functionalities of the Collaborative Environment.	**Number attendees:** 6 **Target audience:** Citizens & public servant & non-profit organization & for-profit organization	The activity was important to better understand the workflow of the collaborative tool before doing a course with more agents. It was also useful to clarify some problems detected with user registration as well as with the addition of registered users to teams.
06/07/22	Inform me	Training	Planning and design of training sessions on the collaborative environment and INTERLINKERs for testers to be held during the month of July.	**Number attendees:** 4 **Target audience:** Citizens & public servant & non-profit organization & for-profit organization	Although tests and mini-workshops were carried out with the collaborative environment (some of them led by Deusto), it was noticed that the testers were not very motivated to use the collaborative environment, so it was decided to hire an expert in collaborative approaches to conduct a course that would link the collaborative environment with a real co-design process.

					In the design of the workshop, we tried to take into account the experience gained so far through the feedback from the testers. We involved an expert in collaborative processes to make the design of the course more attractive and relevant. We informed the expert about the aim of the INTERLINK project in general and the Zaragoza use case in particular. With this information we designed a course that, on the one hand, would allow users to use the tool fluently and, on the other hand, would be as practical as possible. To achieve this objective, a topic was chosen to be co-created using the collaborative environment. All course participants would work on this topic together.

29/06/22	Guide me	Communication	Reminder and practical information on the session scheduled for July to selected participants. An invitation and an explanatory email describing what the training would consist of was sent. https://drive.google.com/file/d/1QcQkPwyyZQtV5v_8hChtg0pH4dIf26Pk/view?usp=sharing The mailing also included a form for attendees to choose from 3 possible topics they would like to co-create with the tool: https://docs.google.com/forms/d/e/1FAIpQLScsdvWmsWTUdJ4QwoedbA_RVGDcGWveEV7CWKvsN1Rm7_djow/viewform?fbzx=-4442835918276899020	**Number people:** 22 **Target audience:** Citizens & public servant & non-profit organization & for-profit organization	Preparing the mailing and processing the responses to it enabled us to fine-tune the content of the course to the topic that was chosen by the majority of respondents.
28/08/22	Guide me	Communication	Reminder email including even more detailed documentation and instructions to follow to register for the training session.	**Number people:** 22 **Target audience:** Citizens & public servant & non-profit organisation & for-profit organisation 16 consent forms 16 demographics & activity satisfaction questionnaires	

				6 final end users' questionnaires 5 co-producers' questionnaires	
07/09/22	Work with me	Workshops	Collaborative Environment. Cafetopia I. People who are part of the eTOPIA ecosystem, including staff from the city council, the FZC, the university and the business incubators.	**Number attendees:** 15 **Target audience:** Citizens & public servant & non-profit organisation & for-profit organisation 16 consent forms 16 demographics & activity satisfaction questionnaires 6 final end users' questionnaires 5 co-producers' questionnaires INTERLINKERs used: - Template for use case scenarios - 10 x External resources - Stakeholder types guidelines	The event brought together various types of stakeholders (all from the eTOPIA ecosystem) who tested the collaborative environment. Some participants provided suggestions for improving the user experience in using the collaborative environment. The event was important because it was intended to get a feel for what it would be like to implement a tool such as the Collaborative Environment in the co-creation processes that are usually carried out at Etopia. Almost all the attendees were the people who lead the participatory processes at the centre. Their opinion is of utmost importance. Evaluation questionnaires were filled providing data for analysis

14/09/22	Work with me	Workshops	Collaborative Environment. Cafetopia II	**Number attendees:** 15 **Target audience**: Citizens & public servant & non-profit organization & for-profit organization	There was a great debate on the importance of agility in the co-production of services that took up a significant part of the course. We highlight this because working with the tool implies an important time effort. For example, to customize the co-creation scheme to the specific needs of each co-production process requires extra time which is not always available. We are used to working with more agile and flexible co-creation processes (our work methodology is closely in line with Lean Startup methodologies with fast iterations to achieve a minimum viable product soon).
19/09/22	Consult me	Monitoring	Breakfast meeting: Informal meeting with the attendees of the two co-creation workshops on their impressions around the Collaborative Environment as a potential tool for co-creation	**Number attendees:** 5 **Target audience:** Citizens & public servant & non-profit organization & for-profit organization	The session is important because the feedback obtained from the participants gave an idea of the popularity of the tool and how easy/difficult it can be to implement it as a tool to be used on

			processes.		a daily basis by the team.
28/09/22	Work with me	Training	Training session II with "Cloud'N'Sci" on eTOPIA's activity booking module. Testing the functionality of the tool. Objectives: 1.- Testing the functionality of the tool 2.- Solving doubts about the information flow of the tool 3.- Requesting changes/improvements: Roles and authorisation levels for users, removal of superfluous information, small bugs detected, etc.	**Number attendees:** 5 **Target audience:** Citizens & public servant & non-profit organization & for-profit organization	Cloud'N'Sci enabled a form to report bugs and possible malfunctions that may arise with the use of the tool: https://docs.google.com/document/d/1ZnGuCMaso57bE6hSYPLRwEUC0S3xvoXBE0tdKMTlejg/edit The first version of the tool was available for testing later than expected. The summer period did not help to progress at the expected pace. However, communication with Cloud'N'Sci has been very fluid and fruitful throughout the implementation phase of the tool. There are still some proposals to be applied to the tool to improve its usability and to better adapt it to Zaragoza's needs (we are working with Cloud'N'Sci) to incorporate them.

(*) More detailed information on gender, type of work, technology skills, etc. is available at: https://docs.google.com/spreadsheets/d/1C2GMDfnR6RfcEHFMw7_rVp0Zk6ngO9lF6GNWCt42yWE/edit#gid=2040411598 (Not all activities asked about this data).

The ZGZ activity table collects the following information about participants: gender, type of stakeholder, educational level, knowledge of digital tools and employment status.

As relevant data on the participants who took part in the various activities, it should be noted that there was a good gender balance, in fact slightly more women than men attended.

In terms of technological skills, the bulk of the participants have an advanced level and only a few can be rated as medium level in this regard.

Regarding work status, the Zaragoza pilot in this first phase of the project has focused mainly on working with the internal agents that comprise its core. Namely: University staff, ZGZ staff, ZFK staff and business incubator staff. For this reason, the diversity of work status of the participants is almost entirely circumscribed to these 2 options:

- Employed (public sector)
- Employed (private sector)

Next, a brief analysis of the community building process carried out in ZGZ is provided.

The following details sum-up **the profile of the participants in this pilot activities**:

- Target audience:
  - Total number of stakeholders involved: 56
    - Female (%): 35 (62,5%)
    - Male (%): 21 (37,5%)
  - Stakeholders' types:
    - Citizen (%): 4 (7,15%)
    - Public servant (%): 24(42,8%)
    - Non-profit organization (%): 14 (25%)
    - For-profit organization (%): 12 (21,4%)
- Level of education: (data relating only to those who participated in "work with me" activities -16 people-)
  - Secondary school: 0 (0%)
  - High school diploma: (0%)
  - Vocational training: 4(25%)
  - University degree: 12(75%)
- Digital tools knowledge level: (data relating only to those who participated in "work with me" activities -16 people-)

  - Basis level:0 (0%)
  - Intermediate Level: 5 (13,25%)
  - Advanced Level: 11(68,75%)
- Work status (data relating only to those who participated in "work with me" activities -16 people-):
  - Unemployed: 0 (0%)
  - Self-employed: 1 (6,25%)
  - Employed (private sector):7 (43,75%)
  - Employed (public sector): 8(50%)

Table 18 contains the listing of activities carried out by ZGZ in the pilot execution subphase. As a summary, the below list indicates what % of activities in each of the engagement levels defined were achieved.

- Number of activities: 12
- Classification of activities (% activities vs total number of activities):
  - Inform me activities: 4 (33,3%)
  - Guide me activities: 4 (33,3%)
  - Work with me activities: 3 (25%)
  - Consult me activities: 1 (8%)
- Average satisfaction level in activities (3.2): helpfulness 3,0; interest 3,8; usefulness 2,5; topicality 3,4.
- Target components:
  - Collaborative environment. Some INTERLINKERs (Canvas, User Map, google docs, Template for use case scenarios - 10 x External resources - Stakeholder types guidelines) were instantiated in the Cafetopia co-creation process.
  - Activity booking module, named Event Organizer in Catalogue. (Booking + Calendar).

We have provided evidence through photos that were taken in some activities. In other cases, evidence is provided in the form of documents (emails, reports, programs, etc.). All this information is detailed in the activity sheet provided for this purpose, which has been completed for each activity carried out by Zaragoza.

Just as an example, these are some graphic pieces of evidence of the Zaragoza pilot.

Figure 45. Habitar Etopia_ to bring together all the agents involved in the innovation ecosystem of Etopia.

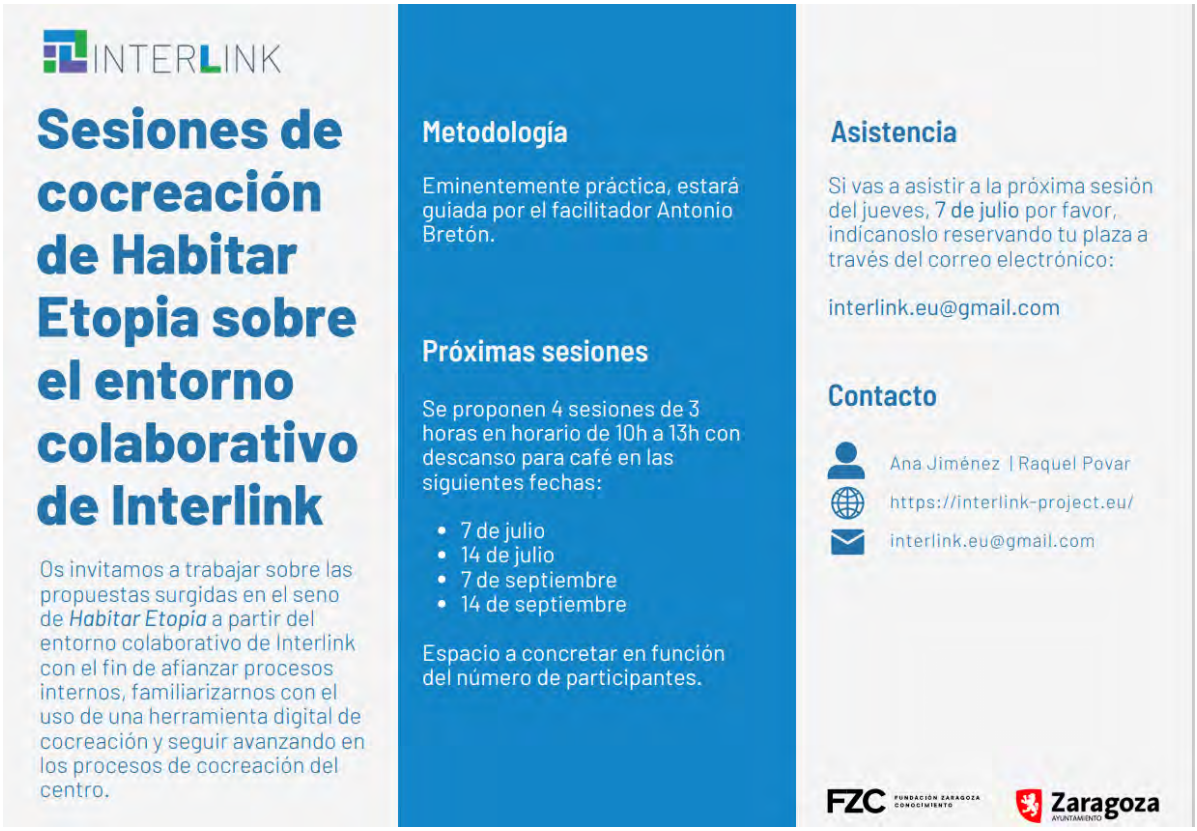

Figure 46. Reminder and additional information on the practical session scheduled for July.

Figure 47. Collaborative Environment. Cafetopia II event.

Figure 48. Collaborative Environment. Cafetopia I with people who are part of the eTOPIA ecosystem.

Figure 49. Training session II with "Cloud'N'Sci" on eTOPIA's calendar and resource booking application.

3.4.4. ZGZ KPIs

This section describes the KPIs that were defined to measure the achievement of the goals of this pilot.

Notice that annexes 6.1. INTERLINK global KPIs and 6.2. INTERLINK local KPIs gather the KPIs that were designed in D5.1 [1]. Some adaptations over the KPIs originally designed have been performed, which are commented under the "Comments" heading. Please also be aware that KPI numbering that includes a second level, e.g. A1.2 are additional KPIs that have been defined to provide further information about the outcomes of the evaluation.

Table 19. KPIs for ZGZ pilot.

A	INTERLINK Use and Co-production of Services	Objective	ZGZ	Comments
A1	**Number of INTERLINKERs used in an actual public service**	3	62	As a matter of fact, Google Drive mainly was the software INTERLIKER mostly used.
A1.1	Number of software INTERLINKERs	-	5	
A1.2	Used software INTERLINKERs	-	Google Drive Augmenter	Google Drive: 15 times Augmenter: once
A1.3	Number of used software INTERLINKERs	-	2	
A1.4	Number of external software INTERLINKERs	-	12	
A1.5	Number of external knowledge INTERLINKERs	-	12	
A1.6	Number of external INTERLINKERs	-	24	
A1.7	Number of knowledge INTERLINKERs	-	33	
A1.8	Used knowledge INTERLINKERs	-	Stakeholder types guidelines Stakeholders Mapping Canvas	Stakeholder types guidelines: 2 times Stakeholders Mapping Canvas: once Template for use case scenarios: 2 times Stakeholders' identification analysis template guidelines: 2 times Demographic and activity satisfaction

			Template for use case scenarios Stakeholders' identification analysis template guidelines Demographic and activity satisfaction questionnaire	questionnaire: once
A1.9	Number of used knowledge INTERLINKERs	-	5	
A2	**Number of citizens involved in service customization**	100	18	It is expected that in iteration 2 a wider involvement of citizens will occur.
A2.1	Number of citizens involved in co-delivered services	-	0	
A2.2	Number of citizens involved in co-designed services	-	18	All citizens that took part did it in co-design activities.
A3	**Number of INTERLINKERs with flag is_sustainabilty enabled**	3	5	Rephrased from "Number of partnership enablers used within INTERLINK service instance". Now, it refers to Number of INTERLINKERs that promote sustainability used in co-production processes
A4	**Number of citizens registered to INTERLINK platform**	100	19	
A5	**Number of citizens involved in co-delivered services**	50	0	Same as A2.1, in ZGZ citizens participation was in the co-design stages of the co-production process
A6	Number of teams	-	8	
A6.1	Number of public administration teams	-	1	
A6.2	Number of public administration teams involved in a co-production process	-	1	
A6.3	Number of citizen teams	-	4	
A6.4	Number of citizen teams involved in a	-	3	

	co-production process			
A6.5	Number of TSO teams	-	3	
A6.6	Number of TSO teams involved in a co-production process	-	2	
A7	**Number of TSOs users**	2	11	
A8	**Number of TSO users involved in a co-production process**	2	10	
A9	**Number of public servants**	2	4	
A10	**Number of public servants involved in a co-production process**	2	1	People that took part in the activities mostly belonged to non-profit organizations (foundations) rather than being direct civil servants
A11	**Number of new co-production processes**	3	13	
A11.1	Number of co-production processes in English	-	6	
A11.2	Number of co-production processes in Latvian	-	0	
A11.3	Number of co-production processes in Italian	-	0	
A11.4	Number of co-production processes in Spanish	-	7	
A12	**Number of active users per month**	100	10	Users were active at workshop times, and it was recorded throughout different times within pilot iteration. The month where most activity was found was in September.
A13	**Number of processes with teams of different stakeholders**	1	4	Mixed citizen, public servants and TSO teams were configured
A14	**Number of TSO teams involved in a co-production process**	3	2	
A15	**Number of co-production processes**	0	0	

	involved in sustainability			
A16	**Percentage of users who completed the in-app questionnaires and made improved suggestions**	25%	12/31 = 38%	12 registered users completed the evaluation questionnaires to provide feedback out of the 31 users registered.
A17	**Number of INTERLINKERs reused in more than one public service**	2	4	
A18	Number of assets	-	12	
A18.1	Number of external assets	-	10	
A18.2	Number of internal assets	-	2	
A19	Number of organizations	-	7	
A20	Number of users	-	31	
A21	Average of members per team	-	5	
B	**THE VALUE PROVIDED BY INTERLINK**			
B1	Perception of reduction of administrative and management costs	3	3	Participants saw the benefit of these digital solutions in reducing the use of resources as well as positively complementing the quality of co-production initiatives. However, it is difficult to quantify this view beyond a personal perception.
B2	Quantity of co-produced initiatives (baseline: number of previously co-produced public services)	3	1	
B3	Quality of co-production initiatives	3	3	
B4	Increased participation of citizens and private entities in customization of public services	> 50%	N/A	At this stage it doesn't apply. In any case there is no previous record of this KPI so that even in the future it will be difficult to establish this percentage based on past data.

B5	Increased participation of citizens and private entities in co-delivery of public services	> 50%		
C	**The Users' Perceptions of INTERLINK**			
C1.1	Usability assessment of INTERLINK and co-produced artefacts (in a scale 1-5) [Citizens]	4	N/A	In this phase the activities collecting feedback on the usability of the INTERLINKERs were addressed to the eTOPIA community and were not open to the public, so this data cannot be completed at this stage.
C1.2	Usability assessment of INTERLINK and co-produced artefacts (in a scale 1-5) [Others]	4	3	Below the objective, feedback was provided to hopefully deliver a more usable second version of the INTERLINK tools
C2.1	Trust assessment of INTERLINK and co-produced artefacts (in a scale 1-5) [Citizens]	4		In this phase the activities collecting feedback on the trust of the INTERLINKERs were addressed to the eTOPIA community and were not open to the public, so this data cannot be completed at this stage.
C2.2	Trust assessment of INTERLINK and co-produced artefacts (in a scale 1-5) [Others]	4	3	
C3.1	Acceptance assessment of INTERLINK and co-produced artefacts (in a scale 1-5) [Citizens]	4		In this phase the activities collecting feedback on the acceptance of the INTERLINKERs were addressed to the eTOPIA community and were not open to the public, so this data cannot be completed at this stage.
C3.2	Acceptance assessment of INTERLINK and co-produced artefacts (in a scale 1-5) [Others]	4	4	
C4.1	Satisfaction level of different stakeholders with INTERLINK tools and INTERLINK-powered public services [Citizens]	80%		In this phase the activities collecting feedback on the satisfaction of the INTERLINKERs were addressed to the eTOPIA community and were not open to the public, so this data cannot be completed at this stage.
C4.1	Satisfaction level of different stakeholders with INTERLINK tools	80%	65%	

	and INTERLINK-powered public services [Others]			
D	**Pilot specific KPIs**			
D2.1	Number of co-created activities in eTOPIA driven by PA	>=5	2	We counted as co-production sessions only the two workshops that had the purpose of co-designing CAfetopia. The other activities that took place in Etopia were rather complementary
D2.2	Number of co-created activities in eTOPIA driven by stakeholders	>=3	0	No stakeholders other than the Etopia ecosystem were involved in the first iteration of the project, so the number of co-created activities is 0.
D2.3	Number of co-creation activities launched with activity management module	>=5	0	N/A at this first iteration
D2.4	Number of users per month accessing to activity booking module	>=50	0	N/A at this first iteration
D2.5	Engagement growth	>=10%	0	N/A at this first iteration
D2.6	Loyalty module usage	30	0	Applicable at 2nd part of the project
D2.7	Open Innovation feasts supported by INTERLINK co-production process	>=2	0	N/A at this first iteration

3.4.5. ZGZ's reflection on KPIs

Quantitative KPIs are a way to partially address the progress of the pilots. To complete the picture, it is advisable to gather qualitative info. The following section aims at providing the reader an overall view of how the first iteration of ZGZ pilot builds on existing needs and expectations and paves the way to the more ambitious goals foreseen in the 2nd iteration.

- *"A. INTERLINK Use and Co-production of Services"*. Overall, the KPIs give a glimpse about the reasonable results achieved by the first iteration of the pilot. In some cases, show notably above expectations, although reaching certain figures has not implied having achieved a relevant objective.

As shown in Table 18. Engagement activities carried out in ZGZ pilot., Zaragoza has not executed many activities (just 12), although the heterogeneity of these activities is significant. However, this is an aspect that is not considered in any KPI.

The feedback from the attendees, with an "advanced" profile in aspects related to co-design methodologies has been valuable. However, it has not been adequately reflected in the surveys prepared ad-hoc to collect it. Only 16 surveys were collected, which raises the question of whether this is a good method for collecting users' opinions or whether we should consider another type of method such as personal interviews.

The indicator "A1. Number of INTERLINKERs used in an actual public service" showed 3 as the expected result, but the result obtained in this first iteration was 62. However, if we go beyond the data, we see that although considerably more INTERLINKERs have been used than foreseen, there has not been much variety. In other words, the same INTERLINKERs were almost always used.

Specifically, the following:
- Stakeholder types' guidelines: 2 times
- Stakeholders Mapping Canvas: once
- Template for use case scenarios: 2 times
- Stakeholders' identification analysis template guidelines: 2 times
- Demographic and activity satisfaction questionnaire: once
- Google Drive: 15 times
- Augmenter: once
- External resources: 10 times

- *"B. THE VALUE PROVIDED BY INTERLINK"*. Due to the nature of the activities carried out in the first iteration, quantitative KPIs do not tend to grasp what is really at stake in ZGZ pilot. For instance, measuring perception is not a straightforward task (B1) neither does a baseline of co-produced initiatives (B2) nor of customization of public services (B4, B5). However, the overall impression is that INTERLINK and its associated tools still need to prove themselves as valuable tools for ZGZ's goals. In order to improve this critical issue, we propose that for the 2nd iteration, the technical partners studying the value of INTERLINK could increase their role in gathering information from users.

- *"C. The Users' Perceptions of INTERLINK"*. The KPIs in this section are focused on addressing the willingness to use INTERLINK by the main *stakeholders*: the users. A first component is the usability, which for INTERLINK shows a reasonable margin of improvement, the reason behind it being that not sufficient UX work has been carried out in the development process (the tools have been handed to pilots

right after development and functional testing). We suggest that the project takes advantage of the time between iterations to address this problem.

For the second iteration, we also suggest that pilots work more closely with technical partners in workflows. This will improve user's perception on the technology and tools that Interlink provides.

- *Reflection on "D. Pilot specific KPIs ..."* When the target values for the indicators were initially established, they did not include an action plan to support the viability of those indicators. This implies that the current values are focused on quantitative targets rather than on more important aspects such as quality or added value. After this first iteration of the pilot and having gained a better understanding of what it means to incorporate a tool such as the collaborative environment into the routine of co-creation of services, it seems sensible to rethink the KPI objectives, at least as far as those of the Zaragoza pilot are concerned.

  Considering that a KPI is only a performance INDICATOR, and not the PERFORMANCE itself, we propose to refocus the KPIs to reflect as much as possible the creation of value.

  As an example, it does not seem to make much sense to have many users registered on a platform if they do not interact with it or do not contribute to the community (zombie users). In this sense, we would change the number of registered users as a relevant data to be achieved by the number of active users, prioritising then the interactions over the simple count of users.

  As a final remark, we should rather avoid grounding our decisions about the pilot performances on "vanity metrics" such as logged users and try to grasp the activity dimensions critical for the success of the developed tools.

3.4.6. Reflections on ZGZ's pilot execution subphase

After the first iteration and after having implemented a dozen engagement activities, we conclude that the project needs to leave margin for flexibility in planning activities, since these highly depend on the nature of tools, which, in turn can only be properly understood when the tools are handed to pilots.

Regarding feedback and evaluation, we suggest that KPIs are insufficient to properly address the success of the INTERLINK "experiment", and therefore we propose for the 2nd phase a more qualitative approach, based on in-depth interviews with users. We suggest a high and direct involvement of technical partners involved in defining and

evaluating co-creation / co-production in these tasks. This will also allow a better understanding of the relationship between users' satisfaction and the set formed by tools and processes.

Success points:

The interests of all the institutions participating in the sessions were common in many areas (innovation, citizen science, smart city, data economy, etc.), which facilitated conducting the sessions.

People involved in the activities had a strong influence on the way of working, so their opinions could significantly determine the adoption of the tool on a daily basis.

Pain points:

Getting participants to complete the surveys is a job that requires additional effort.

Despite the willingness of our operational teams, there is always a certain degree of reluctance to take on new tasks that involve greater dedication.

3.5. User-behaviour analysis: backend and frontend logging

Log data provide a good deal of information about what people are doing but much less about why they are doing so and whether they are satisfied. This must be considered in analyses and complemented by other techniques to provide a more complete understanding of behaviour. "Why" can be understood not only by additional information, but by additional analysis of user behaviour patterns.

When analysing log data, researchers extract a variety of metrics. Metrics are measurable quantities that matter to the users or system stakeholders. Metrics can emerge directly from the data, such as, in the case of search, query length or frequency.

In INTERLINK, user behaviour logs are gathered whilst users interact with Collaborative Environment to make progress in a co-production process. Logs correspond to events generated in the front-end but that often do not result in a change of the Data Model entities in the DB. For instance, the selection of a given INTERLIKER on the Collaborative Environment does not produce changes in the Data Model, unless the INTERLINKER is used to give place to a new resource. The analysis of logs collected from the Collaborative Environment's usage is important to understand user behaviour whilst interacting with the Collaborative Environment. This way, we could be able to answer questions like the following ones:

- What does a user click whilst in the Guide view?
- How much time s/he spends in each of the different views? (which are the most popular or confusing pages?)

- What actions do users perform over assets, e.g. clone or delete events over assets?

We have introduced four different mechanisms to log data in INTERLINK:

1. Loggings resulting from main web portal frontend interactions with backend API which result in data model updates
2. Loggings resulting from API calls from additional INTERLINKER modules
3. Loggings from frontend navigation functionality of web portal through Matomo.
4. INTERLINKER specific loggings to track usage of them as in the case of Augmenter and Loomio.

In iteration 1 we have mostly processed logs resulting from approach 1) and also experienced with approach 3) without truly exploiting the potential of analysing user behaviour in Collaborative Environment in depth. More details on both approaches next. Note that approach 2) has been used to aid pilots populate some of the specific KPIs, i.e. category D, of them.

3.5.1. User-behaviour analysis through backend logging

To collect all these types of user activity data from different sources, a logging and monitoring stack combining ElasticSearch and Grafana has been integrated into the Collaborative Environment platform's backend. It consist of a logging HTTP API which centralises log gathering from Collaborative Environment's containers, a daemon process collecting logs data from log files on each of the software components Docker container, storage of all these log data into ElasticSearch and SQL databases, and a centralized querying tool Dremio connecting all the collected logs data to the common SQL-like querying tool, and Grafana web dashboard.

Concretely, for each pilot a Dremio server combined with a set of Dremio SQL views/queries configured on it and a Grafana dashboard have been deployed. Grafana is a multi-platform open-source analytics and interactive visualization web application[14]. It provides charts, graphs, and alerts for the web when connected to supported data sources. Grafana is an excellent tool analysing time series as the ones resulting from logs issued by the Collaborative Environment.

Usage logs of the following aspects of the co-production process have been collected:

- *Management of co-production processes*: events for creation, read, update or deletion of a co-production process have been defined. Events to gather operations associated with settings of a process have also been defined.
- *Management of organizations and teams*: events for the creation, update, delete of an organization and team, the addition of members to a team and their listing have been defined.

[14] https://grafana.com/

- *Usage of Overview view*: events to capture users switch to this view, and actions on it like the selection of a task associated to a resource or of an INTERLINKER associated to a resource have been defined.
- *Usage of Workplan view*: events to capture the selection or updates of phases, objectives or tasks within the temporal view of a co-production process.
- *Usage of Guide view*: this is the most important view offered by Collaborative Environment. Events to describe operations over a co-production tree (e.g. add new task), selection of a given co-production tree element (e.g. a task), manipulation of the status or details of a tree item have been defined, among other events.
- *Management of permissions for a co-production process*: events associated to the association of permissions to co-production tree sections to different teams or to the whole co-production tree have also been defined.
- *Usage of Catalogue view*: events to gather when searches, filter application in searchers, selection of tabs in view of an INTERLINKER, rating on INTERLINKER have been defined.

The code in Figure 50 piece of code in JSON shows an example log data produced whenever a created resource in a co-production process is selected:


```
{
  "user_id": "u_d59d574a-a3f6-49dc-8479-085b70c96353",
  "service": "coproduction",
  "action": "GET",
  "model": "ASSET",
  "timestamp": "2022-10-13 12:51:48.155086",
  "object_id": "db86f380-a3b8-4981-b1f7-67376bac5b54",
  "task_id": "f0f3dff8-e2d7-4b5a-969f-6260285c20e4",
  "softwareinterlinker_name": "Google Drive",
  "objective_id": "1d1dd09d-1c45-4ccc-8639-4e233a19fe40",
  "coproductionprocess_id": "9431e73e-9f5f-42e1-8b0f-e414f50fa32b",
  "softwareinterlinker_id": "93574360-0539-479e-b676-d75a4a9f984a",
  "roles": [
    "public_administration",
    "administrator"
  ],
  "type": "internalasset",
  "phase_id": "8ae8635f-fd01-4529-8d47-865fcce64c3c",
  "from": "API"
}
```


Figure 50. Exemplary log generated when a resource (asset) created through Google Drive is accessed in Collaborative Environment.

As mentioned, to support the interpretation of these logs, a dashboard in Grafana has been defined per pilot site. Figure 51 to Figure 53 show some snapshots of the Grafana dashboard for MEF and VARAM pilots[15]. Notice that in iteration 1 we have focused on

[15] The log dashboards for Zaragoza and MEF case show results which are close to the ones that we already reported in their respective KPI tables, this explains why we do not include snapshots of them. They are accessible in their respective URLs, namely https://mef.interlink-project.eu/monitoring and https://zgz.interlink-project.eu/monitoring.

analysing the logs associated to the co-production processes. That is, we want to answer the following basic statistics on co-production per pilot:

- Number of users per organization, team and their roles in a given pilot
- Co-production schemas used by teams in a given pilot
- Number of teams, users and roles per process, distinguishing between active and passive users in a given pilot
- List and usage statistics, counting generated resources with them, of knowledge and software INTERLINKERs per process in a given pilot.

The insights obtained are closely related to the insights resulting from populating KPIs per pilot, exploiting the INTERLINK's Collaborative Environment's Data Model, shown in sections 3.2.4. MEF KPIs, 3.3.4. VARAM KPIs and 3.4.4. ZGZ KPIs. Still, the set of metrics gathered in the Grafana dashboard per each pilot streamline the analytics associated with co-production in each pilot. In iteration 2, we should better focus on registering intermediary events about usage of the Collaborative Environment, rather than consummated events which are also realised by giving place to changes in the Data Model's databases. For example, temporal analysis of what actions, when, by whom of the members of a co-producing team were generated to understand the number of interactions, time span and diverse team member involvement across the whole co-production process. This way we could get a more fine-grained understanding of the evolution of a co-production process and possible roadblocks which may impede the finalisation of certain tasks in the co-production process.

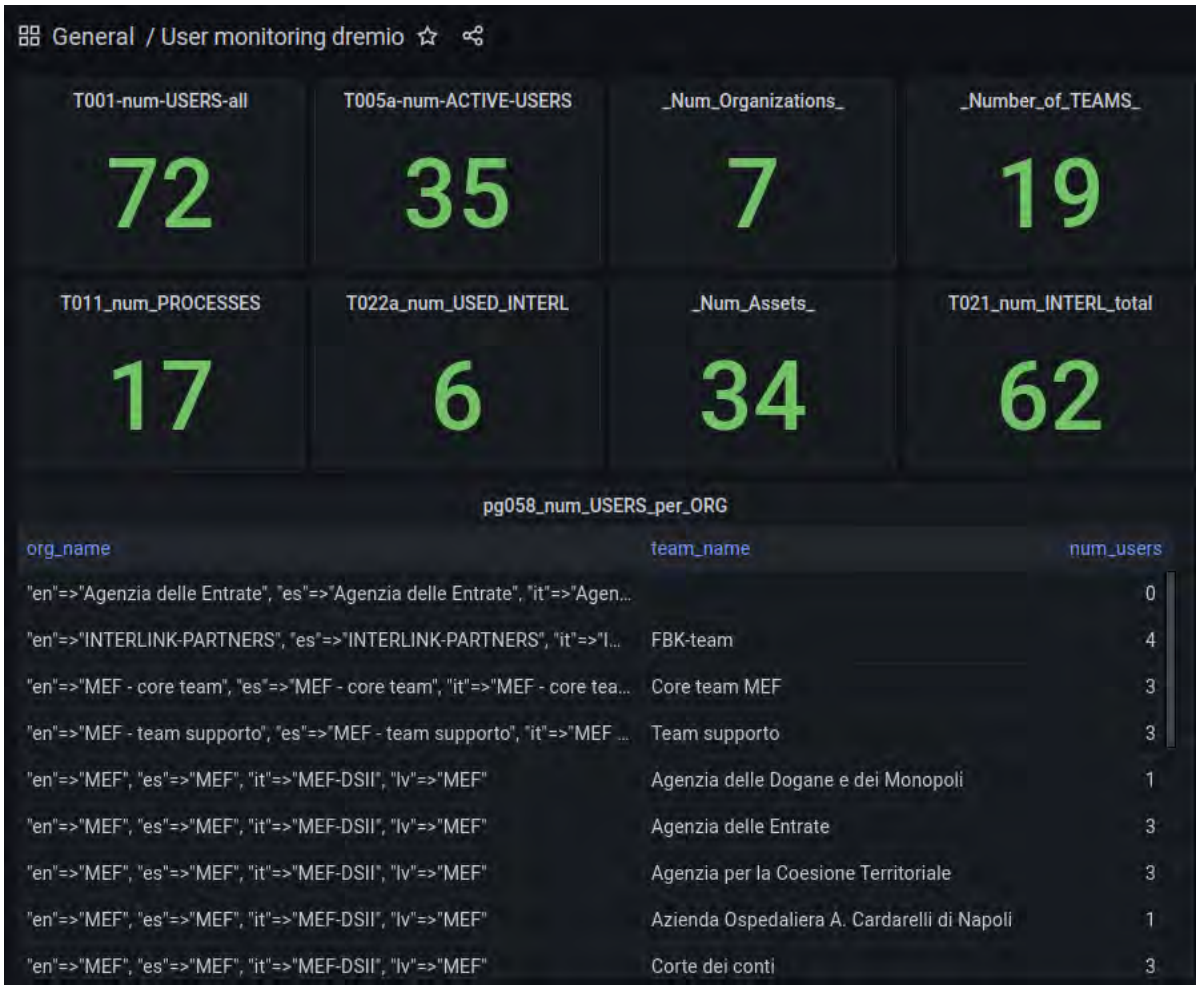

Figure 51. Grafana dashboard for MEF providing statistics about organizations, teams and users (captured from https://varam.interlink-project.eu/monitoring).

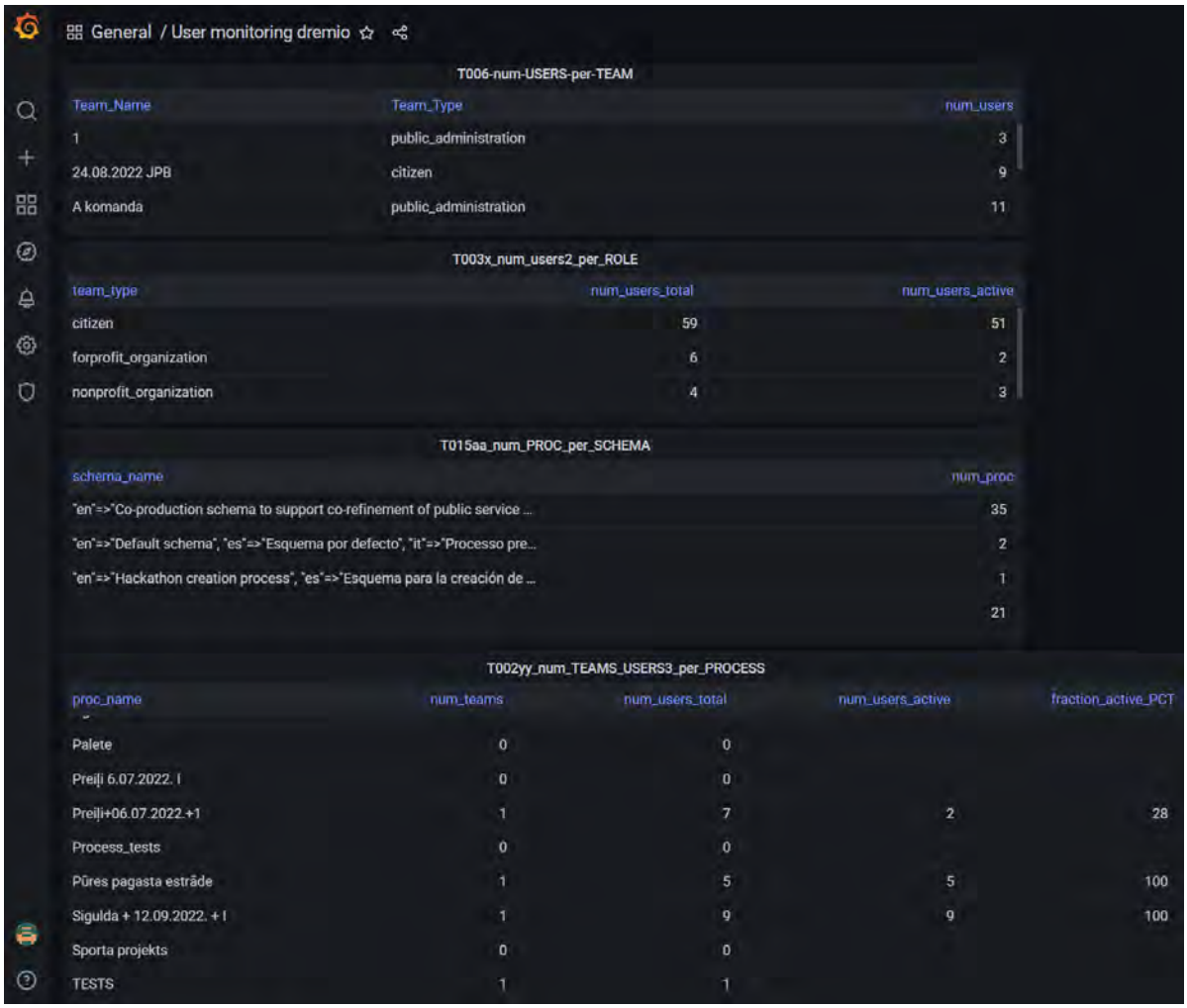

Figure 52. Grafana dashboard for VARAM providing statistics about users and their roles in co-production processes.

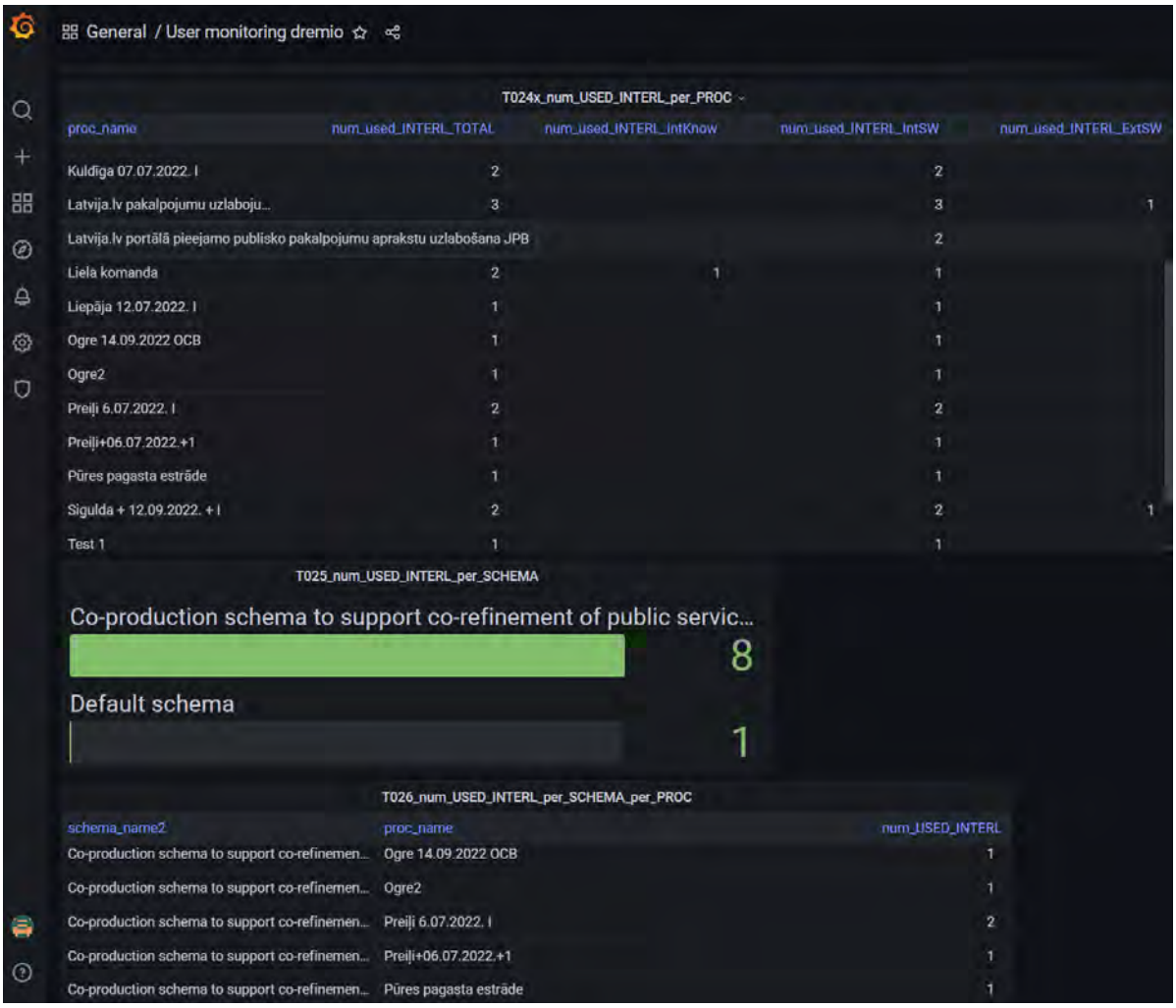

Figure 53. Grafana dashboard for VARAM providing statistics about co-production schemas and INTERLINKERs.

3.5.2. User-behaviour analysis through frontend logging

We have also used Matomo tool[16] in all pilot deployments in order to understand what pages were visited most frequently by whom and from where. Matomo, formerly Piwik, is the most common free and open source web analytics application to track online visits to one or more websites and display reports on these visits for analysis.

The following figures show some of the web analytics associated to the MEF pilot, obtained from its deployment at https://mef.interlink-project.eu/matomo (one per pilot was realized). Observe that we have restricted the analysis to September 2022, the last month of the pilot, which together with July were the most active months across the pilot sites.

[16] https://matomo.org/.

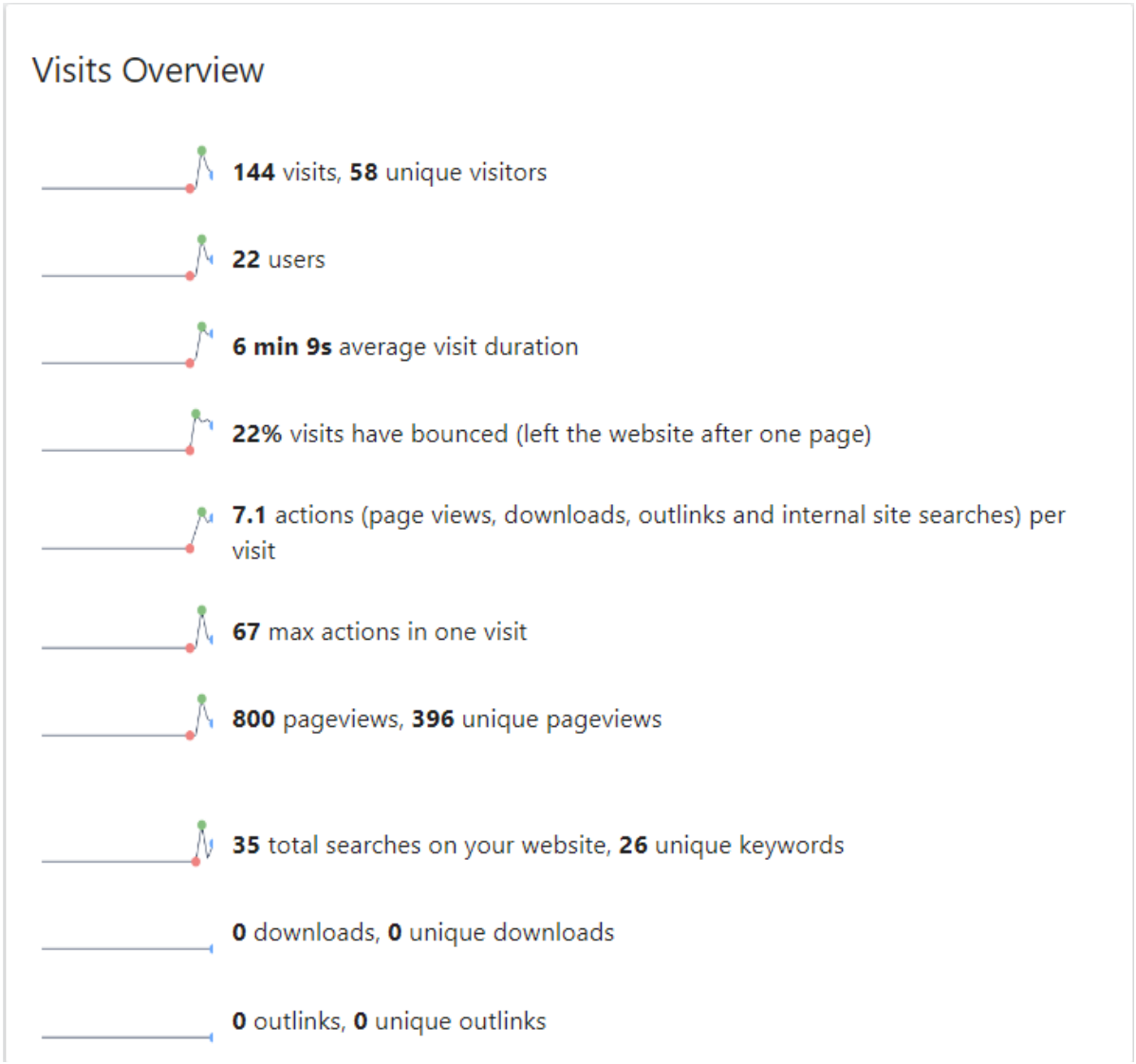

Figure 54. Matomo visit overview during September 2022 for MEF pilot.

Figure 55. Matomo analysis of visitors' country of origin during September 2022 for MEF pilot.

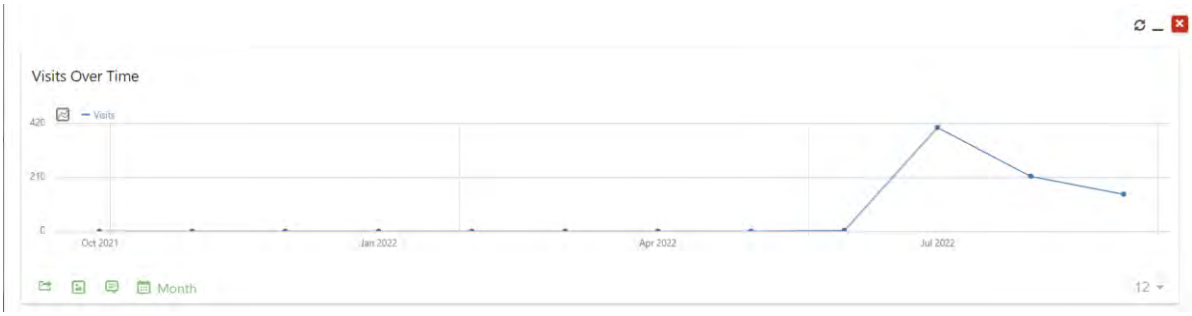

Figure 56. Matomo analysis of visits in the period June to September 2022 for MEF pilot.

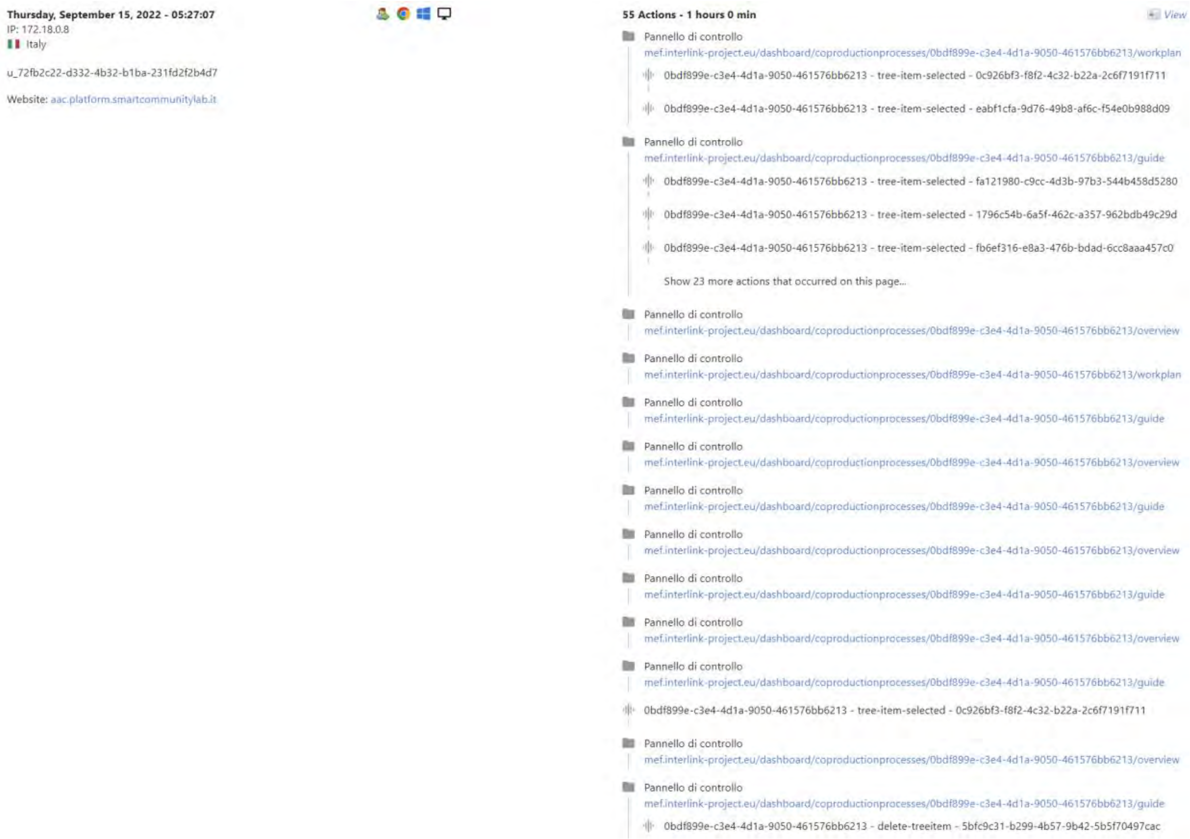

Figure 57. Matomo insights on an activity celebrated on 15th September for MEF.

These visualizations (Figure 54 to Figure 57) clearly showcase the potential that a more fine-grained analysis of the front-end usage behaviour our users might deliver in order to enhance the Collaborative's Environment usability and finetune those views most used or where users struggle most.

3.6. Assessment of quality of the co-production process

Co-production refers to a way of working where service providers and users, work together to reach an agreed outcome. Co-producing thus refers to a process in which services are jointly designed and/or delivered by public authorities and other stakeholders. The approach is value-driven and built on the principle that those who are affected by a service are best placed to help design and implement it.

Co-production is there since it is linked to Open Innovation strategies. This means that the organisation, in our case the Public Administration, does not just rely on their own internal knowledge, sources and resources (such as their own staff or R&D for example) for innovation (of products, services, business models, processes etc.). INTERLINK directly corresponds to an innovation project, not only from a product perspective, but also from a service and business model standpoint.

The services upon which INTERLINK focuses have the following characteristics:

- They are *public services*, in the sense that public authorities have committed to realising them or making them available.
- They have an e*lement of co-creation/-production*, meaning that external stakeholders are engaged and collaborate with public government in their design and/or their delivery.
- Additionally, the services are realised through the *use of digital technologies*, either as a fully digital service or as a human service supported digitally.

The following two sub-sections aim to quantify the quality of the co-production process and reason about the underlying reasons that may encourage coproducers to be engaged with INTERLINK.

3.6.1. Quantifying quality of the co-production process

As indicated in section "1.3.2. Evaluation dimensions and constructs", the main research question that INTERLINK wants to explore is the following:

Will INTERLINK co-production model and its supporting tools and co-production enablers (INTERLINKERs) enhance the quality, quantity, and reuse of public services?

As reasoned in section 1.3.2. Evaluation dimensions and constructs, we believe that the answer to this question may be driven by the combination of product-, user- and value-based quality, since this allows a comprehensive account of the quality associated to the co-production process and the resulting e-government artefacts. This may lead to higher satisfaction on co-produced public service, which should lead to higher trust, which may enhance acceptance and, hence, ultimately, aid the adoption of co-production results among PA stakeholders. More details on the multi-dimensional approach to quality evaluation are collected in deliverable "D2.3 - Governance performance indicators" [8].

Consequently, we propose to use the following formula to measure the associated quality of a co-production process. The higher the resulting quality value the higher the user-based and value-based quality, satisfaction, trust, and acceptance. Potential adoption should be linked to the resulting quality of co-production process, the higher the quality the more likely that should be the adoption of the artefacts resulting from a co-production process.

QoS co-production =

average(user-based quality; value-based quality; satisfaction; trust; acceptance)

where:

- **User-based quality** means that the attributes of a product meet the customer's requirements (in the public sector this is very important due to the need for public accountability). The "quality in use" model is composed of five characteristics that relate to the outcome of interaction when a product, process or service is used in a particular context of use. These characteristics, namely effectiveness, efficiency, usefulness, ease of use and flexibility are fully defined in section 1.3.2. Evaluation dimensions and constructs.
- **Value-based quality** refers to an understanding of quality as processes/outcomes being in line with normative expectations towards public services (e.g. legal treatment) and broader societal norms (e.g. democratic values). . Again, refer to section 1.3.2. Evaluation dimensions and constructs for the definition of the quality characteristics associated to this dimension, namely inclusiveness, security/privacy, democratic values and Weberian principles.
- **Satisfaction** degree to which user needs are satisfied when a product or system is used in a specified context of use
- **Trust** is defined as the belief that a public body will contribute to people's wellbeing through their interaction or actions. In this case, by means of the provision of a co-production model, supporting tools for co-production and co-produced artefacts.
- **Acceptance** whilst acceptability refers to one's perception of a system before use, acceptance is one's perception of the system after use.

During pilots' iteration 1, we have been able to measure these different dimensions through evaluation questionnaires targeted to citizens and other user (public administrations, for profit and non-profit organisations) whilst either consuming co-produced artefacts (see 8.2. INTERLINK End-users' Perception Questionnaire) or actually participating in the co-production (see 8.1. INTERLINK Co-producers' Perceptions Questionnaire) of such artefacts, where:

- User-based quality is calculated as AVG(Effectiveness, Efficiency, Usefulness, Ease of Use, Flexibility).
- Value-based quality is calculated as AVG(Inclusiveness, Security/Privacy, Democratic values, Weberian criteria)

Notice that the main focus on iteration 1's evaluation has been those participants actively taking part in the co-production process, which in most pilots have been public administration users, as was reported in 3.2.3. MEF activities during pilot execution subphase, 3.3.3. VARAM activities during pilot execution subphase and 3.4.3. ZGZ activities during pilot execution subphase.

The questionnaires designed to gather the perceptions on User-based Quality, Value-based Quality, Trust and Acceptance, both by Co-Producer's and End-users are accessible at Appendix C – INTERLINK's Co-producers and End-Users Perceptions questionnaires. These questionnaires include a pair of questions per dimension

established for the evaluation of INTERLINK as was discussed in 1.3.2. Evaluation dimensions and constructs and further justified in deliverable D2.3 [8].

The following table summarizes the results obtained per pilot. Observe that a reduced number of co-producers, i.e. those taking part in a collaborative process, and end-users, i.e. those making use of the outcomes of a collaborative process, completed the survey. Besides, notice that that participants' answers were collected on a 5-point Likert scale (where 1 indicated the most negative opinion and 5 the most positive opinion). (1. Strongly disagree, 2. Disagree, 3. Neither agree nor disagree, 4. Agree and 5. Strongly agree). The higher the value granted the more positive response given to a statement. The respondents' distribution was as follows:

- Co-producers: MEF (25), VARAM (22) and ZGZ (6), this is 53 co-producers, during the month of September. Notice, that we got answers 23 and 21 co-producers of Latvia, during July and August, respectively. Given that evaluation questionnaires were answered by all pilot cases in August, we have restricted the analysis to the month when the Collaborative Environment and INTERLINK's co-production supporting tools was most mature.
- End-users: VARAM (30), ZGZ (5), this is 35 end-users. Observe that in MEF only co-producers took place due to the nature of this pilot, where public servants from different public administrations have been co-designing a new PSPM module. Again, 22 and 24 end-users answered the evaluation questionnaire in Latvia, but we restricted the analysis to August when we had data from all pilots.

Table 20. Quality of Service in Co-production processes in the pilots.

Role	Pilot	#	User-based quality		Value-based quality		Satisfaction		Trust		Acceptance		QoS co-prod.	
			Citz.	Other	Citz.	Other	Citz.	Other	Citz.	Other	Citz.	Other	Citz.	Other
Co-producer	MEF	25	**4.67**	**4.04**	**3.92**	**4.00**	**4.00**	**4.00**	**3.60**	**3.75**	**3.00**	**3.00**	**3.84**	**3.76**
Co-producer	VARAM	22	**4.03**	**3.97**	**4.12**	**4.20**	**4.00**	**4.09**	**3.00**	**3.50**	**3.47**	**3.47**	**3.72**	**3.85**
Co-producer	ZGZ	6		**3,24**		**3,17**		**3,50**		**4,33**		**2,83**		**3,41**
AVG co-producer			**4.35**	**4.01**	**4.02**	**4.10**	**4.00**	**4.05**	**3.30**	**3.63**	**3.24**	**3.24**	**3.78**	**3.81**
AVG GLOBAL			**4.17**		**4.06**		**4.02**		**3.46**		**3.24**		**3.79**	
End-user	ZGZ	5		**2,76**		**3,40**		**2,70**		**3,00**		**2,40**		**2,85**
End-user	VARAM	30	**3.90**	**3.65**	**3.91**	**3.75**	**3.71**	**3.50**	**3.53**	**3.45**	**3.50**	**3.40**	**3.71**	**3.55**
User-user														
AVG end-			**3.90**	**3.65**	**3.91**	**3.75**	**3.71**	**3.50**	**3.53**	**3.45**	**3.50**	**3.40**	**3.71**	**3.55**

user														
AVG GLOBAL			3.77		3.83		3.60		3.49		3.45		3.63	
AVG TOTAL			3.97		3.94		3.81		3.47		3.34		3.71	

As can be seen in Table 20, the user-based quality was higher than 4 out of 5 among all pilots' coproducers (4.17) which means that the INTERLINK co-production model and its supporting collaborative environment and INTERLINKERs may be considered to satisfactorily (score > 4.17/5.0) meet coproducers requirements and expectations. The sample it not big, 53 respondents, but it appears that for co-producers the INTERLINK's Collaborative Environment and co-production supporting tools are overall effective, efficient, useful, easy to use and flexible. In the case of end-users, the provided tools deliver smaller user-based quality (3.77), which seems more than acceptable but, clearly, they find less value on INTERLINK and its supporting tools, since at the end they are not real users of them, only affected or exposed to the results obtained thanks to using them. The sample of end-users answering was smaller (35) bearing in mind that in MEF only co-producers were considered.

Regarding value-based quality again coproducers in all pilots seem to believe that (score > 4,06/5) the INTERLINK co-production model and its supporting collaborative environment and INTERLINKERs are in line with normative expectations towards public services (e.g., legal treatment) and broader societal norms (e.g. democratic values). Again, this is the perception of the 53 limited number of co-producers that answered the survey. Value-based quality obtained a score of 3.94 among end-users, which can be considered as an acceptable average perception regarding how well INTERLINK guarantees inclusiveness, security/privacy, democratic values and Weberian principles.

INTERLINK approach and supporting tools generally satisfies coproducers expectations with an average score of 4.02. End-users obtained a score of 3.60, showcasing that they are slightly less satisfied overall, but still the artefacts co-produced thanks to INTERLINK do moderately satisfy their expectations.

The INTERLINK co-production model and its supporting collaborative environment and INTERLINKERs are generally trusted by both coproducers and end-users with a score around 3.46 and 3.49, respectively. Interestingly, both co-producers and end-users, consumers of co-produced artefacts, generally agree that INTERLINK approach and tools are trustable. Still, the achieved level of trust is only moderate, should be improved.

The INTERLINK co-production model and its supporting collaborative environment and INTERLINKERs are prone to be acceptable with a score of 3.24 for co-producers and 3.45 for end-users. This should be considered as a moderately good result for acceptance. Undoubtedly, further research of what aspects of INTERLINK prevent it from being more acceptable have to be researched.

Finally, the QoS driven from the co-production processes enabled by INTERLINK co-production model and powered by its supporting tool obtained an average score of 3.79/5,0 for co-producers and 3.63/5,0. Hence, we can conclude that the produced co-production methodology and enabling digital tools and knowledge artefacts generally enhance the quality of co-production processes. Consequently, INTERLINK mediated co-produced artefacts should lead to good satisfaction, trust and acceptance levels in the use of digital tools/systems in public administrations. There is clear scope for improvement to enhance the overall perception of quality from those interacting with INTERLINK, since we do not surpass the score of 4 that would allow us to ascertain that INTERLINK will definitely enhance the quality, quantity, and reuse of public services.

Based on the future reflection about the experience in iteration 1 which is compiled in chapter 4. Post-pilot reflection phase, we expect to improve this acceptable result regarding quality of co-production process in iteration 2. Besides, notice that we have weighted equally user-based quality, value-based quality, satisfaction, trust, and acceptance. Further reflection on the weight that each dimension should have to the overall "quality of co-production" should be performed.

Finally, these 'quality of service' results must be correlated with the "B. Value provided by INTERLINK" KPIs described for each of the pilots in sections 3.2.4. MEF KPIs, 3.3.4. VARAM KPIs and 3.4.4. ZGZ KPIs. Pilot participants have reported during the assessment of "B. THE VALUE PROVIDED BY INTERLINK" that they perceive that INTERLINK brings about a reduction on administrative and management costs with a score of 3.91/5.0 whilst the overall quality of co-production processes driven by INTERLINK score a 3.79/5.0 (fed by the outcomes of the category of KPIs "C. The Users' Perceptions of INTERLINK"). Such KPIs have populated the dimensions user-based quality, value-based quality, satisfaction, trust, and acceptance dimensions of the QoS formula.

3.6.2. Co-producers context and experience in INTERLINK

This section summarises the results of exploring the answers given at all pilots for the block of questions with heading "*Reflection about co-production process*" from the questionnaire found in section 8.1. INTERLINK Co-producers' Perceptions Questionnaire of Appendix C. Notice that the charts summarizing the insights gathered about each feature of co-production are detailed at Appendix H – Co-producers' context and experience.

3.6.2.1. Experience on co-production.

We should initially clarify that co-producers' questionnaire has been answered by only people that have technically or strategically taken part in the co-production activities performed. Therefore, we needed to understand their participation, according to their profiles, as identified in previous studies [22], [23], [24]). In this sense, it was

considered essential, based on the literature, to clarify previous experience of these users in open innovation and public open innovation activities [23].

Therefore, an initial question was formulated to clarify previous experiences. The aim of this query was to map the type of co-producers involved in the different case studies and specifically, if possible, identify the different phases in which they have experience. For that, we resorted to the phases determined in the literature: Co-engage, Co-design, Co-implementation, Co-sustainability, or if they have never taken part in previous similar exercises [24].

"**In which collaborative co-production activities have you taken part in, before knowing about INTERLINK?"**

The possible answers were:

1. Co-engagement phase activities (e.g. involving stakeholders, shared problem definition)
2. Co-design phase activities (e.g. shared solution definition, service specification)
3. Co-implementation phase activities (e.g. service implementation, service execution)
4. Co-sustainability phase activities (e.g. maintenance, co-evaluation)
5. Never before in any co-production activity

See charts in section 13.1. Experience in co-production for the analysis of this feature of co-production.

The results we have obtained point to a generalized participation of users in design and active participation phases. Thus, the implementation phase is left on the hands of the technical teams of the administrations themselves. The proactivity of the users is also surprising, being exclusively the case of MEF -Italy-, where we found people who had not previously had any experience, as was already identified by [25], for this phase of the procedure.

Finally, the case of Zaragoza is also surprising as it is the only case study in which users participated in a relevant way in the execution tasks for the co-implementation phase. However, these data should always be analysed with caution and no policy implications can be drawn from them, given the small size of the sample analysed.

3.6.2.2. Participation in co-production

Once the previous experience of the users was analysed, the actual role adopted by each member participating in this project was identified. In order to measure this feature, we enquired them about their actual function and the precise tasks they have performed.

The specific question formulated was: "**In which way have you contributed towards a new or an improved public or private (co-produced) service?"**

Offered answers wanted to capture the concrete activities that can be carried out within a co-production process. In this sense, the possible answers were:

1. I have collaborated with an idea for a solution/answer.
2. I have collaborated with a conceptual design for the solution/answer.
3. I have collaborated in the development of a solution/answer that is reliable enough so that it can be used.
4. Others are developing solution/answer based on my ideas or design
5. I have supported a collaborative decision process
6. I have only participated as an observer (passively) in co-production process

See charts in section 13.2. Participation in co-production for the analysis of this feature of co-production.

In general, we can confirm that most of the participants cooperated with an initial idea they had, in order to produce a new product or service. However, in the case of VARAM, although 34.3% of the sample have also collaborated in the first step of the process, it is worth noting that 44.8% of the sample also has been active in the decision process. In this sense, we can conclude that co-producers in the three case studies participate in co-production projects for new or improved public services in three different ways:

1) I have collaborated with an idea for a solution/answer,

3) I have collaborated in the development of a solution/answer that is reliable enough so that it can be used and

5) I have supported a collaborative decision process.

As a conclusion, we should underline that the challenge remains to involve users in the development and co-production work.

3.6.2.3. Motivation

In order to understand the role of the co-producers we needed to understand their motivation so as to participate in the different stages of a collaborative product or service [26]. Based on the literature, we wanted to capture the possible reasons that might boost co-participation to develop a new public solution [27].

In order to address this facet, we included in the questionnaire the following question, introduced by a brief explanation to position the user on the object of our interest:

"**Internal motivation for your participation in co-producing a service. What made you to co-produce a public service?"**

The possible answers were:

1. The initial solution of the problem was not acceptable for the society (low user experience not ICT solution, not updated, etc.)
2. I have been working on similar solutions/problems that could serve as an example. (For other public administrations, for other services, for other firms, etc.)
3. I used the initial solution of the problem once and found several problems.
4. I am part of teams that have been previously working in this procedure/problem and I have similar ideas to improve the solution/address this problem

See charts in section 13.3. Motivation in co-production for the analysis of this feature of co-production.

Based on the questions asked in the three case studies, we cannot identify a single, joint trend. Always with caution due to the low number of responses received, we could say that the motives and reasons why users participate are different. Three are identified as the key motivations:

1) The initial solution of the problem was not acceptable for the society (low user experience not ICT solution, not updated, etc.), critically and mainly elected by VARAM users.

2) I have been working on similar solutions/problems that could serve as an example. (For other public administrations, for other services, for other firms, etc.), chosen as the primary motivation for those co-producers in the MEF case.

4) I am part of teams that have been previously working in this procedure/problem and I have similar ideas to improve the solution/address this problem, also relevant for MEF case but generally elected by co-producers in the case of Zaragoza.

We should mention that, despite the low number of responses, the existing reality in each use case also justifies the type of responses received from the participating users. Therefore, the answers must be contextualised with the resulting picture of each case study.

3.6.2.4. Reason

Directly linked with the motivation question before, we also enquired users about the specific reason for their active participation in the co-production process (Van Eijik and Gasco, 2018). In this sense, we wanted to understand the intrinsic thinking that motivated co-producers to want to get involved in a new public project. The interest

might arise from professional background, ideas identified from other sources, collaboration with other stakeholders or personal interest.

In order to capture this feature, the question formulated was: "**Reason for your contribution to co-producing a service. Why did you contribute to co-producing a service?**" and the possible answers given, are identified below:

1. Because of my personal experiences (professional background)
2. Because of conversation with other stakeholders
3. Because of opinions gathered from social media/Internet
4. Because of my personal interests

See charts in section 13.4. Reason in co-production for the analysis of this feature of co-production.

In general, we can assure that the main reason identified corresponds to the personal experience (1). This answer has been identified clearly as the most relevant for MEF co-producers (72% of the Italian sample), VARAM (71,6% of Latvian sample), and chosen as the second one in the case of Zaragoza (50% of the Spanish sample). However, in the case of Zaragoza, the key reason appears to be derived from conversation with other stakeholders, so the knowledge required to participate in a co-production process would be linked to ideas received from other people not involved in the project.

As a summary, we could say that the main reasons would be:

1) Because of my personal experiences (professional background)

2) Because of conversation with other stakeholders.

3.6.2.5. Inspiration

Directly linked to the inner or external reasons to participate in a co-production process, we wanted to understand the origin of the idea, which could be understood in the innovation literature as the source from which knowledge is obtained to implement a proposal. In this sense, the answers offered wanted to identify if the proposal was an incremental innovation (because of the adaptation from other public administrations or from the private sector) -Answers 1 and 2 below-, or it was a radical innovation (Answer 3 below). However, we also offered two answers for possible co-producers not participating at the stage in which the solution was formulated (Answer 4 below) or if the innovation was not the idea of that person (Answer 5 below).

The question formulated was: "**Where does your contribution for the final proposal come from?**"

The possible answers were:

1. The solution is adapted from another public administration service
2. The solution is adapted from the private sector

3. The solution is brand new
4. No participation
5. It did not occur to me

See charts in section 13.5. Inspiration in co-production for the analysis of this feature of co-production.

In this case, we can conclude that the proposals made by the participating co-producers always correspond to incremental innovations from other public administrations or the private sector.

In all three case studies, other public administrations are identified as the main source for proposing and participating in a new co-production project. However, surprisingly, several respondents considered their solutions as radical innovations, identified as completely new ideas. This answer corresponds to 28% of the sample in the case of MEF, 29,9% in the case of VARAM and 16,7% for Zaragoza. This ratio is quite high considering the low level of proposals usually shared and developed [28].

Nevertheless, as a conclusion we might say that co-producers participate in co-production projects inspired by:

1) The solution is adapted from another public administration service

2) The solution is adapted from the private sector.

3.7. Conclusions pilot execution subphase

As result of the pilot execution subphase a final release of the Collaborative Environment and associated tools has been produced and published at GitHub. This final release has considered the feedback received from pilots' sites. Generally, the environment has been kept very stable during the 4-month period when the pilots have been executed.

Whilst in the pre-pilot execution subphase the emphasis was on making the INTERLINK Collaborative Environment more usable and robust, in this subphase, the focus has been on understanding whether the flexible co-production models and supporting tools provided by INTERLINK have allowed pilots to accomplish co-production processes successfully. All pilots commented that the INTERLINK co-production model and supporting value do help them towards better quality, better resource, and effort efficiency towards co-production of public services.

Besides, the experience of the co-production process has been explored. A set of 4 categories KPIs have been defined to be able to perform an assessment of the co-production experience brought forward by INTERLINK. The discussion on the achievement of KPIs has been reported in sections 3.2.5. MEF's reflection on KPIs, 3.3.5. VARAM's reflection on KPIs and 3.3.5. VARAM's reflection on KPIs. Overall, the objectives set have been met.

On the other hand, a mechanism to be able to measure the "quality of service - QoS" of the co-co-production process has been devised and measurements carried out at each pilot. As reported in 3.6. Assessment of quality of the co-production process, the achieved QoS values per pilot are very encouraging, overall 3.79/5,0, and a moderate acceptance level perception, 3.24/5, have been obtained. Hence, we can conclude that a wide adoption of INTERLINK can be expected at other pilots, as the ones carried out in this project. Finally, the previous experience, actual participation, motivation, reasons, and inspiration followed by coproducers in each pilot has been gathered and analysed.

Our results cannot be categorized as conclusive given the small sample size, only 53 coproducers answered to our evaluation questionnaires in September whilst the answers from coproducers during the whole piloting timespan (98) were considered to analyse their co-production experience in INTERLINK. Definitely, a higher sample size should be achieved in iteration 2 to claim that the exploratory results obtained could be generalized. Appendix G – Collaborative Environment iteration 1 release shows the release produced after concluding pilot evaluation subphase, corresponding to https://github.com/interlink-project/interlink-project/releases/tag/v1.0.15.

4 Post-pilot reflection phase

After the end of the main pilot activities of iteration 1, during October 2022 a reflection phase has started to reason on the results emerged from the pilot activities and understand how the findings can be translated into (i) implications for possible re-design or extensions of the INTERLINK platform (as an input to WP4, D4.4), (ii) requirements for new useful types of INTERLINKERs (as an input to WP3, D3.3), (iii) valuable input for advanced governance models (as an input to WP2, D2.2).

To facilitate this phase, a list of questions has been distributed to pilot owners (reflection questionnaire) to help them think retrospectively about their experience of using the Collaborative Environment and the INTERLINKERs during their co-production process. At the time of writing this deliverable, the analysis of the collected feedback is in progress. Some preliminary findings are reported here below in section 4.1. Reflection questionnaire.

Further reflection activities have already been planned for the upcoming period, like a reflection workshop with guided brainstorming sessions (to be held on the 4th of November 2022) and a series of focused meetings devoted to the revision of current platform design and to the collaborative design of new INTERLINKERs. The outcome of these activities will be reported in future related deliverables (D4.4 - Second release of INTERLINK platform and community portal due in April 2023, D3.3 - Final repository of INTERLINKERs and partnership tools due in August 2023).

4.1. Reflection questionnaire

The post-pilot reflection questionnaire was structured around themes that relate to how end-users of the Collaborative Environment interacted with the technology to organize their co-production processes and what perception they had about workflows and other stakeholders' engagement with the platform. Nine major themes were identified, with a rationale that explains why they are interesting from a Human-Computer Interaction or governance point of view:

1. *Structure of the co-production working group*: Different PAs, with different internal organizational / hierarchical structures, may interpret the concepts of "organization" and "team" differently according to their usual work practices and may group people according to different rules. This is interesting from the HCI point of view, as the user journey gets adapted to existing work practices. Is there a form of "appropriation"[17] (i.e. observed uses of the functionalities for structuring the working group different from what originally conceived by designers)?
2. *Motivation of participants and awareness of co-production process status*: It may be useful to investigate whether data visualization (e.g. statistics on how the co-production team practically contributes to activities) and motivational mechanisms (e.g. gamification) may be of interest to pilot owners
3. *Structure of the co-production schema*: Currently the schema is the main way to offer guidance through the sequence of co-production steps. Is the co-production schema developed during the early stages of the project in WP2 adequate to match real practice? Would personalisation of co-production schemas be suitable to match real needs?
4. *Choice of the co-production schema*: The selection of the co-production schema is a decision the Collaborative Environment needs to support in an effective way. Is the current interface effective in this respect?
5. *Possible role of success stories and of reusability*: We need to understand whether an example-based approach (i.e. copying, or at least knowing, what others have done successfully) would be an interesting/useful/actually adoptable approach for PAs.
6. *Management of access rights*: According to theory, different team members may participate in different phases of co-production. This was the motivation for including in the implementation of the Collaborative Environment a fine-grained method for assigning permissions at different levels of the co-production tree. It would be interesting to understand whether core teams actually used selective access permissions or not.

[17] https://www.interaction-design.org/literature/topics/appropriation

7. *Most used/useful functionalities of the Collaborative Environment*: The Collaborative Environment is very rich in functionalities. It would be interesting to understand which functionalities have been used by whom. If there are significant differences, a personalization of the interface according to the user profile could be considered.
8. *Most used/useful types of INTERLINKERs, user-friendliness of the catalogue*: It is important to understand whether the platform users have an idea of the contents of the complete INTERLINKERs catalogue or whether they simply focus on what they need to perform their task. We already know that the search/browse in the catalogue should be improved, but which way would be the most desirable?
9. *Motivation for using the INTERLINK platform functionalities*: Some of the resources/assets created within the Collaborative Environment are used for internal purposes of the core team coordinating a co-production process. Other resources are shared with external stakeholders. It would be interesting to understand which are the actual motivations that sustain the usage of the Collaborative Environment and by whom.

Each of the nine research dimensions was further expanded into finer-grained subdimensions and translated into questions to guide the reflection of the coordinating team of each pilot[18].

At the time of writing this deliverable, we are analysing the answers provided by pilot owners (VARAM, MEF, ZGZ) to distil useful lessons learnt. Here follow some examples of the preliminary findings that are emerging.

Structure and management of the co-production working group. The version of the Collaborative Environment that was tested by end-users during pilot iteration 1 provides a flexible way of creating organizations and teams to structure the working group of a co-production process. Users were, therefore, free to decide how to group participants. Pilots did actually exploit this freedom to accommodate different interpretations of the available functionality, different co-production goals and different governance approaches of the process.

In the VARAM pilot, for example, the coordinating team created 11 organizations, i.e. one for each of the municipalities that were invited to participate in the 11 hands-on INTERLINK workshops around Latvia. In the answers to the reflection questionnaire, VARAM pilot owners claimed that they decided to split an organization in different teams just once, given that the number of invited stakeholders was high and it was comfortable to work in two smaller groups. This is probably what happened during the physical workshops, but it is not completely reflected in the digital platform. By looking at the final snapshot of the Collaborative Environment at the end of the pilot, we can

[18] The complete reflection questionnaire is available for consultation from this link.

observe that four out of 11 organizations have no explicit associated team. For 7 organizations 1 team was created collecting the names of the stakeholders invited to participate. For one organization, 4 separate teams were created to reflect different categories of stakeholders who participated in the workshop.

In the MEF pilot, instead, a different strategy was followed. One single organization was created for the co-production process, including 14 teams collecting stakeholders from the different PAs that were invited to participate in co-production activities. This allowed MEF to better handle and organize the involvement of the various stakeholders, assign tailored permissions, and ensure that each participating Administration was promptly represented in the MEF co-production process and in the collaborative environment. By looking at the digital platform, it can also be observed that 3 external PAs, after logging into the system, decided to create their own organization: it is not clear whether this was done to increase visibility of their participation to the platform or for testing purposes only. MEF also observed that in the usage of the system some stakeholders were more active than others (e.g., they proactively explored the INTERLINK platform without prior guidance), contributed more ideas and opinions, and were more active during open discussions. MEF retained the role of coordinators, but there definitively were contributors vs. observers.

In the ZGZ pilot, 7 different organizations were created, corresponding to different PA groups involved in the activities. Only for 1 of the organizations 3 different teams were created, grouping participants according to their category.

The comparison between the three pilots reveals that the functionality for creating organizations has been appropriated by co-production coordinators in two main different ways:

1. To create a match with the co-production process, with just one main organization created, and teams for each invited stakeholder group;
2. To create multiple organizations, one for each involved stakeholder group. In this case, the creation of teams seems to follow more practical and extemporaneous needs.

In both cases, the role of the co-production coordinator seems clear as administrator of the process. Other people mostly would be contributors and observers, based on their level of engagement in the activity. The identification of these main categories of participants (administrator, contributors, observers) by pilot owners might be used to manage the level of access and the authorizations to the platform's resources in an easier way.

Motivation of participants and awareness of co-production process status. On average, pilot owners (MEF, VARAM, ZGZ) observed in stakeholders a good motivation to participate in co-production, especially when stakeholders already had awareness of and direct experience with the problem tackled by the co-production process (i.e. the addressed problem is relevant for their activity and aligned with their skills). To sustain

onboarding, VARAM also used gifts (material rewards). For ZGZ, participants were already very familiar with co-design and collaborative practices, therefore motivation was not a major problem. MEF also took advantage of surveys and other interactive tools (like Loomio) to keep stakeholders involved. Interactive functionalities, like virtual boards or similar tools useful to brainstorm and discuss "live" are considered as very important to sustain active participation in the tasks.

The real difficulty lies in asking co-producers to introduce a new work methodology or to use a different digital platform than the one already established in their daily work practice. For the Collaborative environment to be adopted as a working tool it needs to maximize the value provided to the team involved in co-governance, co-design and co-production. This includes not only making possible a better service quality but also time savings. According to pilot owners, some improvements should be implemented in the Collaborative Environment to increase intuitiveness of use, simplicity and guidance.

As regards the problem of monitoring how the co-production process is going, pilot owners recognize that face-to-face gatherings offer the optimal opportunity for coordinators to monitor stakeholders' involvement. INTERLINKERs like the Augmenter can additionally contribute a summary of which stakeholders contribute to what specific collaboration activities (like in the case of the VARAM pilot).

It is harder to get an intuitive view of the status of the entire process, to determine where resources have been created. Pilot owners suggest that the process dashboard could be more simplified, including a progress board - maybe something like a Kanban board[19] that tracks, for instance, the phases and tasks that have already been worked on and those that are in progress.

Structure of the co-production schema. Pilot owners welcome the possibility of choosing among the different schemas available in the Collaborative Environment and appreciate the possibility of simplifying existing schemas to adapt them to their own purposes: the examples offered in version 1 of the Collaborative Environment (see Table 2), although theoretically well justified, are too rich and complex to be manageable, as not all the optional steps are of interest in a specific use case.

The names and terminology used to describe phases, objectives and tasks should be carefully revised, to avoid duplications and make concepts clearer. Making the schema more visual (or at least including it as an option) would be beneficial, for example, arranging it in a decision tree type of visual or process flow.

Tasks in progress should also be highlighted so that users can quickly find their location.

[19] https://en.wikipedia.org/wiki/Kanban_board.

INTERLINKERs should be annotated more carefully so that the recommendation function can filter and reorder them correctly. Finally, the Overview section of the interfaces, showing a summary of the created resources should provide additional explicit information about the phases/tasks those resources pertain to.

Choice of the co-production schema. Choosing from an existing set a co-production schema to fit specific use case needs is a difficult task. As an alternative, the possibility of creating a bespoke schema from scratch has been positively evaluated. Both VARAM and ZGZ have also suggested that simpler customized schemas could be created from the full schemas. Ideally, this could be done in an intuitive and simple way. Something like dragging and dropping the tasks and phases that best fit the co-creation process being designed. As a welcome improvement, end-users also propose that team members could receive notifications, invitations to participate in a specific task or phase, etc.

Possible role of success stories and of reusability of experiences. At this stage of project advancement, pilot owners (MEF, VARAM, ZGZ) have not expressed the need of success stories to foster reuse in co-production processes. However, they fully recognize the importance of reading the experience of testimonials for getting inspired, informed, and additionally guided by what others have done. This aspect will be further investigated with ad hoc brainstorming activities to better understand how a catalogue of success stories would be most useful to them.

Management of access rights. The possibility to assign different access privileges to teams and team members has been evaluated as an important feature for the Collaborative Environment. On the contrary, during pilot iteration 1 the need to assign different access rights for different phases/tasks of the co-production process did not emerge (MEF, VARAM) or it was not easy to do (ZGZ). Further investigation is required to understand whether the flexibility of assigning access rights according to the position in the co-production tree/schema (that was included in the digital platform to reflect indications emerged from governance theory, as explained in section "2.5.2. Results" is exploited in practice.

Most used/useful functionalities of the Collaborative Environment. When asked about their perception on which have been the most used functionalities of the Collaborative Environment, pilot owners clearly indicated: the creation of the co-production process, the creation of organizations and teams, the upload and storage of documents. Of all these, the storage of the information and resources all in one place, also to keep account of the process carried out, has been mentioned as the (perceived) most useful functionality. Perceived as very useful was also the possibility to link external resources that were not yet available as native tools of INTERLINK.

Regarding possible new functionalities envisaged as potentially useful to be directly integrated inside the Collaborative Environment, pilot owners mentioned communication facilities, like discussion forum, group chat or instant chat (VARAM), possibility to send emails and notifications to team participants (ZGZ). A visual

rendering of what is new is the co-production process (e.g. newly created resources) and virtual boards to support "live" discussion were also mentioned by MEF.

Most used/useful types of INTERLINKERs, user-friendliness of the INTERLINKERs catalogue. The subjective perception of which have been the most used INTERLINKERs[20] indicates that Google docs, with the related possibility of creating and sharing documents, was used most often. Then come other pilot specific INTERLINKERs, more closely related to the collaborative process to be performed: for VARAM, the process targets collaborative augmentation/refinement of web-based contents, therefore the Augmenter INTERLINKER was mentioned; for ZGZ, the process targets the co-creation and co-delivery of activities at Etopia, therefore guidelines for stakeholders analysis and in particular the template for use case scenarios were considered as most useful; for MEF, the process targets the co-design of a new software component, therefore knowledge INTERLINKERs to set-up the stakeholders' engagement and the organization of activities were greatly used. MEF also took advantage of INTERLINKERs supporting communication (Mailchimp) and ideas crowdsourcing, e-voting and collaborative discussions, like Loomio and Google Jamboard.

It was commented that other design thinking tools (for example, Miro/Mural boards and similar) would be good for longer co-production processes.

It was felt that, in general, the current version of the INTERLINKERs catalogue and the way INTERLINKERs are recommended within the co-production schema, is not intuitive for users who have not much knowledge about the current contents or about digital tools. It was suggested that a tech-savvy process leader/administrator should facilitate the choice of INTERLINKERs or choose in advance which INTERLINKERs will be available for each process and "hide" the others.

Motivation for using the INTERLINK platform functionalities. Pilot owners were asked the following question: "In your opinion, considering the experience that you had during the first pilots, what is the difference between the INTERLINK Collaborative Environment and other digital platforms that support collaboration, group work or project management, like for example Office365, Google Workspace, Trello?". Collected answers highlight that the INTERLINK Collaborative Environment can store every kind of resource without taking into account its format. MEF specifically mentioned that the INTERLINK platform combines functionalities of several of these competitor platforms and allows for the integration of missing ones from different software development providers. Also, collaboration is the central theme of INTERLINK while other tools are built like a storage space which can be readjusted for collaboration. An added value is provided by the guiding tool through a co-production process (including the evaluation phase). This, however, also brings drawbacks, as there might be reluctance in

[20] Objective data is also available as collected by the system logs and explained in previous section 3.5. User-behaviour analysis: backend and frontend logging.

stakeholders to incorporate new work tools in day-to-day work. Intuitiveness of the tool and extra effort to train people and get them involved are essential.

When asked how they would valorise and reward the activities of different team members in a co-production process, VARAM suggested that it could be possible to do on a case-by-case basis with physical rewards. Tokens are a good idea, but it should be laid out early in each process for what kind of value those tokens can be exchanged. It would also be beneficial to be able to exchange tokens for charity which could raise the motivation by helping two causes at once (typical practice in Latvian social and market research online panels). Also, ZGZ agrees that the community dimension is important: in their case, for example, more proactive users could accumulate points that they can redeem within the Etopia community. MEF highlighted, however, the difficulties that some public administrations might have in the provision of rewards. This latter aspect will be carefully investigated in the next phases of project development.

5 Conclusion

This deliverable has been divided into 5 chapters. In chapter "1. Introduction", the methodology for pilot evaluation and the applied strategy (goals, dimensions, constructs), provided measurement instruments (logs, questionnaires), how automation of KPI collection has been performed and how pilot execution has been operatised (evaluation journey) has been described. Pilot execution was divided in two phases, namely pre-pilot and pilot execution subphases. Details about the tools made available and instruments used to gather insights were outlined: questionnaires, log data together with the engagement strategy. As a result of these activities, INTERLINK made available for pilot owners a working first prototype (alpha version) of the platform and the design of all measurement instruments applied in the evaluation of the pilots.

Chapter "2. Pre-pilot subphase evaluation" described the pre-pilot subphase evaluation. A diverse range of evaluation techniques has been used to gain insights and refine the original prototype of Collaborative Environment made available in April 2022. Heuristic evaluation, alpha usability tests, focus groups, training sessions, cross-testing sessions with social scientists and pilot owners were carried out. As result, a new version, named beta version, more solid and usable of Collaborative Environment was provided. Along the technical developments the evaluation questionnaires and log gathering mechanisms were improved and got ready for use in the actual pilot execution subphase.

Chapter "3. Pilot execution subphase evaluation" described the pilots' execution subphase. Execution details at each pilot were provided: goal, co-production approach followed, activities executed, KPIs monitored and their actual values, together with reflections on KPIs and the overall pilot execution. Pilot by pilot evaluation was followed by a user-behaviour analysis exploiting front-end and back-end logging data and the assessment of quality of the co-production process. As result of this process, we were

able to quantify the resulting quality out the co-production processes enabled by INTERLINK, raising a 3.79 out of 5 score, which is promising but far from conclusive.

Chapter "4. Post-pilot reflection phase" dealt with the post-pilot reflection phase, where pilots reflected about what was useful and what improvements should be made to provide a truly usable, satisfactory, acceptable, and hence, widely adopted, Collaborative Environment. The reflections gathered in this chapter set the basis for further developments to be realized before iteration 2 of the pilots.

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6 Appendix A – KPIs for pilots' evaluation

This appendix showcases the KPIs that were defined at pilots' planning time both globally and locally, i.e., for each specific pilot site.

6.1. INTERLINK global KPIs

Table 21. INTERLINK global KPIs.

KPI table for iteration 1		Pilots			
		VARAM	ZGZ	MEF	Means (way of measuring)
A	**Interlink Use and Co-production of Services**				
A1	Number of INTERLINKERs used in an actual public service	>= 3	>= 3	>= 3	INTERLINK catalogue indexes public services and INTERLINKERs and returns INTERLINK-powered dependencies on INTERLINKERs
A2	Number of citizens involved in service customization	> 100	>=100	>= 1	Retrieve from collaborative environment number of teams and their members participating in co-production and the time invested by them, frequency of their contributions and so on

A3	Number of partnership enablers used within INTERLINK service instance	>=3	>=3	>= 1	INTERLINKERs are tagged when they are partnership enablers in the INTERLINK catalogue
A4	Number of citizens registered to INTERLINK platform	> 100	>=100	>= 1	Users of collaborative environment indicate in which role (civil servant, citizen) a user is co-producing something
A5	Number of citizens involved in co-delivered services	> 25	> 50	>= 1	Check projects whose co-production process is concluded and members that took part in co-production team
A6	Number of TSOs involved in co-delivered services	> 5	>=2	>= 1	When users register, they must indicate their role, if they are citizens, PA representatives, TSOs and so on. When taking part in a team if a user may have several roles, then they need to indicate the role under which they take part.
A7	Number of new co-delivered services	>= 1	>=3	>= 1	# co-produced services in the catalogue
A8	Number of active users (sessions) per co-produced service (cumulative value of summing up users in all co-delivered services per iteration)	> 100	> 100	> 100	Gather usage and participation logs in a co-production process, co-producing a service

A9	Number and Percentage of shared services between PAs and citizens that were co-produced through INTERLINK platform	> 1 and > 50%	> 1 and > 50%	> 1 and > 50%	# INTERLINKERS used in different co-produced services # public services that have cloned or derived from existing public services Analyse composition of co-production teams
A10	Number of private companies involved in co-delivered services		>= 3		Again count users under role company having taken part in finalized co-production process
A11	Number and Percentage of shared services between PAs and private companies that were co-produced through INTERLINK platform		>= 1 and > 25%		# INTERLINKERS used in different co-produced services # public services that have cloned or derived from existing public services Analyse composition of co-production teams
A12	Self-sustained services (without public expenses)	1	0		# Co-delivered public services with business model where maintenance and exploitation is carried out by stakeholders other than PAs

A13	Number and variety of INTERLINK business model (investor funding, crowdfunding, revenue sharing models…) applied to co-produced services	>= 2	>=2	>= 2	In sustainability phase of co-production model, co-produced artefacts must be associated a business model from a new taxonomy of innovative business models for co-creation
A14	Percentage of users who completed the in-app questionnaires and made improved suggestions	> 50%	N/A	> 50%	Gather results of INTERLINKER instrumented with in-app questionnaires
A15	Number of INTERLINKERs reused in more than one public service	>= 2	>= 2	>= 1	Dependencies among INTERLINKERs and public services are retrieved from INTERLINK catalogue
B	**THE VALUE PROVIDED BY INTERLINK**				
B1	Perception of reduction of administrative and management costs	> 20%	> 20%	> 20%	Survey. Qualitative analysis with previous case study data analysis
B2	Quantity of co-produced initiatives (baseline: number of previously co-produced public services)	> 30%	> 30%	> 30%	Number of co-produced public services and INTERLINKERs

B3	Quality of co-production initiatives				Feedback from end-users about the co-produced services quality based on a quality assessment questionnaire which measures usability, acceptance, trust and adoption. Such questionnaire will be adapted to the final co-produced public services at each pilot site.
B4	Increased participation of citizens and private-entities in customization of public services	> 50%	> 50%		Simple quantitative tools (such as attendance lists and meeting minutes) can be used to measure frequency and timing of encounters. Socio demographic questionnaires will be filled in by attendees to engagement sessions.
B5	Increased participation of citizens and private entities in co-delivery of public services	> 50%	> 50%	> 50%	Simple quantitative tools (such as attendance lists and meeting minutes) can be used to measure frequency and timing of encounters. Socio demographic questionnaires will be filled in by attendees to engagement sessions.
C	**The Users' Perceptions of INTERLINK - Quality**				

C1	Usability assessment of INTERLINK and co-produced artefacts (in a scale 1-5)	>= 4	>= 4	>= 4	Usability questionnaire based on SUS
C2	Trust assessment of INTERLINK and co-produced artefacts (in a scale 1-5)	>= 4	>= 4	>= 4	Newly defined questionnaire created by INTERLINK based on Trust analysis from SOTA
C3	Acceptance assessment of INTERLINK and co-produced artefacts (in a scale 1-5)	>= 4	>= 4	>= 4	Acceptance questionnaires based on TAM
C4	Satisfaction level of different stakeholders with INTERLINK tools and INTERLINK-powered public services	> 80%	> 80%	> 80%	Satisfaction questionnaire, distinguishing satisfaction level across different stakeholders

6.2. INTERLINK local KPIs

Table 22. INTERLINK local KPIs.

KPI table for iteration 1		Pilots			
		VARAM	ZGZ	MEF	Means (way of measuring)
D	**Pilot specific evaluations**				
D1	**VARAM**				

D1.1	Number of service descriptions improved through INTERLINK	>= 3			Count the number of service descriptions augmented though Description Augmenter component part of Servicepedia
D1.2	Perceived improvement in service descriptions thanks to INTERLINK from citizens perspective	>= 50%			Satisfaction survey completed by beta testers taking part in service description collaborative sessions aided by Collaborative Environment and Description Augmenter INTERLINKER
D1.3	Perceived improved productivity in collaboratively enhancing public service descriptions	>= 50%			Satisfaction survey
D1.4	Municipalities involved in INTERLINK pilot	> 3			# of local PAs who are involved in the pilot
D1.5	Digital agents involved in INTERLINK pilot (trained)	>10			# of digital agents taking part in co-production processes
D2	**ZARAGOZA**				
D2.1	Number of co-created activities in eTOPIA_ driven by PA		>=5		Count the co-created activities either through collaborative environment or through eTOPIA_ activity co-creation and management led by PA

D2.2	Number of co-created activities in eTOPIA_ driven by stakeholders		>=3		Count the co-created activities either through collaborative environment or through eTOPIA_ activity co-creation and management led by external to eTOPIA_ parties
D2.3	Number of co-creation activities launched with activity management module		>=5		Count the number of projects started
D2.4	Number of users per month accessing to activity booking module		>=50		Count the number of users making use of activity booking INTERLINKER
D2.5	Engagement growth		>=10%		Growth of citizen participation / attendance to eTOPIA_ activities
D2.6	Loyalty module usage		30		Number of citizens whose contributions have been audited and rewarded by loyalty module
D2.7	Open Innovation feasts supported by INTERLINK co-production process		>=2		Activities organized to promote usage of INTERLINK tools and services
D3	**MEF**				

D3.1	Number of Public Bodies involved in co-design of PSPM			>= 3	Indicator is self explanatory
D3.2	Number of civil servants involved in co-design of PSPM			>= 45	Indicator is self explanatory
D3.3	Number of INTERLINKERs used in the PSPM model			>= 5	Indicator is self explanatory
D3.4	Number of features contributed by external stakeholders to include into the PSPM model			>= 5	Indicator is self explanatory
D3.5	Increased representativeness of stakeholders during the co-testing phase			>=25%	Use existing process as benchmark, allocating a weight to each stakeholder group involved in the process to determine an increase of representativeness in relevant actors
D3.6	Perceived efficiency gains of the strategic planning process (value creation) thanks to INTERLINKERs			>35%	Conduct a survey after the co-design process to determine the stakeholders perception of the process improvement

7 Appendix B – Data models of INTERLINK

7.1. Catalogue data model

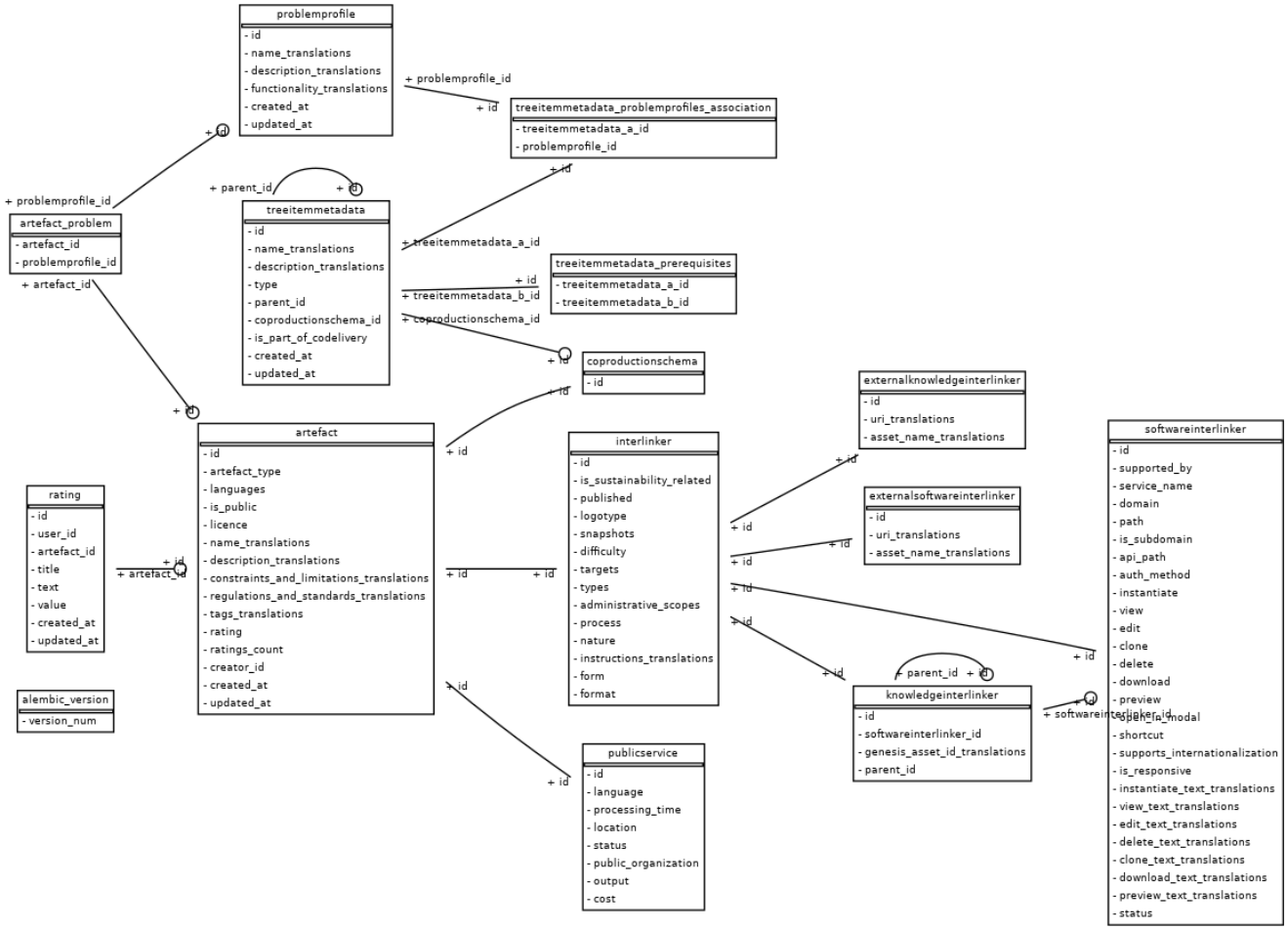


Figure 58. INTERLINK's catalogue data model

7.2. Co-production data model

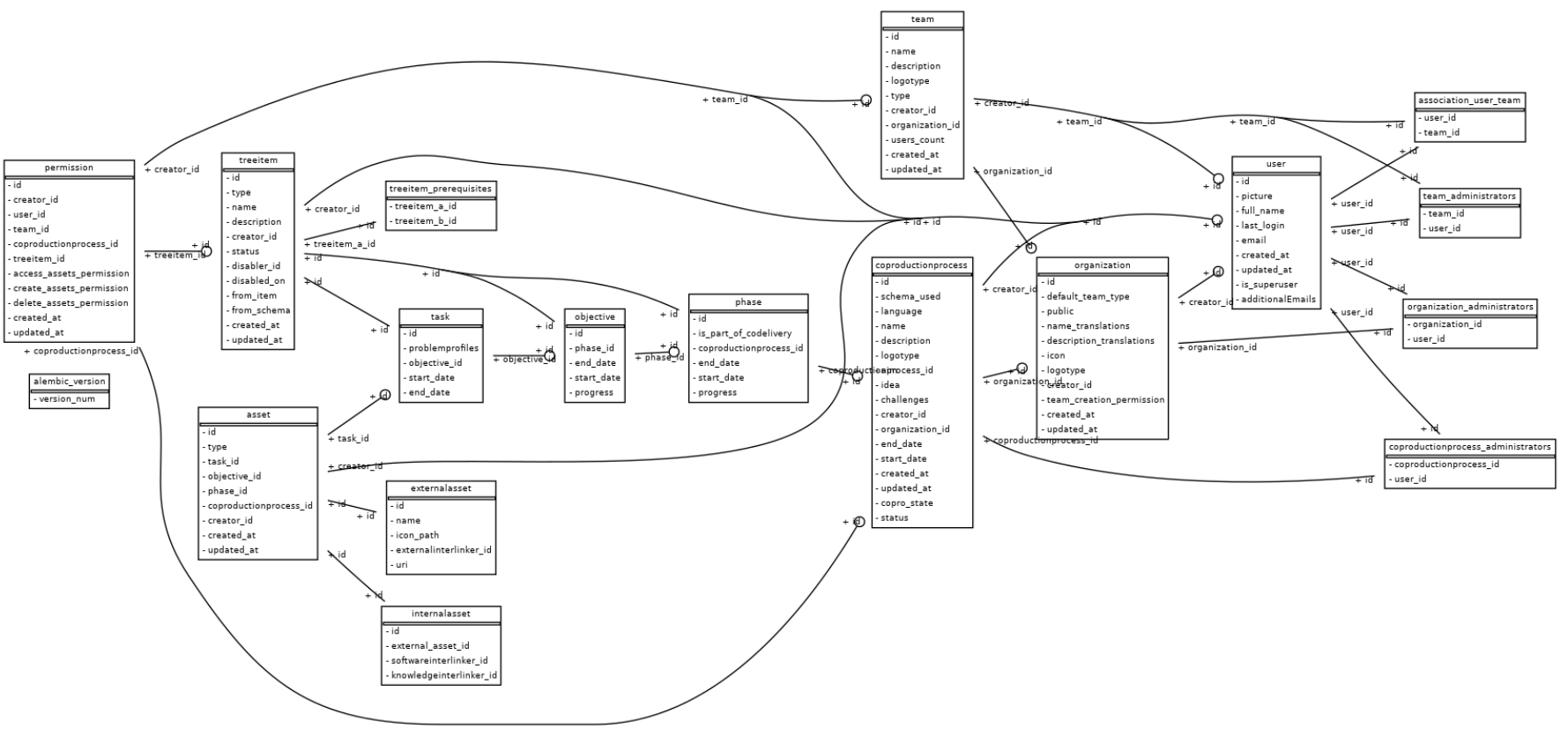


Figure 59. INTERLINK's co-production data model

8 Appendix C – INTERLINK's Co-producers and End-Users Perceptions questionnaires

This appendix showcases the Co-Producer's and End-Users perceptions on User-based Quality, Value-based Quality, Trust and Acceptance.

These questionnaires are thought to be answered by: a) those (coproducers) who take part in the co-production of a public service or reuse artefacts (public services & INTERLINKERs) made available through INTERLINK co-production tools (Collaborative Environment and Catalogue); and b) those (endusers) who make use of the resulting artefacts from co-production processes enabled by INTERLINK co-production methodology and associated supporting tools, i.e Collaborative Environment and INTERLINKERs.

8.1. INTERLINK Co-producers' Perceptions Questionnaire

INTERLINK Co-producers' Assessment Questionnaire.pdf

8.2. INTERLINK End-users' Perception Questionnaire

INTERLINK End Users' Perceptions Questionnaire.pdf

9 Appendix D – Detailed feedback from VARAM's cross-testing session in pre-pilot subphase

The following feedback was received regarding the two tools used in VARAM's cross-testing session.

Servicepedia

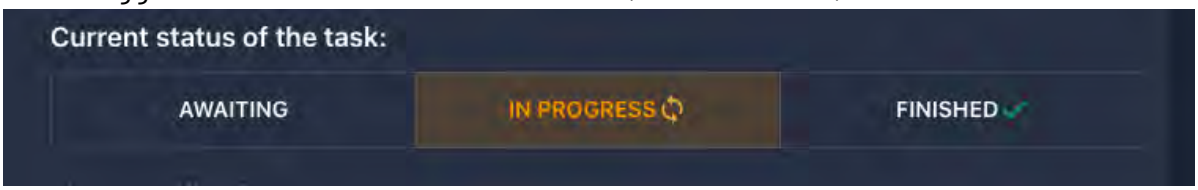
- Not very distinguishable colours in dashboard, why some appear in colour and move you to screen to vote, approve or discard and URL paths send to view in augmented version of web page.
- Augmented version of webpage is by far the most useful part
  - Votes for suggestions should be incorporated there without having to to Admin part, which is less clear more confusing

- The fonts of the **Refinement Report** should be more homogeneous, its format has to help those embarked in refinement.
  - Several fonts are used in the document, and it feels like a copy-paste from different places without spending time on it. It is suggested to use a single font and to play with sizes, bold and underlining.
- Refinement maybe in two stages:
  - Get feedback (Include all comments)
  - Try to answer (Experts can give solutions and try to came up with ideas)
- Can it be 2 groups users citizens and experts.
- Why did at the beginning encounter many problems, but did not collaborate to find solutions to descriptions
- Bugs for Augmenter/Servicepedia:
  - When you are in the integrated system and you approve it doesn't refresh, show the approved annotations.
  - Should we add another way of voting to add more prevalence?
  - Links to external pages should not be annotable.
  - View, real time activity need to be implemented for user to interact.
- In general, working with Servicepedia is easier for the user. Its functionality is limited and the tasks to be performed by the user are few and concrete.
  - With an explanation of how to proceed, citizens could be asked to help with the annotations. (Video o Help)
  - The problem is that the whole process of why and for what purpose the citizen's help is requested would have to be managed externally. This management seems to be offered by the collaborative environment, but it is complex to understand because it has so much functionality.
- The problem here is that the icons and representations are not intuitive. They do not clearly reflect the functionality, for example: the eye icon, the icon to generate the report, the behaviour of the fields of each comment (the coloured text allows you to do one thing and the path another).
  - To solve this, it is suggested to use more representative visual icons and to have an explanatory visual legend always at hand.

Collaborative Environment

- It is not obvious, steep learning curve
- Hard to see that a team has to be linked to a project
- Too many tabs are opened

- INTERLINKER word is not very meaningful, better to use Catalogue name
- Some characters in Latvian do not appear well in the menus
- In the Team menus, horizontal scrolling impends seeing that there are buttons in the right hand side
- If you want to edit some task information, the pencil button is quite invisible for the user, it took some time to locate the functionality.
- Bug for the environment:
  - When you create a augmenter description from recommended didn't create it.
  - Go to the guide, select recommended INTERLINKERs, button instantiate (didn't work).
- It is not clear that the way to access the system is by pressing the "Go to dashboard" button. Why not rename the button to login? Also, button needs to be bigger or more visible, it is hard to locate where user can access the platform (there is no such option also in the menu on the upper side of the page.
- Once inside the dashboard, the login button appears very low and as it has no fill colour, it is practically not visible. The central image is very large and makes it difficult to see the button.
- The system does not log out correctly. If I logout I want to exit and the next time I log in I will be asked for my password again. The current behaviour is NOT correct. Another thing is to close the window or tab without pressing logout, in that case it would leave the current behaviour.
- When adding members to a group, is it possible to add suggestions as you write, or is this not done for privacy?
  - Better feedback should be given when somebody cannot be added because it has not logged in previously
- The distinction in the use of the terms process and project is not clear. In creation, "process" is used, but in editing, "project" is used.
- Suggested names for task status: TODO, IN PROGRESS, DONE



10 Appendix E – Collaborative Environment Alpha release

The following snapshots exemplify the look and feel of the alpha release made available alpha testers in INTERLINK's iteration 1' pilot evaluations.

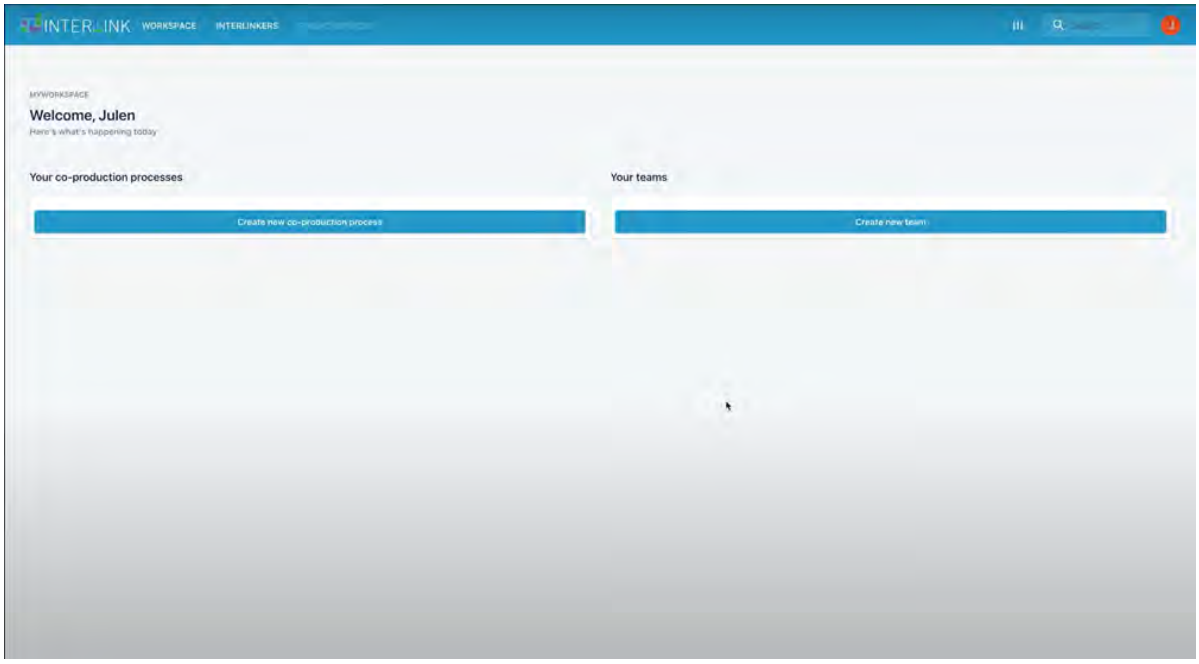


Figure 60. Collaborative Environment's Workspace view

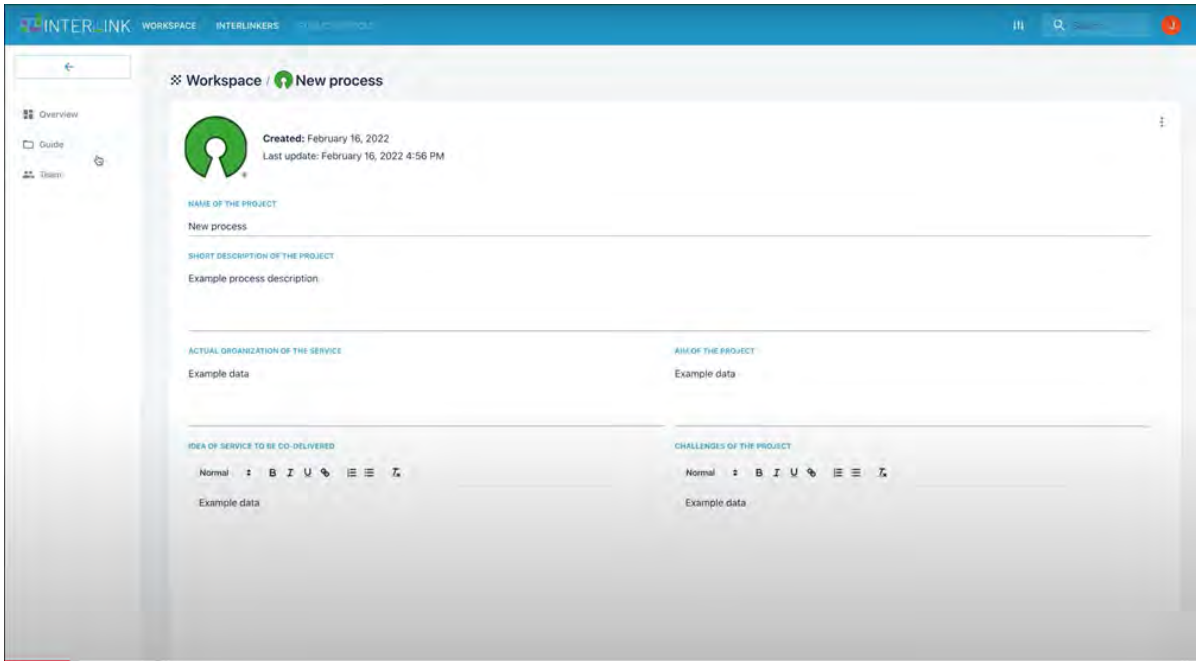


Figure 61. Collaborative Environment's co-production process view

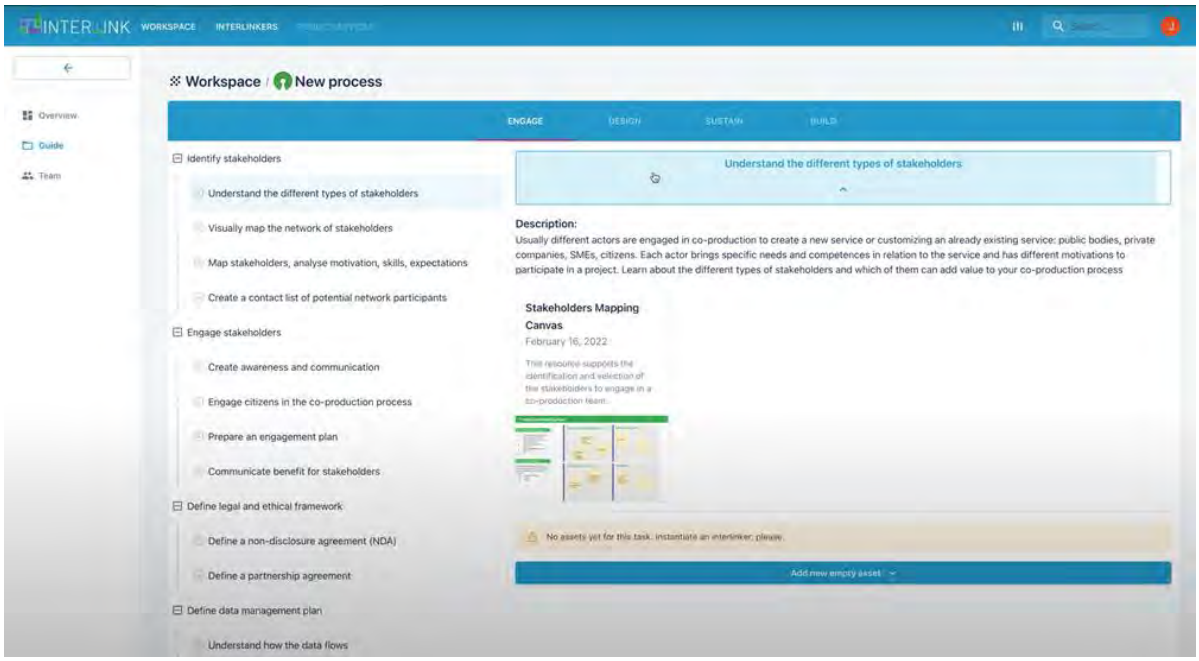


Figure 62. Collaborative Environment's co-production Guide view

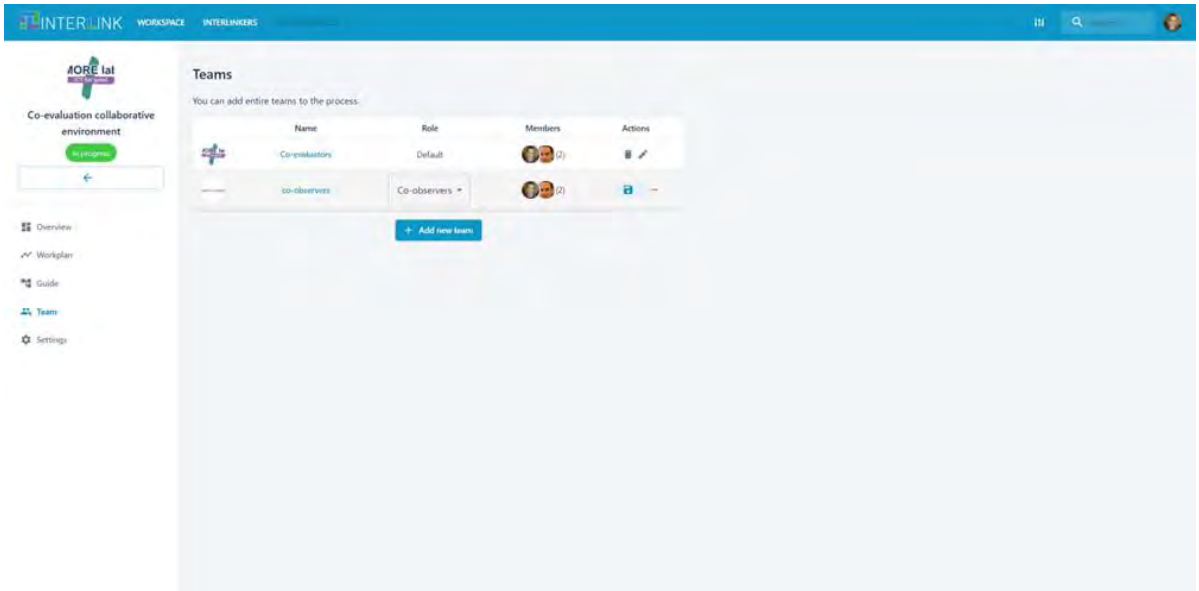


Figure 63. Collaborative Environment's co-production Team view

11 Appendix F – Collaborative Environment Beta release

The following snapshots exemplify the look and feel of the beta release made available beta testers in INTERLINK's iteration 1' pilot evaluations.

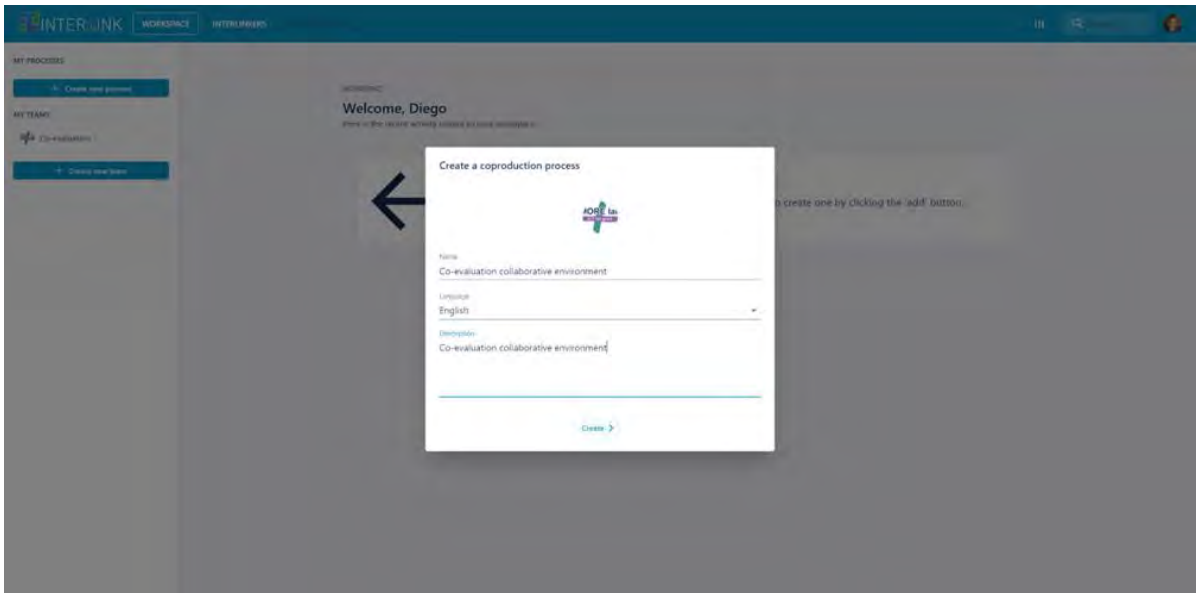


Figure 64. Collaborative Environment's WorkSpace view

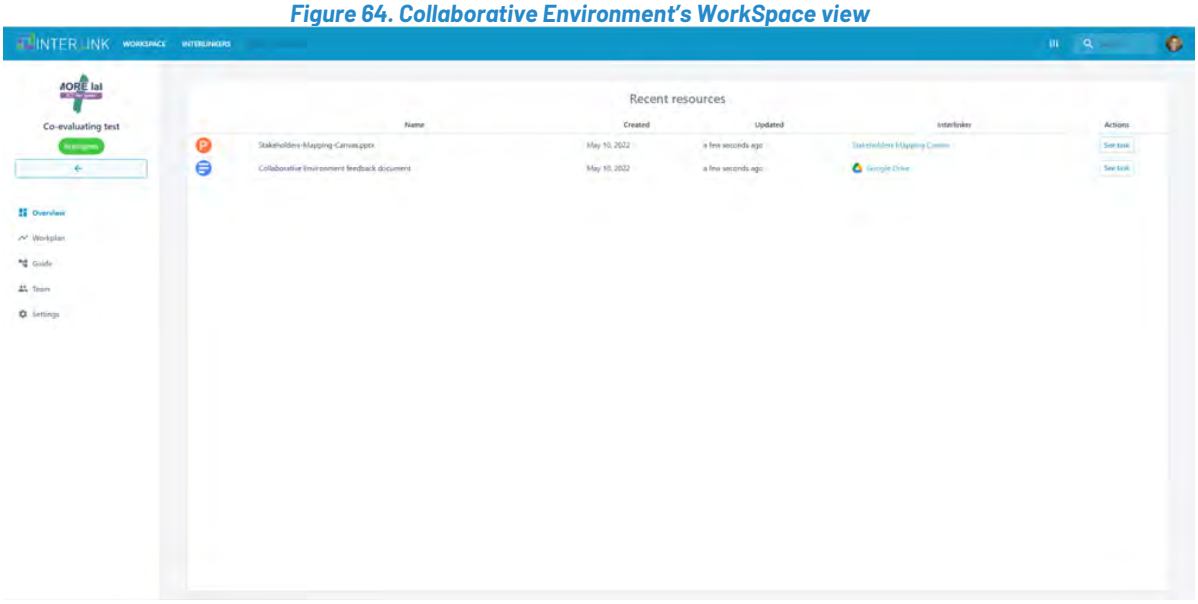


Figure 65. Collaborative Environment's co-production Overview view

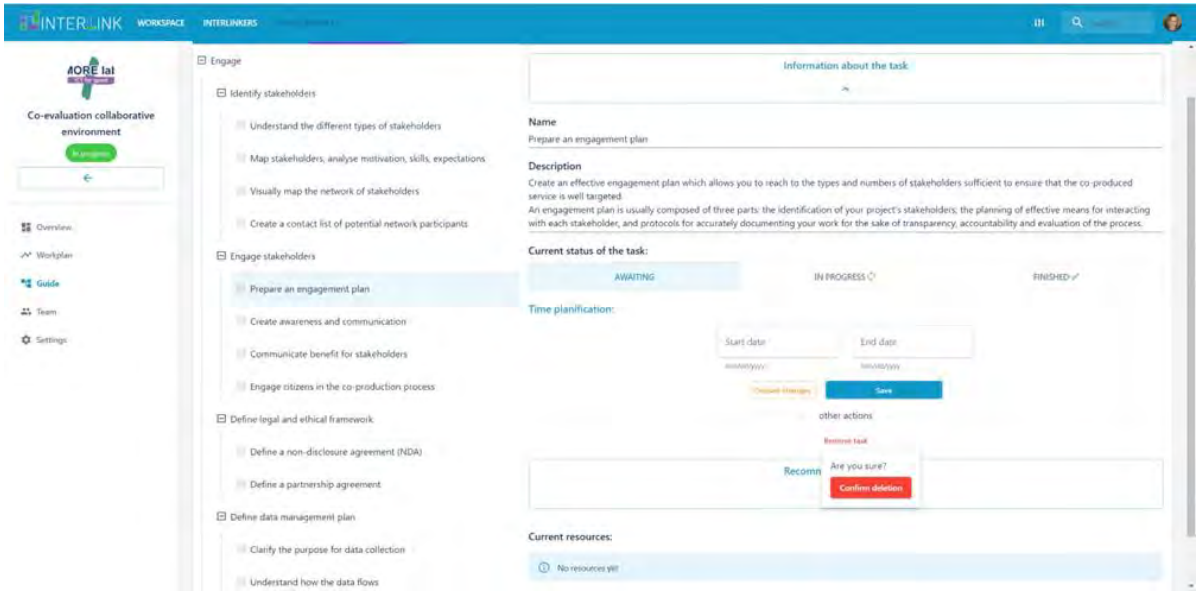


Figure 66. Collaborative Environment's co-production Guide view

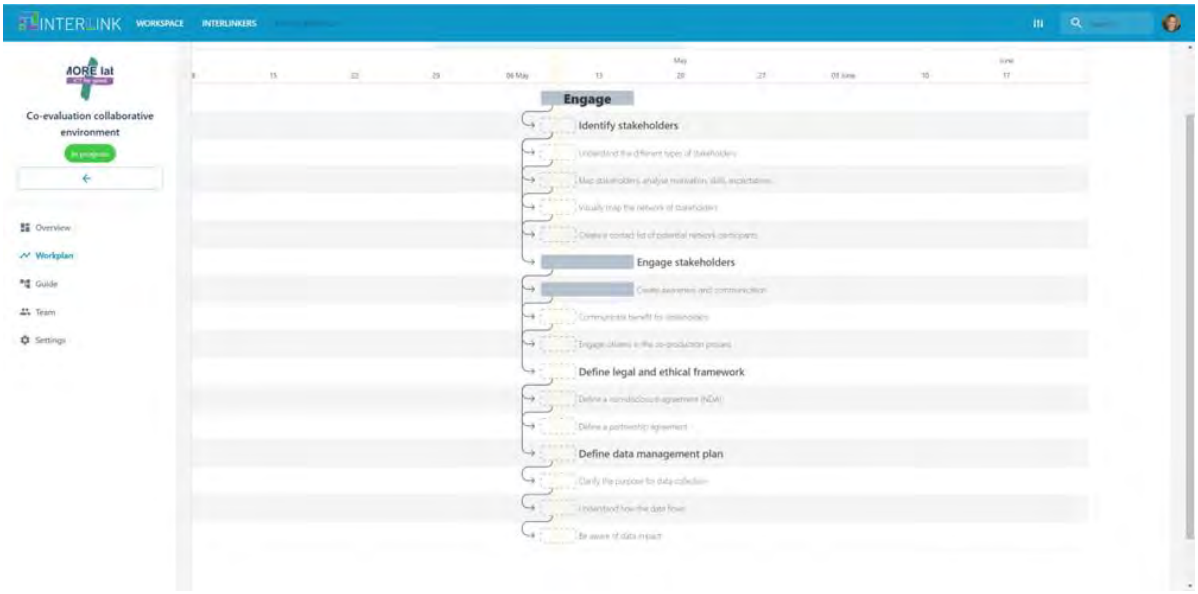


Figure 67. Collaborative Environment's co-production Workplan view

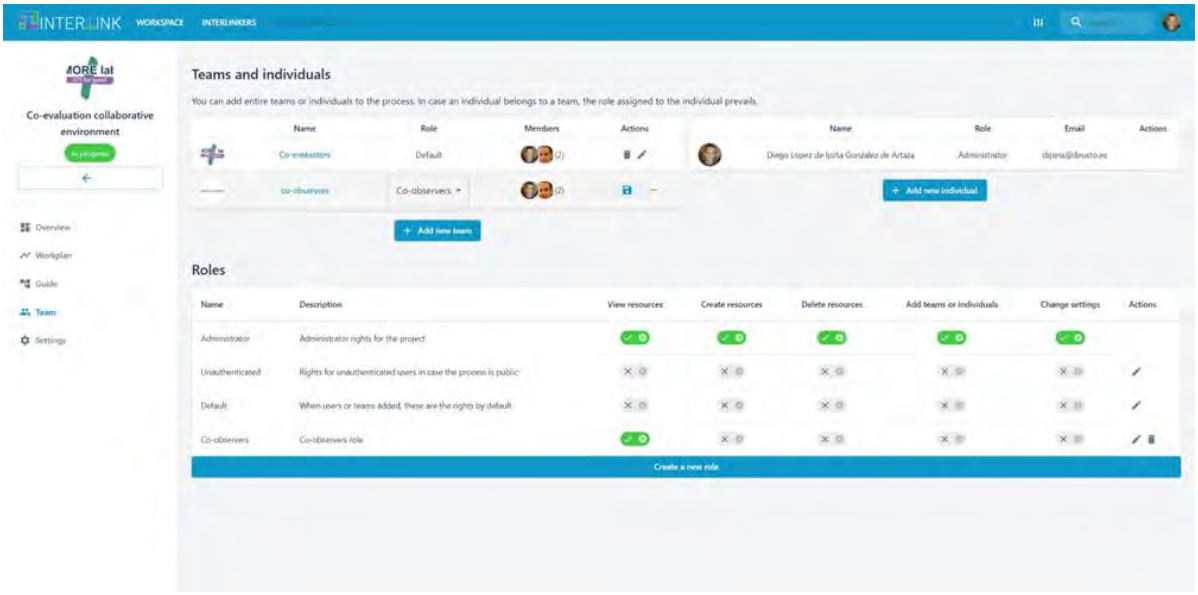


Figure 68. Collaborative Environment's co-production Team view

12 Appendix G – Collaborative Environment iteration 1 release

The following snapshots exemplify the look and feel of iteration 1 release made available beta testers in INTERLINK's iteration 1' pilot evaluations.

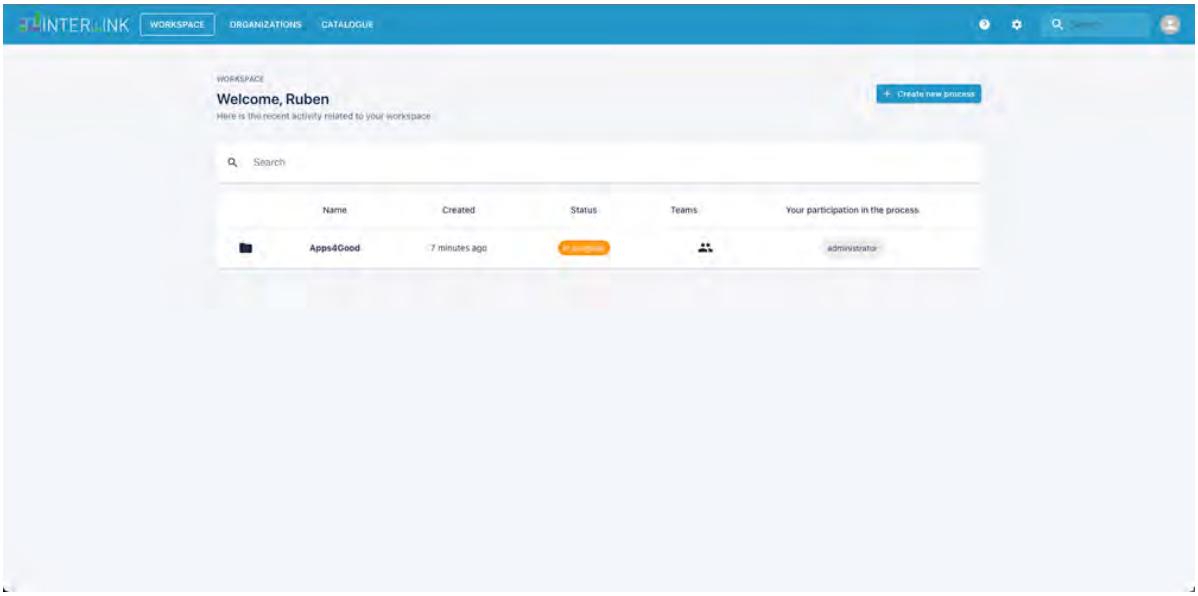


Figure 69. Collaborative Environment's Workspace view

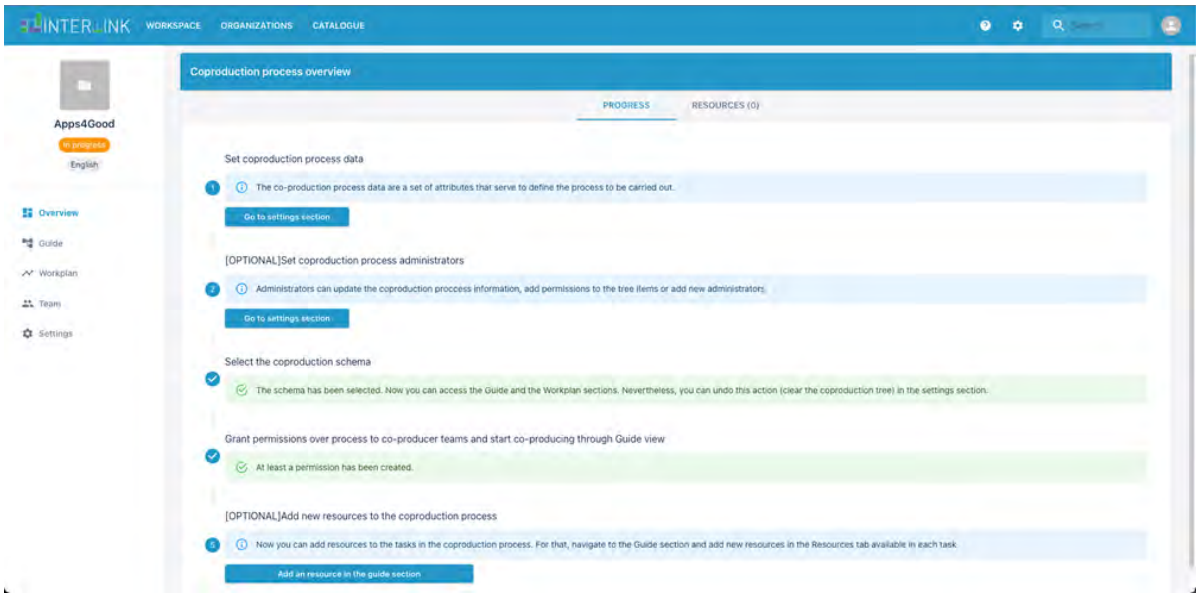


Figure 70. Collaborative Environment's Overview view

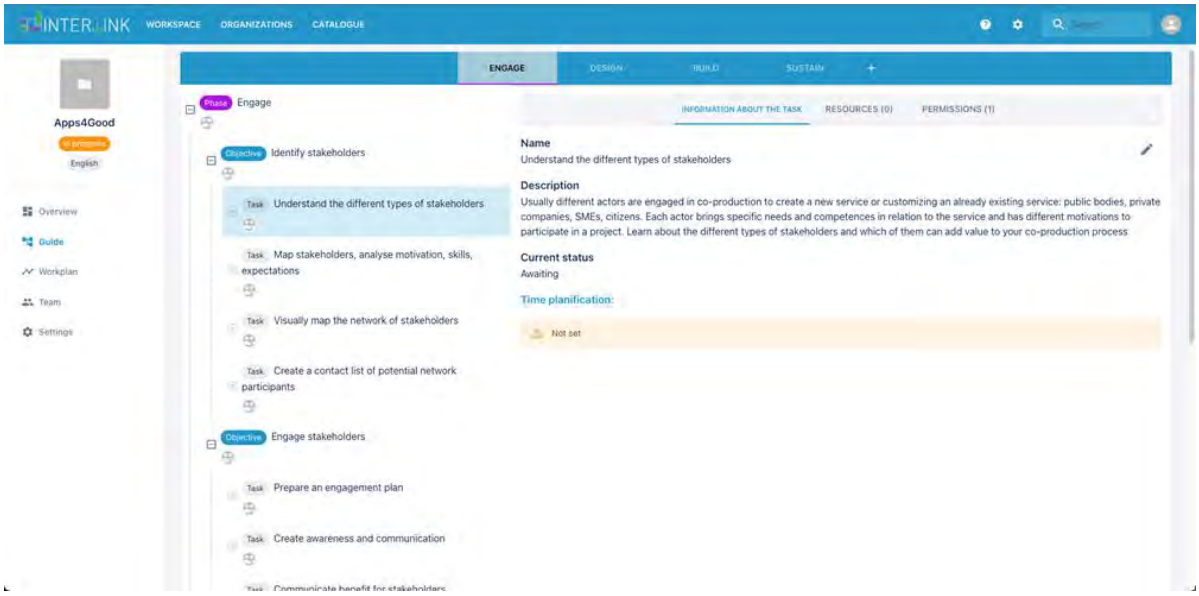


Figure 71. Collaborative Environment's Guide view.

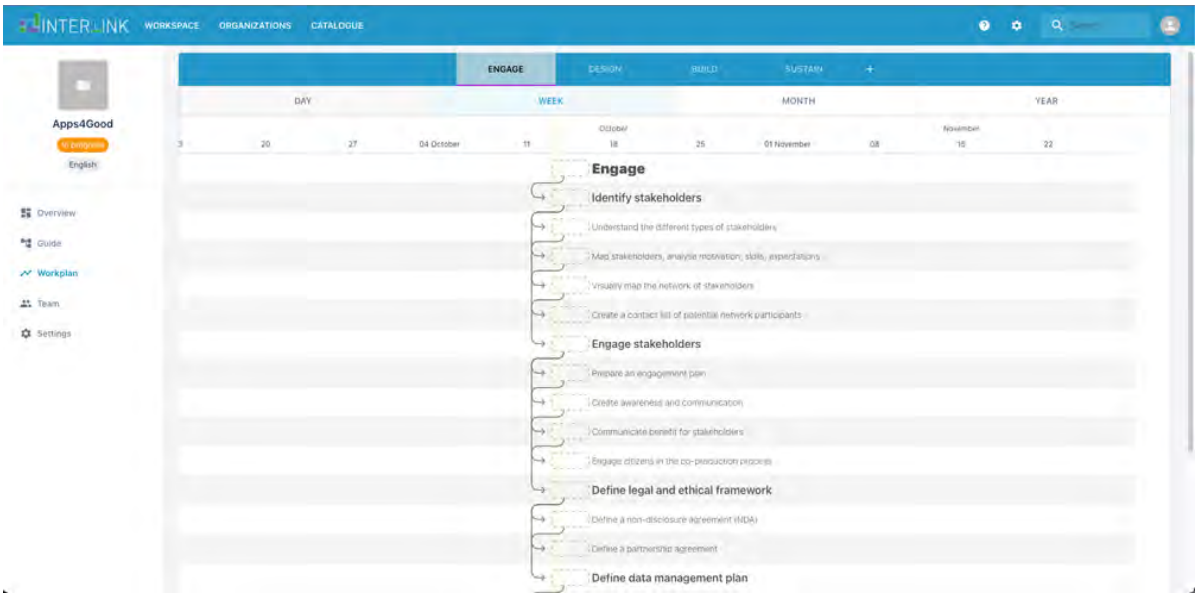


Figure 72. Collaborative Environment's Workplan view.

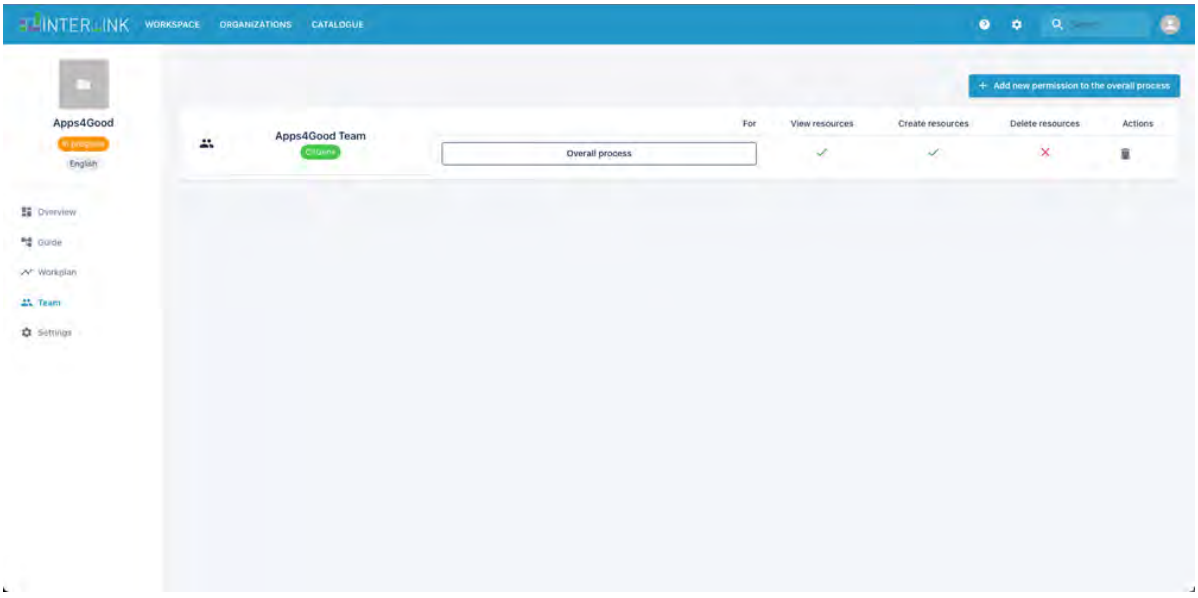


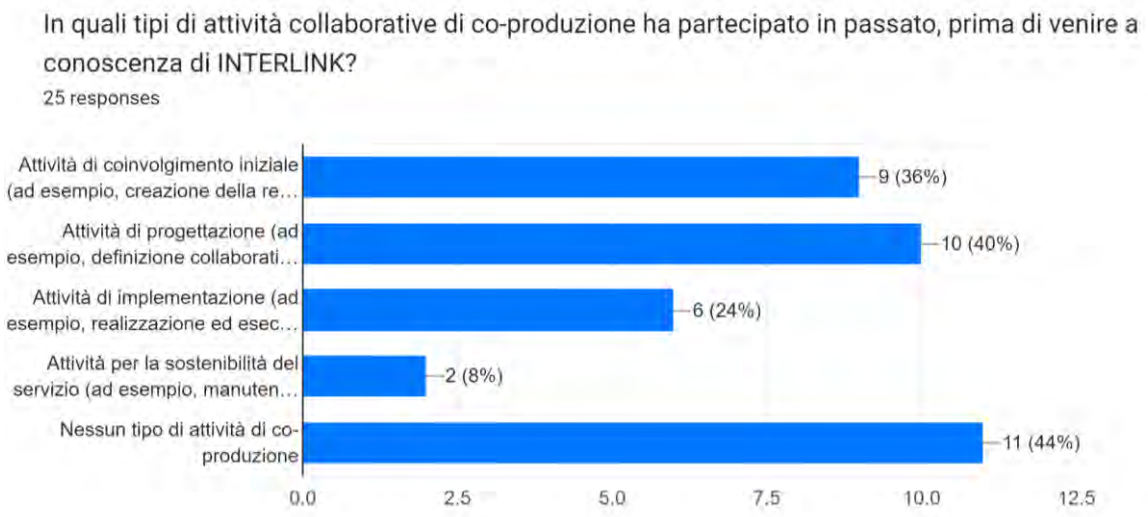
Figure 73. Collaborative Environment's Team view.

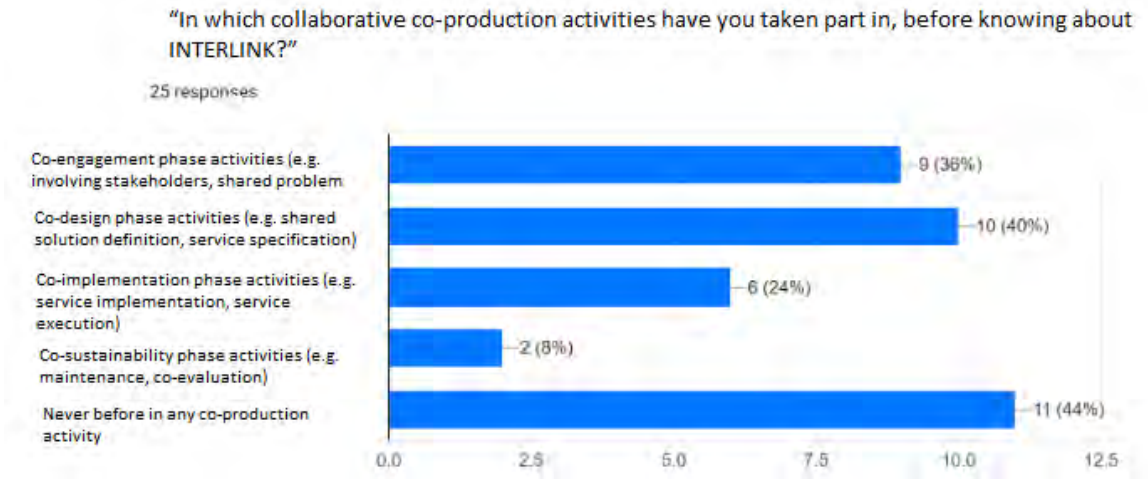
13 Appendix H – Co-producers' context and experience

The following snapshots exemplify the look and feel (*co-production facets*) of iteration 1 release made available beta testers in INTERLINK's iteration 1' pilot evaluations.

13.1. Experience in co-production

MEF

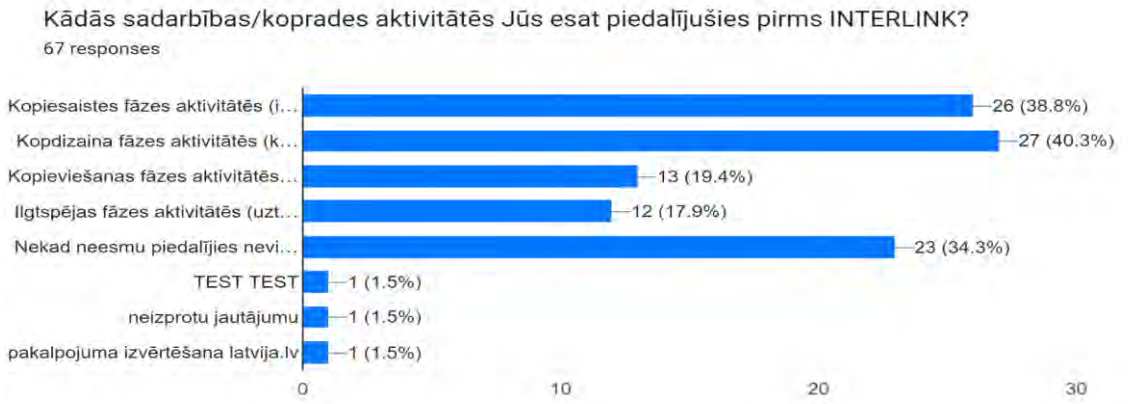




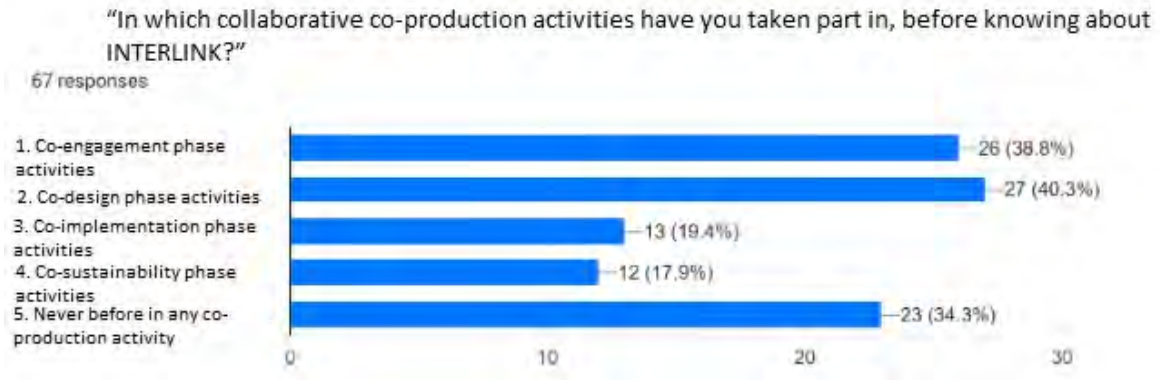
[21]

VARAM

[21] Translated based on the original results



22



23

ZARAGOZA

[22] The questionnaire performed by VARAM included several test samples which are not relevant for the final consideration of the results -those corresponding with the 1,5% of the sample-.

[23] Translated based on the original results.

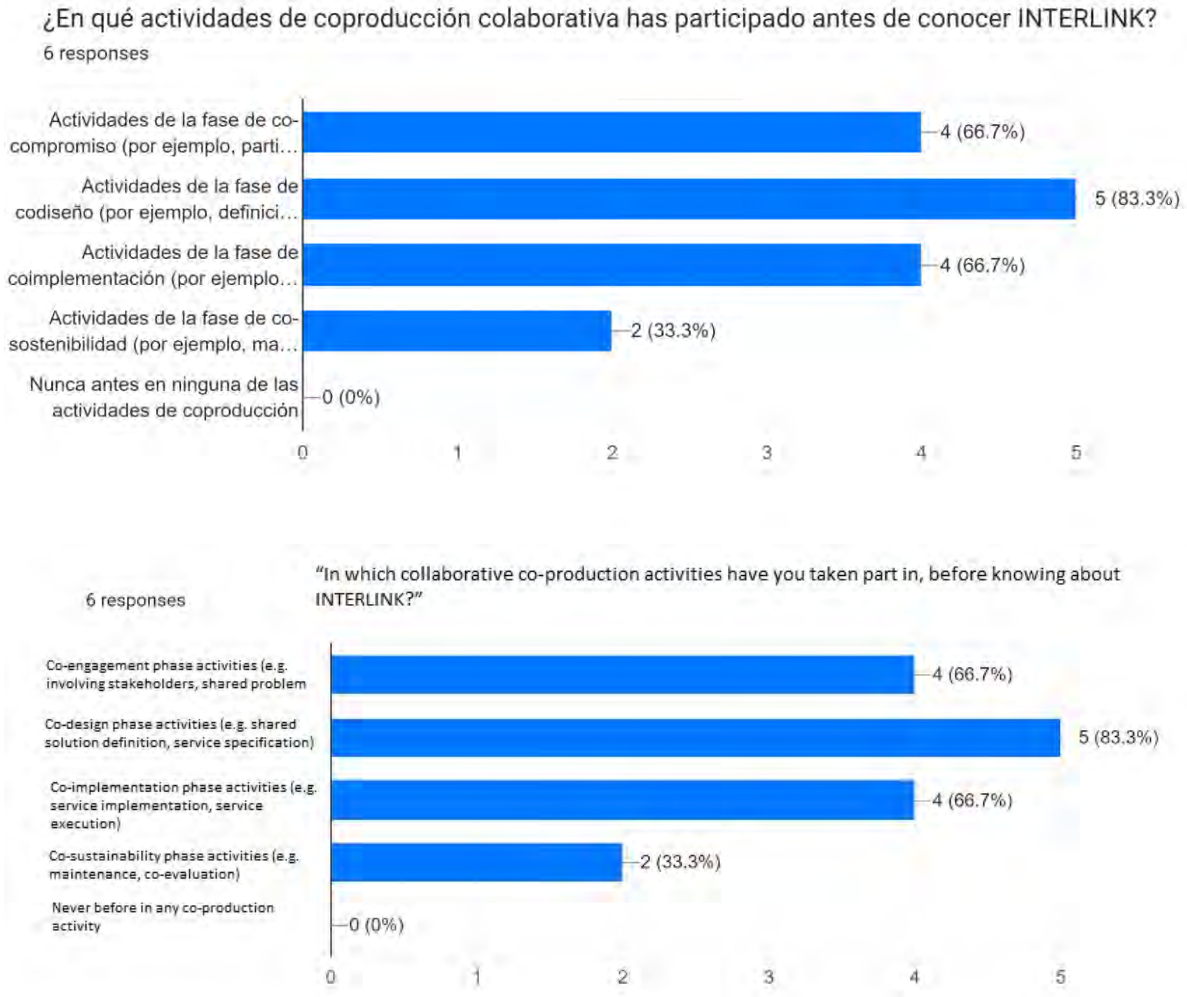
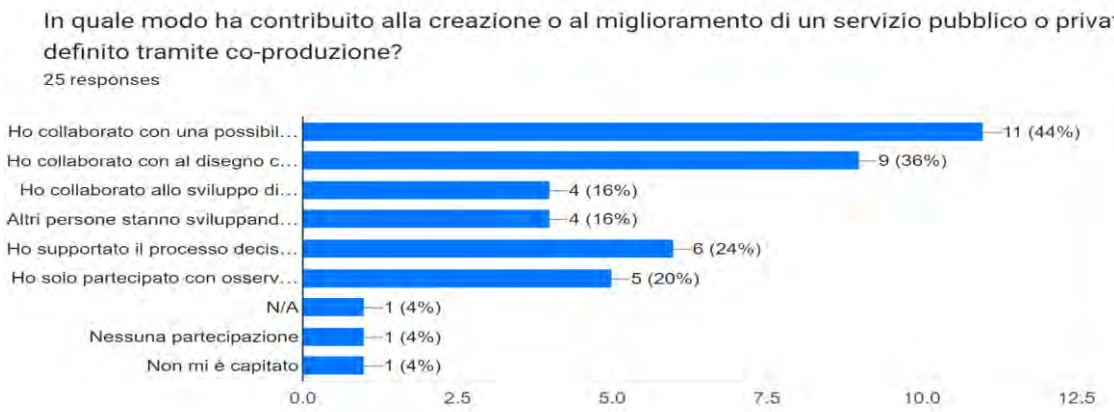


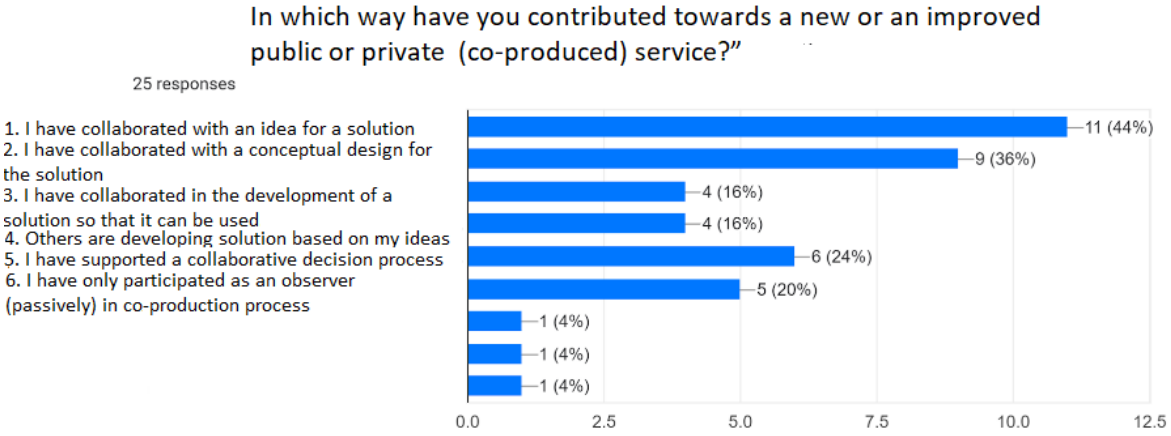
Figure 74. Experience feature on co-production across the 3 pilots.

13.2. Participation in co-production

MEF



24



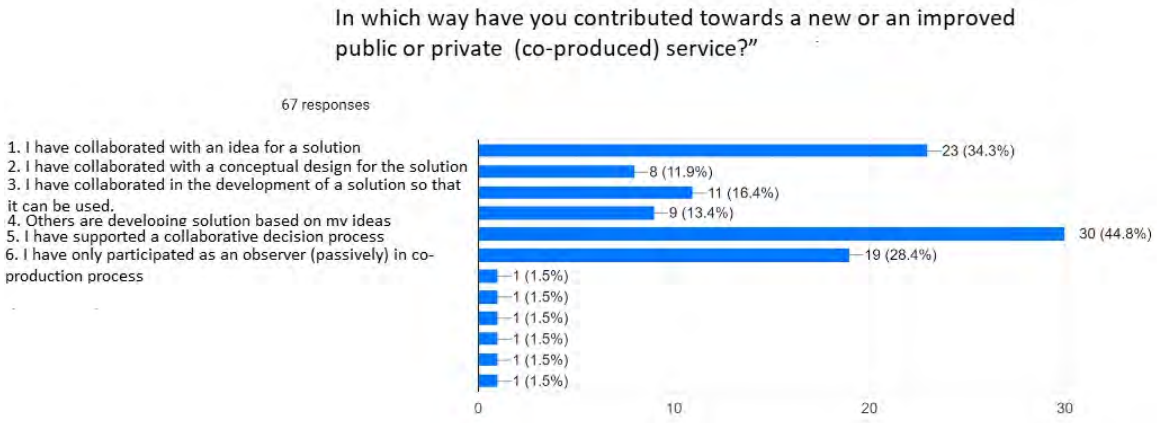
25

VARAM

[24] The questionnaire performed by MEF included as possible answers -Not available, Have not participated and I have never thought about it-, which were not included in the original questionnaire, which are not relevant for the final consideration of the results -just 1 single answer of the complete sample, corresponding to the 4%-.

[25] Translated based on the original results.

26

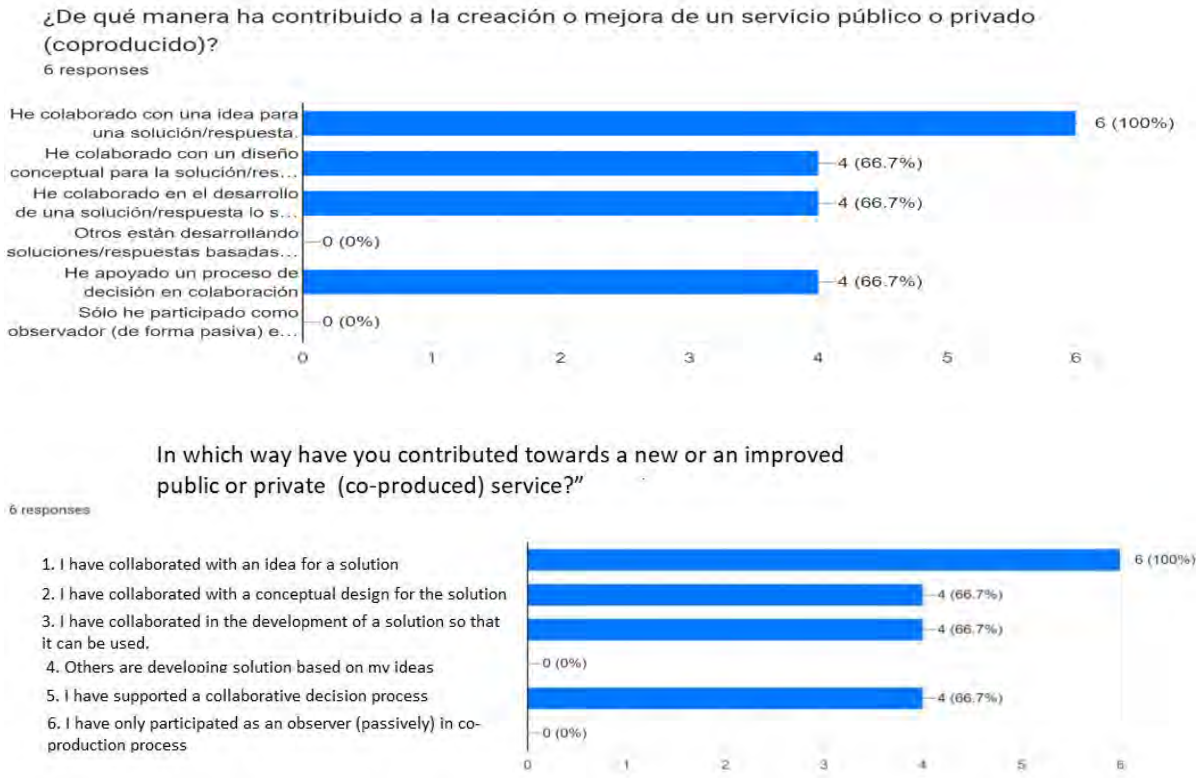


27

ZARAGOZA

[26] The questionnaire performed by VARAM included several test samples which are not relevant for the final consideration of the results -those corresponding with the 1,5% of the sample-.

[27] Translated based on the original results.



28

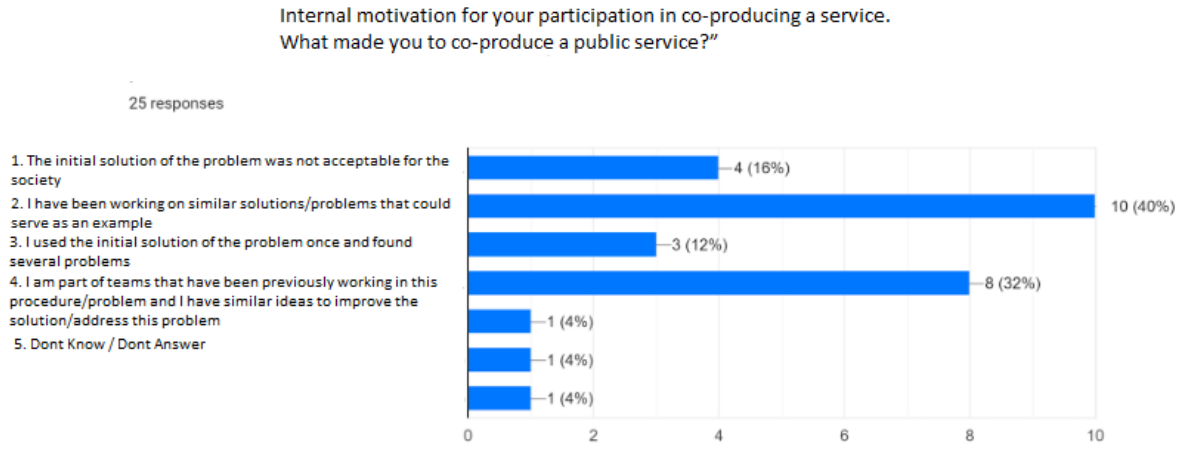
Figure 75. Participation feature on co-production across the 3 pilots.

13.3. Motivation in co-production

MEF

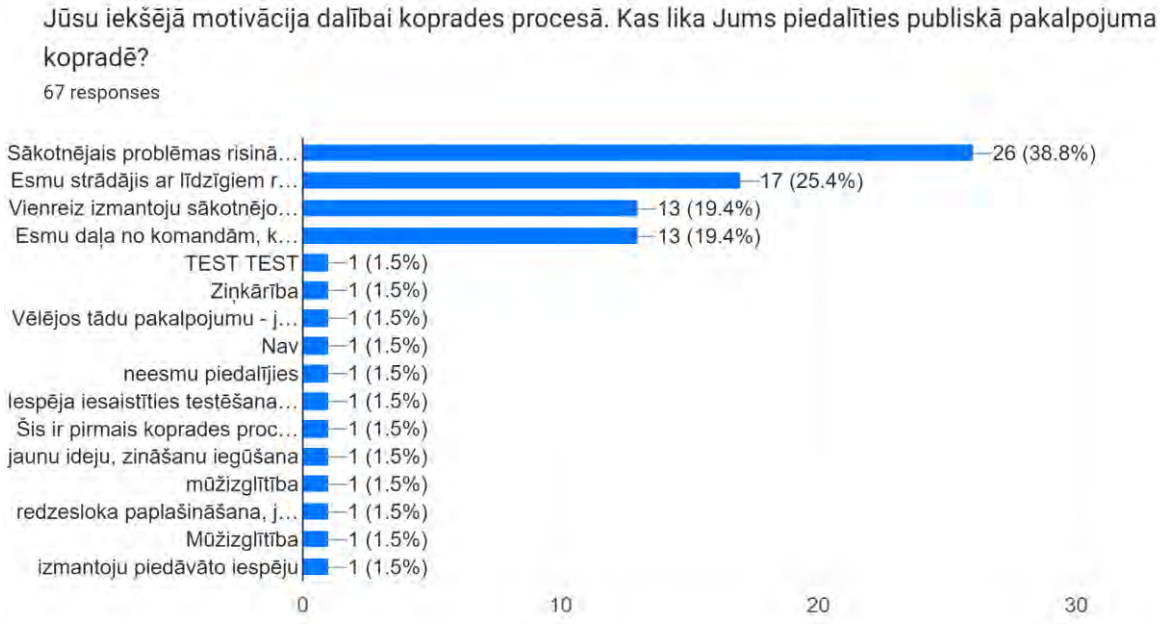
[28] Translated based on the original results.

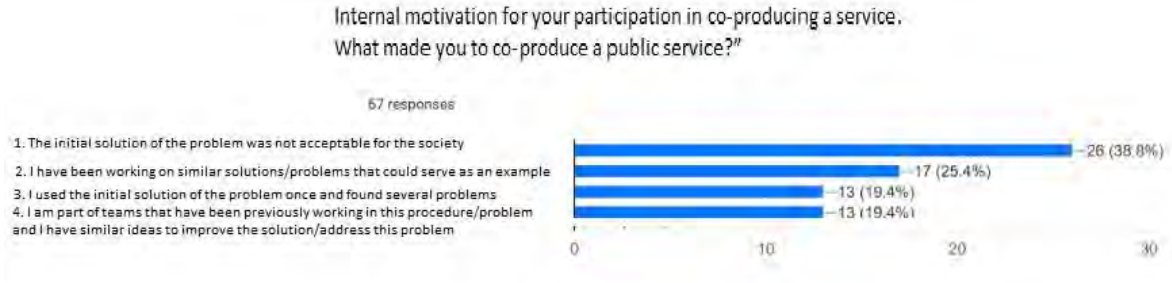
29



VARAM

[29] The questionnaire performed by MEF included as possible answers -Not available, Have not participated and I have never thought about it-, which were not included in the original questionnaire, which are not relevant for the final consideration of the results -just 1 single answer of the complete sample, corresponding to the 4%-.


Jūsu iekšējā motivācija dalībai koprades procesā. Kas lika Jums piedalīties publiskā pakalpojuma kopradē?
67 responses
Sākotnējais problēmas risinā...
Esmu strādājis ar līdzīgiem r...
Vienreiz izmantoju sākotnējo...
Esmu daļa no komandām, k...
TEST TEST
Ziņkārība
Vēlējos tādu pakalpojumu - j...
Nav
neesmu piedalījies
Iespēja iesaistīties testēšana...
Šis ir pirmais koprades proc...
jaunu ideju, zināšanu iegūšana
mūžizglītība
redzesloka paplašināšana, j...
Mūžizglītība
izmantoju piedāvāto iespēju
26 (38.8%)
17 (25.4%)
13 (19.4%)
13 (19.4%)
1 (1.5%)
0
10
20
30


Internal motivation for your participation in co-producing a service.
What made you to co-produce a public service?"
67 responses
1. The initial solution of the problem was not acceptable for the society
2. I have been working on similar solutions/problems that could serve as an example
3. I used the initial solution of the problem once and found several problems
4. I am part of teams that have been previously working in this procedure/problem and I have similar ideas to improve the solution/address this problem
26 (38.8%)
17 (25.4%)
13 (19.4%)
13 (19.4%)
0
10
20
30

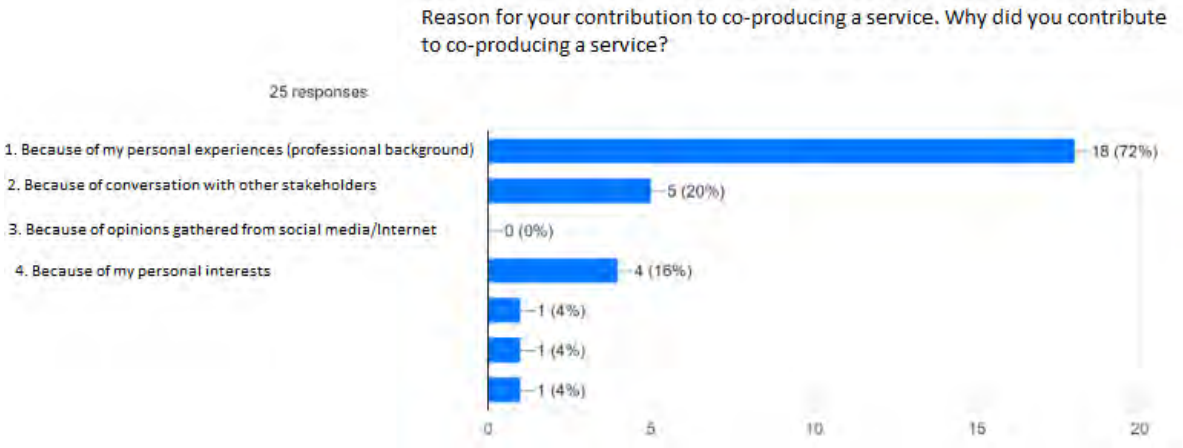
ZARAGOZA

Figure 76. Motivation feature on co-production across the 3 pilots.

13.4. Reason in co-production

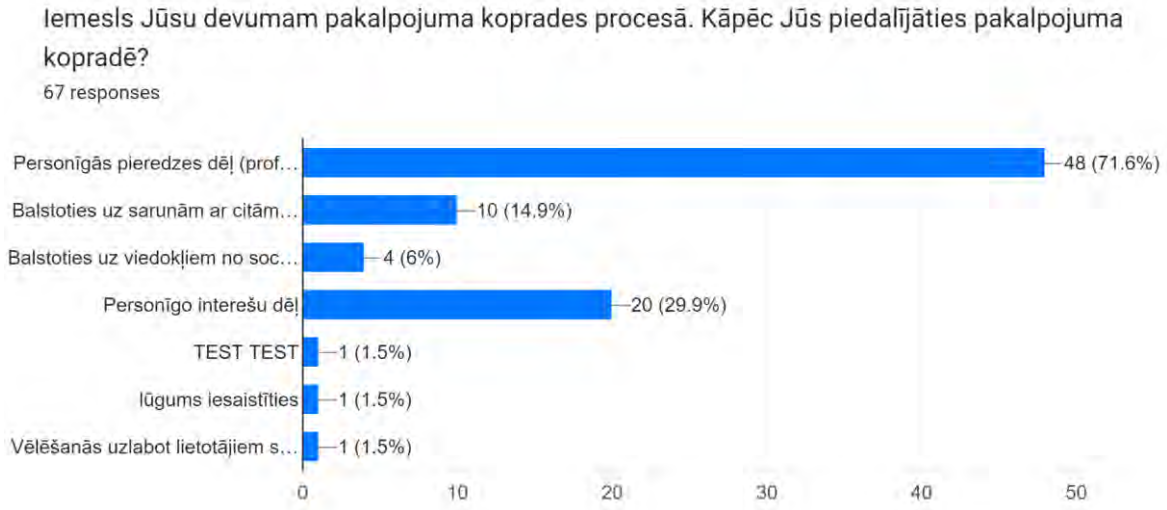
MEF

30

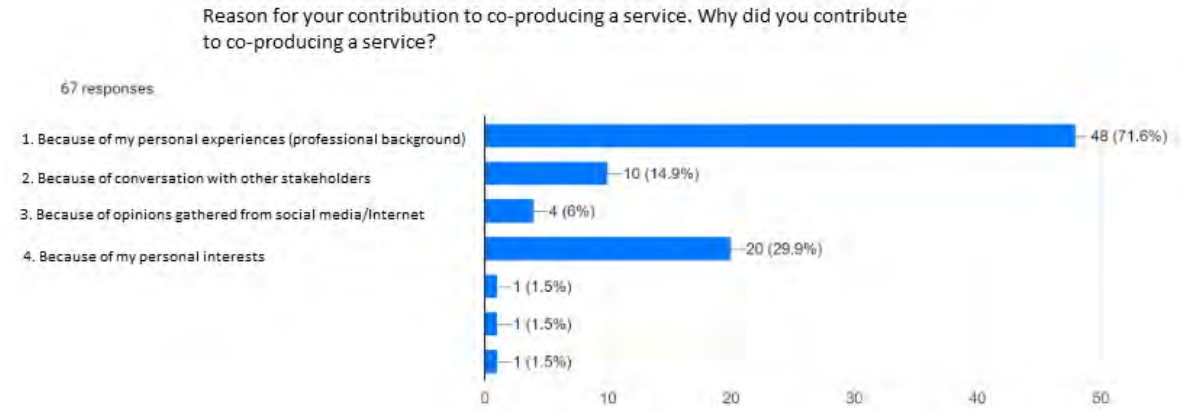


VARAM

[30] The questionnaire performed by MEF included as possible answers -Not available, Have not participated and I have never thought about it-, which were not included in the original questionnaire, which are not relevant for the final consideration of the results -just 1 single answer of the complete sample, corresponding to the 4%-.



31



ZARAGOZA

[31] The questionnaire performed by VARAM included several test samples which are not relevant for the final consideration of the results -those corresponding with the 1,5% of the sample-.

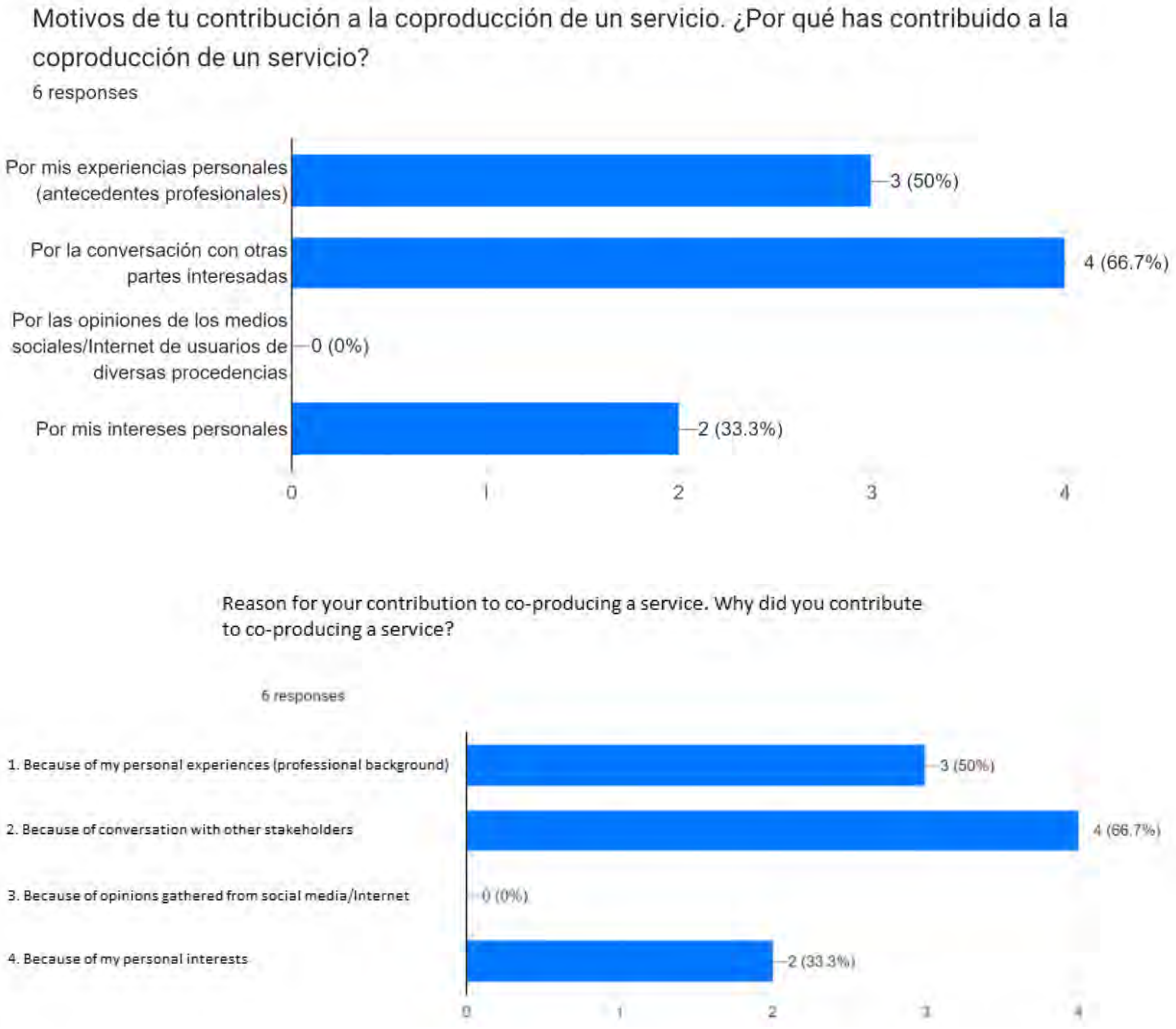
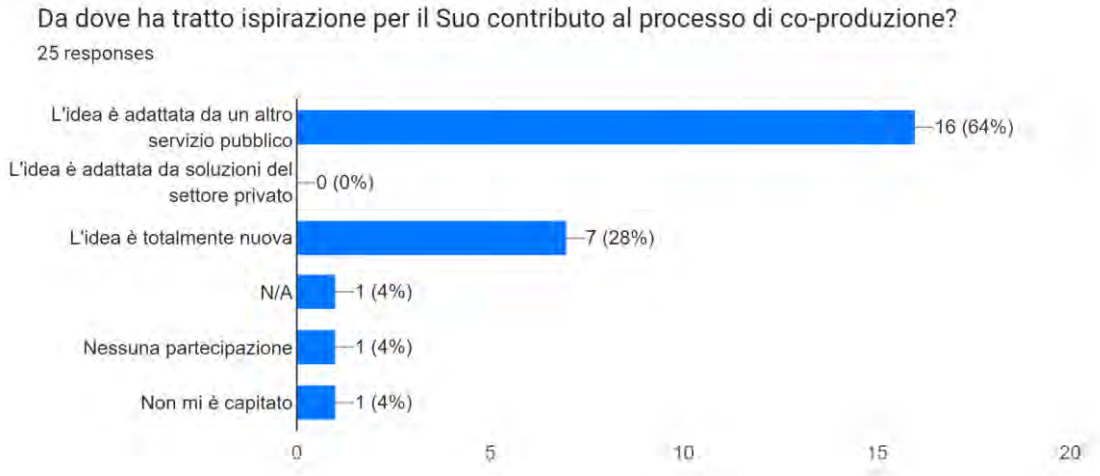


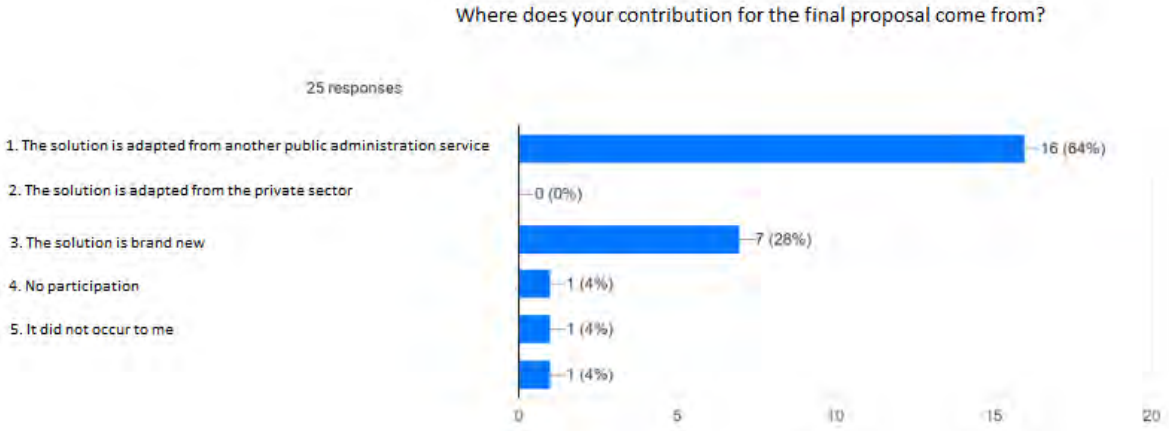
Figure 77. Reason feature on co-production across the 3 pilots.

13.5. Inspiration in co-production

MEF

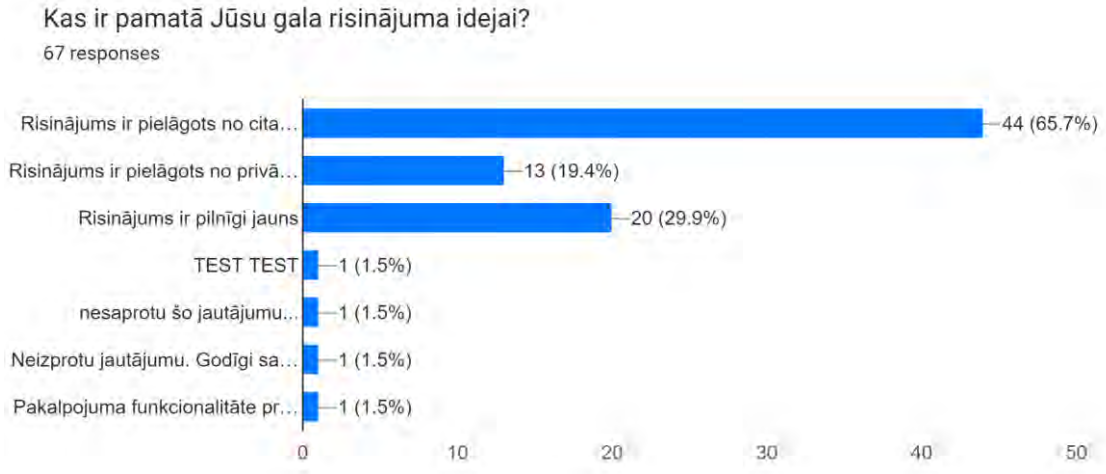


32

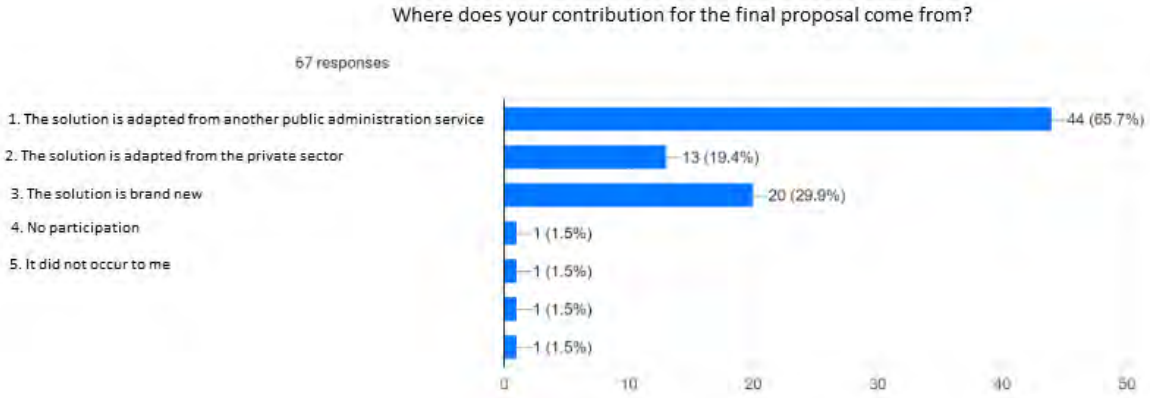


VARAM

[32] The questionnaire performed by MEF included as possible answers -Not available, Have not participated and I have never thought about it-, which were not included in the original questionnaire, which are not relevant for the final consideration of the results -just 1 single answer of the complete sample, corresponding to the 4%-.



33



ZARAGOZA

[33] The questionnaire performed by VARAM included several test samples which are not relevant for the final consideration of the results -those corresponding with the 1,5% of the sample-.

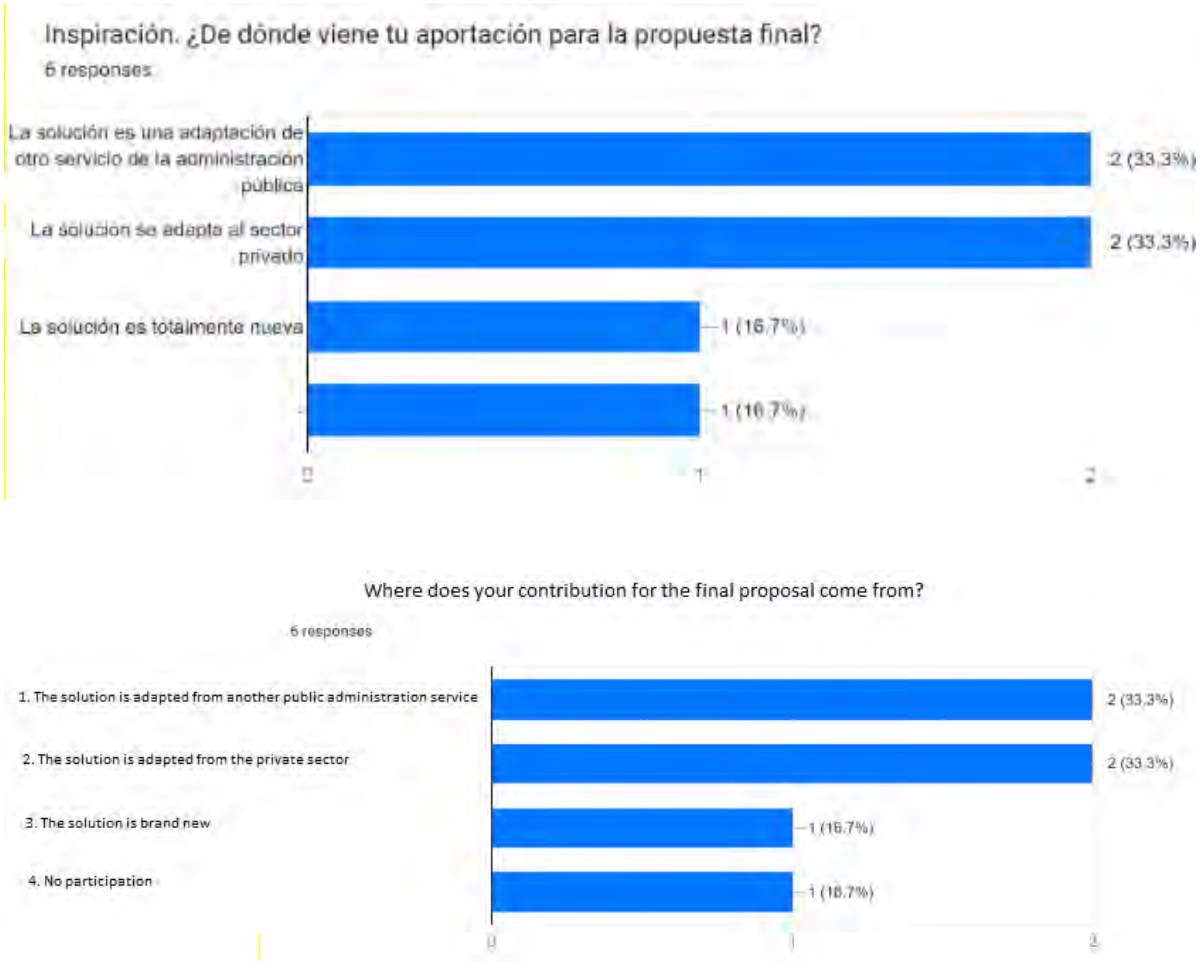


Figure 78. Inspiration feature on co-production across the 3 pilots.