

INTELCOMP PROJECT

A COMPETITIVE INTELLIGENCE CLOUD/HPC PLATFORM FOR AI-BASED STI POLICY MAKING

(GRANT AGREEMENT NUMBER 101004870)

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Contents

Executive Summary.....	7
1. Introduction	9
2. Living Lab Goals.....	10
2.1. Project Goals.....	10
2.2. Goals of the Artificial Intelligence Living Lab.....	10
2.3. Software Development Goals.....	13
3. Methodology.....	15
3.1. What is a Living Lab?	15
3.2. Overall IntelComp Living Lab Approach	15
3.3. Tailored Approach for Artificial Intelligence Living Lab.....	16
3.3.1. AI LL: Introduction	16
3.3.2. AI LL: Policy questions and data facilitation.....	17
3.3.3. AI LL: Stakeholders	19
3.3.4. AI LL: Alignment with technical development	23
3.3.5. AI LL: Design Thinking methodology	24
4. AI LL ROADMAP	26
5. Living Lab Results	27
5.1. Introductory remark	27
5.2. Events	27
5.2.1. Kick-off event (24 th October 2022).....	27
5.2.2. Interactive Model Trainer (IMT) event (June 6 th , 2023).....	29
5.2.3. STI Viewer event (September 27 th , 2023)	34
5.2.4. Final AI LL event (November 27 th , 2023).....	36
5.3. Internal co-creation meetings	39
5.3.1. IMT Training Session (March 21 st , 2023).....	39
5.3.2. IMT internal sprints (May-June, 2023).....	40
6. Conclusion	43
Annexes.....	45
1. INVITATION TEXT for AI LL events.....	46
2. AI LL SURVEY.....	50

Tables

Table 1: IntelComp tools – their purpose for the primary Living Lab stakeholders	14
Table 2: Agenda of the Kick-off event, AI LL	29
Table 3: Agenda of the IMT event, AI LL	33
Table 4: Agenda of the STI Viewer event, AI LL	36
Table 5: Agenda of the final event, AI LL	37
Table 6: Proposed time plan for the internal sprints	41
Table 7: Screenshots of co-created work on data selection	41

Pictures

Picture 1: Screenshot taken from the kick-off meeting.....	28
Picture 2: Screenshot taken from the IMT meeting	30
Picture 3: Screenshot taken from the STI Viewer event.....	35
Picture 4: IMT internal training and co-creation session.....	40

Figures

Figure 1: Living Lab AI – Examples of the circular innovation approach	11
Figure 2: Living Lab AI – the four components of the quadruple helix.....	11
Figure 3: AI LL – Primary and secondary goals.....	13
Figure 4: Key elements and principles of living labs	16
Figure 5: Living Lab AI – actor roles	20
Figure 6: Living Lab AI – distinguishing between PA and other stakeholders	20
Figure 7: Living Lab AI – Initial stakeholder framework for the AI LL: two-levelled stakeholders and product owner	21
Figure 8: Screenshots of the Stakeholder Recruitment Campaign workshops	22
Figure 9: AI LL - overarching timeline	26
Figure 10: Screenshot from the design thinking methodology followed during the IMT workshop.....	32
Figure 11: Screenshot from the design thinking methodology: Value Proposition Canvas	33

ACRONYMS

AI — Artificial Intelligence

AI LL — Artificial Intelligence Living Lab

ENIA — National Strategy on Artificial Intelligence (Spain)

IMT— Interactive Model Trainer

LL — Living Lab(s)

PA — Public Administrations

SEDIA — Secretary of State for Digitalisation and Artificial Intelligence

SME — Small and Medium Enterprise

STI — Science, Technology, and Innovation

List of Partners and their acronyms

Acronym	Full name
ARC	ATHINA-EREVNITIKO KENTRO KAINOTOMIAS STIS TECHNOLOGIES TIS PLIROFORIAS, TON EPIKOINONION KAI TIS GNOSIS
BSC	BARCELONA SUPERCOMPUTING CENTER
CITE	COMMUNICATION & INFORMATION TECHNOLOGIES EXPERTS ANONYMOS ETAIREIA SYMVOULEFTIKON KAI ANAPTYXIAKON YPIRESION
FECYT	FUNDACIÓN ESPAÑOLA PARA LA CIENCIA Y LA TECNOLOGÍA
HCERES	HAUT CONSEIL DE L'EVALUATION DE LA RECHERCHE ET DE L'ENSEIGNEMENT SUPERIEUR
HFRI	ELLINIKO IDRYMA EREVNAS KAI KAINOTOMIAS
NTTD	NTT DATA
OPENAIRE	OPENAIRE AMKE
SEDIA	SECRETARIA DE ESTADO DE DIGITALIZACIÓN E INTELIGENCIA ARTIFICIAL - MINISTERIO DE ASUNTOS ECONÓMICOS Y TRANSFORMACIÓN DIGITAL
TGB	TECHNOPOLIS CONSULTING GROUP BELGIUM
TILDE	TILDE SIA
UC3M	UNIVERSIDAD CARLOS III DE MADRID
ZSI	ZENTRUM FÜR SOZIALE INNOVATION GMBH / CENTRE FOR SOCIAL INNOVATION

EXECUTIVE SUMMARY

IntelComp project is a Horizon 2020 Innovation Action to build a platform that can analyse large volumes of textual data using Artificial Intelligence services. IntelComp adopts a Living Labs methodology and involves external Public Administrations and stakeholders (civil society organisations, academia, and industry organisations) (i) to co-design and co-create IntelComp tools and services; and (ii) to validate the resulting platform through the co-creation of Science, Technology, and Innovation (STI) policies in three different domains: artificial intelligence, climate change and cancer.

This document constitutes the final report of IntelComp *Artificial Intelligence Living Lab* (AI LL, hereinafter). The overall goals of the project driving the LL activities comprise the ambition to understand the challenges of STI policymaking and the development of a suite of AI models and tools for analysing STI and validating STI policies; the proper exploitation of the project's many results; and the creation of a data space containing both raw and processed data. These goals guided the LL planning and implementation, in addition to the main objectives stated above.

To meet those objectives and goals, the AI LL followed a common methodological approach which was further tailored to the needs and context of this Living Lab. This includes concrete goals, policy questions and data considerations, a stakeholder engagement strategy, an alignment with the technical development, and a roadmap to capture the implementation path towards the set goals.

The AI LL, which was commissioned to the Spanish Secretary of State for Digitalisation and Artificial Intelligence (SEDIA), has undertaken an intense activity during 2022 and 2023 encompassing different events and workshops with the shared aim of making co-creation the *leitmotif* of IntelComp. As such, and with the particular landing in the field of AI, this LL has intended to engage a wide range of stakeholders in the project, both by showcasing the main IntelComp tools and by getting feedback, to optimise the alignment of the tools with stakeholders' real needs.

Although the bulk of activities were rolled out over 2022 and 2023, some crucial operations (not reported) were developed long before. A case in point is the mapping of stakeholders that started to be built at the dawn of IntelComp.

The AI Living Lab has followed the *Design Thinking* methodology with the goal of making existing IntelComp tools more accessible so that they become more collaborative and repeatable. The methodology was deployed for the Interactive Model Trainer (IMT) event. Besides, a series of internal sprints along with the technical team turned out to be a powerful & useful co-creation activity to streamline and optimise platform tools.

IntelComp itself has been a co-created project, which means that it allowed the consortium to pivot on some preconceived ideas and approaches. This implied that detecting the initial expectations of the stakeholders regarding the project has been rather challenging, because its outlines have been gradually nuanced over time.

The AI LL experience shows that events undertaken were quite useful for stakeholders to fully understand the rationale of the project. Those events involving hands-on sessions were really useful and spurred interest in the tools and functionalities of IntelComp. There were some concerns

expressed by the stakeholders that had to do with ethical issues and trustworthiness of the platform, the importance of feeding it with new databases to obtain high-value insights, the stability of sources providing the data, or the convenience to spread the evidence obtained through some other European countries.

Since IntelComp is a modular project, explaining the role of various IntelComp tools and how they relate and interact with each other posed a significant challenge, especially in the events dedicated to a specific tool. In any case, some stakeholders showed interest to be involved in the future exploitation of IntelComp's results, as all components of the platform have been made *open access*. Furthermore, SEDIA is committed to the sustainability of selected tools of IntelComp once the project has finished.

Finally, the AI Survey that has been created to give full meaning to and exploit the potential of the STI Participation Portal is a useful tool to capture the needs, concerns, and aspirations of civil society in AI, and connect them to policymakers/policy representatives in an agile and fluid way (through the STI Viewer). In a way, the AI Survey is the tool that enables closing "the virtuous circle of IntelComp".

1. INTRODUCTION

IntelComp project is a Horizon 2020 Innovation Action to build a platform that can analyse large volumes of textual data using Artificial Intelligence services. IntelComp adopts a Living Labs methodology and involves as primary stakeholder group *public administrations* and *policy-makers*, as well as other relevant stakeholders groups (such as *civil society organisations*, *academia*, or *industry organisations*), to (i) co-design and co-create IntelComp tools and services and (ii) validate the resulting platform through the co-creation of Science, Technology, and Innovation policies in three different domains: artificial intelligence, climate change/energy and health/cancer, for specific use cases of the IntelComp tools and services.

This document captures the results of the AI LL, and constitutes deliverable D6.2. The AI LL was implemented during Q2/2022 to Q4/2023, based on a joint approach outlined by D6.1 whose purpose was to ensure that the envisioned LL objectives were achieved.

The deliverable captures the main results and activities of the AI LL. It starts with this introduction to provide the background and plan at the outset of the LL activities, emphasising how the course of events led to a shift in the initially held focus. Following the methodology, the main part of the report comprises the main activities developed by the AI LL and the key results in terms of LL activities, as well as implications on the thematic domain of the LL and the technical development of IntelComp tools.

The final part of the deliverable comprises the overall conclusion of the LL. The report is complemented by two annexes: the invitation text to the AI LL events and the AI survey that was built and ingested in the STI Participation Portal.

2. LIVING LAB GOALS

2.1. Project Goals

IntelComp as a project has been devised to build a platform that can analyse large volumes of textual data using Artificial Intelligence services. It adopts a LL (Living Labs) methodology and involves external stakeholders¹ to co-create the envisioned tools and services, and to validate the resulting platform through the co-creation of STI policies in three different domains: artificial intelligence, climate change, and cancer.

Apart from these overarching goals, several further initial goals of the project need to be stated here:

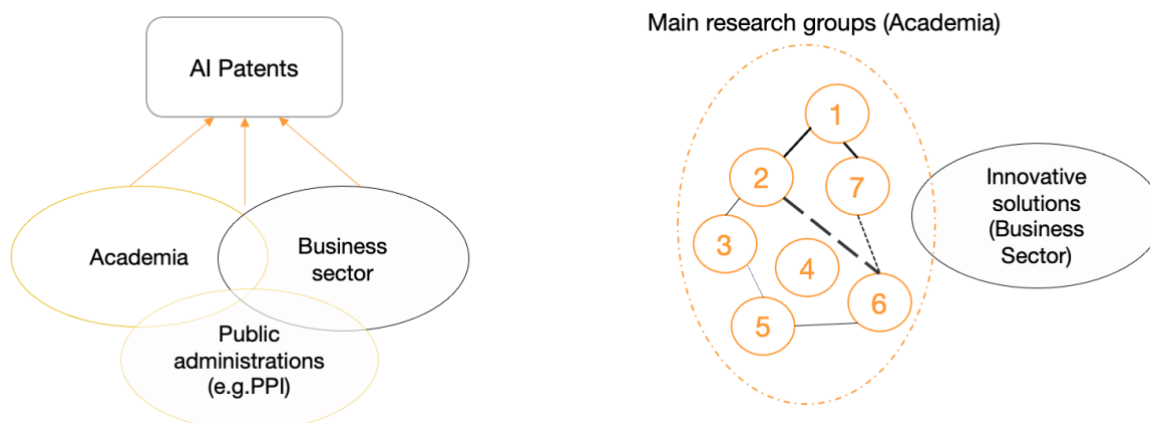
- The IntelComp platform shall be deployed in high performance computing environment;
- A suite of AI Models and tools for STI analysis shall be developed;
- The exploitation of the results shall be achieved through adequate use of communication and dissemination processes;
- A data space of raw and processed STI sources shall be created;
- The project strives to understand the challenges of STI policy-making; and that
- The project aims at analysing and validating STI policy models.

2.2. Goals of the Artificial Intelligence Living Lab

As mentioned above, the AI LL has been led by the Spanish Secretary of State for Digitalisation and Artificial Intelligence (SEDIA). As such, the AI LL has been set up to address a primary goal, namely: to provide a full picture of the Spanish STI-AI ecosystem to optimise policy action by providing policymakers coming not only from SEDIA, but also from other institutions of PA at different levels, with information to understand the array of sectoral/technological/institutional potential for a specific future period, determined by internal and external factors. The first necessary step to tackle this goal is to analyse how the different stakeholders making the AI ecosystem have evolved over the last few years, what their main prospects are, what the main strengths and weaknesses are, and how they are interrelating and cooperating. This approach is very much circular-based and considers innovation as a systemic phenomenon, where innovation outcomes and impacts are the results of multiple interactions and back-and-forth loops -see Figure 1.

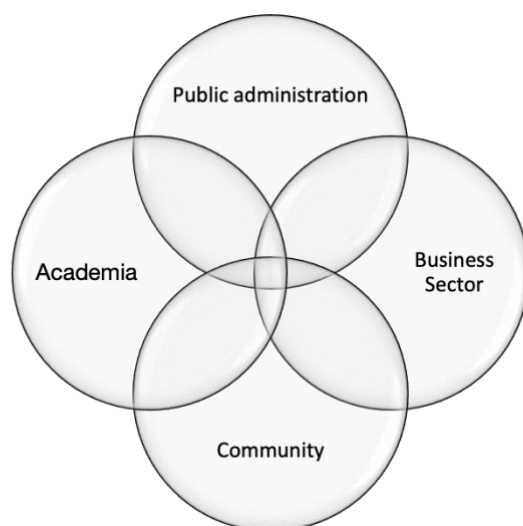
¹ i.e. PA (public administrations) and stakeholders from civil society organisations, academia, and industry/business organisations.

Figure 1: Living Lab AI – Examples of the circular innovation approach



The AI ecosystem is defined in terms of the quadruple helix, which emphasises the interplay amongst Academia, Public administration, the business sector (industry), and civil society/community (cf. Figure 2).

Figure 2: Living Lab AI – the four components of the quadruple helix



In addition to this primary goal, the AI LL envisioned two complementary (secondary) goals:

- To fully and effectively involve the four different types of stakeholders making up the “quadruple helix” thus pushing forward new synergies; and

- To serve as a useful instrument to meet the main Spanish strategic policy guidelines on AI. These strategic policy guidelines are mainly represented by:
 - The National Strategy on Artificial Intelligence (ENIA, according to the Spanish acronym). ENIA is organised under different strategic axes and actions within each axis, some of which are heavily aligned with the AI LL approach. In fact, axis 1 of ENIA is aimed at promoting scientific research, and technological development in AI by, amongst others:
 - The creation of the Spanish network of excellence in AI providing cutting-edge research and training programs in different AI fields (action 1).
 - The promotion of the creation of new national centres for technological development in multidisciplinary fields, jointly together with other sciences such as neurotechnology, psychology, sociology, politics, etc. (action 4).
 - The strengthening of Digital Innovation Hubs network specialised in AI research, providing access to smart technology, data, and computational capabilities.

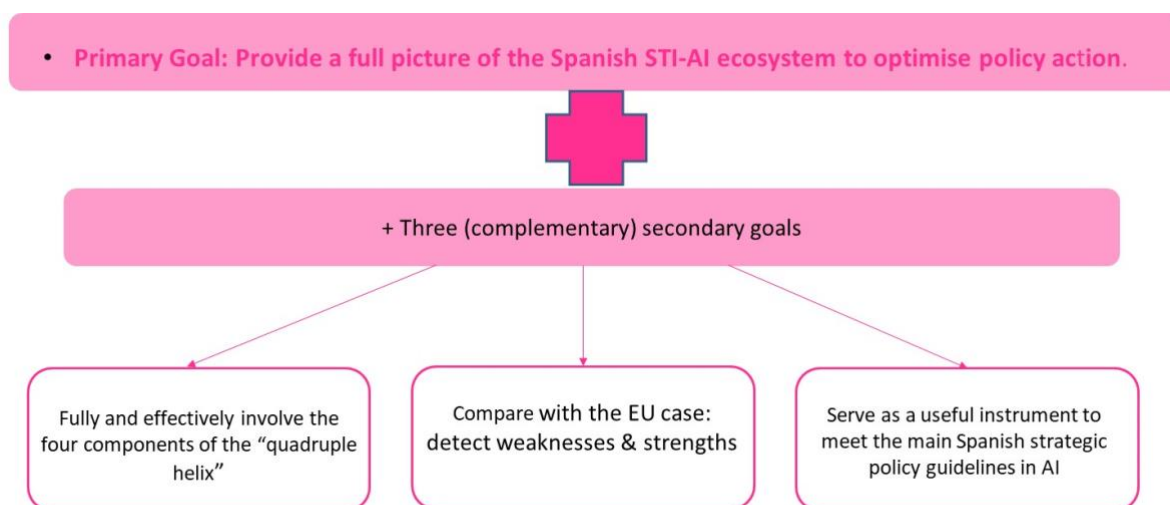
There are other additional actions directly aligned with the approach followed by the LL. Examples are action 10 (corresponding to axis 2), which is intended to implement a Spanish talent hub program; action 14 (axis 3), which is meant to promote a Spanish National Language Technology Plan and the creation of resources in the Spanish Language in AI (LEIA); actions 17 and 18 from axis 4, which are aimed at fostering digital transformation, innovation, AI uptake and the creation of an ecosystem of participation and mutual benefit involving companies. In the same vein, actions 23 and 24 (axis 5) is aimed at enhancing the use of AI in Public Administration and national strategic missions.

- The N. 16 component of the Recovery, Transformation, and Resilience Plan. The component is quite close to the ENIA approach but is much more focused on specific programs and measures with a rather transversal setting.
- The New Language Economy PERTE (*Proyectos Estratégicos para la Recuperación y Transformación Económica* – Strategic Projects for the Economic Transformation and Recovery). This strategic project is organised under five axes, the second of which is intended to introduce AI in the Spanish language.

Initially, the AI LL approach was quite “country based”, even though the priorities guiding the policy questions are fully European grounded (cf. D1.1: *Report on the domain-specific needs and PA and stakeholder assessment in the three pilot domains*). Nevertheless, as the datasets ingested in the platform are mainly of European nature and were the first to be confronted, a third complementary goal for the AI LL was added, namely:

- To serve as a tool to compare the Spanish evidence with the European evidence, thus extracting the main strengths and weaknesses of the Spanish AI ecosystem.

Figure 3: AI LL – Primary and secondary goals



2.3. Software Development Goals

The goals of the software development overlap partly with those of the LL. For instance, the collaboration with the project's stakeholders and aligning their interests with the interests and capabilities of IntelComp. The software development has two additional specific goals, namely (a) to build a timeline and a management structure for coordinating software production and delivery, and (b) to set the basis for ensuring the compliance of the project's outcomes with regulations, policies, and other common paradigms applied or enforced in the domains addressed by the project.

IntelComp's Software Development Plan envisions many services and four main tools that are of particular relevance, as the LL participants will have the opportunity to use them. The first one, the *Interactive Model Trainer* is an expert tool that makes it possible to (a) train new topic models, (b) edit and curate topic models, (c) train new classification models, (d) generate sub-corpora, and (e) evaluate models. The other three are mainly geared towards fulfilling the needs of the primary stakeholder of the LL – Table 1 characterises their main features.

Table 1: IntelComp tools – their purpose for the primary Living Lab stakeholders

	STI Viewer	STI Policy Participation Portal	Evaluation Workbench
Targeted Organisation	Public administration (Ministry), funding agency	Ministry, funding agencies, academic, business, and citizen organisations	Funding Agency, Evaluation Agency (if independent of the Funding Agency)
Targeted users	Policy & STI analyst	Policy officers, STI managers/agents for organisations, citizens	Call Manager
Main functionality	Analyse, compare, and visualise a comprehensive set of STI-related KPIs	To provide a synthetic list of measurements for participatory STI policy-making	To assist in the ex-ante evaluation of STI proposals for funding
Stage of the policy-making cycle	Agenda setting, monitoring, and ex post evaluation	Agenda setting, monitoring, and ex post evaluation	Implementation
Tool predecessor	Data4Impact	<i>(simplified)</i> STI Viewer	Corpus Viewer

The development timeline of these tools was provided in the *Platform Development Plan*. The LL planning accommodated that timeline as much as possible by aligning its stakeholder engagement activities with the development phases laid out in that plan.

3. METHODOLOGY

Living Labs, as a concept, have long existed² but in recent years become popular in all kinds of research and innovation projects, including in public administration research (cf. Decker, Contreras, and Meijer, 2020). Especially in Europe, the concept has been further developed and adopted to the needs and setup of publicly funded projects (cf. Beaudoin et al., 2022; Compagnucci, Spigarelli, Coelho, and Duarte, 2020).

3.1. What is a Living Lab?

What a Living Lab (LL) is can be difficult to determine exactly because many – sometimes competing – definitions exist (cf. Compagnucci, Spigarelli, Coelho, and Duarte, 2020; pp. 3). There are several key characteristics that are mentioned in most definitions, namely the relation to real-life environments, the focus on stakeholders, on collaborative activities such as validation, experimentation, or testing – sometimes, these are part of a co-creation approach. Another important characteristic is that LL is facilitated, not managed, i.e. the team behind a LL has no authority over the lab’s participants (cf. Westerlund and Leminen, 2011). Sustainability is yet another characteristic that is often crucial (cf. Leminen et al., 2016).

As a work definition, IntelComp’s understanding of LL largely matches the definition offered by Schaffers and Turkama (2012): *A living lab provides a setting for collaborative innovation by offering a collaborative platform for research, development, and experimentation with product and service innovations in real-life contexts, based on specific methodologies and tools, and implemented through concrete innovation projects and community-building activities.*

3.2. Overall IntelComp Living Lab Approach

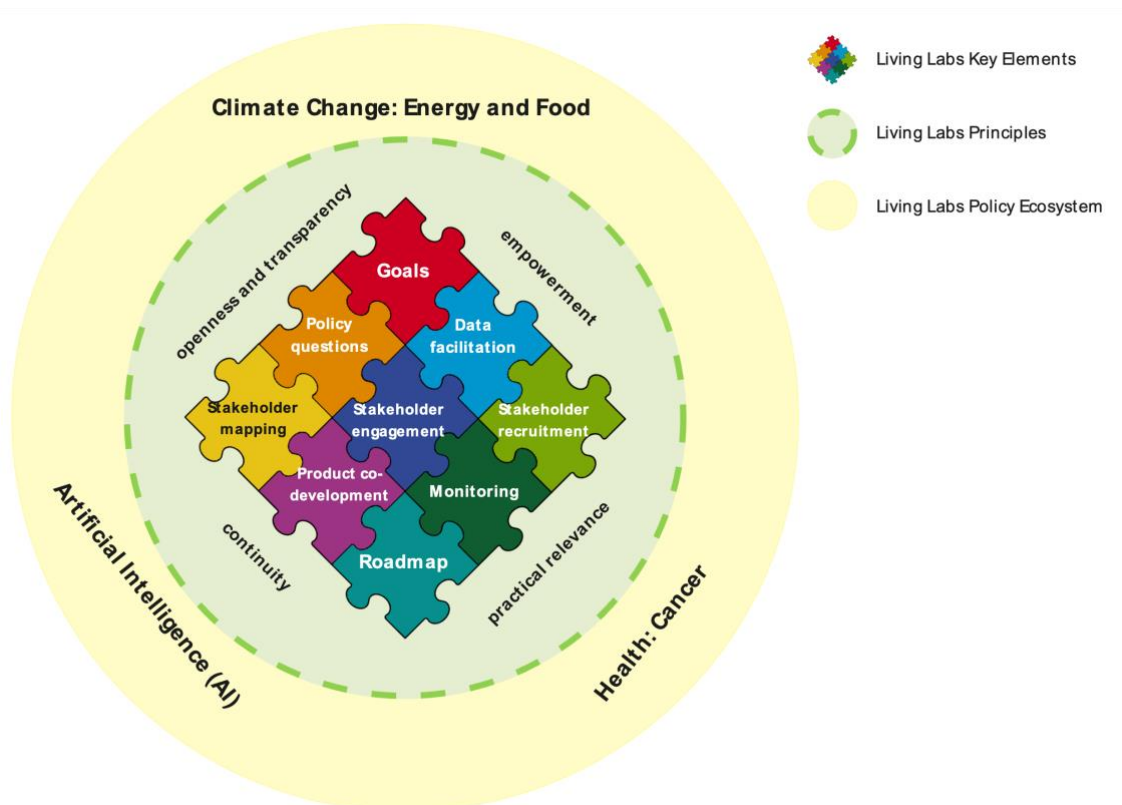
IntelComp largely follows the general approach of an LL but tweaks it such that it fits the project’s setting. This includes its **policy ecosystem** which, as the figure below shows, comprises **AI, Cancer, and Climate Change**; moreover, it follows the following four **guiding principles**³:

- **Openness and transparency** – open to the participation of many stakeholders; open to perspectives, needs, expertise, etc.; transparency with regard to goals (no hidden agenda) and expected outcomes, decisions, limitations, and expectations.
- **Empowerment** – empowering LL participants by taking their inputs and contributions seriously, enabling them to engage in the LL activities, and helping them find answers to their (policy) questions;
- **Continuity** – continuous (mutual) learning; continuous fostering of relations between participants; and
- **Practical relevance** – relevance of activities, outputs, and results for LL participants in their real-life setting; relevance of results and outcomes for IntelComp.

² On the origin of the concept, cf. Eriksson, Niitamo, Kulkki, et al. (2005); Dutilleul, Birrer, and Mensink (2010); or Hossain, Leminen, and Westerlund (2019)

³ Scholarly literature sometimes labels these differently and may include more such principles, but these are the ones that are most essential for the LL foreseen by IntelComp.

Figure 4: Key elements and principles of living labs



3.3. Tailored Approach for Artificial Intelligence Living Lab

3.3.1. AI LL: Introduction

The creation of the AI LL is justified on different grounds. On a strategic level, a European leadership on AI is crucial not only to fostering the EU economy and national security but also to align AI developments according to European values and policy priorities. Furthermore, on an instrumental/policy-based level, the living lab is aimed at optimising STI-based policy action. As such, there is a sizeable number of STI policy guidelines that might be streamlined by implementing IntelComp, such as:

- Aligning efforts at European, national, and regional levels;
- Considering partnerships between the private and the public sector;
- Mobilising resources to achieve an 'ecosystem of excellence' along the entire value chain,
- Creating the right incentives to accelerate the adoption of solutions based on AI, including by SMEs;
- Giving citizens, companies, and public organisations the confidence to take up AI applications (including legal).

As mentioned above, the AI LL has been led by SEDIA, which was the main developer of the *Corpus Viewer* tool and is the Spanish Public Administration responsible for the definition and implementation of the National Strategy on Artificial Intelligence (ENIA, in Spanish). The governance model of ENIA emphasises the importance of the inclusion of different stakeholders,

thus involving different levels of PA and economic and social representatives. In this setting, SEDIA coordinates, through the different instruments, actions to facilitate the introduction of AI in the productive system, taking into account the different European and international initiatives. Furthermore, SEDIA has a close collaboration and specific agreements with other public administration bodies in Spain to foster implementation and use of IntelComp.

3.3.2. AI LL: Policy questions and data facilitation

The AI LL has been very much focused on agenda setting. As such, the policy questions have been selected to detect current and emerging challenges on AI, how AI has permeated across different stakeholders' activities and agendas, and how AI has been an engine to spur initiatives and endeavours of different kinds. The knowledge provided thanks to IntelComp tools is likely to be extremely useful for policymakers to effectively guide policy making.

Policy questions have been selected with the goal of covering the highest number of functions of research and innovation policy, as suggested by the Utrecht and Chalmers universities (Hekkert et al., 2007). As such, policy questions have been selected to cover the following functions:

- Entrepreneurial activities, which emphasise the presence of active entrepreneurs as a first and prime indication of the performance of an innovation system;
- Knowledge creation, which stresses the importance of learning acquisition and accumulation;
- Knowledge linkages and diffusion;
- Guidance and contribution of social changes, and;
- Creation of legitimacy // address public concerns, which recognises the important role that attitudes of reluctance // proactivity towards AI may play in fostering AI uptake and diffusion.

The list of policy questions has been selected on two different grounds. First of all, the list is deeply aligned with the main goals of the AI LL and, at the same time, it covers a wide range of research and innovation functions. Second, all policy questions may be measured and supported by different types of databases. The initial set of questions was the following:

- Questions on entrepreneurial activities:
 - Are companies adopting/implementing AI in their respective sectors? How do they compare with competitors?
 - Which companies are the biggest AI investors?
 - Which companies are the main AI innovators?
 - What are the AI topics where companies effectively invest more heavily in R&D?
 - Are there companies involved in (national) AI-related funded projects?
 - Are there companies involved in EU (H2020/HEurope) AI-related funded projects?
- Questions on knowledge creation:
 - What are the research centres with "AI activity" in Spain? Where are they located? What are the main AI fields tackled?
 - Are research teams working in EU-funded projects?
 - Are there "top performers" amongst research teams?
 - To what extent are these research groups led by women?

- Which channels of diffusion work best in good practices at the international level?
- Which ones are the AI-related prevailing topics (i. e. AI topics that are of common of interest for all stakeholders, that is, academia, industry, public administration, and citizens/communities)?
- Are the stakeholders collaborating (shared patents, publications, projects)?
- Questions on guidance & contribution to social changes:
 - To which societal changes are the research groups contributing?
 - To what extent are the AI national projects aligned with the goals of the Spanish Recovery, Transformation & Resilience Plan? (incl. other strategic plans/guidelines)
 - To which societal changes are the AI national-funded projects contributing?
- Questions on legitimacy/address public concerns:
 - What is the general perception of Spanish society about AI? What are the main concerns of AI?
 - What are the main topics on AI debated in the Parliament? What is the general perception?

This set of questions was somehow modulated and narrowed as the project progressed through stages. There were some technical constraints (see below for examples) that had a significant influence, but also, as the AI LL gained momentum, the goal of comparing the evidence in Spain and the EU emerged as more relevant. Consequently, more detailed questions on specific researchers, points of excellence, or “top performers” were streamlined and limited, and more general matters linked, for example, to the importance of different AI topics and the evolution over time, patents, collaboration between stakeholders (shared patents, publications and projects), or perception of society about AI were the primary question addressed.

The availability of databases and datasets is an *ex-ante* necessary condition to address policy questions. Most databases/datasets that have been ingested in IntelComp show a rather transversal nature, in the sense that they will serve the different AI LL goals. Nevertheless, some databases /datasets are more AI LL- specific and, accordingly, SEDIA has been in charge of providing access to them, including formal requests when necessary.

The main transversal (LL-agnostic) databases are listed below:

- CRUNCHBASE: The leading destination for company insights from early-stage start-ups to the Fortune 1000.
- CORDIS: Provides information on all EU-supported R&D activities, including programs (H2020, FP7 and older), projects, results, publications.
- GITHUB: A code hosting platform for version control and collaboration. It lets you and others work together on projects from anywhere.
- OPENAIRE: Provides one of the largest open scholarly records collections worldwide.
- PATSTAT: The most extensive database on bibliographic and legal event data on published patents.

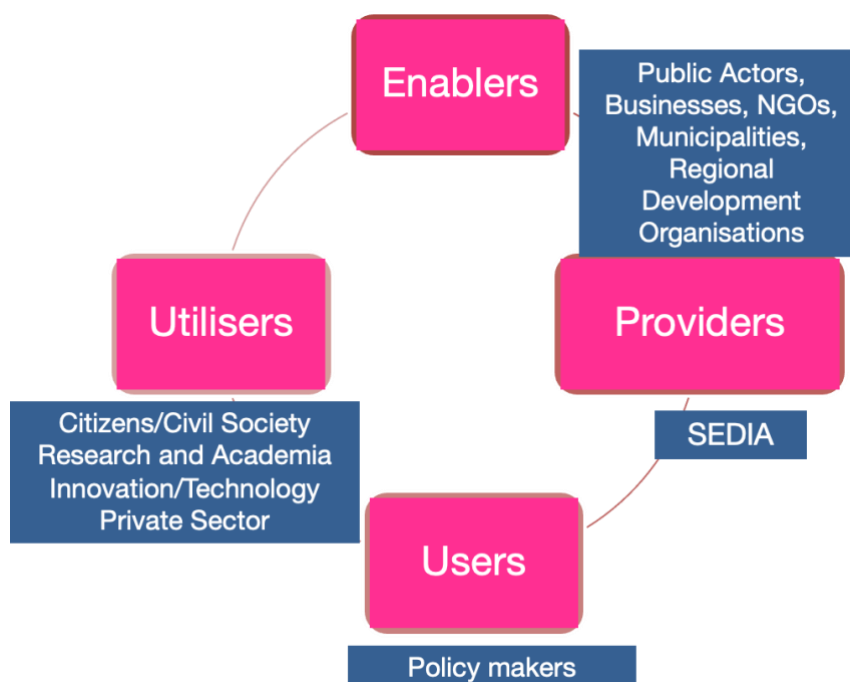
In order to address some of the aforementioned policy questions, attempts were made to access alternative databases of an ad-hoc nature and focused solely on Spain. There were the following:

- **AXESOR (EXPERIAN) Knowledge Expert Repository:** This repository, which is called *Data Lake Omnia*, is a set of high-value, relevant, and accurate variables and indicators that contains information on Spanish companies, self-employed and public administrations, covering a huge range of descriptive, economic, financial, innovation-related and performance indicators. An effort was made to select the indicators and variables that are of interest to address the AI LL use case. The database is not free of charge, which means that the Consortium studied the convenience of the database and then, it was determined, by consensus, to pay the fee to be given access. The technical teams explored the database in-depth and concluded that the number of available URLs for web crawling was below 240,000 (in contrast to the number of 1,7 million companies that are available in the database). In short, this is just over 10% of the universe of companies contained in Data Lake. Out of these 240,000 companies, only 1,200 with activity/related to AI could be identified. This implies that some basic analysis could be undertaken using the database, but sophisticated analyses (i.e. topic-modeling based//segmented) were completely discarded.
- **Binding reports (*Informes Motivados Vinculantes*, IMV, in Spanish).** Binding reports are documents issued by the Ministry of Science & Innovation (in Spain) that qualify the activities of a project as R&D and/or technological innovation within the framework of an annual project. As the binding reports are the result of a double cross-checking process involving the Ministry of Finance, the level of accuracy and reliability is rather high. A request to obtain anonymised data was issued to the Ministry of Science & Innovation, as the reports deal with highly sensitive information. Unfortunately, due to privacy issues, the information was not provided.
- **In order to proceed with the sentiment analysis on AI,** Spanish Parliament minutes over the last 10 years are to be requested. In so doing, it would be possible to get a glimpse about, for example, how the Spanish political class is managing AI challenges, what the main topics debated, or to what extent the sentiment on AI has evolved over time. The technical team explored the feasibility of this analysis, but it was fraught with some difficulties. On the one hand, there were some technical obstacles to ingesting the information contained in the databases and identifying AI related content. Furthermore, the need for specific software development effort for a specific dataset somehow collided with the plans and priorities of the technical team to provide more generic data ingestion tools. Accordingly, the analysis was discarded.

3.3.3. AI LL: Stakeholders

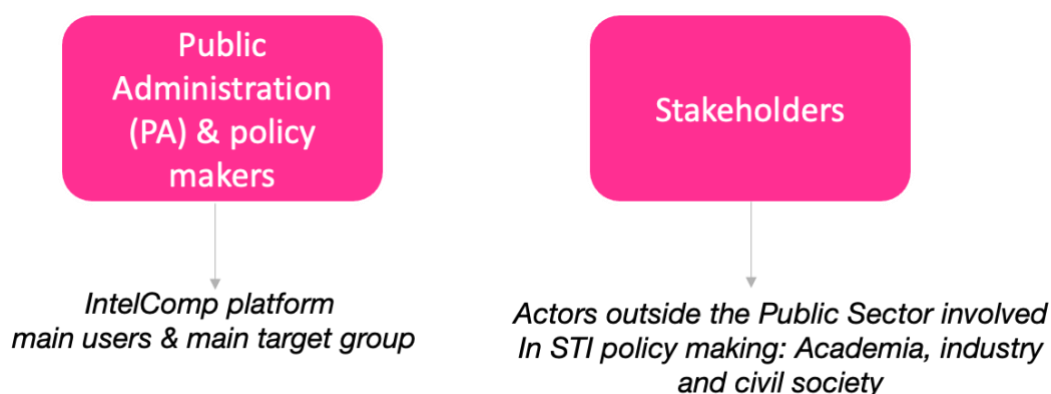
Some preliminary conceptual underpinnings are worth explaining regarding the selection of stakeholders. The selected stakeholders reflect the quadruple helix rationale, whereby industry, public administration (incl. policymakers), academia, and the civil society (community) interact and are expected to create fruitful co-creation dynamics. In this setting, stakeholders are to display different roles according to their position on the network, be it as enablers, users, providers, and utilisers in the way depicted in Figure 5.

Figure 5: Living Lab AI – actor roles



A further distinction takes place between public administration and policymakers on the one hand, and the rest of the stakeholders, on the other. Public administration seems to represent the main target group of LL activities, whereas the rest of the stakeholders may be relevant, but usually restricted to a rather specific role.

Figure 6: Living Lab AI – distinguishing between PA and other stakeholders

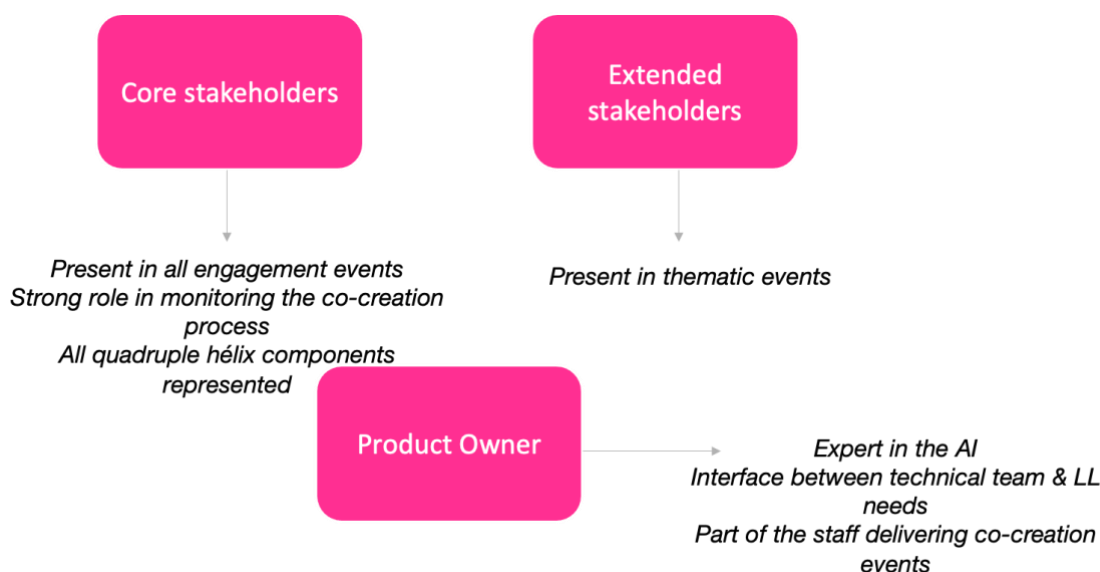


Accordingly, the AI LL was devised to be organised in two different levels (cf. Figure 7). The first level, which was labelled as the *core stakeholder group*, comprises those organisations that play a relevant role in helping to move the project forward and achieve project goals. Members of the core group are not only expected to attend all scheduled meetings, but also to have a transversal, forward-looking, and strategic approach, thus accompanying SEDIA in the LL creation.

In contrast, the second tier was represented by the *extended stakeholder group*, which is only present in thematic events, basically associated with the delivery of different IntelComp tools. Feedback from them is also welcomed, but it will be more focused on tool functionalities.

Additionally, the role of a product owner for some IntelComp tools needed to be filled. It was agreed among members of the IntelComp steering group, that the Coordinator of the AI LL (i.e., David Gago), would perform this role, as he possesses the skills necessary for the job.

Figure 7: Living Lab AI – Initial stakeholder framework for the AI LL: two-levelled stakeholders and product owner



This was the initial conception of the stakeholders' framework (it also included names and organisations for every category of stakeholder). Nevertheless, as the project started to progress, it became somewhat non-useful, because some of the stakeholders could not commit themselves to the project in the long term. Accordingly, a more fluid and less hierarchical-based structure of the stakeholders' framework was finally adopted.

Stakeholders mapping methodology

Different criteria were considered to create the AI LL stakeholder mapping:

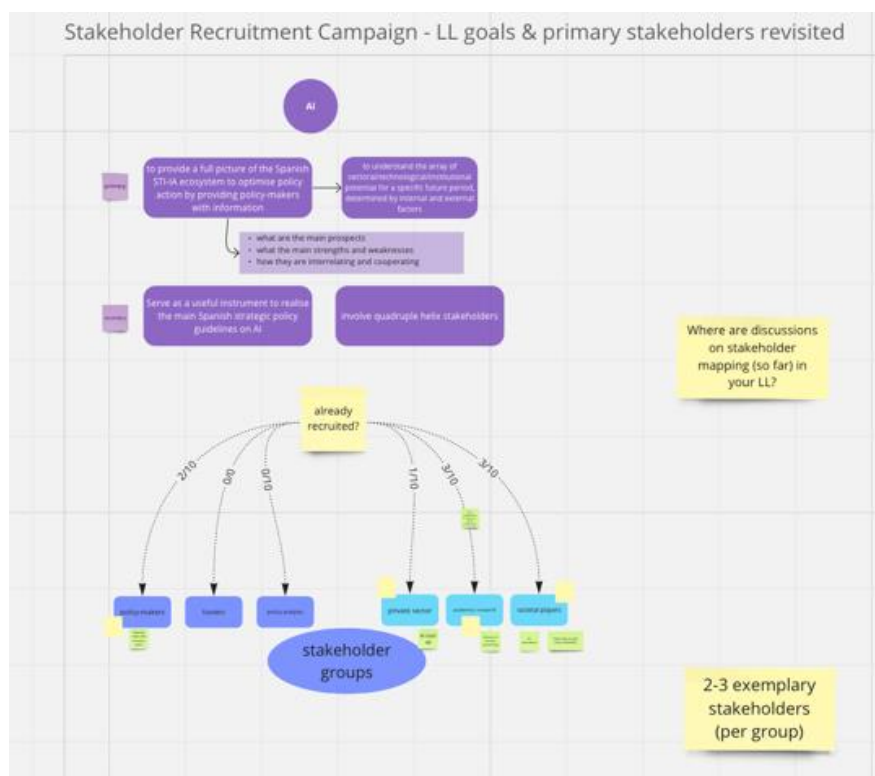
- Balancing the quadruple helix components. As a starting point, the selection of stakeholders was designed to ensure a fairly balanced number of stakeholders for each component of the quadruple helix. The concept of "balance" here is not related to having the same number of stakeholders for each component, but a reasonable representation in every case.
- Highlighting the importance of the initial AI consultation workshop. On 21 June 2021, the IntelComp Artificial Intelligence consultation workshop took place. Nearly 30 people of different backgrounds attended the online workshop. Some of them became AI LL stakeholders.
- Stressing the criteria of influence and importance in the selection of stakeholders. As such, the final selection was addressed prioritising those stakeholders bearing with:

- High influence on the state of affairs within their organisation, and typically can affect or have an impact on the organisation's activities, targets, or policies; and/or
- High interest: how likely they are to engage in using the IntelComp platform after the end of the project and what are the expected outcomes.

The draft stakeholder mapping for the AI may be provided if requested. In relation to this, it is worth emphasising that SEDIA has made duly use of SEDIA AI-business incentivisation programs to enlarge the number of business units and other organisations (including Universities, research centers, and third-sector organisations) engaged as IntelComp stakeholders. This was done in full compliance with GDPR. A case in point is the Artificial Intelligence R&D Missions Programme (*Programa Misiones I+D en IA*), which aims to fund Artificial Intelligence projects to address major societal/country challenges.

Led by WP6 coordinators (ZSI), a series of workshops were carried out via the online collaborative platform MIRO Board. Under the “Stakeholder Recruitment Campaign” title, the workshops were useful to implement the stakeholder mapping methodology, which is the *raison d’être* of the LLs. Furthermore, the strategies implemented helped improve the engagement of stakeholders by identifying the activities to be deployed based on project objectives, challenges, impacts and expected outputs, making use of visualisation tools to support the exploration of the different perspectives, and knowledge across communities.

Figure 8: Screenshots of the Stakeholder Recruitment Campaign workshops



(a)



The AI LL use case envisages a bold alignment with the technical development of the IntelComp platform. On a more conceptual basis, SEDIA developed the *Corpus Viewer* tool, which may be deemed as a precursor of some IntelComp end-user tools. *Corpus Viewer* is an in-house tool to assist in policy making and policy implementation of STI policies, and, in this sense, IntelComp may benefit in different ways from *Corpus Viewer* creation and pilot implementation. An example is the

method to select knowledge areas using a mixture of graph analysis and an automatic learning algorithm under the supervision of human domain experts.

The very creation of the AI LL is aligned with the technical development of the project. Co-creation events became a key initiative to bring the technical team closer to the true needs of stakeholders. There is, therefore, a clear vocation of the AI LL to adapt to the technical needs of the project and be useful to provide insights and feedback to eventually make the platform stronger.

3.3.5. AI LL: Design Thinking methodology

The AI LL has followed the *Design Thinking* methodology with the goal of making existing IntelComp tools more accessible so that they become more collaborative and repeatable. To be more precise, Design Thinking was envisaged to unleash co-creation at the Interactive Model Trainer (IMT) workshop (see section 5.2.2).

The methodology allowed:

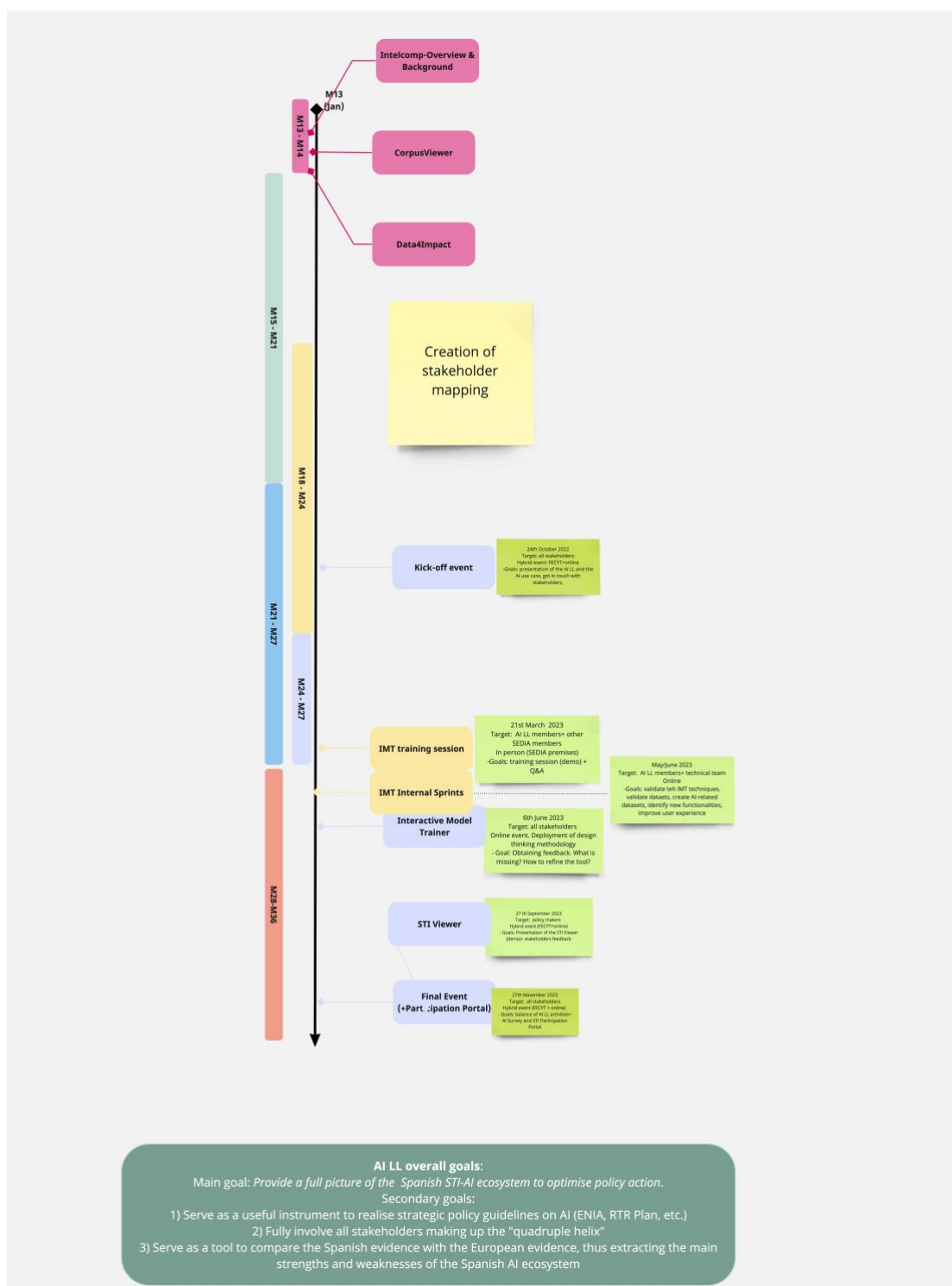
- **Maintain a focus on user empathy**, putting the human at the centre. This refers to the customer and end user, but also to the people who are behind the scenes, making it a meaningful experience for everybody who is involved. Online and in-person sessions always involved user interactions to gather feedback and validate assumptions.
- **Risk and ambiguity: tolerate risk and ambiguity**. In some cases, workshop participants were also encouraged to have a divergent mindset. There is a human bias that drives us towards sticking to an idea we started even though signs tell us it's not the best idea, and in most organisations, we have a tendency to converge early, meaning, delivering quickly, sticking to a tight deadline, not presenting any uncertainties. Thanks to Design Thinking we tried to stay away from that, incorporating dynamic activities to gather new necessities, ideas (functionalities for the tools), hypotheses to validate, etc. This future mindset helped us create a small AI community around IntelComp tools and activities.
- **Interdisciplinary Co-creation**: get everyone in the same room. In IntelComp, we need a variety of expertise knowledge and ways of thinking for our complex problems. In AI LL sessions, we were able to attract a bunch of stakeholders, and by having people create things together in the same room, we increased ownership.
- **Creativity**: Even though the focus of some events was to present IntelComp and its tools, we also reserved time to question if we could approach things differently. This pertains to the brainstorming sessions and creative tools we incorporated into the workshops.
- **Visualisation and tangible tools**: In Design Thinking, visualisation-meaning drawing, using flip charts, maps, and post-its is crucial. The use of tangible tools is also essential. Even though some IntelComp tools weren't ready to demo, we aimed to make our thinking as visual and tangible as possible to foster innovative ideas. We used user journeys, storyboards, or UI mock-ups to imagine and visualise IntelComp processes and services.
- **Gamification**: a subtly fundamental part of design thinking. Not everything is a game, but we incorporate game aspects, such as the previously mentioned tangible and visual material, creating representations of situations or products so that we can "play" out different scenarios. From games, we adopted the idea of taking turns and having time

constraints in our workshops. We also designed experiences that were intrinsically motivating because we understand that in this state, we produce our best thinking and generate our best ideas. Games also inspired us to create dynamic and collaborative online sessions (incorporating icebreakers to introduce ourselves, starting with identifying the necessities or problems, followed by ideation to solve the problems, and concluding by sharing and enriching ideas while involving users).

4. AI LL ROADMAP

Below is an illustration of the AI LL roadmap in terms of events and activities rolled out, which are described in detail in the following section.

Figure 9: AI LL - overarching timeline



As it may be noted, the bulk of activities were placed around 2023, when the majority of IntelComp tools were delivered.

5. LIVING LAB RESULTS

5.1. Introductory remark

The AI LL has developed two main types of activities. As they differ in nature, scope, and goals, it has been decided to split them into two groups. The first type of activities are events dealing with the involvement of stakeholders, that is, agents who are not part of the consortium. The main goals of these events were either to get feedback on particular tools or functionalities of IntelComp or just showcase the tools/functionalities and the main results driven by the use of such tools. The second type of activities are internal co-creation events, which do not involve external stakeholders, but mobilise members of the consortium to unleash dynamics of co-creation to optimise tools or functionalities of the project.

5.2. Events

5.2.1. Kick-off event (24th October 2022)

5.2.1.1. Preparation & protocols

The event was made possible thanks to an array of preparatory works and protocols that were put in place, namely:

- A formal invitation was designed and launched to those stakeholders who gave previous consent to join the IntelComp project. In order to spur both interest and awareness about the event, slightly customised versions of the invitations were created for the different quadruple helix stakeholders. Said invitations were launched in the period ranging from Oct 3 to Oct 7. A reminder message was sent a week before the celebration of the event.
- A registration form for the meeting was designed. In order to be registered for the event, stakeholders were required to fill in the form, indicating their preference for in-person or online attendance.
- Before starting the event and complying with legal and ethical considerations of the project, attendees were asked to read and sign an informed consent collaboration form.

5.2.1.2. Details about the event

The AI LL kick-off event took place on the October 24th, 2022 at *Fundación Española de Ciencia y Tecnología* (FECYT) premises in Alcobendas (Madrid). The event was rolled out in a hybrid nature (in-person + online) and was attended by 53 stakeholders representing the four components of the quadruple helix.

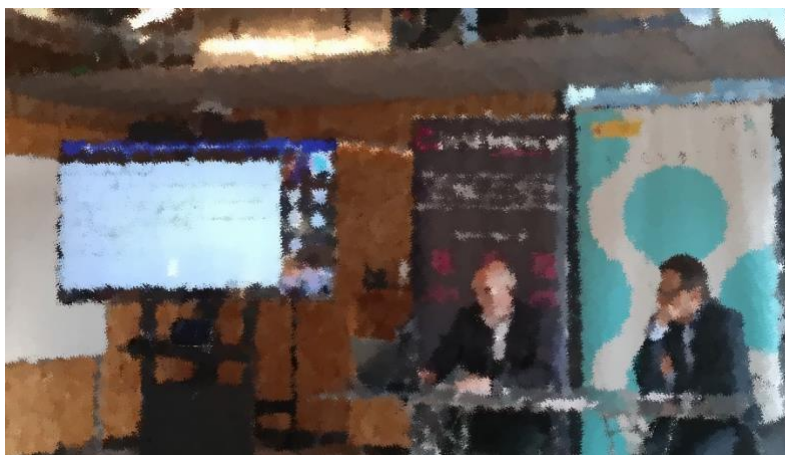
The meeting was structured around a series of presentations ranging from the more general to the more specific (top-down approach), but always focusing on the role of artificial intelligence as a useful tool for decision-making in the field of science, technology, and innovation policies. All the speakers used a PowerPoint presentation (available, if required), as supporting material.

Thus, after some words of welcome by Cecilia Cabello (Director of European Policies of FECYT and Coordinator of the IntelComp Project) and a brief space of time devoted to the presentation of all

attendees, the first intervention was given by Ezequiel García (Technology Coordinator, SEDIA), who reviewed the main initiatives of SEDIA in the field of AI, focusing on those related to Natural Language Processing (NLP). Richard Benjamins (Head of AI and Data Strategy, Telefónica), as a facilitator of the IntelComp project, delivered the second talk, who analysed the vast opportunities generated by natural language programming in the particular case of the Spanish language. From that moment on, the meeting focused on the presentation of different issues related entirely to the project. Thus, Joseba Sanmartín (Policy Analyst, FECYT) showed the main characteristics of Project IntelComp, highlighting, among other issues, the overall background, main objectives, associated tasks, and the members making up the consortium. On the other hand, Jesús Cid (Professor at Carlos III University), tackled the fundamental technological tools that make up the tool (Interactive Model Trainer, STI Viewer, STI Portal, and Evaluation Workbench) and the specific orientation of each tool towards specific groups of facilitating agents.

Next, Dietmar Lampert (researcher at the Centre for Social Innovation, Austria), explained the living lab approach followed by the Project IntelComp as a way of generating co-creation dynamics to optimise the results obtained. Finally, David Gago (Coordinator of SEDIA's AI living lab) explained the main characteristics of the use case around which the living lab is to be articulated, the alignment of the use case with the main strategic references of AI in Spain, as well as the role associated with the dynamising agents and the main steps, in the form of future events, that will be carried out in 2023. The event ended with a Q&A session and a networking coffee.

Picture 1: Screenshot taken from the kick-off meeting



5.2.1.3. Agenda

Below is the agenda of the meeting:

Table 2: Agenda of the Kick-off event, AI LL

Timing	Agenda topic and (suggested) speakers
09:30 – 09:40	Welcome and openings <ul style="list-style-type: none"> ○ Cecilia Cabello (FECYT)
9:40 – 10:00	Brief Round of Presentations
10:00 – 10:15	AI and policy action: reflections from SEDIA <ul style="list-style-type: none"> ○ Ezequiel García (SEDIA)
10:15 – 10:30	IA and Natural Language Processing <ul style="list-style-type: none"> ○ Richard Benjamins (TELEFONICA)
10:30 – 10:45	The IntelComp project: brief introduction and partners <ul style="list-style-type: none"> ○ Joseba San Martin (FECYT)
10:45 – 11:15	Description of main IntelComp tools <ul style="list-style-type: none"> ○ Jesús Cid (U3CM)
11:15-11:30	The Living Lab approach to IntelComp <ul style="list-style-type: none"> ○ Dietmar Lampert (ZSI)
11:30-12:00	The IA living lab: approach, organisation, and next steps <ul style="list-style-type: none"> ○ David Gago (SEDIA)
12:00-12:30	Q&A, wrap up
12:30-13:00	Coffee and networking

5.2.1.4. Results relevant for the technical development & agenda setting

Even though it was a kick-off meeting, and accordingly, it had basically an informative character, both the Q&A session and the networking coffee were useful to spur the debate and clarification of some doubts. As such, activities could not be considered co-creation in the strict sense but helped pave the way for future discussions and exchange of ideas. From the event, it was also clear that stakeholders' participation basically came from in-person attendees, while online participants remained rather passive. The main concerns of the stakeholders had to do with ethical considerations and the trustworthiness of the platform (as it implies working with extensive databases), and IntelComp vocation to endure once the project has officially finished.

5.2.2. Interactive Model Trainer (IMT) event (June 6th, 2023)

5.2.2.1. Preparation & protocols

Preparations and protocols for this event were very much aligned with the ones followed during the kick-off meeting, but there were minor differences that are worth emphasising:

- As the event was focused on a tool that is of transversal nature, the invitations were not customised as in the kick-off event. On the contrary, only one version of the invitation was designed and launched, both in Spanish and English.

- As in the kick-off event, a registration form for the meeting was designed, including attached the informed consent form.

5.2.2.2. Details about the event

The event was held on June 6th, as a virtual meeting. The event took place around the Interactive Model Trainer (IMT) tool and started at 10:00 am, finishing at 12:00pm. It encompassed a twofold objective: firstly, to present the main functionalities of this tool to IntelComp stakeholders, and secondly, to create a space of interaction where the stakeholders might play a role in giving shape to the main IMT functionalities. In order to optimise stakeholders' feedback, a powerful *agile methodology* was applied, as explained below.

Picture 2: Screenshot taken from the IMT meeting



The number of stakeholders registered for the event, including members of the IntelComp Consortium, was around 30, while the final number of attendees was just over 20. The profile of stakeholders was diverse, as representatives from Academia, the business sector, and public administration attended the meeting. The session began with a brief presentation by David Gago, coordinator of the AI LL, who then facilitated a short round of introductions by each event attendee. Subsequently, Joseba Sanmartín (FECYT) provided some general insights into the IntelComp project overall, and the IMT in particular. In the next presentation, Asier López (NTT Data) outlined the main features of the co-creation methodology implemented (i.e., *design thinking*), and the dynamics used to generate interaction among attendees. Based on this methodology, David Gago explained the basic concepts related to IMT, emphasising the added value elements (enhancement of gains and elimination of pains) that its use can bring about. Following this, Jerónimo Arenas (UC3M) conducted a demo of the IMT toll, highlighting the main functionalities currently available and some others that will be added shortly.

The last part of the session was devoted to creating a space for reflection and interaction on IMT from the perspective of the Design Thinking methodology.

5.2.2.3. Design thinking methodology

The use of a design thinking methodology in the event was justified on three different grounds:

- Approach Design Thinking as a framework that helps to innovate in IntelComp's and IMT Tool's value proposition focusing on the client or user.

- Experiment with this approach by identifying customer and user needs related to IMT.
- Generate high-level ideas to evolve the IMT tool.

Methodology and structure:

Thanks to the Design Thinking methodology, we were able to empathize with participants and users, understanding who they were. We spoke with them, observed them, and even invited them to collaborate in the design process of the IMT tool.

The first step was to introduce participants to the Design Thinking methodology. The workshop was divided into three phases:

- **Introduction:**

Workshop objectives were reviewed, and co-created agreements for the session were established. A quick icebreaker set the mood for the session, allowing us to meet all the participants. After introducing ourselves, we provided a brief update on the IntelComp ecosystem/last updates and gave a short introduction to the Design Thinking methodology.

- **Exploration:**

The first phase of the workshop involved co-creating the value proposition of the IMT tool. We aimed to balance the current value proposition of IMT tools (related to the AI environment) with customer needs. Before the session, we had already completed the Value Offering based on internal workshops to gather already developed functionalities/offerings and stakeholder needs. In these internal preparatory sessions, we used Persona tools or Archetypes to form hypotheses that we wanted to validate with real stakeholders in the workshop.

With these Archetypes, it was discovered:

- How users behave now and what needs they have related to AI and the scope of IMTs (prior to using/knowning IntelComp)
- What actions do these users perform in their daily work (regarding IMT scope)
- What pains and gains do they experience in that process?

Once we confirmed that participant needs to be aligned with our Archetypes, we presented the value proposition of IntelComp's IMT services, aligning user needs with existing IMT functionalities.

- **Ideation and Feedback:**

To generate new functionalities based on user needs, we showcased a use case, presenting a visual prototype of IMT. With that inspiration, workgroups were created to brainstorm improvements or new functionalities.

Once participants generated ideas, they filtered them using an Impact matrix (High/Low). This information could be significant for the development team to prioritise future developments, considering the impact/effort of developing functionalities that solve real stakeholder problems.

Although one of the goals was to generate high-level ideas to evolve the IMT tool, our main focus was on experimenting with the Design Thinking methodology by identifying customer and user needs related to IMT and validating IMT's value proposition. As some of IMT's functionalities were already developed, ensuring that these already addressed stakeholders' needs was crucial. Therefore, in this workshop, we prioritised outcomes over outputs.

Figure 10 and

Figure 11 below, represent a visualisation of the design thinking methodology deployed. The figures are not meant to be read; they are just a reflection of the kind of interactions developed amongst stakeholders involved.

Figure 10: Screenshot from the design thinking methodology followed during the IMT workshop

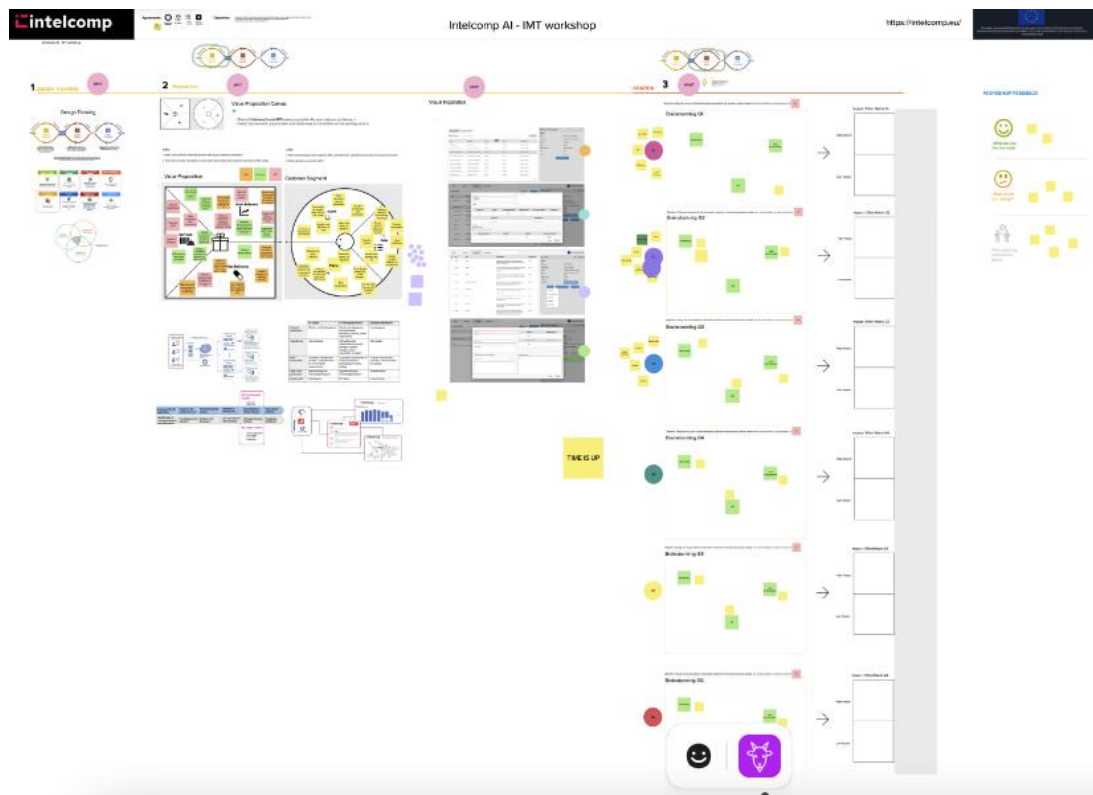
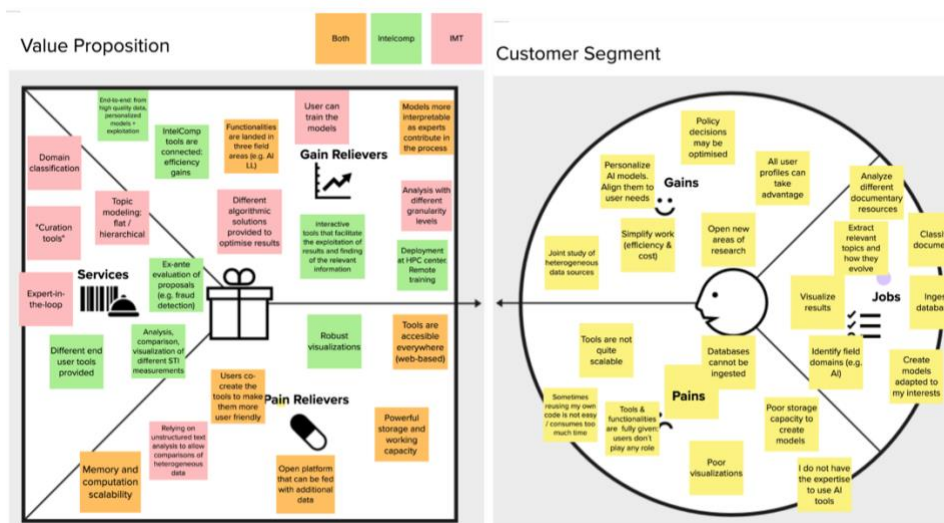


Figure 11: Screenshot from the design thinking methodology: Value Proposition Canvas



5.2.2.4. Agenda

Below is the agenda of the meeting:

Table 3: Agenda of the IMT event, AI LL

Timing	Agenda topic and speakers
10:00-10:10	Welcome & presentation <ul style="list-style-type: none"> David Gago (AI Living Lab Coordinator, SEDIA)
10:10 – 10:20	IntelComp: balance of results <ul style="list-style-type: none"> Joseba Sanmartín (Policy Analyst, FECYT)
10:20 – 10:40	Introducing the co-creation activity <ul style="list-style-type: none"> Asier López (Innovation Coach, NTT Data)
10:40-10:50	Interactive Model Trainer (IMT): basic concepts and overall approach <ul style="list-style-type: none"> David Gago (AI Living Lab Coordinator, SEDIA)
10:50 – 11:05	IMT Demo <ul style="list-style-type: none"> Jerónimo Arenas (Full Professor, University Carlos III)
11:05-11:35	Co-creation space <ul style="list-style-type: none"> Asier López (Innovation Coach, NTT Data)
11:35-11:50	Co-creation: main conclusions and results <ul style="list-style-type: none"> Asier López (Innovation Coach, NTT Data) David Gago (AI living lab coordinator, SEDIA)
11:50-12:00	Next steps & wrap up

5.2.2.5. Results relevant for the technical development & agenda setting

There were some relevant conclusions drawn from the implementation of the co-creation methodology:

- Regarding data/insights captured during the process we highlight:
 - Validation of the Value Proposition of IMT in the AI Field.
 - User pains aligned with pain relievers offered by IMT and IntelComp.
 - User gains aligned with gain relievers offered by IMT and IntelComp.
 - IMT and IntelComp services that relieve those pains and gains.
 - Identification of New User Needs (some examples):
 - Scalable tools.
 - Need for visualisations.
 - Database ingestion challenges.
 - Limited storage capacities to create models.
 - Code reutilisation.
 - Validation of the User Experience of IMT.
 - No pain points were identified in the case presented to users in the mock-up.
 - IMT was accessible and intuitive enough for them.
 - The Interactive Model Trainer could already be at a remarkably advanced stage of completion when it was presented at the event. This result could explain why stakeholders were not very much proactive in the session.
 - Explaining the integration of IMT with respect to the other IntelComp tools posed a significant challenge. It is difficult to showcase the innovative nature of IMT (which broadly relies on topic modelling and domain selection, i.e., relatively standardised functionalities) without placing this tool in the context of others, such as STI Viewer or STI Participation Portal.
 - Speaking on the implementation of the methodology, the exercise proved that agile methodologies seem to display better results when the session is rolled out in person, and not online.

5.2.3. STI Viewer event (September 27th, 2023)

5.2.3.1. Preparation & protocols

The STI Viewer tool is mainly aimed at policymakers and policy representatives, and accordingly, only one type of invitation was launched. The rest of the preparation arrangements were similar to the former events.

5.2.3.2. Details of the event

On September 27th, 2023, a presentation session of the STI Viewer tool took place at the Spanish Foundation for Science and Technology (FECYT). The STI Viewer is an interactive AI-based data and visualisation platform designed for monitoring, evaluation, and policy development. The tool is

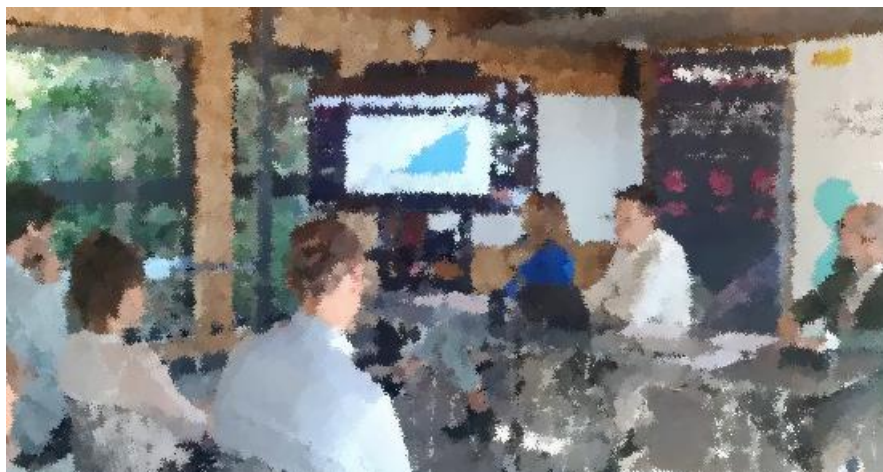
structured around a set of well-documented, reliable, and timely indicators that can be segmented into multiple dimensions for in-depth analysis. In this sense, it can be highly useful in the decision-making processes of policymakers related to science, technology, and innovation.

The event, of a hybrid nature (as it could be followed both in-person and online), began with a welcome from Almudena Claudio, Director of Technological Innovation and Digitisation at FECYT, who then facilitated a round of personal introductions from the stakeholders. Subsequently, Joseba Sanmartín, also from FECYT, briefly outlined the current situation of the IntelComp project and its next steps. He then delved into explaining the main features and potentialities of the STI Viewer tool and its relationship with other tools in the project.

Following this, David Gago, Coordinator of the AI Living Lab at SEDIA, explained the basic foundations of STI Viewer applied to the field of the AI use case from the perspective of its two main functionalities (domain classification and topic modeling). He then proceeded to give a brief demonstration so that the stakeholders could first-hand experience the tool and visualise some of the already available indicators related to the field of science and technology, both for the entire European Union and for Spain.

To conclude, Almudena Claudio delivered closing remarks, followed by a networking coffee offered to the attendees who gathered at FECYT. The event recorded a high level of interest and interaction from attendees, who had diverse profiles, although there was a greater presence of public policy decision-makers.

Picture 3: Screenshot taken from the STI Viewer event



5.2.3.3. Agenda

Below is the agenda for the meeting:

Table 4: Agenda of the STI Viewer event, AI LL

Timing	Agenda and speakers
10:00-10:10h	Almudena Claudio- Head of Technological Innovation and Digitisation, FECYT
10:10h-10:15h	IntelComp: where we are and the next steps Joseba Sanmartin – Policy Analyst FECYT
10:15h-10:25h	The role of STI Viewer in IntelComp: main tools & functionalities. Joseba Sanmartin-Policy Analyst FECYT
10: 25h-10:50h	STI Viewer demo for the Spanish AI use case David Gago- AI Living lab coordinator- SEDIA
10:50h-11:00h	Wrapping up: Q&As
11:00h-11:30h	Coffee & networking

5.2.3.4. Results relevant for the technical development & agenda setting

STI Viewer is an interactive tool to visualise and explore a wide range of indicators on research and innovation activities. The STI Viewer that was shared during the event encapsulates and reflects the AI LL strategic approach and provides answers to the agenda questions through the available indicators (and the corresponding visualisations). The indicators were available both for Spain and the European Union in the Science field, while they were only available at the European Union level in the Technology field. As such, acknowledging the technical and/or data constraints, the AI LL has been able to decide, according to the agenda-setting preferences, the set of indicators that made up the STI Viewer. Furthermore, it implied a very close and joint work with the technical team that was prior to the presentation of the STI Viewer demo to the stakeholders, as the technical team acknowledged the needs of the AI LL and adapted the information and the visualisations accordingly.

5.2.4. Final AI LL event (November 27th, 2023)

5.2.4.1 Preparation & protocols

Regarding the preparation and protocols of the event, there were no differences with respect to the former activities. As no major issues were detected, we determined to follow the same procedures.

5.2.4.2. Details of the event

On November 27th, 2023, the closing event of the AI LL took place. The event, which started at 9:30 am and concluded at 12:00 p.m., was held in person at the headquarters of the Spanish Foundation for Science and Technology (FECYT). However, it had a hybrid nature, combining both in-person and online participation.

The meeting aimed to achieve three main objectives. Firstly, to present an overview of the Living Lab activities during the lifespan of IntelComp, as well as address more general issues related to the project's main achievements and technological challenges. Secondly, to introduce the STI Participation Portal tool, including a practical demonstration of its main functionalities. And thirdly, to discuss the sustainability and potential exploitation possibilities of IntelComp in the future.

The event, with over 35 registered attendees, began with a brief opening statement by Almudena Claudio (Director of Technological Innovation and Digitisation at FECYT), followed by short presentations by the speakers. Subsequently, presentations related to the role of living labs took place. In the first presentation, Dietmar Lampert (Centre for Social Innovation, Vienna) briefly discussed the role of co-creation and the justification of living labs as the main vehicle in the context of the IntelComp project. Following this, David Gago (Coordinator of the AI Living Lab at SEDIA) provided an overview of the main activities carried out by the AI LL.

Later, David Gago presented the main features of the STI Participation Portal, a recently designed tool that allows obtaining feedback from civil society on various aspects of AI and its relationship with science, technology, and innovation policies collected through a survey integrated into the tool. A hands-on demonstration of its main functionalities was conducted, emphasising its connection with the STI Viewer tool aimed at public policy decision-makers.

A broad section followed, where Jerónimo Arenas-García (Technical Manager of IntelComp, Carlos III University) addressed the main technological challenges posed by the project and how they were tackled. Joseba Sanmartín (IntelComp Coordination, FECYT) provided a brief overview of the main milestones achieved, and Daniel Jiménez (NTT Data, IntelComp Exploitation Manager) presented a high-level analysis of the exploitation scenarios for the IntelComp tools once the project has concluded.

María Barroso (SEDIA) replaced David de Francisco in her presentation about SEDIA's vision of IntelComp and the support that will be provided to the project after its closure. The event concluded with closing remarks by Almudena Claudio, followed by a networking coffee session enjoyed by all attendees.

5.2.4.3 Agenda

Below is the agenda for the meeting:

Table 5: Agenda of the final event, AI LL

Timing	Agenda topic and speakers
09:30 – 09:45	Welcome, openings, and presentations <ul style="list-style-type: none"> Almudena Claudio (Head of Technological Innovation and Digitisation, FECYT)
09:45-10:05	The role of co-creation in the IntelComp LL activity <ul style="list-style-type: none"> Dietmar Lampert (Centre for Social Innovation, Vienna, IntelComp WP6 Lead) David Gago (Professor, UNED. AI LL Coordinator)
10:05-10:25	STI Participation Portal & STI Viewer in the AI LL: brief demo <ul style="list-style-type: none"> David Gago (Professor, UNED. AI LL Coordinator)

10:25– 11:10	IntelComp: main achievements, technological breakthroughs, and sustainability challenges <ul style="list-style-type: none"> ○ Jerónimo Arenas (Full Professor, University Carlos III. Scientific Coordinator, IntelComp) ○ Joseba Sanmartín (Policy Analyst, FECYT. IntelComp Coordination) ○ Daniel Jiménez (Consultant, NTT Data, Exploitation Manager, IntelComp)
11:10-11:20	IntelComp vision from SEDIA <ul style="list-style-type: none"> ○ David de Francisco (Area Coordinator, Subdirectorate of Artificial Intelligence and Digital Enabling Technologies, SEDIA)
11:20-11:30	Q&A and closing remarks <ul style="list-style-type: none"> ○ Almudena Claudio (Head of Technological Innovation and Digitisation, FECYT)
11:30-12:00	Coffee and networking

5.2.4.4. Results relevant for the technical development & agenda setting

The celebration of this event was crucial in many ways both for technical development and agenda setting.

As for technical development, showcasing the AI Survey was a challenge that implied the full involvement of the ATHENA RC team to successfully ingest the survey in the STI Participation Portal and to connect the STI Participation Portal with the STI Viewer. A draft version of the STI Portal was shared with the AI LL and a process of finetuning followed, during which the technical team ensured that the tool was functioning properly, met usability standards, and interacted with the STI accordingly.

The AI Survey (see annex to check the overall organisation and the questions) is organised under three main sections. Section A comprises demographics, that is, basic information required (e.g.: country where the organisation is based; type of stakeholder; number of employees; priorities on AI, etc.). Section B requests information on how the organisation keeps track of STI news, degree of interest in STI policymaking, degree of participation in STI policymaking, channels used, etc. Finally, part C is about AI-related STI policymaking and, accordingly, it brings questions on STI-based policies to boost AI uptake & AI investments and global AI perception (main opportunities, threats, and examples of AI effective use). Finally, the AI Survey also contains validation of trends shown in the STI Viewer, namely: technological production trends in AI, evolution of publications on different topics in the AI domain, and international collaboration by AI topic.

The inclusion of the AI Survey in the STI Participation Portal has strongly influenced agenda setting. A set of agenda-setting questions (cf. pages 18-19), that were raised had to do with legitimacy and address public concerns (e.g., questions on the general perception of the Spanish civil society about the AI). As the analysis based on the Spanish Parliament minutes was finally discarded, the AI Survey made up a more rooted and fluid source of knowledge to grasp the societal vision of AI.

The event also shed some light on the SEDIA commitment to the project in the near future. Even though the specific terms are still to be decided, SEDIA has included IntelComp in the Language

Modelling Initiative to be led by the Barcelona Supercomputing Center (BSC-CNS). In this respect, the BSC-CNS will be in charge of:

- Maintenance of existing infrastructure for small-scale use case development.
- Code support and support for open issues on GitHub.
- Develop installation guides and user manuals for the development of unbiased models in line with the AI Act.

Furthermore, SEDIA will address the feasibility of generating a sectoral monitoring application to assist in the management of public policies by analysing the fields of application of the services and products contracted (ICT, defence, construction, etc.)

5.3. Internal co-creation meetings

5.3.1. *IMT Training Session (March 21st, 2023)*

On March 21, 2023, a training session on the Interactive Model Trainer (IMT) tool took place at SEDIA. The session was led by Prof. Jerónimo Arenas from the Carlos III University of Madrid, the institution responsible for the technical coordination of the project. In attendance were individuals associated with Carlos III University, members of the SEDIA team affiliated with the IntelComp project, as well as individuals from SEDIA who were not directly involved in the project.

Prof. Jerónimo Arenas initiated the session with a brief introduction to the main objectives of IntelComp, its primary tools, and distinctive elements. He then focused on the Interactive Model Trainer (IMT) tool, highlighting its relationship with other IntelComp tools and its distinctive role within the project. In this context, he emphasised that the objective of IMT is the creation and training of models, not their exploitation. Its essence lies in co-creation, allowing users to act as “curators” and optimise its performance.

The final phase of the training session was dedicated to a demonstration of IMT and a brief question-and-answer dialogue. The demo primarily involved using the functionalities already installed in the web-based tool: access to the tool, selection of the corpus to work with (based on the already ingested databases), creation of a custom corpus, import of external corpora, and exploration of the logical corpora functionality for model training.

Picture 4: IMT internal training and co-creation session



This session landmarked the starting point of the IMT internal sprints (see next section), as well as the final stage of implementation and co-creation of IntelComp tools.

5.3.2. IMT internal sprints (May-June, 2023)

IMT internal sprints were rolled out during the months of May and June 2023 (on a weekly basis in May, and every 10 days approximately in June), under the aegis of the University Carlos III technical team. Both the AI LL (SEDIA) and the Cancer LL (HCÉRES) were involved in a fruitful co-creation process developed via Teams, which aimed the following objectives:

- Validate the techniques of the current IMT. Modify how functionality is presented in terms of usability (“cosmetic changes”)
- Identify new functionalities that the technical team could work on after Summer 2023.
- Create AI-related subsets for the following corpora: CORDIS, publications, and PATSTAT and create topic models for these subsets.
- Validate datasets that are to be visible through the IMT, as well as check KPIs that are relevant and aligned with the AI LL.
- Work on joint preparation of the LLs IMT-related events. In the particular case of the AI LL, support for the organisation of the IMT event in June was granted.

Internal sprints followed a very well-crafted time plan, as illustrated below (table 6), as well as a scrum-based tool (Jira) to monitor the progress of sprints as well as the achievements and results attained (or the lack thereof).

Table 6: Proposed time plan for the internal sprints

09/05	UC3M + LLS: Decision of Raw corpora to include in the IMT UC3M: Ingest at least Semantic Scholar subsets defined by the LLS LLS + CITE + UC3M: - Validate the correct deployment of topic modeling components - Correct errors - Propose changes to make the tool more user friendly - Identify new functions for implementation after the sprint (if any) CITE + UC3M: Finish deployment of domain classification component
16/05	LLS + CITE + UC3M: - Validate the correct deployment of topic modeling components - Correct errors - Propose changes to make the tool more user friendly - Identify new functions for implementation after the sprint (if any) LLS + CITE + UC3M: - Validate the correct deployment of domain classification components - Correct errors - Propose changes to make the tool more user friendly - Identify new functions for implementation after the sprint (if any)
23/05	LLS + CITE + UC3M: - Validate the correct deployment of domain classification components - Correct errors - Propose changes to make the tool more user friendly - Identify new functions for implementation after the sprint (if any) LLS + UC3M : Create domain models as needed
30/05	LLS + UC3M : Create topic models as needed AI LL: Preparation of LL Workshop
06/06	AI IMT Workshop
26/06	Health IMT Workshop

5.3.2.1. Results relevant for the technical development & agenda setting

The celebration of the sprints meant a rather relevant instrument to optimise the technical development of the IMT, which may be considered as the core tool of the IntelComp platform to create AI/NLP models. An example of how the sprints helped shape the final version of IMT is the co-created work on datasets selection both for domain classification and data modelling. Dataset selection covered projects (CORDIS), OpenAIRE and Semantic Scholar (publications), and PATSTAT (patents).

Table 7: Screenshots of co-created work on data selection

	CORDIS (projects)	Semantic Scholar (papers)	PATSTAT (patents)
Domain Classification (which is labeled as positive)	CORDIS provides a FOS classification (at project level). 6 FOS are available- Could we take "engineering & technology" as a FOS of reference?	We would go for AI keywords in S2 (1.62 millions) (*) Consider my question on Computer Science	Only patents from 70 onwards (prior to the 70s the number of AI patents is negligible) if my interpretation of figure "AI patents with keywords" is correct. 3 AI keywords produce 80% of PATENTS. 3 keywords might be a good cutting point
Topic Modeling	The same as for domain classification	The same as for domain classification	Use the results of domain classification to produce topic modelling

Thanks to the co-creation work, it was decided the criteria to select the project dataset (Engineering & Technology Field of Science), as well as publications and patents datasets (selection based on 3 or more keywords on AI).

There were some other non-critical requests made to improve IMT usability, some of which were finally implemented. Some examples that were noted in a “*Changes in IMT*” Excel file created *ad hoc*, were the following:

- 1) *On the right-hand side of the IMT landing page, there were some instructions to create a new corpus, to create a model, or to manage a list of items, but no instructions were given (the fields were empty).*

Corrective action: displayed menus were included in the final version of the IMT to help users create new corpus and models.

- 2) *Remove the language selection menu.*

Corrective action: The language selection menu was deleted, as English is the only language available.

- 3) *Clarify the distinction between logical & raw corpora (maybe with labels)*

Corrective action: such distinction was operated in the displayed menu include in the final version of the IMT (see amendment #1)

6. CONCLUSION

Implementing the AI LL has required different sets of actions. The first action, which was prior to the formal starting of the AI LL, was to build a solid network of stakeholders. Although IntelComp is basically aimed at policymakers and policy representatives, the four components of the quadruple helix (i.e., Public Administration, Academia, the business sector, and civil society) were represented, thus illustrating the inclusive approach of IntelComp.

The AI LL has intended to provide evidence on the Spanish AI ecosystem, emphasising the eventual weaknesses and strengths with respect to the European case. Besides, the AI LL was envisaged to serve as a useful instrument to meet the main Spanish strategic policy guidelines in AI.

In order to do so, a varied array of activities have been organised to both showcase the different IntelComp tools to the stakeholders and more importantly, to unleash co-creation dynamics. Co-creation has been conceived to be deployed internally, that is, involving members of the IntelComp consortium, and externally, that is, with stakeholders. Internal co-creation has taken place through several activities held jointly between the AI LL and the technical team. External co-creation was provided through the events organised *ad hoc*, but also through informal and tacit meetings and encounters.

Some relevant takeaways can be drawn from the implementation of the AI LL that capture the feedback obtained from the stakeholders, not only during the meetings and workshops organised but also from other contact forms (i.e. email or phone calls). They can be summarised in the following messages:

- The stakeholders involved have demonstrated **a strong interest in the practical implementation of AI tools** in the events carried out, as it **helped clarify the rationale and full potential of the IntelComp platform**.
- Conveying the **comprehensive nature of the platform and the interactions generated between the various integrating tools** to the stakeholders was a significant challenge, as usually the stakeholders did not fully understand what the purpose of every IntelComp tool is and how they interacted. Organising events dedicated to a specific tool enabled a more focused approach, but its downside meant losing the integral perspective of the project. Ultimately, the balance between the two approaches led to a successful interaction.
- The stakeholders also agreed on **the importance of feeding the platform with new databases** in order to obtain high-value-added insights. There were also concerns about the **stability of the sources providing the data**, as the sources are ever-changing, and this could eventually affect the utility of the platform.
- The stakeholders asked about the **possibility (and convenience) of spreading the platform to other European countries**, apart from the ones (i.e., Spain, France, and Greece) where the use cases are based. It should be noted that IntelComp is a European project and is not anchored on countries. Thus, the three use cases are just “particular landings” of the project in three different STI fields and for three European countries.

- The **trustworthiness of the platform**, as well as the **ethical issues**, attracted attention and interest from the stakeholders. The issue was raised as the AI LL is aimed at picturing the STI ecosystem, and it could imply identifying individual nodes of the system (e.g. “a salient figure in the deep learning field”) in order to optimise policymaking. Nevertheless, the IntelComp approach is more on policy cycle aspects and feeds on aggregate information. Besides, the approach of the AI LL has geared towards more global and integral aspects on AI to facilitate Spain-EU comparison. Finally, the databases that are ingested in IntelComp are fundamentally open based, which means that they can be accessed by anyone who is willing to do so.
- **Intelcomp itself has been a co-created project**, in the sense that the final development of tools and functionalities has been the result of decisions and agreement made during its course, and therefore, it **allowed the consortium to pivot on some preconceived ideas** and approaches. This implied that **detecting the initial expectations of the stakeholders regarding the project has been rather challenging**, because its outlines have been gradually nuanced over time.
- The AI LL events that involved engaging stakeholders to get feedback on Intelcomp tools (i.e., IMT & STI Viewer, as well as the AI Survey in the STI Participation Portal), showcased **such tools in advanced stage of completion**, resulting in contributions of the stakeholders that were not aligned with modifications in the functionalities of the tools, but with more general questions on, for example, how the tools are connected, what their main objectives are, or how the sustainability is foreseen (see next bullet).
- **Internal sprints** have turned out to be a **powerful & useful co-creation activity** to streamline and optimise platform tools. Besides, it was an important activity to strengthen ties between the AI LL and the technical team.
- A relevant concern of the stakeholders had to do with the **sustainability of the platform and the possibility of joining it to undertake further developments** using the tools already available. This concern was critical during the first events (especially at the kick-off event). In this respect, it should be emphasised that most components of IntelComp are made *open access* (e.g. at GitHub). This enables modularity, in the sense that anyone interested could select the component(s) required without having to select the whole IntelComp suite. Thus, organisations willing to make use of IntelComp tools, if they wish, could work along with IntelComp partners to design new services or functionalities according to their own and diverse needs.
- The **AI Survey** that has been created to give full meaning to and exploit the potential of the STI Participation Portal is a **useful tool to capture the needs, concerns, and aspirations of civil society** in AI, and connect them to policymakers/policy representatives in an agile and fluid way (through the STI Viewer).
- **SEDIA**, as the entity commissioned to undertake the AI LL and having been included in the Language Modelling Initiative to be led by the BSC-CNS, is committed to the sustainability of selected tools of IntelComp once the project has finished.

ANNEXES

1. INVITATION TEXT FOR AI LL EVENTS

() Only reported in English*

Kick off event (October 24th, 2022)

Dear Sir / Madam, thank you very much for becoming an IntelComp stakeholder. We are pleased to invite you to the AI living lab kick-off event, which is to be held on **October 24, 2022, from 9:30h to 13:00h** at the Spanish Foundation for Science and Technology (FECYT). As the event is hybrid, you may choose between in-person participation at FECYT (**MUNCYT Building - Pintor Murillo, 15 - Alcobendas-Madrid**) or online participation through Microsoft Teams. Please consider that, in case of in-person participation, registration should be completed as soon as possible (first come-first serve principle), but no later than Oct. 16.

[Draft Agenda]

To register, please fill in the form at the IntelComp website: <https://IntelComp.eu/kick-off-living-lab-ia> indicating whether your participation will be in-person or online. In-person participation has the advantage of enjoying a networking space around a coffee at the end of the session, from 12:30 to 13:00. After registration, you will receive a confirmation email.

We remain at your disposal to answer any questions or queries you may have and look forward to seeing you at this interesting kick-off event.

Best regards,

SEDIA IntelComp Team

IMT event (June 6th, 2023)

Dear [IntelComp](#) stakeholder, It has been a few months since the kick-off event of the Artificial Intelligence Living Lab, led by the Spanish State Secretariat for Digitisation and Artificial Intelligence. During this time, the IntelComp team has been working intensively to advance the most significant tools of the IntelComp platform. One of these tools, which may be considered the heart of the platform, is the so-called Interactive Model Trainer (IMT, hereinafter). IMT is a tool specifically designed for the training of Artificial Intelligence models, allowing a user-in-the-loop approach that embeds the knowledge of experts in specific domains into the models. The use of IMT as part of the work of the living labs is basically connected to the selection of subsets of documents of interest, as well as the thematic characterisation of the selected documents.

In this context, and as an IntelComp stakeholder, we are pleased to invite you to an **online event** that will be held on **June 6, from 10:00 am to 12:00 pm**. The objective of the event is twofold: on the one hand, to share the main IMT functionalities, and, on the other hand, to spur a space of interaction in which the IntelComp stakeholders will play a role in streamlining the final IMT functionalities for the AI living lab.

The online session is open to all IntelComp stakeholders, whether they come from the academic, private, public, or civil society sectors. The final agenda of the event will be shared shortly.

This online event is the prelude to one or two face-to-face sessions that will take place at the Spanish Foundation for Science and Technology (FECYT) in June. These sessions will be voluntary, and those IntelComp stakeholders willing to do so will be able to experiment with the IMT and carry out model training.

To register, please fill out the following form: (<https://IntelComp.eu/ai-living-lab-IMT-workshop>). After registering, you will receive a confirmation email.

We remain at your disposal to answer any questions or doubts you may have regarding the event.

Best regards,

SEDIA-IntelComp team

STI Viewer event (September 27th, 2023)

Dear [IntelComp](#) stakeholder, we are delighted to invite you to the presentation of IntelComp's tool STI Viewer applied to the AI domain next **September 27th**. STI Viewer is an interactive AI-based data and visualisation platform for monitoring, evaluation, and policymaking. STI Viewer is built around a set of well-documented, reliable, and timely indicators that can be broken down into multiple dimensions for in-depth analysis. Indeed, It is a tool that can be very useful for public policymakers focused on AI.

The presentation will take place from **10h to 11:30h** in a hybrid format (face-to-face / online), being able to attend, if you wish, in person at the Spanish Foundation for Science and Technology (**FECYT**-C/ Pintor Murillo, 15 - 28100 Alcobendas-Madrid), or follow it online through Microsoft Teams.

To register, you must access the following form: <https://IntelComp.eu/form/artificial-intelligence-sti>, indicating whether your participation will be in person or online. In-person participation will have the advantage of enjoying a networking space around a coffee at the end of the session, from 11:00 to 11:30. After registration, you will receive a confirmation email.

We remain at your disposal to answer whatever questions or doubts you may have regarding the event.

Best regards,

Final AI LL event (November 27th, 2023)

Dear [IntelComp](#) stakeholder, we are delighted to invite you to the **closing event of the Artificial Intelligence Living Lab (AI LL) of the IntelComp project**, on **November 27th**. This final meeting presents a great opportunity to get acquainted with all the activities that have been developed within the AI LL related to the project, to practically demonstrate some newly designed tools (such as the STI Participation Portal), and to assess the potential real-world applications of the IntelComp project shortly. For all these reasons, we believe that the event might be of interest to you.

The presentation will take place from **9.30 am to 11:30 am** in a hybrid format (in-person / online), You have the option to attend in-person at the Spanish Foundation for Science and Technology (FECYT - C/ Pintor Murillo, 15 - 28100 Alcobendas-Madrid) if you wish, or you can follow it online through Microsoft Teams.

To register, you must access the following form: <https://IntelComp.eu/final-event-ai-living-lab>, indicating whether your participation will be in-person or online. In-person participation will have the advantage of enjoying a **networking space around a coffee at the end of the session, from 11:30 am to 12:00 pm**. After registration, you will receive a confirmation email and instructions on how to join the event if you choose to participate remotely.

We remain at your disposal to answer whatever questions or doubts you may have regarding the event.

Warm regards,

SEDIA-IntelComp Team

2. AI LL SURVEY

GOAL:

- The goal of the survey is to support evidence-based policymaking, by allowing STI policymakers to comprehend public opinions (not to help us design the IntelComp tools).

TARGET AUDIENCE:

- Third sector (see question A2) (More than one delegate will be able to complete the survey)
- Participation in the survey is by invitation only; it is not available to everyone.
- LL Leads will invite specific stakeholders to fill in the survey

SURVEY EXPLOITATION:

- The survey will be integrated into the IntelComp platform
- The responses to the survey will be sent directly to STI policymakers

QUESTIONS FORMAT:

- Some questions are based on the STI Viewer graphs, and some others are open
- Both general questions for everyone and customised for specific NGOs
- Graphs from the STI Viewer are integrated into the survey

Part A: Demographics

A1: In which country is your organisation based?

[multiple choice – all countries in the world]

A2: Which stakeholder group(s) would you attribute yourself to?

[multiple choice]

- NGO/CSO
- Professional association
- Advocacy group
- Think tank
- Foundation
- Social Enterprise
- Other _____

A3: What is your current position?

[open]

A4: What is the name of your organisation?

[Open question]

A5: How many employees (headcount) are working in your organisation?

[multiple choice]

- 1-9
- 10-49
- 50-249
- 250-999
- 1000+

A6: How long have you been in your current position?

[multiple choice]

- Less than six months
- Six months to less than two years
- Two years to less than five years
- Five years or more

A7: What are your organisation's priorities regarding artificial intelligence? (more than one answer is allowed)

- Ethics and responsible AI

- Policy and regulation
- AI and social impact
- AI safety and security
- Promotion of AI skills & and education
- AI and healthcare
- AI and environment
- AI in Government
- AI and innovation
- Other _____

Part B: General

B1: How interested is your organisation in Science-Technology-Innovation (STI) policymaking?
Please give us your opinion using a score from 1 (NOT INTERESTED AT ALL) to 10 (VERY INTERESTED).

[1-10 scale]

B2a: How do you keep track of STI policy-making updates? (more than one answer is allowed)

- Monitoring Government Websites
- Engaging in Stakeholder Consultations
- Networking and Partnerships
- Subscribing to Newsletters and Publications
- Monitoring Legislative Processes
- Engaging with International Organisations
- Building Relationships with Policy Makers
- Other _____

B2b: How do you keep track of STI updates? (more than one answer is allowed)

- Research and Analysis
- Collaboration and Partnerships
- Networking
- Engaging with Experts and Professionals
- Monitoring News and Publications
- Engaging with Policy Processes
- Engaging with International Organisations
- Monitoring Funding Opportunities
- Other _____

B3: Is there any stream of communication between your organisation and STI policymakers?

Yes/No/Not sure

If they answered “yes” in B3

B4: What are these channels? (more than one answer is allowed)

- Public consultations
- Stakeholder meetings
- Citizen panels
- Online platforms
- Other_____

B5: Please list the forums that you are familiar with.

[open-ended question]

B6: How frequently do they occur?

[multiple choice]

- Once per month
- Once every 3 months
- 2 times per year
- Once per year
- Other_____

B7: Have you ever participated in any of these forums?

Yes/No

If they answered “yes” in B7

B8: Do you think your opinion was taken into consideration in the policymaking?

Yes/No

B9: What would you like to be different in these forums?

[open-ended question]

If they answered “no” in B7

B8: Why did you not participate?

[open-ended question]

B9: What would you like to be different in these forums?

[open-ended question]

----- end-----

If they answered “no” or “not sure” in B3

B4: Do you believe that policymakers should consider scientific results in the decision-making process? Please give us your opinion using a score from 1 (I DO NOT AGREE) to 10 (I STRONGLY AGREE).

[1-10 scale]

B5: Would you like to have an open stream of communication with the STI Policymakers?

Yes/No

B6: What channels would you like this open stream to be? (more than one answer is allowed)

- Public consultations
- Stakeholder meetings
- Citizen panels
- Online platforms
- Other_____

B7: How frequently would you like them to occur? [multiple choice]

- Once per month
- Once every 3 months
- 2 times per year
- Once per year
- Other_____

B8: Would you like to monitor the consideration of your feedback in the policy-making process? If yes, how?

[open-ended question]

B9: Would you consider taking a more active role in this process, such as feeding a citizens' observatory with the community view?

[open-ended question]

-----end-----

B10: What implementation level of STI policies are you more interested in (regional, national, or European? Please, score from 1 to 5, with being 1 the lowest interest and 5 being the highest.

Regional _____

National _____

European _____

Part C: AI-related STI Policymaking

C1: What, in your opinion, are the most crucial issues about the Science-Technology-Innovation policy-making process for AI in your country? Please select up to 3.

- R&D investment
- Regulatory Framework & intellectual Property Rights
- Public Awareness and Education
- Monitoring and evaluation
- Ethics and responsible AI
- Data governance and privacy
- International cooperation
- Access and inclusivity
- Economic and environmental impact
- National security and cybersecurity
- Support for start-ups and innovation
- Other _____

C2: How can the Third Sector collaborate with governments to guarantee the transparency and accountability of AI-related STI Policymaking? Please select up to three

- Advocacy and Public Awareness
- Monitoring and Research
- Policy Analysis and Recommendations
- Stakeholder engagement
- Capacity building
- Collaboration and Partnerships
- Independent Auditing and Verification
- Other _____

C3: What are, according to your experience, the most effective policy instruments and incentives for encouraging the development and adoption of AI? Please select up to three.

[checkbox]

- Research funding
- AI skills and education
- Regulatory frameworks and regulatory sandboxes
- Intellectual property protection
- Standards development and interoperability
- Tax incentives and credits
- Grants and prizes
- Public-private partnerships
- Public procurement of AI
- Data sharing incentives
- International agreements
- Green AI initiatives
- Ethical audits and impact assessment

- Other_____

C4: Could you cite some examples of the effective use of any of these instruments that have led to a substantial increase in AI investments?

[open-ended question]

C5: According to your experience, which prospective area of AI has the highest potential to change our lives? Please select up to three.

- Healthcare and medicine
- Autonomous vehicles
- Personalised Education
- Language translation and cross-cultural communication
- Accessibility and inclusion
- Virtual assistants and chatbots
- Smart homes and household assistance
- Personal Finance
- Other_____

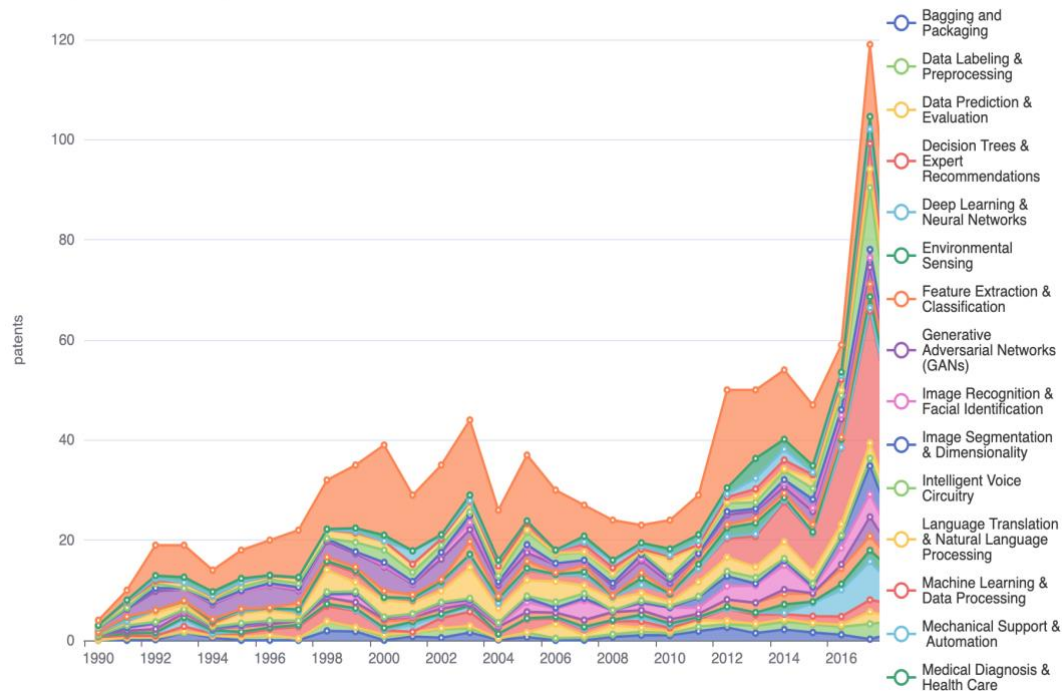
C6: According to your experience, which are the major threats attached to the development of AI? Please select up to three.

- Bias and discrimination
- Job displacement
- Security risks
- Lack of transparency
- Energy consumption
- Legal and regulatory challenges
- Privacy concerns
- Deepfakes and misinformation
- Killer robots
- Dependence and over-reliance on AI
- Other_____

C7: In the graph below, you see the trends in technology production in the AI domain in the EU. Is there something odd that draws your attention? Did you expect to see something different?

[open-ended question]

Share of patents in AI topics over time



(Substitute graph)

C7a: Which topic(s) of the former are you more familiar with?

#list the topics in the appearing order

C7b: Do you believe that technological production trends are in line with the societal challenges/needs in AI?

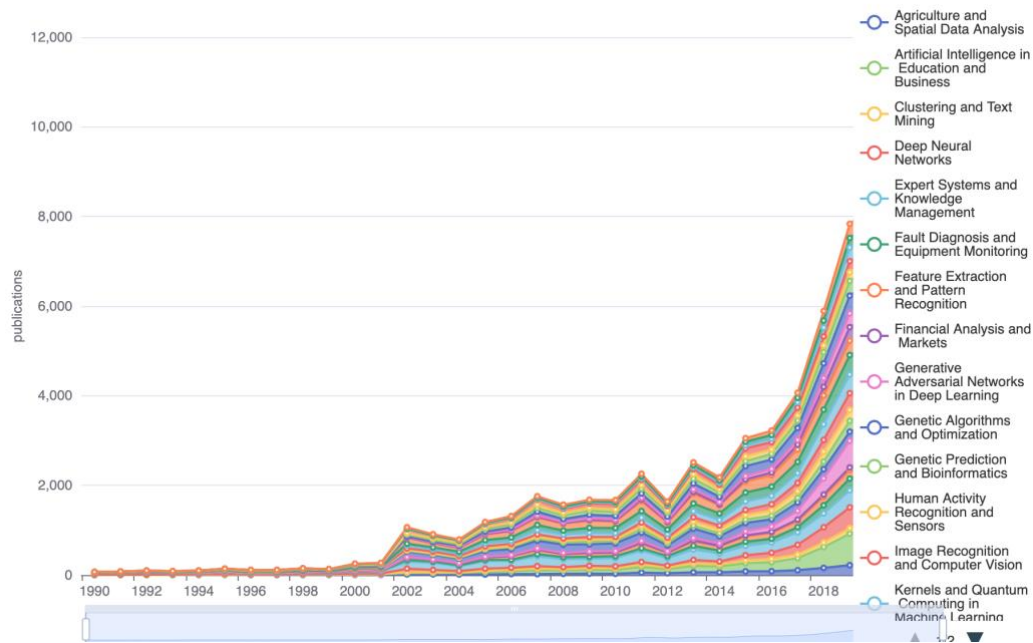
[open-ended question]

C7c: Do you believe, according to your experience, that technological production trends are in line with private investments in AI?

[open-ended question]

C8: Here is a graph that shows the evolution of publications on different topics in the AI domain in the EU over time.

Share of publications in AI topics over time



(Substitute graph)

C8a Considering your expertise, did you expect to see something different? Is there a specific topic that policymaking should focus on and why?

#list the topics as checkboxes

C8b: Is society ready for the implementation of the scientific trends, as presented in the graph?

[open-ended question]

C8c: Do you believe that scientific production is taking into consideration societal needs in AI?

[open-ended question]

C9: According to your experience, is technological development aligned with scientific research? If not, why?

[open-ended question]

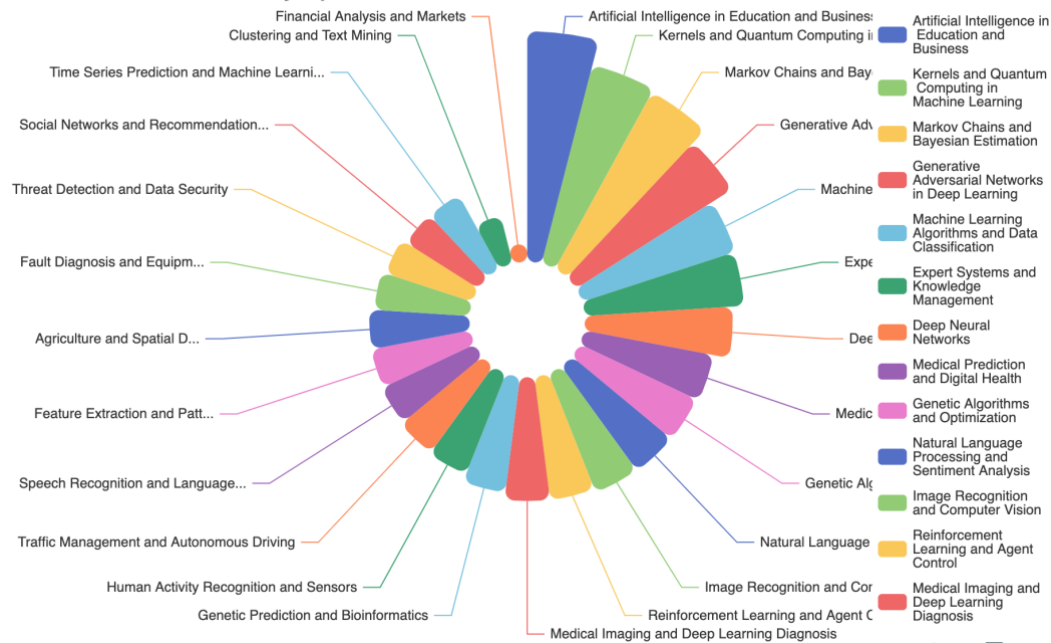
C10: On the topic of your expertise, do you have examples of successful AI-related collaborative initiatives between government agencies, non-profit organisations, and private sector partners?

[open-ended question]

C11: Here is a chart presenting the international collaborations by AI topic. Is there something else you would expect?

[open-ended question]

International collaborations by topic



(Substitute graph)