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INTEGER

INTERCONNECTING 4 HELIX INNOVATION ECOSYSTEMS IN EUROPEAN REGIONS

D4.3 INTEGER 4-H COLLABORATORY COMPREHENSIVE MODEL: ACADEMIC PAPERS ACCEPTED IN SCIENTIFIC PUBLICATIONS

Call and Topic: HORIZON-EIE-2022-CONNECT-01-02

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EXECUTIVE SUMMARY

The aim of this document is to describe the process of defining a comprehensive INTEGER 4-H Model within the new generation of living labs that the INTEGER project is piloting and experimenting with active and relevant actors from three European regions (Catalonia, Krakow and Hamburg).

The basic principles, structure, dimensions and content of the INTEGER 4-H Model have gone through a co-creation process that started with the project partners and was extended at the beginning of the project to key stakeholders from the quadruple helix spectrum, identified by the partners in the three European regions mentioned above. The engagement of these stakeholders resulted in greater involvement of some of them, as they volunteered to actively participate and share their systemic approach in several collaborative processes. The 4-H Model benefits from their in-depth knowledge, as well as their professional background and experience in the field of health and wellbeing.

The INTEGER 4-H Model went through an iterative procedure of co-creation, redefinition, testing and experimentation in real settings from the INTEGER 4-H Model event participatory and co-creation activities run on May 2023, through the Col·laborathons and other participatory and co-creation activities in and across the three European regions.

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SYMBOLS, ABBREVIATIONS AND ACRONYMS

4-H	Quadruple Helix (Academia, Business, Civil Society and Public Administration)
D	Deliverable
EU	European Union
INTEGER	Interconnecting 4 Helix Innovation Ecosystems in European Regions
NGO	Non-Governmental Organisation
SDGs	Sustainable Development Goals
T	Task
UN	United Nations
WP	Work Package

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1 INTRODUCTION

The comprehensive INTEGER 4-H collaboratory Model has been developed through the 2-year Horizon Europe project INTEGER (Interconnecting 4 Helix Innovation Ecosystems in European Regions) funded under the Call for Proposals: HORIZON-EIE-2022-CONNECT-01.

The INTEGER project is based on the implementation of a quadruple helix community approach that involves existing knowledge, emerging initiatives and ongoing projects, mainly focused on the field of health and well-being.

Through the actions carried out during the project, INTEGER proposes a systemic process that facilitates the co-creation of solutions among the actors of the quadruple helix, in response to the challenges identified at regional level.

In Europe, many initiatives are being promoted in order to innovate, however, some of these innovations do not reach the market. Therefore, the need to create a different INTEGER 4-H Model of an innovative ecosystem emerges. In this sense, users/consumers are being involved, but without much success. Currently, there are many different types of labs innovating, however, they lack the linkages/networks and it is difficult to evaluate quality social impact in a short term. The proposed Model aims to contribute to changing this situation by providing structure and a methodology beyond the 2-year project duration. This INTEGER 4-H Model is characterised by being scalable, flexible and adaptable.

This deliverable is linked with the previous deliverable D4.1 First Draft of Comprehensive 3H and 4-H Integration Innovation Ecosystems INTEGER 4-H Model as it is the continuation of the collaborative and iterative process of defining, designing and creating the final INTEGER 4-H Model proposal.

The deliverable is structured as follows: after a section referred to the process followed to design the model, the model itself is presented. Then it follows a section regarding the platform, and then the conclusions are provided.

2 PROCESS FOLLOWED TO DESIGN AND DEFINE THE INTEGER 4-H MODEL

2.1. Basic principles of the INTEGER 4-H Model

INTEGER is based on the urgent need to accelerate a third *social transition*, following the *green* and *digital transitions* which are more widely recognised by the international community. Innovation, or a double transition led by European industry aiming for climate neutrality and digital leadership, cannot be supported without strong, responsive and responsible social and environmental engagement. A triple transition must be firmly rooted in worthwhile human development, underpinned by the Sustainable Development Goals (SDGs) (United Nations, 2024). A basic principle of the INTEGER 4-H Model is that none of these transitions can stand alone and/or in isolation; they must all be intertwined around the notion of (more, stronger, and more determined) just transition (Caro-Gonzalez, 2023).

This second phase builds on the proposal presented in the deliverable D4.1 First Draft of Comprehensive 3H and 4-H Integration Innovation Ecosystems model based on the first phase. This deliverable was submitted at the end of January 2024 and approved in early March 2024.

In figure 1, the representation of the process over time is shown.



Figure 1. Representation of the whole process over time

In order to elaborate the final proposal of the INTEGER 4-H Model, we started from the version of the INTEGER 4-H Model presented in the deliverable mentioned above, which is the following one (Figure 2):

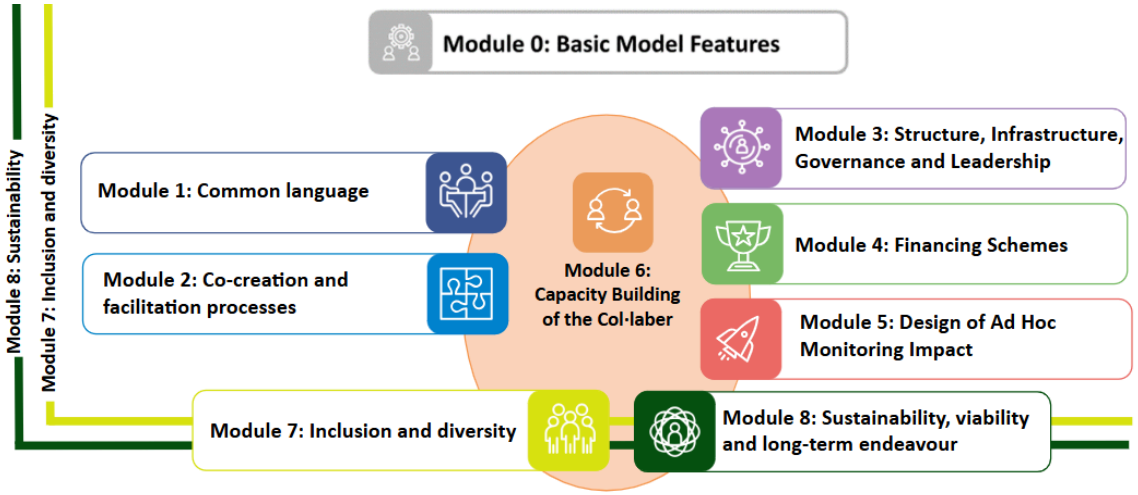


Figure 2. First draft of the model (Jan 2024)

Based on this, the i2CAT team made first a double internal review of the draft INTEGER 4-H Model and the content of each of the 9 modules initially proposed. Some adjustments were made and several points were modified, while concepts and structure have been clarified.

From here on, it was agreed to hold 3 focus groups between April and June 2024 in order to develop the final 4-H Model, as shown in table 1:

Name	Participants	Number of participants	Date
Focus Group 1 (FG1)	Partners	12	17th of April 2024
Focus Group 2 (FG2)	Stakeholders	16	27th of May 2024
Focus Group 3 (FG3)	Driving group	4	6th of June 2024

Table 1. General characteristics of the focus groups for the final proposal

The whole process has been incremental. That is, FG1 worked from the version generated in January 2024; FG2 worked from the version generated after FG1, and finally, FG3 worked from the version generated after FG2. Each of these sessions was done online through the Zoom platform and using the Mural tool to work collaboratively.

2.2. Focus Group 1 (FG1): Partners

This first focus group was conducted online for an hour and a half with the attendance and participation of INTEGER's partners. Prior to the focus group, a PPT document with the summarised INTEGER 4-H Model was shared with the invited actors.

During the online focus group and in order to allow the participating partners to provide their proposals, as well as comments and ideas for adjustments, the Mural tool was used to review the overall concept of the INTEGER 4-H Model and each of the previously presented modules (See figure 3).

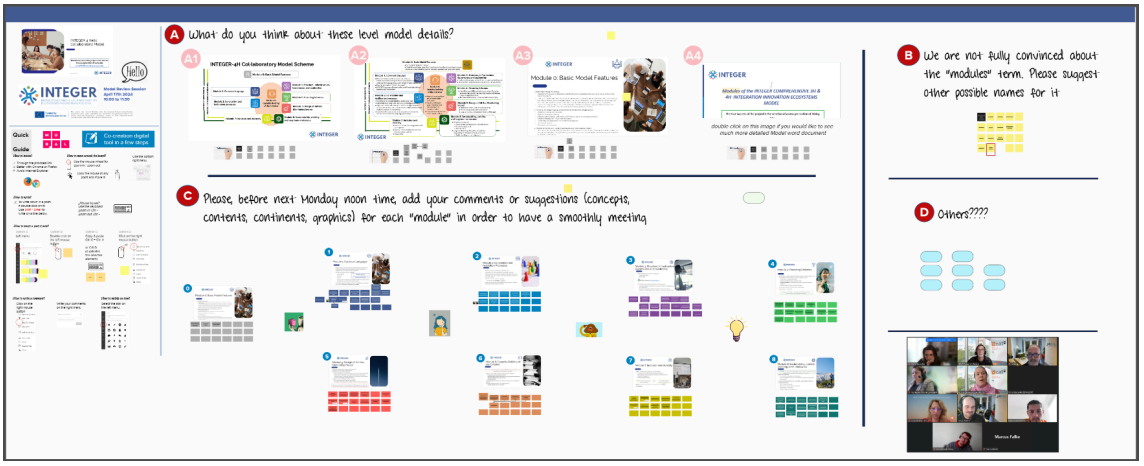


Figure 3. Screenshot of the Mural of Focus Group 1

In fact, at the beginning of this second focus group, it was discussed how to name each of the parts of the INTEGER 4-H Model , since up to that moment they were called “modules” and it was perceived that this term created a lot of confusion and doubts in relation to the word “model”. After discussing different proposals from the participants, it was agreed to use the term “unit” for each of the parts of the INTEGER 4-H Model . Subsequently, each “unit” was discussed in order to define it as precisely as possible.

2.3. Focus Group 2 (FG2): Stakeholders

In the framework of the update of the new INTEGER 4-H Model , key stakeholders from two European regions (Hamburg and Krakow) were invited to present them the INTEGER 4-H Model and to study their new suggestions and proposals. This session was very interesting as the profiles of the participants were different in terms of professional background, geographical location and belonging to a helix. Again, the session took place online and lasted approximately one and a half hours.

On this occasion, the collaborative Mural digital tool was used again, which was really useful for this type of work, with all the updated content from the previous focus group (See figure 4).

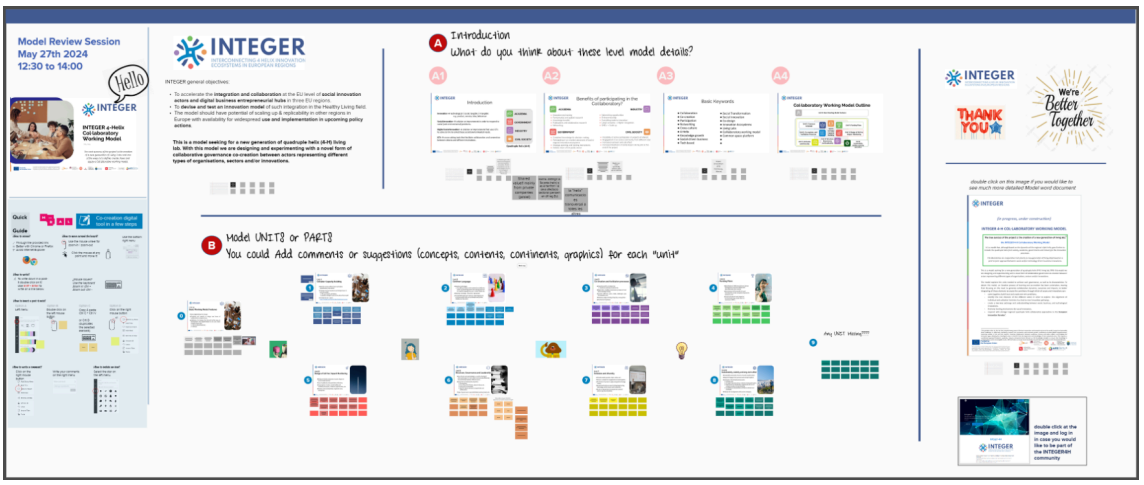


Figure 4. Screenshot of the Mural of Focus Group 2

2.4. Focus group 3 (FG3): Driving Group

As no key actors from the Catalonia region participated in focus group 2, another focus group was organised a few days later, a new meeting between i2CAT and Catalan key actors who used to participate in previous INTEGER activities at regional and international level. The process was again the same regarding the use of Mural and using the INTEGER 4-H Model version obtained from the last co-creation session with the Hamburg and Krakow regions. All their contributions and comments helped us to adjust and improve the current INTEGER 4-H Model document.

Finally, a final internal review was carried out by the i2CAT Foundation, specifically by the research and innovation area of Digital Society Technologies (DST) in order to generate the final version of the INTEGER 4-H Collaboratory Comprehensive Model.

2.5. Data Analysis Approach

Once the three focus groups were done, the data collected was ready to be analysed. This process followed the Sutton and Austin (2015) study that suggests that there are four main phases, which are *transcription* (of the virtual sticky notes), *interpretation*, *coding* (identification of issues, themes, similarities and differences), and *thematization* of the data to present coherent, faithful and meaningful conclusions (Elo and Kyngäs, 2008). All this process was reviewed by three different researchers from i2CAT Foundation.

2.6. Work Plan and key events to build the INTEGER 4-H Comprehensive Model

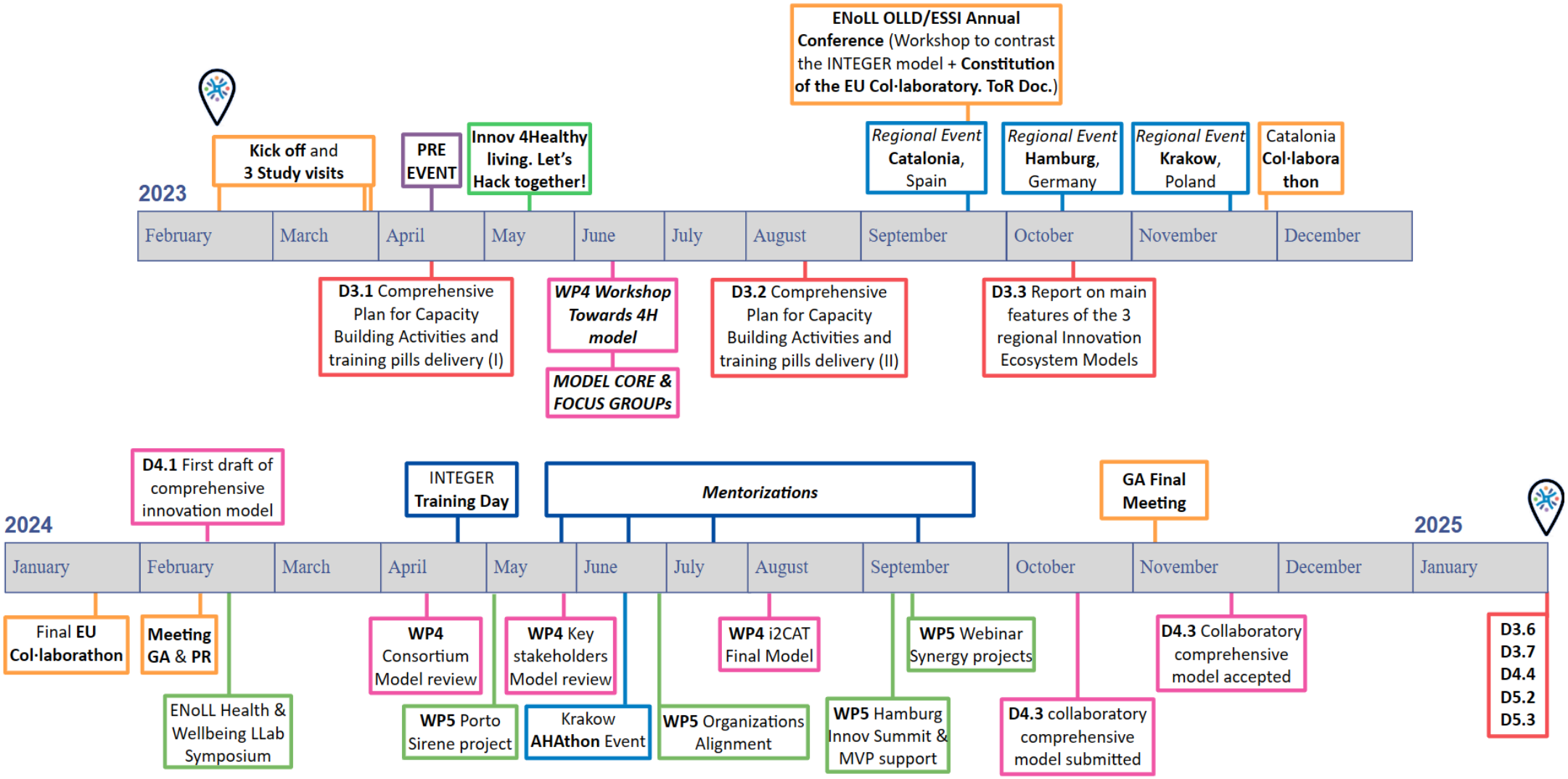


Figure 5. Work Plan and key events related to the definition of the Model

3 INTEGER 4-H COLLABORATORY COMPREHENSIVE MODEL

After a thorough analysis of the characteristics, key events and focus group sessions, the final INTEGER 4-H Model was refined and defined. This achievement represents an important milestone in the development of this project, highlighting our commitment to excellence and the delivery of a final INTEGER 4-H Model that meets the expectations and requirements set.

3.1 INTEGER 4-H Model description

The Quadruple Helix (4-H) model of innovation and development dynamics (Carayannis and Campbell, 2009) is based on the Triple Helix (3-H) model (Etzkowitz and Leydesdorff, 1995). This suggests that innovation occurs within three main helixes: *Government*, *Academia* and *Industry*, which includes both individuals and groups. However, the 4-H model also adds some additional elements:

- The main novelty is that it includes a fourth group of actors (the fourth helix), which is made up of *social actors* (NGOs, foundations, citizen associations, and individual citizens).
- New ideas are treated as a combination of existing ones derived from previous research and/or collaborative/competitive efforts.
- The focus is on how knowledge is transferred from one generation to another so that new ideas emerge.
- Convergence does not occur spontaneously. It is the result of intense collaboration and participation of the actors through intense interdependent activities such as cooperative learning or exchange programs between academia and industry (Aggarwal and Sindakis, 2022).

3.2 The importance of effective communication

Communication between people in a social (or organisational) group is a key element for an innovation to be disseminated (Rogers, 2003). It is important to note that exchanging information alone does not guarantee effective communication. According to the American Psychological Association (APA), effective communication also requires different collaborative skills. It is crucial that all individuals in the group need to understand the objectives, outcomes and benefits of the project or initiative for communication to be effective (and successful) (Frank Cervone, 2014). Through effective communication, interpersonal bonds can be strengthened, trust and respect can be increased, and teamwork can be improved, among other things.

Some examples of effective communication can be found between patients and healthcare systems (specially in the patient-doctor relationship), which is important, for example, when delivering healthcare (Ratna, 2019). However, user-developer communication will not always

ensure that the resulting system will be designed to meet users' needs and will be accepted by them (Gallivan and Keil, 2003). Thus, the user (consumer or adopter) perspective (their specificities and capacities) should be included clearly when social innovations are designed (Hölsgens, 2022). This can work through user-centred design which is an iterative process in which designers focus on users and their needs at every stage of the process, involving them through various techniques, in order to create highly usable and accessible products for them. Our research work includes this type of design within the focus groups.

3.3 The Col·laber and its role as a facilitator

The role of the Col·laber (commonly known as "facilitator") is fundamental in order to promote and guide the collaboration and active participation of the different actors of the 4-H. It includes accompanying and providing support during the co-creation process and stimulating the generation of synergies and collaborations in order to ensure the achievement of the established objectives. It is the task of the Col·laber to determine the interests and needs of the actors so that the co-creation process addresses a win-win strategy.

It is very important to keep in mind that they should be aware of the ecosystem in which they are working and, in addition, they should facilitate the internal and external connection of the ecosystem, moving from bilateral to mutual and multi-level connections. Therefore, trust is essential to build the Col·laber's work, because they must be very close to the stakeholders and have a good knowledge of their interests, activities and possible areas of action. Moreover, Col·labers must be able to communicate at all times and show the benefits of generating dynamics, as a win-win principle that makes all parties benefit from the process.

In this project, emphasis has been put on the training of Col·labers so that they can dynamise and support co-creative activities through inspiring content, follow-up discussions, definition of new groups and initiatives, or the creation of the right environment for people to exchange and trust each other, offering tools to move forward together to a better understanding of concepts and vision (roadmap, brainstorming). For example, in April a targeted training[1] took place under the title "The Col·laber Training Day".

Finally, tailor-made training pills for Col·labers have been created to transfer targeted knowledge on the INTEGER project and innovation to the focus groups or within other activities among the INTEGER community. As a summary of all developed materials to specify the role of the Col·laber, the *Collaber's and Facilitator's corner*[2] has been created on the platform as a resource to explore new ways of fostering synergies and collaboration.

[1] The Col·laber Training Day
[2] Col·laber's and Facilitator's corner (4-H)

3.4 Propositions

Propositions form the basis of scientific research (Avan and White, 2001). A research proposition is a statement about concepts that can be judged as true or false if it refers to observable phenomena. Thus, a proposition is a tentative and conjectural relationship between constructs that is stated declaratively. The validity of a research study is assessed, to a large extent, according to the criteria of its propositions.

Two propositions are established before presenting the model and are detailed below.

3.4.1 Setting up the Environment for the Community to Exist

It is a challenge to engage the key actors. For this purpose, creating a social network, collaborating, and partnering are crucial factors (Berkhout et al., 2010) as they involve the end-user (Weber et al., 1999). A supportive environment or space is needed in which individuals from different helixes interrelate and reflect, individually and together, on their interests and potential challenges in which they can engage with their resources to develop a groupal solution. Therefore, it is decisive to organise meetings with local actors or agents and build a community (eventually becoming a Living Lab) in which they can raise challenges and work on them together. To do this, it is required that a government institution commits to structural change or to the creation of a new ecosystem. In this context, the mentioned col·labers (in their role as facilitators) are needed to plan, guide and manage meetings between community members to ensure that goals are identified and achieved. In addition, it is important to differentiate the role of the facilitating col·labers (as community guide, companion and support) from the roles of the project managers or the responsible persons. During the project and its processes, these different profiles are required separately.

Proposition 1: *The environmental setting requires the representation of individuals from the Quadruple Helix, in which there is a governmental institution that supports and promotes the projects that emerge from the collaborative processes and facilitating* col·labers *that accompany the community throughout the process.*

3.4.2 Effective Communication: Key to Purposeful Outcomes

A community is born out of networking between actors from the different helixes and the presence of homophily (McPherson et al., 2001), understood as common values or interests. This requires spaces in which thinking and sharing ideas and perspectives are promoted (Arnkil et al., 2010; Bryson et al., 2006). Trust must also be built for communication to be effective (Frank Cervone, 2014) among members of the community. The different community actors reflect separately and pool, discuss and negotiate to reach agreements. The role of the col·laber as a facilitator is therefore key here. Everyone has their own interests, and it is necessary to reach a middle ground, a common language and challenge. In order to address

societal problems collaboratively, each one must be contributing from their own perspective to reach a collaborative and participatory solution or improvement through co-creation and co-design activities (Lopera-Molano and Lopera-Molano, 2020; O'Hern and Rindfleisch, 2017).

Proposition 2: *Communication between actors within the community needs to be effective to achieve the common purpose. The* Col·laber as a *facilitator needs to be objective and focused on the group process so that decisions are made, problems are solved and tasks are accomplished.*

3.5 Dimensions of the INTEGER 4-H Collaboratory Comprehensive Model

The final version of the INTEGER 4-H Collaboratory Comprehensive Model (see figure 6) is composed of 7 dimensions. These are:

- Dimension 1: Transferability
- Dimension 2: Collaboration
- Dimension 3: Financing
- Dimension 4: Evaluation
- Dimension 5: Management
- Dimension 6: Belonging
- Dimension 7: Sustainability

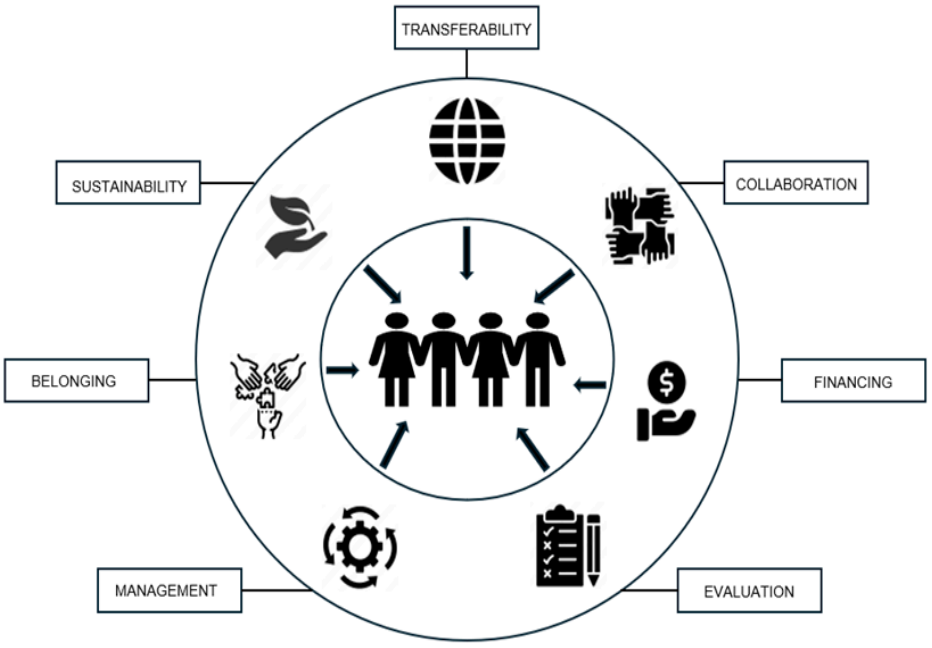


Figure 6. Dimensions of the INTEGER 4-H Collaboratory Comprehensive Model

3.5.1 Dimension 1: Transferability

This dimension refers to the replicability and/or scalability of the project/initiative. It describes whether the community could be expanded to cover new regions within the same or another country and even the possibility of starting a new independent community elsewhere. It also opens the door for a community to explore different topics of common interest.

Social innovation is the key to addressing today's problems and challenges in a systemic way. The basis of this systemic approach directly links problems to their causes and possible solutions. And nowadays, no one would think that these solutions do not include the use of technology to further enhance the impact that can be achieved. This is why we are committed to digital social innovation (DSI) in order to replicate and scale our model. If we have common and global objectives like the Sustainable Development Goals (SDGs), which can be addressed through DSI, it is because it can and should be done in a scalable and replicable way.

The current situation is paradoxical. People, citizens, have the power to innovate in the same way that companies used to do. Now they can do it thanks to the large number of tools they have at their disposal. This means that the power of innovation has infected all citizens of the world, there are no borders.

That is why the model that has been proposed and tested is based on these principles: everyone is a potential innovator. It only has to be adapted to the context of the place in the world DSI is applied.

It is in this special and specific environment that everything begins to happen. A challenge created jointly, taking into account the 4-H, because it will have been jointly identified. This description will already be marked with the particularity and specificity of the community. And this is the basis for co-creating and co-designing possible replicable and scalable solutions. Many challenges are global, and DSI innovation allows us to address them together, adapting them to the specificities of each community.

Through the actions carried out during the project, a systemic process has been established that facilitates the co-creation of solutions among 4-H actors in response to the challenges identified at community and regional level. As a result, this INTEGER 4-H Model is characterised by being scalable, flexible and adaptable.

3.5.2 Dimension 2: Collaboration

According to Berkhout et al. (2010) collaboration is a key factor for the setting up of the community. Moreover, participation is one of the essential points for co-creation, promoting dialogue, and the exchange of ideas. For this reason, col·labers (in their role as facilitators) must be in continuous search of new potential participants that attract new members to the community to make it as dynamic and inclusive as possible. Once the community has a good number of representatives and committed stakeholders, col·labers will be able to activate

dynamisation and content creation. Bridges need to be built between the different actors, as each of them has its own needs, knowledge and language. Each actor must make a transition to reach a common point for all. It is therefore essential to have a common language to meet, share, discuss and reach agreements. It is the col·laber´s role to accompany this process.

3.5.3 Dimension 3: Financing

Funding is a difficult dimension to discuss (Chronéer et al., 2019). It is crucial to identify funding that is aligned with common needs and interests. New ways of explaining the added value of social innovations and the need to finance them are needed. Although the trend is towards public funding, it is important to also identify funding from the private sector. To this end, the benefits of social innovation, beyond the economic ones, should be disseminated to private companies as well as the other helixes (e.g. Social Return On Investment).

In addition, it is important to point out that the initial/basic model on which INTEGER is based is the Col·laboratorI Catalunya. Consistent with Mazzucato (2011), Col·laboratori Catalunya is funded by the Catalan government, i.e. the public administration, and this actor is key to be able to support the project. Capital risk demands solutions in no more than 5 years, or even less at present.

Through participative activities, citizens should be involved in the debates together with the rest of the actors to discuss the key challenges to be addressed and to decide where some of the investment should be made. This is important and crucial, because behind this vision of public co-investment, it can be seen how public funding leads to wealth creation, i.e. new economic models: the commitment to cooperatives, social entrepreneurship, clusters that become living labs, etc.In other words, behind this model, we can see new forms of cooperation in a country or a region, and thus new territories and new social structures are created, which will lead us to new forms of a country's economy.

3.5.4 Dimension 4: Evaluation

Impact is a key factor for the successful and sustainable development of public funded proposals, which goes hand in hand with innovation, science, decision-making, and results. Considering and measuring the social impact/transformation that innovation might have once implemented is relevant (Ståhlbröst and Holst, 2013). Having a clear idea of the objectives of the challenge(s) to be worked on together, indicators must be designed to help carry out posterior evaluation. These indicators must be both quantitative and qualitative to have a diagnosis that is closer to reality. These indicators should be reviewed from time to time to make the appropriate modifications according to the evolution of the foreseen social innovation process.

3.5.5 Dimension 5: Management

The recommended type of governance is the "advisory board" type, in which all the helixes are represented with total renewal at a frequency of between 9 and 15 months approximately. Moreover, leadership is crucial too for the community to work together (Morgan et al., 2019). Possible theft of ideas, abuses and even imbalances between competitiveness and collaboration should be detected and cleared in time. Furthermore, to facilitate communication between actors, it is recommended to use the digital platform[3] and common tools, e.g. Mural, Google Drive, etc.

If co-creation is intended to generate interesting dynamics, it is important that there are different roles (Col·laber, project manager, etc.) within the ecosystem and that the people who occupy them vary, so that all the actors, at some point, can take a step forward and adapt to the different situations that arise throughout the process for the sake of the commonly expected results. Therefore, there is no fixed leadership. It is suggested to use participatory decision-making in which ecosystem actors are encouraged to share and/or participate in decision-making (Probst, 2005), either formally or informally (Cotton et al., 1988).

3.5.6 Dimension 6: Belonging

It is increasingly recognised that belonging plays a vital role in the healthy functioning of people in society (Allen, 2020). Welcoming is key to the emergence of a sense of community, where people feel that they are becoming part of a rewarding community that supports each other and recognises one another's value in the ecosystem. The community must be a meeting point in which all actors feel that they participate, regardless of their gender, age, academic and social background, origin, culture, etc. Therefore, all actors have the possibility to express themselves and interact respectfully. In addition, the digital platform should be accessible for people with physical and/or cognitive disabilities and/or a low level of digital literacy. This accessibility can be increased through tools such as https://www.equalweb.com/.

In this way, it is important to ensure that there is always a shared awareness that this is a win-win relationship, where all actors of the quadruple helix, in general, and community users, in particular, see and feel the benefits of belonging to a partnership and exchanging input at all times. The interest in participating should always be mutual, so that everyone wins, promoting greater engagement and attracting new stakeholders.

3.5.7 Dimension 7: Sustainability

Sustainable development meets the needs of the present without compromising the ability of the future generation to meet their own needs (International Institute for Sustainable Development). The community must be sustainable over time and this requires commitment, perseverance and participation among the different actors to ensure sustainable development. In addition, it is necessary to maintain the digital platform both technologically and in terms of

[3] Integer-4H

the activities and relationships that are created there. Finally, it is important to bear in mind that the community (and its potential challenges) may be influenced by the fact that they are not aligned with the political will of the moment. This dimension also indicates the flexibility of the INTEGER 4-H Model , being possible to replicate and adapt it in other regional contexts.

Although all the above dimensions interact with each other, there are some that are deeply related in terms of their specific actions and outcomes. The table below (Table 2) indicates which dimensions have this close relationship.

DIMENSIONS	Transferability	Collaboration	Financing	Evaluation	Management	Belonging	Sustainability
Transferability		✔	✔	✔		✔	✔
Collaboration	✔				✔	✔	✔
Financing	✔			✔			✔
Evaluation	✔		✔		✔		✔
Management	✔	✔		✔		✔	
Belonging	✔	✔			✔		✔
Sustainability	✔	✔	✔	✔		✔	

Table 2. Main interactions among the seven dimensions

One key aspect is management-transferability. Dynamics and co-creation processes should be adapted to the context (environment, people involved, type of administration (regional, local, etc.). Therefore, the management model can be transferred only if it is adapted according to the objective and the context.

4 SUBMISSION OF THE INTEGER 4-H MODEL TO A JOURNAL

On 21 October 2024, the article was submitted to the Technological Forecasting and Social Change (TFSC) journal for its interesting scope on the interrelating factors of technology, environment and society. Unfortunately, the article was rejected on 28 November 2024.

View Submission View Decision Letter Send E-mail	TFS-D-24-08144	Opening our Innovation Ecosystems to All: The INTEGER Project Case Study	Oct 21, 2024	Nov 28, 2024	Completed - Reject	Nov 28, 2024	Reject

Figure 7. Submission to the TFSC journal

For this reason, the article has been resubmitted to the Open Research Europe journal on the same day.

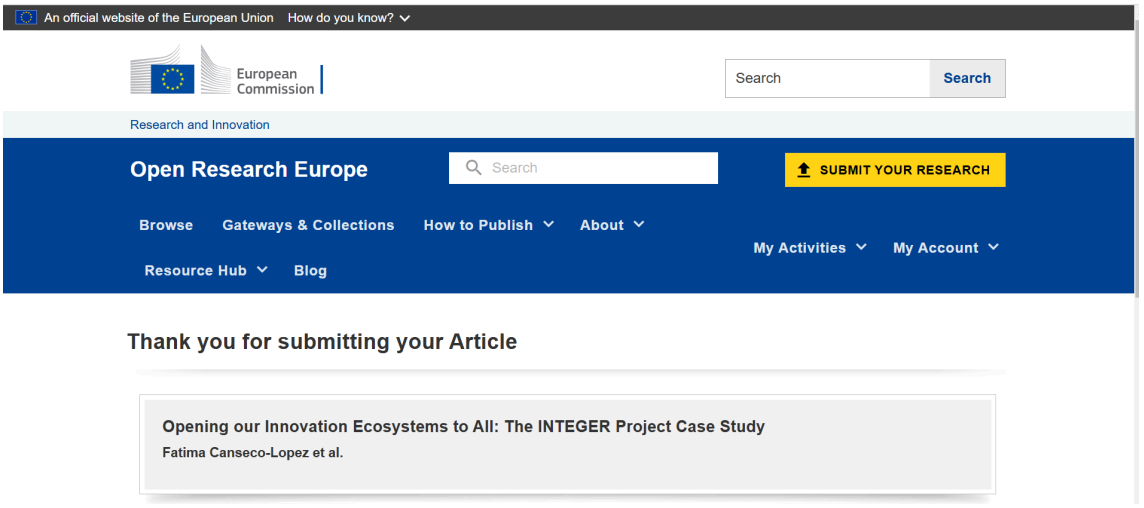


Figure 8. Current status of the document submitted to the Open Research Europe

As the article is not yet published, the following link (https://drive.google.com/file/d/1sW3wGXvfwXGdFQRQ1T3NiEbIDqwMp_sO/view?usp=sharing) is provided to access the version of the submitted article, which is still awaiting review and feedback.

5 THE PLATFORM

The real success of the project lies in the creation of new projects. In order to encourage the creation of these projects, it is essential, first of all, to establish a meeting point between the different actors involved. This step has already been created with the INTEGER 4-H platform. In order for the platform to fulfil the established purpose, it must have the following characteristics:

- Accessibility and user-friendliness
- Effective communication
- Sharing information and resources
- Project and task management
- Fostering creativity and innovation
- Data collection and proposal of solutions through artificial intelligence
- Security and privacy
- Monitoring and evaluation

The digital platform is one of the INTEGER 4-H community's tools to facilitate the implementation, development and achievement of the different dimensions of the collaborative model, to ensure interactions between participants and the strengthening of the community.

5.1 Events on the Platform

The EU-INTEGER Col·laboratory for Health and Wellbeing has the platform digital space[4] to co-create solutions by combining busi-techno-social innovations that respond to health and wellbeing challenges and needs identified by communities, regions, sectors on a European or global scale. The power of this EU-INTEGER Col·laboratory is to have the capacity to bring together commitments, needs, capacities and interests of different actors to solve identified problems that cannot be solved by an organisation, a helix, a sector... alone, given their complexity.

Within the platform, a specific section[5] has been created, so that potential connectors can access and collaborate with each other and use various training materials. The main objective is to facilitate and encourage active participation, guiding co-creation, fostering synergies, managing conflicts, and ensuring the achievement of the established objectives. The ability of the Col·laber to promote interaction, conflict resolution, and creativity proves is fundamental in the implementation of innovative projects. The main objective is to facilitate and promote collaboration and active participation of the different actors.

Individuals are encouraged to participate actively, beyond the INTEGER co-worker or manager to explore emerging methods that fit the evolution and needs of communities in the regions.

6 CONCLUSIONS

Throughout the INTEGER project, the importance of the co-creation process has been highlighted to shape a robust INTEGER 4-H Model in which effective communication processes between the four helixes, *academia*, *industry*, *government* and *civil society* are bi-directional in order to drive innovation. The essence of the INTEGER 4-H Model lies in active participation of all actors, promoting and prioritising synergies, facilitating iterative feedback loops that drive constant learning and presenting one's own perspectives to converge in the co-design of an agreed INTEGER 4-H Model.

Academic rigour, practical knowledge, policy considerations and a nuanced understanding of the citizens were all brought to bear in designing the INTEGER 4-H Model for more effective implementation, a more complete ecosystem perspective, the design of an integrative vision, and improved impact and sustainability. The dimensions of the INTEGER 4-H Model serve as a test bed for this complex mixtures of views, meticulously reflecting the collective knowledge and experience resulting from working together.

The nature of the co-creation process has enabled the INTEGER 4-H Model to be refined, ensuring that each dimension encapsulates the richness of these multifaceted perspectives. This adaptive approach, based on continuous learning from quadruple helix stakeholders, has been instrumental in creating an increasingly robust approach that reflects the real-world complexities inherent in socio-digital innovations. Importantly, the INTEGER 4-H Model is flexible and adaptable to the specific context of each 4-H ecosystem.

[4] Integer-4H platform
[5] Col·laber's and facilitator's corner

In essence, the co-creation process driven by the INTEGER project stands as a paradigm of collaborative innovation, demonstrating that collective intelligence drawn from diverse contexts, backgrounds and regional propellers leads to a more resilient, adaptive and effective model.

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