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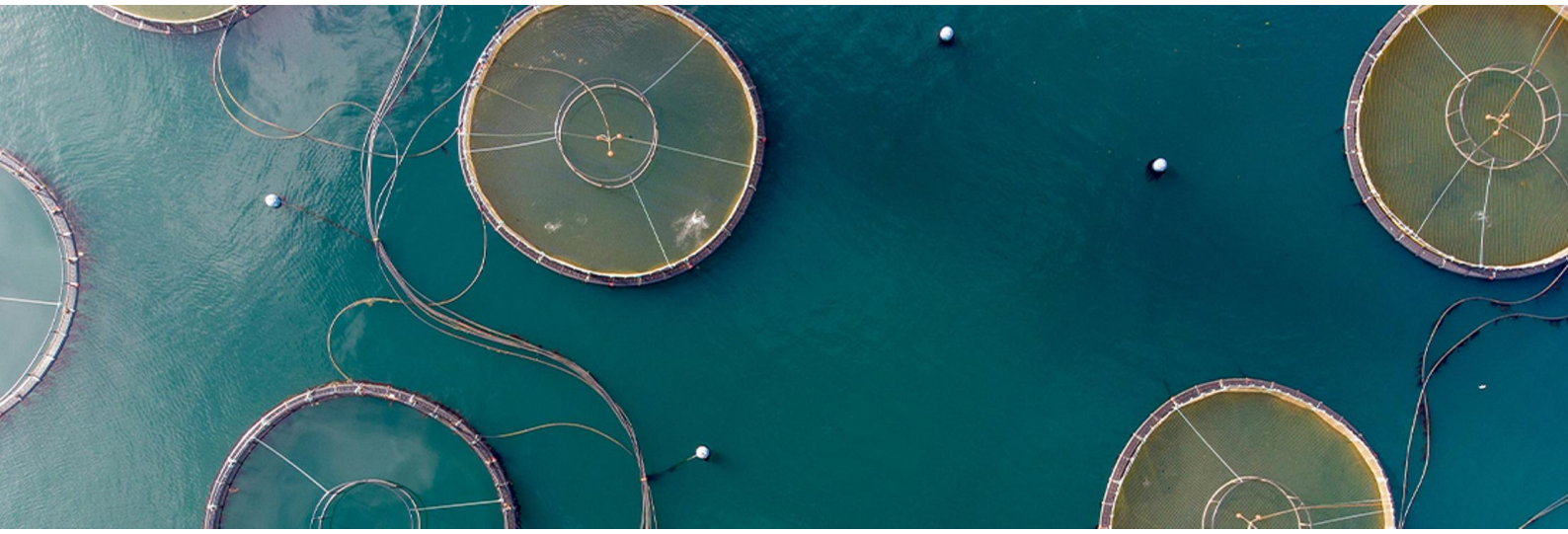

May 2024

Living Responsible Research Innovation Ecosystems (LiRRIE) methodology

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Deliverable ID

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ABBREVIATIONS

AZA Allocated Zones for Aquaculture

C-AZA Allocated Zones for Circular Aquaculture

CE Circular Economy

IMTA Integrated Multi-Trophic Aquaculture

KPIs Key Performance Indicators

LiRRIEs Living Responsible Research Innovation Ecosystems

PPs Project Partners

RAS Recirculating Aquaculture Systems

EXECUTIVE SUMMARY

In Euro-MED area, fisheries and aquaculture have been key socioeconomic drivers for millennia, providing livelihoods and being the Mediterranean diet's basis. Aquaculture is still key economic sector for the area, but faces many challenges, such as the lack of strategies for sustainable development and public sector's relevant low capacity; linear economy practices and business models that are traditionally used; complicated legal and licensing framework; the lack of dialogue between stakeholders; limited access to space.

The overarching challenge of sustainable aquaculture is jointly tackled in AZA4ICE project, specifically in close-to-coast and inland waters, where it has great potential for local economies and consumption system. AZA4ICE amplifies the transition to Inclusive and Circular Economy in the sector, implementing innovative ecosystem spatial planning approach embedded with circular practices-production systems in close-to-coast and inland waters. It brings together stakeholders of Quintuple-Helix (5-Helix) to increase their knowledge and skills, to exchange experience and collaborate in drafting their vision and Action Plan for sector's transition. This will result in filling the lack of dialogue and blunting conflicts of different uses, leading to new business opportunities and an eco-consciousness society. AZA4ICE aquaculture spatial planning approach, stakeholder engagement methodology and Action Plans are the main outputs to be used by public authorities, private sector and academia to benefit the whole society. AZA4ICE approach builds on partners' existing knowledge and engages 5-Helix actors increasing their capacity by exchanging cross boarder experiences.

With the ultimate scope of bringing together 5-Helix actors and engaging them in the project's activities, AZA4ICE develops a multi-level and multi-sectoral stakeholders' engagement methodology to be followed by projects partners to set up cooperation patterns, the ***Living Responsible Research Innovation Ecosystems (LiRRIEs)***. The methodology is built on BLUEfasma Living Lab methodology (BLUEfasma project) enriched with Responsible Research Innovation-RRI (European Commission) principles following RRI Roadmap (MARINA project). In this way, AZA4ICE goes beyond Living Lab (LL) focusing on co-creation and co-decision of involved stakeholders based on a common vision to be drafted at LiRRIEs beginning. The stakeholders-members of LiRRIEs will represent the 5-Helix (a.k.a. academia – industry - government - civil society - environment) and several sectors (e.g. tourism) due to the co-existence of aquaculture with other economic operations.

LiRRIEs goal is to bring together these stakeholders to co-create Allocated Zones for Circular Aquaculture (C-AZA) results, co-decide project Action Plans, increase their Circular Economy (CE) capacity and transnational collaboration/networking in the Euro-MED area and beyond.

AZA4ICE LiRRIEs will be the concrete innovative product of integrating Living Lab methodology and Responsible Research Innovation Roadmap. LiRRIEs cannot be efficiently realised by segmenting them at national/regional/local level. Axiomatically, they demand transnational exchange and cross-fertilization of knowledge to support stakeholders at local/regional level to co-create C-AZA results and co-decide on Action Plans' drafting. In particular, during a series of project's educational, training and mentoring events, AZA4ICE will achieve transferring of cross-border knowledge, know-how, expertise and validated common solutions (hardly achievable at local level); increasing 5-Helix CE capacity in aquaculture, and transnational collaboration and networking in the Euro-MED area and beyond in a long-term scope. For instance, public sector will increase its capacity in aquaculture areas' management and monitoring, and receive mentoring on circular aquaculture spatial planning; private sector's capacity on aquaculture circular practices and innovative circular production models will be increased receiving training/mentoring for new circular businesses and upgrading existing ones towards circularity; awareness campaigns will be launched to increase society's acceptance on aquaculture development in their area and trigger consumers' behavioral change on innovative aquaculture food. Project partners and stakeholders, benefiting from the generation of a systematized knowledge and creation of cooperative structures and transnational synergies in the framework of the LiRRIEs, will be transformed into a pool of actors working transnationally to reach critical mass for the common need to the transition to Inclusive and Circular Economy in aquaculture, multiplying Euro-MED efforts towards this direction.

1. INTRODUCTION

The present document is Deliverable 2.1.1, named ***LiRRIE methodology***. It consists of two main parts, Part I and Part II. The aim of Part I is to provide general understanding of Living Lab (LL) concept and Responsible Research and Innovation (RRI) principles, while Part II details the LiRRIE methodology describing step by step the approach for setting up the LiRRIEs in AZA4ICE project; thus guiding and supporting project partners in their relevant activities.

In Part I, the general understanding of Living Labs and Responsible Research Innovation - RRI concept is established by providing general description and definition of both terms. Regarding the Living Labs, by presenting different types, key components and principles of Living Lab environment, AZA4ICE partners will gain valuable background knowledge of Living Lab concept. Several valuable conclusions from studying existing Living Labs are introduced to partners and taken into knowledge while forming LiRRIE methodology. Concerning Responsible Research Innovation, the RRI Roadmap (MARINA project) is shortly presented, focusing on its transferrable principles and the achievements that can derived from its application. The background knowledge gained from Part I will assist partners to build LiRRIEs able to address their problems and opportunities throughout innovation process.

In Part II, the detailed methodology on setting up AZA4ICE LiRRIEs is presented. The set-up of LiRRIEs includes seven phases, each following several steps. The aim of each phase, the roles of the involved parties, the approach, the activities and the deliverables are described in concise way to efficiently guide partners throughout the establishment and the operationalisation of LiRRIEs.

Part I

2. WHAT IS A LIVING LAB (LL)?

2.1 LITERATURE REVIEW

The idea of Living Lab has a long history, going back in 1749 when the term “living laboratory” was first used by Knight, according to Tukiainen et al. (2015). Since then, the emergence of the contemporary Living Lab movement has been affected and shaped by numerous researchers and innovators (Ballon and Schuurman, 2015). In the modern context, Westerlund and Leminen have defined living labs as: "physical regions or virtual realities, or interaction spaces, in which stakeholders form public-private-people partnerships (4Ps) of companies, public agencies, universities, users, and other stakeholders, all collaborating for creation, prototyping, validating, and testing of new technologies, services, products, and systems in real-life contexts" (Leminen, 2013; Westerlund & Leminen, 2011). Living labs are argued to offer a variety of benefits for stakeholders, including new business opportunities, more effective innovation processes, and savings in R&D costs.

While the terms “Living Lab”, “living laboratory” and “living labbing” have been used interchangeably in the literature, there are two distinguishable approaches to Living Labs: the North American view and the European view. The early North American approach and the more recent European approach share the concept of involving users in innovation activities in real environments. The North American approach, however, considers Living Labs as demo-homes, home labs, or houses of the future; whereas the European approach views them as a platform to study users' everyday habits (Schuurman et al., 2011; Leminen and Westerlund, 2016).

Some studies suggest that the Living Lab concept originated from Prof. William Mitchell of the Massachusetts Institute of Technology (e.g. Bergvall-Kåreborn et al., 2009; Budweg et al., 2011; Schuurman et al., 2011). In addition, ENoLL credits him as the father of the concept (ENoLL, 2018), especially because Mitchell and his team played a significant role in boosting early Living Lab activities in Europe (Leminen et al., 2017a). Other studies (e.g. Følstad, 2008b; Leminen and Westerlund, 2016) identify pioneers in the field prior to Mitchell, such as Abowd and his colleagues at the Georgia Institute of Technology. The Living Lab concept appeared in scholarly discussion in

the 1990s, when the EU began funding various large-scale living lab projects (Følstad, 2008a; Veeckman et al., 2013; Leminen et al., 2017a).

Studies of Living Labs have been appeared in a broad range of journals and conference proceedings. The publication trend for Living Labs had been accelerating between 2006 and 2014. There was also a significant jump in the number of publication in 2015 and the subsequent three years. A systematic review of Living Lab Literature was carried out by Hossain et al., 2019. The existing literature considers Living Labs to be a multidisciplinary (Bergvall-Kåreborn et al., 2009) upper-level concept covering diverse activities, typologies and types of open innovation. Prior studies have used the term 'Living Labs' in association with innovation systems, experimentation, user involvement in the product development process, and organizations facilitating an innovation network and offering relevant services (Leminen, 2013).

The definition of Living Labs offered by ENoLL puts forward five key dimensions: innovation settings, operating environments, influence on innovation processes, user engagement and expected outcomes (Edwards-Schachter et al., 2012). Similarly, Bergvall- Kåreborn et al. (2009) point out five key principles: openness, influence, realism, value, and sustainability. Many definitions stress the collaboration between different actors, combining technological research with user research (Rits et al., 2015).

Furthermore, Living Labs include a set of features and principles (Bergvall-Kåreborn et al., 2009; Guimont and Lapointe, 2016), namely technological infrastructure, an ecosystem of stakeholders, an open innovation process, a human-centric design approach, community involvement, and users' natural environments. Bergvall-Kareborn and Stahlbrost (2009) also point out that Living Labs are open innovation environments in real-life contexts for new products and services. Living Labs aim to co-create innovation through the involvement of users in real-life settings (Dell'Era and Landoni, 2014).

Meanwhile, the global economy is moving towards a knowledge-intensive model and the European Union (EU) has identified innovation as a key driver (Gray et al., 2014) for economic and social growth. At the same time, sustainability has increasingly become a global challenge (Hossain et al., 2019). Indeed, in September 2015, 193 countries met to define and adopt the 17 Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development. Companies, individuals, governments, universities and non-governmental organizations (NGOs) must all contribute to protect the planet, to end poverty and to ensure peace and

prosperity (UN General Assembly, 2015). Although various studies have dealt with sustainable development and innovation (Mulder, 2007), the relationship between innovation and sustainability processes is neither obvious nor simple. Indeed, sustainable development can only be a structural driver for innovation if it is pursued adopting a transdisciplinary approach (Fourati-Jamoussi et al., 2019).

2.2 LL DESCRIPTION AND DEFINITION

Living Labs present a specific trend in open innovation approaches. In Living Lab approach, external ideas are resources in innovation process. The aim of the Living Lab approach is to support innovation process with a usable solution (product or service) as a result of the innovation process. Different stakeholders are involved in the Living Lab, from researchers, developers and end users aiming to co-create innovative products and services in a real-world environment.

A Living Lab is considered a multidisciplinary phenomenon and it encompasses various research domains. The existing literature views Living Labs simultaneously as landscapes, real-life environments and methodologies, and it suggests that they include heterogeneous stakeholders and apply various business models, methods, tools and approaches.

The Living Lab concept is based on a systematic user co-creation approach integrating research and innovation processes (bringing together users, R&D institutions, producers, service providers and all relevant stakeholders in focused and integrated development process). These are integrated through the co-creation, exploration, experimentation and evaluation of innovative ideas, scenarios, concepts and related technological artefacts in real life use cases, as shown in Figure 1.

Such use cases involve users, not only as observed subjects, but also as a source of creation. This approach allows all involved stakeholders to concurrently consider both the global performance of a solution and its potential adoption by users. This consideration may be made at the earlier stage of research and development and through all elements of the solution (e.g. a product) life-cycle, from design up to recycling. Living Labs usually exploit opportunities of modern ICT and can be seen as “a large, broadly conceptualized laboratory”. Cooperation of all stakeholders (from users, to companies, ICT providers, developers, government organizations,

universities and other involved institutions) is sought. Although there have been numerous attempts to define what an LL is (Table 1), there is still no one widely accepted definition (Dell'Era and Landoni, 2014).

Last but not least, Living Labs face some challenges, such as temporality, governance, efficiency, user recruitment, sustainability, scalability and unpredictable outcomes. In contrast, the benefits include tangible and intangible innovation and a broader diversity of innovation.

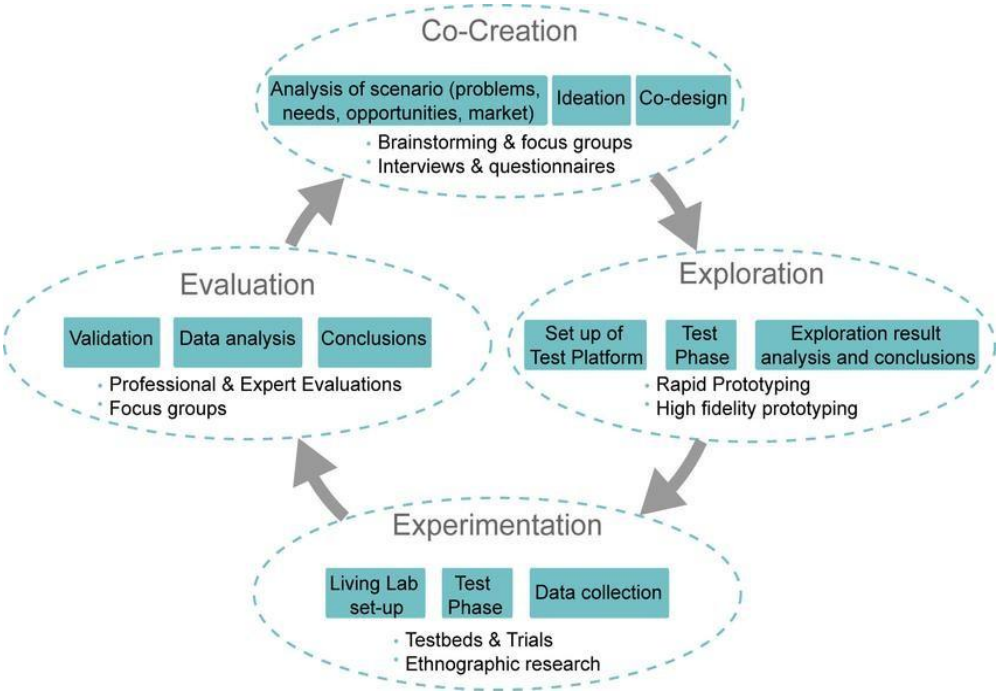


Figure 1. A visual representation of the Living Lab process (Vicini et al. 2012).

Table 1. Different perspectives on Living Labs definition (Compagnucci et al., 2020)

Living Labs definition	Source
LLs include "a research methodology for sensing, prototyping, validating and refining complex solutions in multiple and evolving real-life contexts"	Eriksson et al. (2005)
An LL is "an experimentation environment in which technology is given shape in real-life contexts andin which (end) users are considered 'co-producers'"	Ballon et al. (2005)
An LL represents "an R&D methodology where innovations, such as new services and products, or application enhancements, are created and validated in collaborative, multi-contextual, empirical, real-world environments within individual regions"	de Leon et al. (2006)
LLs "are experimentation and validation environments characterized by early involvement of user communities, closely working together with developers and other stakeholders, and driving rapid cycles of ICT-based innovations"	Schaffers and Kulkki (2007)
LLs are "collaborations of public-private-civic partnerships in which stakeholders co-create new products, services, businesses and technologies in real-life environments and virtual networks in multi-contextual spheres"	Feurstein et al. (2008)
An LL is an innovation intermediary community which shares the view of a user innovation approach	Ståhlbrost and Bergvall-Kåreborn (2008)
An LL consists of a social configuration which is arranged for innovation creation by contact, communication and collaboration	Dutilleul et al. (2010)
An LL is an enhancement or implementation of public and user involvement, such as a public-private- people partnership (4Ps or quadruple helix)	Arnkil et al. (2010); Ferrari et al. (2011); Molinari (2011)
LLs are "open innovation intermediaries that seek to mediate between users, research, and public and private organizations, (and to) advance our concept of technology transfer by incorporating not only the user-based experimentation, but also by engaging firms and public organizations in a process of learning and the creation of pre-commercial demand"	Almirall and Wareham (2011)

2.3 LL AS AN ENVIRONMENT

Living Lab is a real-life environment in which various stakeholders (Guzman et al., 2013) experiment, develop, co-create, validate and test existing products, services and systems, as well as develop new products and services (Følstad, 2008a; Leminen et al., 2012). Unlike conventional laboratory settings, Living Labs assume real-life environments. There is a diverse set of environments, ranging from a single isolated place to broader environments such as educational institutes, people's homes and workplaces, and even a city or a part thereof (Nystrom et al., 2014; Leminen et al., 2017b).

In the Living Lab environment researchers, developers and end-users co-create innovative solutions (products or services) in the shortest possible time according to the needs of end-users and test the idea in the real-life environment (a city, a region, a country, an industry or a supply chain). Different types of Living Lab environments exist such as the ones demonstrated in the Figure below which are commonly used. However, the constant development of the concept, leads to more types of Living Labs.

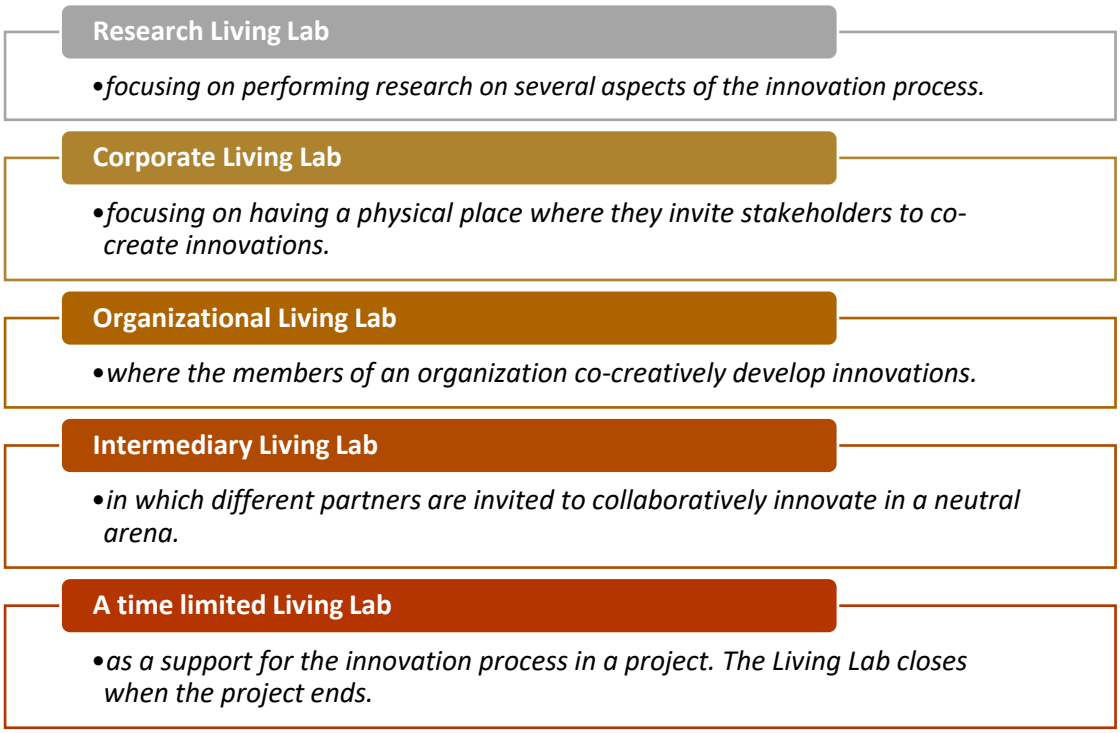


Figure 2. Different types of Living Lab environments

2.4 LL KEY COMPONENTS

The term 'Living Lab' covers multiple topics, thus its key characteristics have been discussed from various perspectives.

Folstad (2008b) identifies several characteristics of Living Labs: context (e.g. context research, familiar context, real-world context), users (involving users as co-creators), activity (e.g. co-creation, technical testing, evaluation), challenges (discovery), and innovative outcomes (e.g. large-scale solutions). Mulder et al. (2008) in turn propose six elements of Living Labs: user involvement, service creation, infrastructure, governance, innovative outcomes, and methods and tools. Furthermore, Bergvall-Kereborn et al. (2009), as well as Vicini et al. (2012), point out five key components: ICT and infrastructure, management, partners and users, research, and approaches, as shown in Figure 3. They share the views of Folstad (2008b) and Mulder et al. (2008).

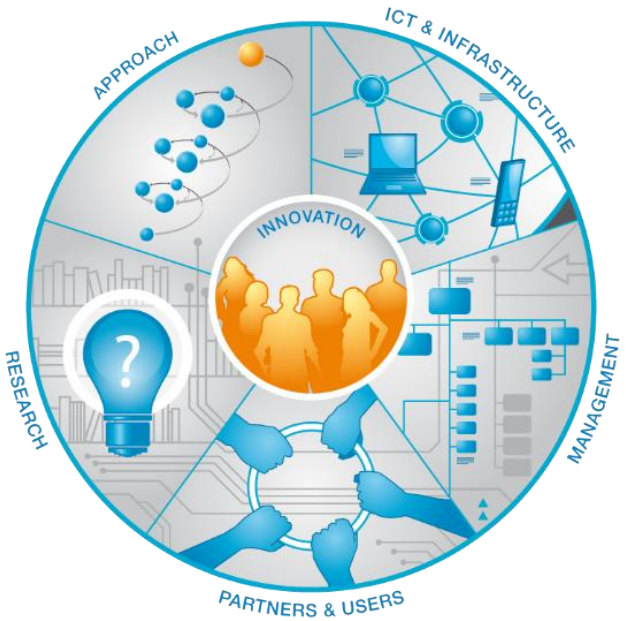


Figure 3. Living Lab key components (Vicini et al. 2012)

Meanwhile, Leminen and Westerlund (2016), identify four key aspects in nine identified research avenues for Living Labs, namely (i) systems (networks and ecosystems), (ii) milieu (real-life environments) and approach, (iii) user and public involvement, and (iv) the activity, project, or management tool. Finally, Voytenko et al. (2016) list geographical embeddedness, experimentation, learning, participation, user involvement, leadership,

ownership, evaluation, and refinement as key characteristics of Living Labs, thus aligning with most of the previously identified key characteristics of Living Labs. Based on literature review, and in line AZA4ICE project needs, the following key components were identified.

Figure 4. The key components of a Living Lab in line with the AZA4ICE project.

2.5 LL STAKEHOLDERS

Stakeholders can be considered the most important component for the successful implementation of a Living Lab. It is pointed out that Living Labs are built around innovation and structured cooperation. A Living Lab is not similar to a test-bed as its philosophy is to turn users, from being traditionally considered as observed subjects for testing modules against requirements, into value creation in contributing to the co-creation and exploration of emerging ideas, breakthrough scenarios, innovative concepts and related artefacts.

Hence, a Living Lab rather constitutes an experiential environment, where users are immersed in a creative social space for designing and experiencing their own future. Living Labs can be used by policy makers, research organisation, private sector and users/citizens for designing, exploring, experiencing and refining new policies and regulations in real-life scenarios in order to evaluate their potential impacts before actual implementation.

The existing literature about Living Labs emphasizes on the presence of multiple stakeholders and highlights the makeup of public-private partnerships (3Ps) (e.g. Feurstein et al., 2008; Almirall and Wareham, 2011) or public-private-people partnerships (4Ps) (e.g. Bergvall-Kereborn et al., 2009a; Veeckman et al., 2013). Whereas the former encompasses collaboration with citizens, companies and public authorities (Almirall and Wareham, 2011), the latter puts forward the notion that companies, public agencies, universities, various institutions, and users participate in innovation activities in Living Labs (Westerlund and Leminen, 2011). In other words, Living Labs assume a quadruple helix approach, i.e. a collaboration between business, research and education, public administration, and civil society/users. (Hyysalo and Hakkarainen, 2014).

In contrast to many other forms of innovation, Living Labs involve heterogeneous stakeholders such as academics, developers, industry representatives, citizens, and users, as well as various public and private organizations in living lab networks (Ballon and Schuurman, 2015; Schuurman et al., 2011). For example, Living Labs involve users in a way that can be addressed by companies, public organizations, policy makers, and research institutions (Almirall and Wareham, 2008a). Evans et al. (2015) add that Living Labs bring a broad variety of stakeholders-such as researchers, students, citizens, user communities, external people, non-profit organizations, small firms, consultants, university estates, and facilities staff-

together to co-create knowledge for sustainable products and services in real-world settings.

According to Westerlund and Leminen (2011), Living Labs comprise four key actors: enablers, providers, users, and utilizers. Enablers refer to the organizations that make it all possible, those that enable the activities of Living Labs and support them by promoting them or allocating financial backing or space for Living Labs. Enablers could be public actors, financiers, or non-governmental organizations (such as towns), municipalities, and regional development organizations (Leminen et al., 2012). Providers, meanwhile, are development organizations such as educational institutes, universities, or consultants that bring knowledge and expertise, as well as innovation support activities (Leminen et al., 2016). Users represent the citizens or end customers, and they are active or passive actors that participate in living labs in various roles. Finally, utilizers are the public or private organizations that will benefit from the results of innovation activities in many ways (Leminen et al., 2012).

Living Labs are used to structure user participation in real-life settings (Schuurman and De Marez, 2012). In so doing, Living Labs involve users in the innovation process by providing cohesion, offering support, developing competencies and promoting participants (Almirall and Wareham, 2008a). They can be open or closed in terms of participation. Open Living Labs imply that anyone can participate, while in closed living labs, participating users are preselected (Dell'Era and Landoni, 2014). The open approach is simple to implement, and it helps gather diverse feedback. The closed approach, in contrast, enables living labs to remain highly focused, and this approach requires engaging appropriate participants to solve problems.

AZA4ICE project is a pioneer, involving stakeholders representing the Quintuple-Helix, going beyond Quadruple-Helix stakeholders which are traditionally involved in the Living Labs.

The Quintuple-Helix innovation model is even broader and more comprehensive by contextualizing the Quadruple-Helix and by additionally adding the helix (and perspective) of the 'natural environments of society'. In a Quadruple Helix understanding, the sustainable development of a knowledge economy requires a coevolution with the knowledge society. The Quintuple Helix stresses the necessary socioecological transition of society and economy in the twenty-first century; therefore, the Quintuple Helix is ecologically sensitive. Within the framework of the Quintuple Helix innovation model, the natural environments of society and the economy also should be seen as drivers for knowledge production and innovation,

therefore defining opportunities for the knowledge economy. The European Commission in 2009 identified the socioecological transition as a major challenge for the future roadmap of development. The Quintuple Helix supports here the formation of a win-win situation between ecology, knowledge and innovation, creating synergies between economy, society, and democracy. (Carayannis et al, 2012)

In other words, the *Quintuple-Helix bring together stakeholders representing* academia, industry, government, civil society and environment. In more detail the subsystems of the Quintuple-Helix model are shown in Figure 5.

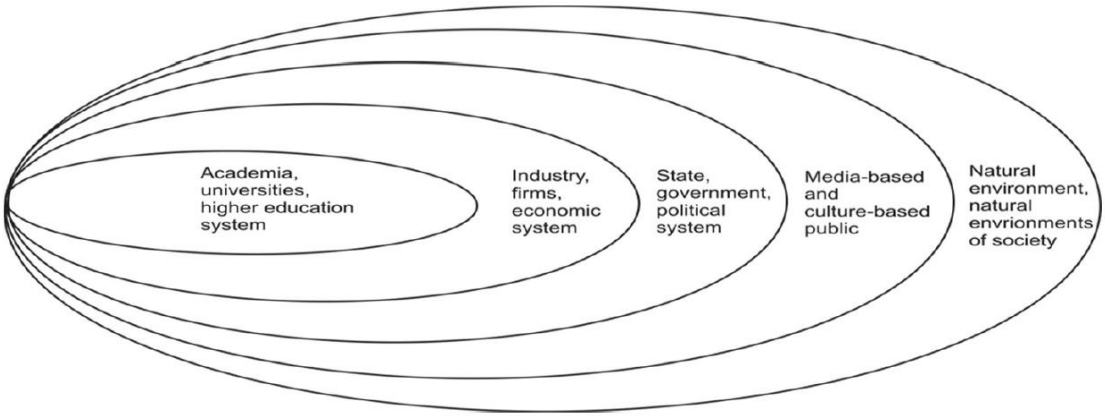


Figure 5. The subsystems of the Quintuple Helix model. Modified from Etzkowitz and Leydesdorff (2000) and Carayannis and Campbell (2009; 2010).

The Quintuple-Helix model is a theoretical and practical model for knowledge exchange among the five societal subsystems, in order to generate and promote a sustainable development of society (Carayannis and Campbell, 2010). In this Cumulative Model of Quintuple Helix, the resource of knowledge moves through a circulation of knowledge from subsystem-to-subsystem (Barth 2011a), as shown in Figure 5.

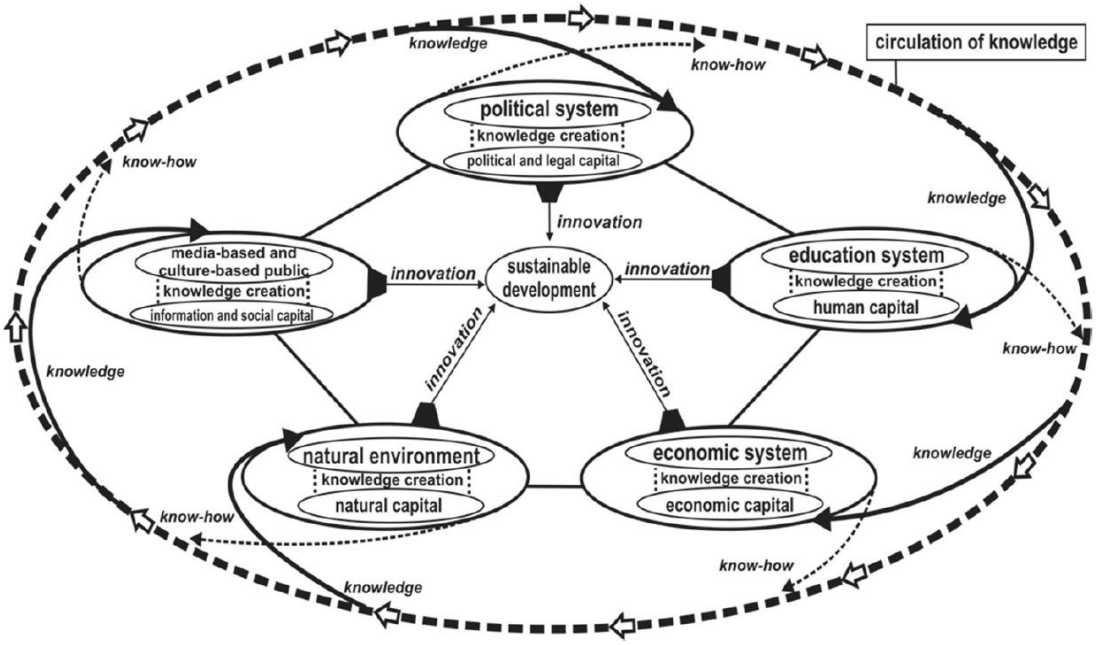


Figure 6. The Quintuple Helix model and its function (functions). Modified from Etzkowitz and Leydesdorff (2000), on Carayannis and Campbell (2006, 2009, 2010), and on Barth (2011a).

2.6 LL ROLES

Living Labs success is conditional to have a clear understanding (and acceptance, as well) of different roles inside the process. According to what is proposed by Nesterova and Quak (2016), there are at least four main roles that have to be considered within the Living Lab framework (Figure 7):

- **Living Lab Owner**: this role is crucial as a promoter, enabler and partner of the Living Lab itself; it is suggested to appoint an organization of one/two people (inside each single Living Lab Owner) in order to lead the whole Living Lab process, i.e., setting up, organizing, conducting and monitoring.

- **Living Lab Stakeholders**: organizations and/or group of citizens that need to be involved in the Living Lab process, since they are considered useful in order to contribute to one or more LL phases.

- **Users**: organizations and/or group of citizens that are involved in real life testing of the proposed LL solutions; LL Users can be also LL Stakeholders, but as users their role is different, since they are only

in charge of testing the LL proposed solutions.

- **Costumers**: organizations and/or group of citizens that benefit from the LL results.

It should be noted that, notwithstanding the differences between the roles listed above, it is possible to play different roles. For instance, a LL Stakeholder can be at the same time a User and a Costumer, testing and benefiting respectively from the proposed solution and for which it contributed in the development.

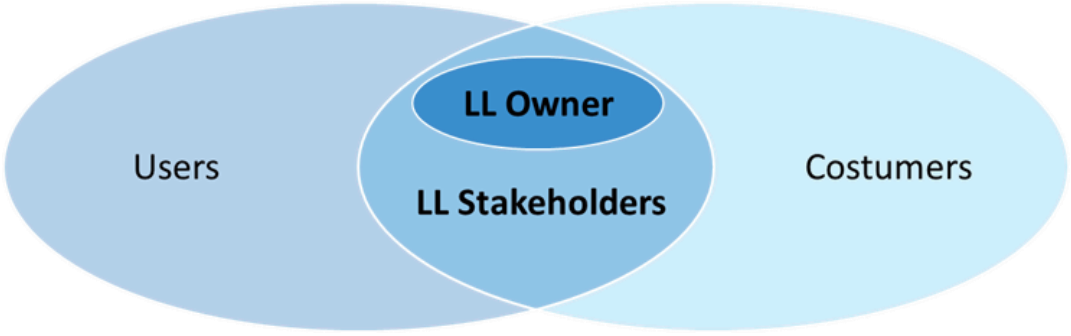


Figure 7. Living Lab roles

2.7 KEY PRINCIPLES FOR THE LL

In Living Lab's activities there are five Key Principles that should permeate all operations:

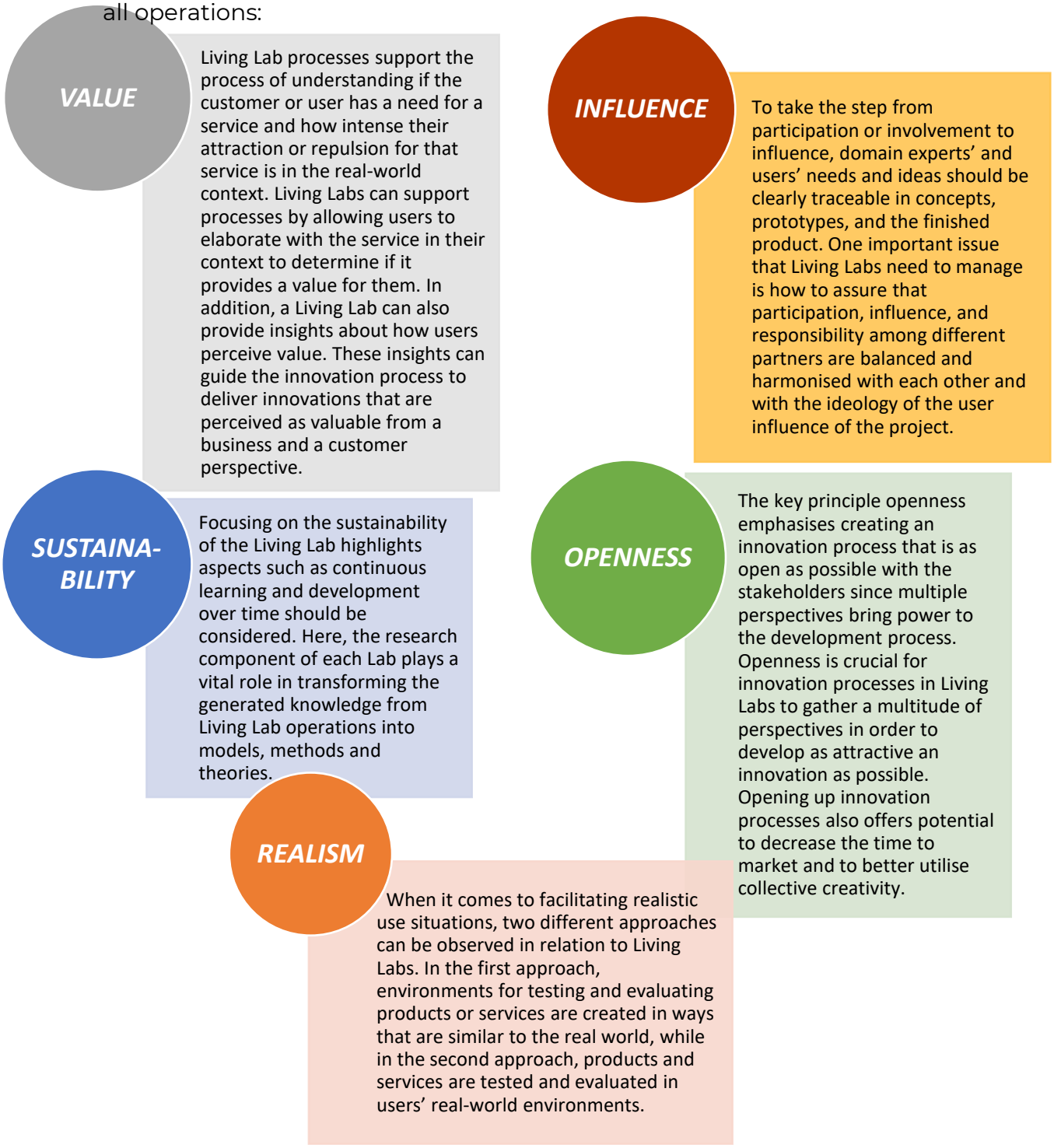


Figure 8. Five key principles that should permeate all LL operations

2.8 LL COMMON ELEMENTS

Living Labs can be characterized in multiple ways and serve several purposes. They are both practice-driven organisations that facilitate and foster open, collaborative innovation, as well as real-life environments or arenas, where both open innovation and user innovation processes can be studied and experimented with, and where new solutions are developed.

Living Labs operate as intermediaries among citizens, research organisations, companies, cities and regions for joint value co-creation, rapid prototyping or validation to scale up innovation and businesses. These activities take place across many different domains, typically in health and wellbeing, smart cities and circular economy, culture and creativity, energy and mobility. Despite the multiple different implementations, Living Labs share certain common elements that are central to the approach:

- ✓ **Multi-method approaches**: there is no single Living Lab methodology, but all Living Labs combine and customize different user-centred, co-creation methodologies to best fit their purpose.

- ✓ **User engagement**: this is rooted already in the origins of Living Labs, the key to success in any activity is to involve the users already at the beginning of the process.

- ✓ **Multi-stakeholder participation**: even if the focus is on users, involving all relevant stakeholders is of crucial importance. These include all the quadruple helix actors: representatives of public and private sector, academia and people.

- ✓ **Real-life setting**: a very specific characteristic of Living Labs is that the activities take place in real-life settings to gain a thorough overview of the context.

- ✓ **Co-creation**: typically, especially in technology projects, activities are designed as top-down experiments, benefiting from users being involved as factors rather than actors. There is an increasing recognition that this needs to change so that users become equal contributors and co-creators rather than subjects of studies. The Living Lab approach strives for mutually valued outcomes that are results of all stakeholders being actively engaged in the process from the very beginning.

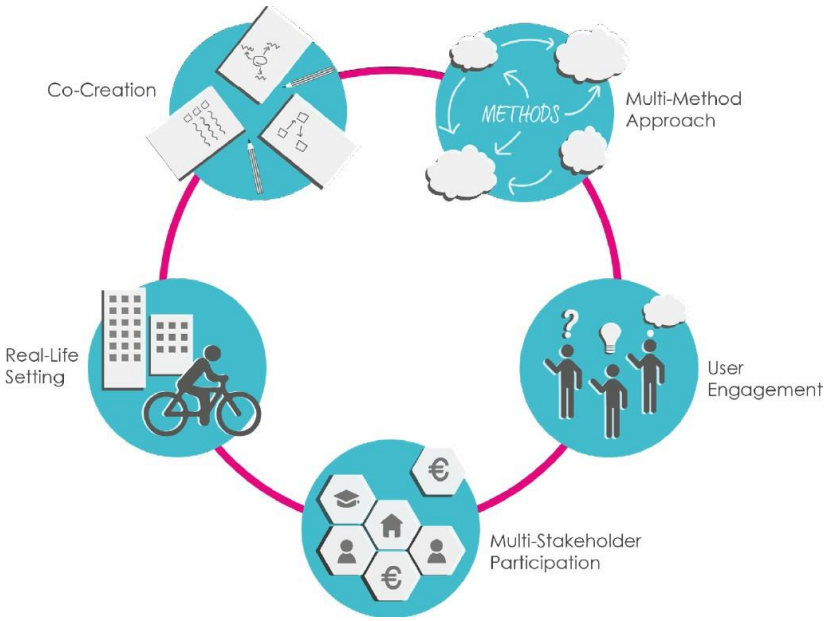


Figure 9. Living Labs common elements (Malmberg et al., 2017)

2.9 CHALLENGES

The previous literature also suggests the importance of close collaboration between participants in Living Labs in order to accelerate innovation activities. In so doing, stakeholders bring heterogeneous resources and knowledge into joint activities, and there may be a collision of ideas between stakeholders and between a context and stakeholders (Leminen and Westerlund, 2012). Although prior studies are quite unified in their view of close collaboration and the benefits it brings to different stakeholders, they stress challenges related to the methods and concepts of Living Labs. These challenges are diverse and associated with the type of Living Lab and the context in which it operates. They include temporality, governance, unforeseen outcomes, efficiency, the recruitment of user group(s) and the sustainability and scalability of their innovation activities.

Also, the previous literature discusses the temporality of Living Labs and their activities. For example, Leminen et al. (2012) suggest that utilizer-driven Living Labs often have a short-term focus on organizational needs. Key participants may leave living lab activities, and there will be a need to replace such players (Leminen and Westerlund, 2012). The long-term value of Living Labs is also often difficult to demonstrate to businesses, user communities, and society (Guzman et al., 2013).

Next, the governance of Living Labs is challenging due to the multifaceted situation (van Geenhuizen, 2013), and project management tools that assume linear thinking do not support activities (Westerlund and Leminen, 2011). Living Labs comprise multiple stakeholders who are often beyond organizational boundaries, and they cannot manage or control stakeholders but rather just motivate them to engage in innovation activities (Ståhlbrost and Bergvall-Kåreborn, 2011; Leminen and Westerlund, 2012). Diverse competences and the interests of the actors may complicate technology development projects (Hakkarainen and Hyysalo, 2013), and stakeholders may provide negative feedback that may be difficult to embrace (Dvarioniene et al., 2015).

Furthermore, prior studies report that Living Labs steer innovation activities through their results with multiple stakeholders (Ståhlbrost, 2008), and such results often lead to unforeseen outcomes (Leminen et al., 2017b). Hence, Living Labs cannot guarantee the achievement of the anticipated results, and their activities often lead to unforeseen outcomes due to feedback from users. In fact, Almirall and Wareham propose that a Living Lab faces challenges in gaining support for better products and social readiness.

Moreover, the efficiency of innovation activities depends on learning in the innovation process (Leminen and Westerlund, 2012). Scholars frequently suggest that collaborative learning in real-life environments is one of the main rationales for setting up a Living Lab (Hakkarainen and Hyysalo, 2013). Hence, the success of Living Labs depends on transferring knowledge between different parties. Often, a painful and conflicting effort is required to establish a valuable learning environment. Learning is lost on many occasions as groups disband and the outcomes of a Living Lab are commercialized by people unrelated to the project.

Living Labs research so far describes both passive and active user participants (Leminen et al., 2015). As regards passive user participants, recruitment of user groups may be challenging because new technologies may attract people with certain personal traits (Bergvall-Kareborn and Stahlbrost, 2009). Conversely, active user participants have their own interest in innovation activities (Nystrom et al., 2014). User participation is high when sustainability is highly relevant to participants. User engagement should therefore not be taken for granted, even if the activities seek to solve real-life problems faced by the participants.

Finally, Living Labs require long-term funding to sustain and scale up their innovation activities (Guzman et al., 2013; Evans et al., 2015). They may rely heavily on public funding, which limits their growth. The underlying

assumption is that the intended goal emerges based on the achieved results of living lab activities among the stakeholders. Living Labs face challenges, such as a lack of standardization and insufficient criteria for living lab performance (Schaffers and Turkama, 2012). In summary, the challenges that Living Labs face are diverse and vary significantly from one instance to another.

3. WHAT IS RESPONSIBLE RESEARCH AND INNOVATION (RRI)?

Responsible Research and Innovation (RRI) aims at an interactive process where societal actors, researchers and innovators actively cooperate to co-define, co-design and co-construct solutions, services and products that are socially acceptable, sustainable and resolve important societal issues (Schneider, 2019).

European funded Programmes perceive RRI as a crucial horizontal principle that their projects should follow, especially the ones which bring together societal actors to work during the whole research and innovation process for better aligning its outputs with the values, needs and expectations of the civil society. To fulfill this European Commission's volition, policy makers and academia representatives should involve and collaborate with societal actors for co-defining the vision mutually, co-mapping the real needs and societal challenges, and co-designing the most appropriate solutions.

Sustainability and environmental protection are overarching principles in the concept of RRI, in the sense that RRI supports research and innovation results not only in societal benefits, but also simultaneously in environmental benefits.

Through Research and Innovation (R&I) solutions can be found to face the society's main challenges, such as blue growth, green growth, climate change, circular economy, poverty, food safety, energy security, resources depletion, demographic change and well-being. All these challenges have the same origin: they are caused by intensive human activities and pressures. United Nations set the 17 Sustainable Development Goals (SDGs) in the 2030 Agenda for Sustainable Development, which was adopted by all United Nations Member States in 2015; thus recognizing these challenges. European Union strives for RRI as an enabler to address them. In addition, RRI can play a pivotal role for bridging science and policy and for enabling policy makers to increase their knowledge and capacity for improved

policies to reach the SDGs. Moreover, public governance and corporate governance should be aiming for integrity and responsible actions for avoiding sole focus on individual corporate and political interests in the expense of other stakeholders, the natural environment and society at large.

"*RRI is a concept for responsibly addressing societal issues, including the sustainability of the natural environment, through research and innovation actions. Another way of looking at RRI is like a social quality assurance system, which is applicable to private and public funded research and innovation.* ***RRI is simply asking researchers, scientists, businesses, policy-makers and research funders to be responsible socially, ethically, environmentally and politically****. RRI is an enabler for any research and innovation centre to include in their research and innovation processes not only profit goals and economies of scale, but also social value. Social value may be a longterm asset for any business for improving its goodwill. Likewise, RRI in the EU funded research is expecting positive social impact by pushing for a mind-shift towards socially responsible research and innovation for addressing societal challenges. As RRI approach is increasingly present in funding calls, both explicitly and implicitly, EU-funded projects must promote social value, sustainability, ethical acceptability and governance in research and innovation results, products and services." (MARINA Project)*

3.1 THE RRI ROADMAP

The RRI Roadmap was developed in the framework of the MARINA EU-funded project "Marine Knowledge Sharing Platform Federating Responsible Research and Innovation Communities". The MARINA project had four main aims:

1. Promote Responsible Research and Innovation (RRI) with focus on marine societal challenges and engage all stakeholders in participatory dialogue about marine issues.
2. Create an all-inclusive Knowledge Sharing Platform to facilitate and stimulate the engagement of all stakeholders.
3. Collect lessons learned and good practices for advancing RRI in research and innovation initiatives.
4. Provide policy recommendations concerning RRI in Blue Growth.

RRI Roadmap's aim is to provide an approach for addressing a challenge through the application of RRI and the involvement of diverse stakeholders such as citizens, civil society, researchers and scientists, policy makers, policy implementers, business and industry people.

The RRI Roadmap provides clear milestones and steps to guide processes of for working together to engage, co-design, co-construct and co-implement solutions for addressing a specific challenge by considering stakeholders' perspective, experience and knowledge.

The European Commission has defined RRI through six dimensions (Figure 10) as listed below and which were used in the RRI Roadmap milestones:

- public engagement
- gender equality
- science education
- open access
- ethics
- governance

RRI Dimension	Definition and Explanation
Public Engagement	Engaging all societal actors and stakeholders: researchers, innovators, industry, policy-makers, civil society and citizens for joint active participation in the research and innovation processes from co-definition to co-construction of innovative solutions, products and services for better alignment with society's values, needs and expectations.
Gender	To unlock the full potential by having all societal actors of all genders on board in research and innovation activities. Fully integrated gender in research and innovation results. Gender must be considered when it can be expected that research and innovation findings may affect women and men differently.
Science education	Enhance education processes to attract and better equip future researchers and other societal actors with necessary knowledge to fully responsible join research and innovation processes.
Open Science/ Open Access	Provide easily understood scientific advancements and results in open platforms. Open science represents an approach to research that is collaborative, transparent and accessible.
Ethics	Respect fundamental rights and highest ethical societal standards with research integrity in order to adequately respond to societal challenges. Ensure open, responsive and transparent processes.
Governance	Research and innovation centers and policy-makers have responsibility to prevent harmful or unethical developments in research and innovation.

Figure 10. European Commission's RRI dimensions (RRI Roadmap, 2019)

In short, the purpose of the RRI Roadmap is to enable anyone to initiate and address effectively any important issue by considering the responsible research and innovation concept and dimensions. This will ensure viable, sustainable and worthwhile actions towards a solution that is created and accepted by the majority of stakeholders.

3.2 WHO SHOULD USE THE RRI ROADMAP?

The RRI Roadmap is for any:

- Organisation or groups of organisations that wish to address a societal issue in a holistic manner through the involvement of diverse and multidisciplinary stakeholders.
- Research and Technology Organisations and Universities performing research and development activities and/or innovation activities and wish to focus their activities for assisting wide societal challenges.
- Enterprises and businesses that perform research and innovation activities and wishes to involve end-users and other stakeholders to ensure wide acceptance of their work and results.
- Governmental Organisations that wish to improve their policy-making and policy implementation abilities for addressing effectively societal issues.
- Policy making organisations that wish to base their decisions on scientific results and wish to involve several types of stakeholders.
- Project Coordinators that submit a project proposal for EU-funding.
- Research and Innovation Funding organisations aiming at making research and innovation relevant for the society since the funding is coming from public funds.

3.3 WHAT IS ACHIEVED BY THE USE OF RRI ROADMAP?

The RRI Roadmap enables the involved stakeholders representing all types of actors within a society (citizens, civil society organisations, businesses, policy makers and implementers, researchers and innovators) to:

Figure 11. RRI Roadmap achievements (RRI Roadmap, 2019)

Summarising, RRI Roadmap helps its users to achieve:

- ✓ Responsible growth
- ✓ Building trust
- ✓ Mobilising knowledge
- ✓ New engagement opportunities
- ✓ Common vision
- ✓ Common action plan
- ✓ Common Implementation
- ✓ New growth opportunities

3.4 THE RRI ROADMAP MILESTONES

The RRI Roadmap has 8 distinct milestones. Each milestone illustration is linked to its predominant RRI dimensions to guide their application and the focus of the efforts.

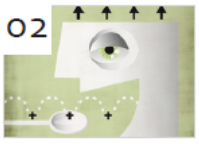
	IDENTIFY NEEDS	**Milestone 1: Identify the needs of the challenge.** Analyse current situation of the challenge Understand the stakeholders "Who is who" and their priorities Define the needs
	MOTIVATE CHANGE	**Milestone 2: To motivate the need for change in societal actors, explain the urgency of the challenge.** Use facts to create urgency Motivate stakeholders based on their priorities Explain the challenge using storytelling
	ENGAGE	**Milestone 3: Engage all stakeholders through participatory workshops.** **Engage all stakeholders for active participation.** Open dialogue based on challenge Build trust among stakeholders Enable Network Building
	IDEATE & FRAME	**Milestone 4: Stakeholders generate and discuss ideas for solutions and frame how the future should be once the challenge is resolved.** Invite different insights, listen and learn Generate ideas for solutions and for creating new opportunities Frame the future
	CO-DESIGN	**Milestone 5: Based on the framed future situation, define and group actions.** Through agreement, co-define the common vision and action plan. Co-design a common vision for the framed future Co-design an action plan and measurements Identify gaps of scientific information and science education Enable knowledge sharing for better decisions
	CO-CONSTRUCT	**Milestone 6: All stakeholders implement the co-designed action plan.** Implement the easier actions first Make research results available to enable action implementation Inform Policy and push for policy adjustments
	MEASURE & ADJUST	**Milestone 7: Measure implemented actions and adjust the co-designed action plan.** Measure actions Communicate widely the results Adjust action plan
	INTENSIFY	**Milestone 8: Intensify the effort to reach the common vision.** Co-construct bigger actions Involve more actors Push for RRI funding and incentives Build capacity through Science Education Intensify awareness

Figure 12. RRI Roadmap milestones (RRI Roadmap, 2019)

Part II

4. LiRRIE METHODOLOGY AND SET-UP

AZA4ICE aims to amplify the transition to Inclusive and Circular Economy in aquaculture sector, implementing an innovative ecosystem spatial planning approach in close-to-coast and inland waters. AZA4ICE will develop Action Plans for this transition in line with Smart Specialisation Strategies uptaken by public authorities, enhancing transnational cooperation, leading to new business opportunities & eco-consciousness society. To achieve its objectives, AZA4ICE partnership has acknowledged the importance of the engagement of 5-helix stakeholders in project co-creation and co-decision processes and the main activities implementation. Only in this way, the project results can achieve wide users' acceptance and thus being sustainable.

AZA4ICE develops a multi-level and multi-sectoral stakeholders' engagement methodology to be followed by PPs to set up cooperation patterns, the ***Living Responsible Research Innovation Ecosystems (LiRRIEs)***.The methodology is built on BLUEfasma Living Lab methodology (BLUEfasma project) enriched with Responsible Research Innovation-RRI (European Commission) principles following RRI Roadmap (MARINA project). In this way, AZA4ICE goes beyond Living Lab (LL) focusing on co-creation and co-decision of involved stakeholders based on a common vision to be drafted at LiRRIEs beginning. The stakeholders-members of LiRRIEs will represent the 5-Helix (a.k.a. academia – industry - government - civil society - environment) and several sectors (e.g. tourism) due to the co-existence of aquaculture with other economic operations.

LiRRIEs goal is to bring together these stakeholders of 5-helix to increase their knowledge and skills, exchange experience and collaborate in drafting their vision and Action Plan for sector's transition; thus filling the lack of dialogue and blunting conflicts of different uses. Through LiRRIEs the involved stakeholders will co-create Allocated Zones for Circular Aquaculture (C-AZA) results, co-decide project Action Plans, increase their Circular Economy (CE) capacity and transnational collaboration and networking in the Euro-MED area and beyond.

AZA4ICE partners will be LiRRIEs' initiators, whose responsibility is to set up and realise LiRRIEs following the present methodology composed of several phases, as developed by AZA4ICE LP. Before LiRRIEs denouement, UPatras will present in detail the methodology to all partners during the 2nd project

meeting in Cadiz (4-6 June 2024) to ensure that they have deeply comprehended methodology and its steps, thus assuring LiRRIEs successful implementation.

The LiRRIE methodology will be applied in eight participating countries and consists of 7 phases i.e. Identify and Map, Motivate and Connect, Frame and Cross-fertilise, Deepen, Co-decide and Co-construct, Evaluate and Adjust, Intensify and Disseminate, as shown in Figure 13. Within project, 8 LiRRIEs are planned to be set up.

Through LiRRIEs approach stakeholders need to be involved not only as observed subjects but active contributors and as a source of creation. Namely, innovations (including new approaches and tools) generally face resistance from users especially if users are not sure about benefits to be gained - this might be especially true for public sector and citizens. Experiential learning is one of the most powerful teaching and learning tools to overcome this reluctance and to facilitate change of people behaviours. Experiential learning involves: a reflective learning phase, a learning phase coming from exchange and from feedback. These phases are well aligned with the LiRRIE phases “Frame and Cross-fertilise”, “Deepen”, “Co-decide and Co-construct”, “Evaluate and Adjust” of the LiRRIE methodology.

The main types of stakeholders to be targeted are public sector, policy makers, SMEs/clusters/networks, professional associations including clusters/networks, business support organisations, NGOs, citizens’ associations, environmental agencies, research and academia. LiRRIEs should also involve policy stakeholders with power to design public policies for blue circular eco-innovation and action plans for CE in aquaculture. Due to the co-existence of aquaculture with other economic operations in close-to-coast and inland waters, LiRRIEs target groups will not be restricted to those involved in the aquaculture sector. For example, LiRRIEs target groups will be SMEs/businesses such as aquaculture enterprises, enterprises involved along the entire fish chain e.g. dealing with post-harvest fish processing and industrial transformation, SMEs providing innovation services in the sector, but also tourism and transportation enterprises acting in the pilot areas and having interests influenced by the AZA4ICE spatial planning results. Beside mentioned, also mentoring/financing experts could be involved to share their expertise in funding/mentoring opportunities in the sector.

In every country, the correspondent LiRRIEs’ initiators will identify the relevant stakeholders and will launch an open invitation to them. The stakeholders who will respond to the invitation and will be engaged in the

LiRRIE will become the LiRRIE members composing an informal "LiRRIE forum". This "LiRRIE forum" will be participating in the LiRRIE phases and the corresponding events without formalisation in terms of legal commitments. The informal establishment of LiRRIE, not requiring establishment of new legal entity but only formal commitment to participation (Declaration of Participation or similar) should ease the involvement of stakeholders. The national "LiRRIE fora" will work together following the same methodology and exchanging experiences.

The activities of each LiRRIE will follow the phases of the LiRRIE methodology as shown below. If needed, the LiRRIE methodology will be slightly adapted to national/regional specificities.

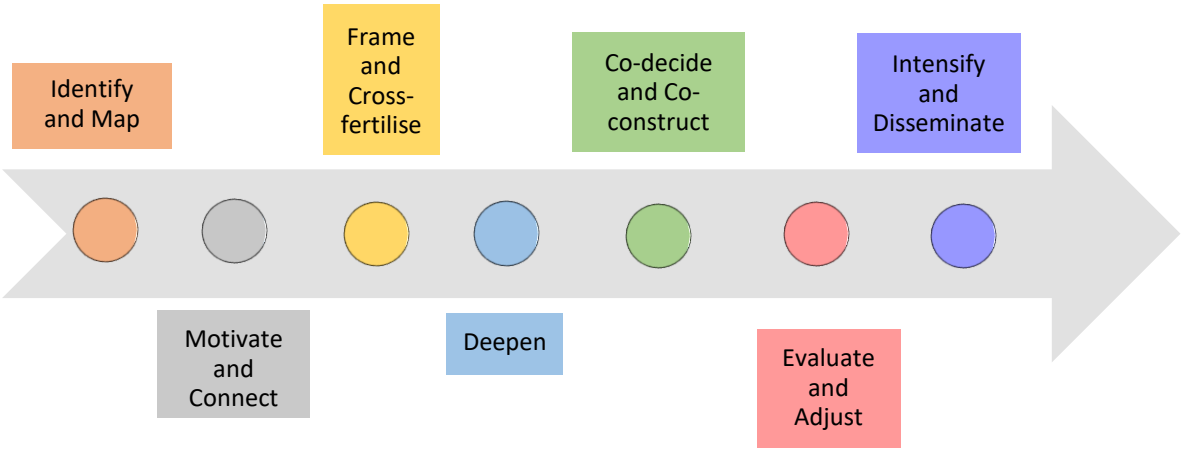


Figure 13. LiRRIE methodology.

The LiRRIE methodology is described in detail in the following sections (5.1 – 5.7.). Every section presents a different phase detailing the aim of the phase, the approach to be followed by the LiRRIE initiator, the events to be organise, the involved parties and the final output. The set-up of LiRRIEs combines seven phases, each consisting of several steps. The LiRRIE set-up time plan is presented in Figure 14.

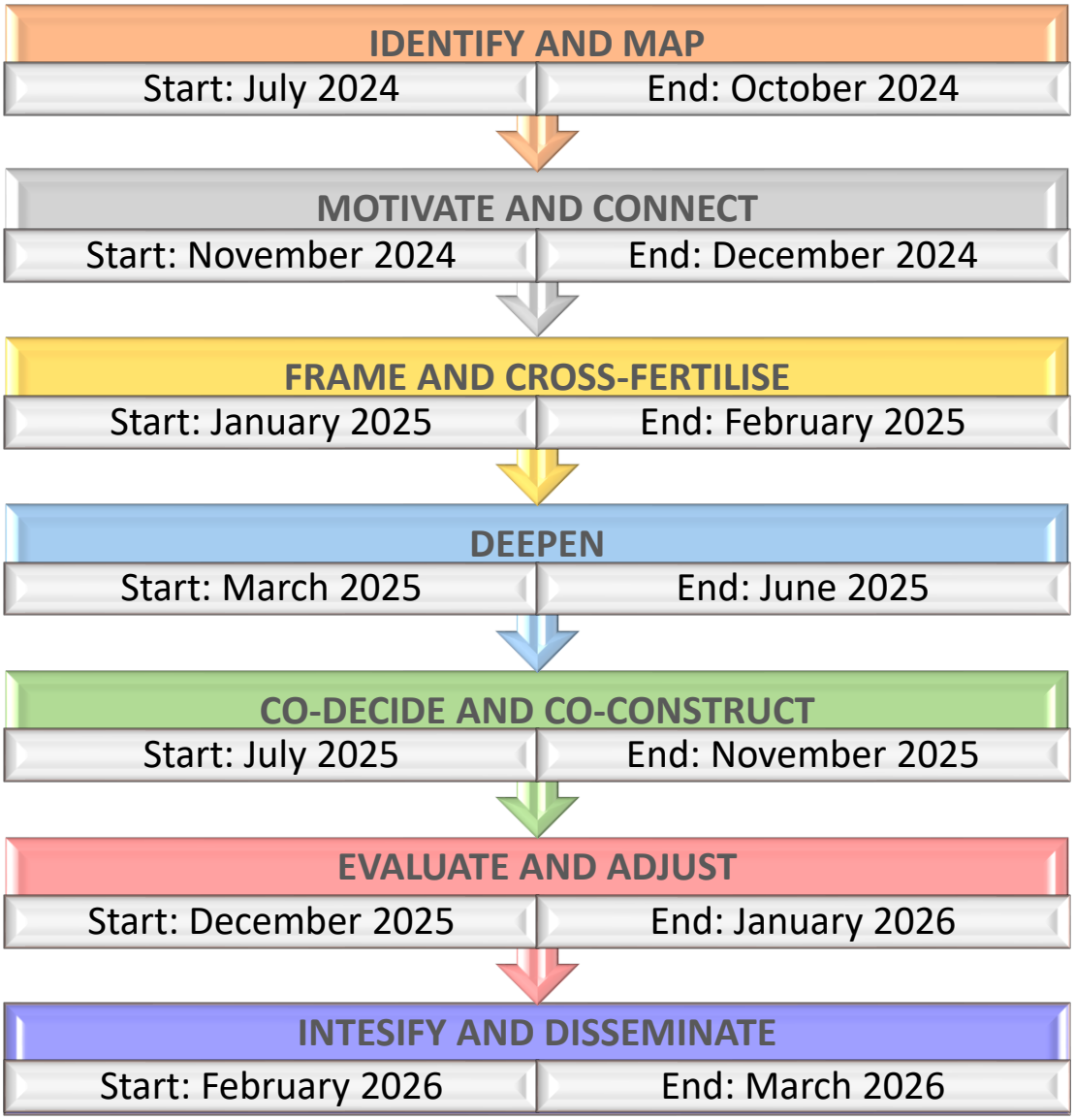


Figure 14. Time plan of LiRRIEs phases set-up.

AZA4ICE partners who are responsible for the LiRRIE establishmen and operationalisation in their country will follow step by step LiRRIE methodology. After the finalisation of each phase, the LiRRIE initiator will report the activities carried out during the phase filling in the LiRRIE report template, which is developed by the University of Patras. In this regard, in the following sections of the LiRRIE phases, there is reference to the report template when needed; thus guiding exactly the partners which specific section should fill-in. When reporting the activities implemented in LiRRIE phases, the initiators must focus on the **co-decided conclusions and lessons learnt**. In their report, they should also highlight the **challenges**

faced to setup LiRRIE, stakeholders' participation, interactions and communication channels used.

As regards the events which are described in the phases below, it is advised to be organised with **physical presence of the stakeholders**. The success of multi-stakeholder participatory schemes, like LiRRIEs, depends significantly on the collaboration of the different stakeholders. As widely known, meeting people face-to-face can create a more personal approach by bringing the stakeholders together to work and co-decide on an issue. There is more opportunity for interaction, to ask questions, listen to others' opinions, build trust and reach a consensus. In case that a physical event is not possible or LiRRIE initiator considers that the desired level of stakeholders' participation cannot be reached, then online format of events organisation can be considered. In case of online event, online collaborative tools (e.g. Miro, Jamboard) should be available to facilitate the co-creation process.

4.1 PHASE 1 – IDENTIFY AND MAP

IDENTIFY AND MAP	
Start: July 2024	End: October 2024

The main elements of ***Phase 1 – Identify and Map*** are shown below:

Responsible	LiRRIE initiator (AZ4ICE partners)
Contributors	-
Aim	To identify the current challenges, needs, barriers and opportunities to be tackled in the framework of LiRRIE and to draft the corresponding LiRRIE vision. Also to map the relevant stakeholders from all economic sectors (due to the co-existence of aquaculture with other economic operations in close-to-coast and inland waters) to be invited becoming LiRRIE members.
How - approach	The initiator of LiRRIE is identified within the project consortium to take over the LiRRIE set-up activities. The

	LiRRIE initiator identifies the current challenges, needs, barriers and opportunities related to Circular Economy in the aquaculture sector to be tackled in the framework of LiRRIE. This identification process is carried out based on partners' experience, work done in AZA4ICE completed activities, knowledge gained in previous projects (e.g. BLUEfasma), desk research, etc. Based on the identification results, the common problem or opportunity for collaboration is identified. Accordingly, LiRRIE initiator drafts the vision of the LiRRIE to be presented later to the LiRRIE forum, modified and finally agreed. The vision should be concise and clear, able to attract stakeholders' attention and fulfil their ambitions for the future of the sector. A mapping process is also carried out by the LiRRIE initiator to identify the stakeholders with interest and appropriate skills to participate in the LiRRIE.
Deliverables	✓ Identified LiRRIE initiator ✓ Identified current challenges, needs, barriers and opportunities and the user driven problem/opportunity ✓ Drafted LiRRIE vision ✓ List of potential stakeholders to participate in LiRRIE

The ***step-by-step approach*** follows:

➢ **STEP 1**: DEFINE LiRRIE LEADERSHIP

Activities	Identify the initiator of LiRRIE, responsible for coordination of LiRRIE at each country. The organisations acting as initiators are the AZ4ICE partners as foreseen in the project Application Form. Beyond the partner organization, a person(s) within the partner organisation is identified to lead the set-up and operation activities of LiRRIE. The LiRRIE initiator is

	responsible to coordinate all LiRRIE activities, motivate stakeholders to actively engage in them, arrange meetings/workshops/training courses, correspond to stakeholder needs or requirements, ensure that activities are carried out with time plan and develop the corresponding reports.
Deliverables	Identified LiRRIE leadership (organisation and contact person(s)) The description will be reported in the internal deliverable "D.2.2.2 - LiRRIEs denouement" per partner (chapter X.X. Identify and Map - X.X.X The leader of LiRRIE).

- **STEP 2:** IDENTIFY COMMON PROBLEM OR OPPORTUNITY AND DRAFT LiRRIE VISION

Activities	Identify the current challenges, needs, barriers and opportunities to be tackled in the framework of LiRRIE and define a user driven problem/opportunity in order to define key areas for improvement. The problem can be identified either by partners' institutional experience, knowledge gained in previous projects, AZA4ICE implemented activities, and desktop research, stakeholders' consultations, interviews with PAs and SMEs and brainstorming evets. The problem/opportunity will lead the LiRRIE initiator to draft the LiRRIE vision.
Deliverables	Short report on the identified challenges, needs, barriers and opportunities, the user driven problem/opportunity and the draft LiRRIE vision. This short report will be incorporated in the internal deliverable "D.2.2.2 - LiRRIEs denouement" per partner (chapter X.X. Identify and Map - X.X.X LiRRIE VISION).

- **STEP 3:** MAP STAKEHOLDERS

Activities	Map the relevant stakeholders ensuring the representation of the 5-Helix. The main types of stakeholders to be targeted are public sector, policy makers, SMEs/clusters/networks, professional associations including clusters/networks, business support organisations, NGOs, citizens' associations, environmental agencies, research and academia. These stakeholders should have time, resources and interest to participate in LiRRIE.
Deliverables	List of LiRRIE potential stakeholders

4.2 PHASE 2 – MOTIVATE AND CONNECT

MOTIVATE AND CONNECT	
Start: November 2024	End: December 2024

The main elements of ***Phase 2 – Motivate and Connect*** are shown below:

Responsible	LiRRIE initiator (AZ4ICE partners)
Contributors	-
Aim	To form the "LiRRIE forum" of complementary stakeholders of 5-Helix addressing the common problem/opportunity towards the achievement of the LiRRIE vision with clear understanding of LiRRIE leadership, stakeholder's commitment, necessary activities and resources.
How - approach	Based on the stakeholders mapping (carried out in the previous phase "Identify and Map"), LiRRIE initiator addresses an open invitation as well as targeted invitations to interested stakeholders inviting them to become members of the LiRRIE. Several channels and

	dissemination tools (official project website, partners' websites, promotional material, social media, etc.) should be used to address potential stakeholders. The invitations should be formed in such way to highly motivate the stakeholders explaining shortly the draft vision, the LiRRIE aim and the benefits to be gained. For highlighting the importance of stakeholders' active participation and engagement throughout all LiRRIE's phases, each stakeholder should be asked to sign the Declaration of Participation (DoP) in LiRRIE (or similar document) to define the purpose of such participation and collaboration. University of Patras has developed a template for the DoP .
Deliverables	✓ Invitations (of any kind) addressed to stakeholders ✓ List of stakeholders who are LiRRIE members forming the "LiRRIE forum" ✓ Signed DoPs

The ***step-by-step approach*** follows:

➢ **STEP 1:** ADDRESS AND MOTIVATE STAKEHOLDERS

Activities	Address potential stakeholders by: • Publishing an open invitation ensuring the equal opportunity of all potential interested stakeholders to participate in LiRRIE using: – AZA4ICE website and social media accounts – Partners' institutional websites and social media accounts • Using contacts from stakeholders participated in previous AZA4ICE activities

	• Using contacts from stakeholders participated BLUEfasma project and other relevant on-going and past projects • Using channels to find people and organizations with relevant interests Reply to any request for clarifications, send reminder emails, perform phone calls and/or visits to stakeholders' offices, provide further details when requested.
Deliverables	Published and sent invitations. Also, short report on interaction with stakeholders mainly highlighting the good practices for inviting them and the difficulties in reaching them. This short report on interaction with stakeholders will be incorporated in the internal deliverable "D.2.2.2 - LiRRIEs denouement" per partner (chapter X.X. Motivate and Connect - X.X.X Inviting Stakeholders).

➢ **STEP 2:** LAUNCH "LiRRIE forum"

Activities	Exchange further with the stakeholders who expressed interest in becoming LiRRIE member. LiRRIE initiator organises a physical or online meeting with each stakeholder to provide more insight on the scope and the activities of LiRRIE. Also, this first bilateral meeting facilitates LiRRIE initiator understand better the needs and capacity of each stakeholder. Further, this meeting eases the signing of the Declaration of Participation (DoP). The LiRRIE initiator should clearly explain that no formal obligation arises for the stakeholders through this document's signing. Based on previous experience, this clarification eases the signing procedure. The signatory should not necessarily be the legal representative of the stakeholder's organisation; the signatory could be the person who will mainly participate in LiRRIE activities representing the stakeholder organisation.

	LiRRIE initiator launches the "LiRRIE forum" by sending a common informative email to all stakeholders being LiRRIE members concerning the next steps.
Deliverables	The signed DoP will be incorporated in the internal deliverable "D.2.2.2 - LiRRIEs denouement" per partner as appendix.

4.3 PHASE 3 – FRAME AND CROSS-FERTILISE

FRAME AND CROSS-FERTILISE	
Start: January 2025	End: February 2025

The main elements of ***Phase 3 – Frame and Cross-fertilise*** are shown below:

Responsible	LiRRIE initiator (AZ4ICE partners)
Contributors	Members of LiRRIE forum
Aim	To fine-tune the LiRRIE vision with the stakeholders, to cross-fertilise their ideas on AZA4ICE methodology and to collect data for the AZA4ICE tests.
How - approach	Following the present LiRRIE methodology, every LiRRIE initiator establishes a solid LiRRIE plan with necessary time frame and resources. LiRRIE initiator organises the **1st LiRRIE event** and the active participation of the members of LiRRIE forum should be ensured. The preparation of the event should be well-organised and the invitation to the LiRRIE members should be sent well in advance to allow them save the date and get prepared (review material sent along with the invitation, collect request data, etc). The invitation should include details on the event format and the expected type of stakeholders' participation.

	The event includes the following: - Presentation of LiRRIE plan - Presentation of challenges, needs, barriers and opportunities, the user driven problem/opportunity and the draft LiRRIE vision. - Fine–tune LiRRIE vision with the stakeholders and shape the final version. - Presentation of the AZA4ICE methodology (D.1.1.1) - Cross-fertilise stakeholders' ideas on AZA4ICE methodology - Collection of stakeholders' data for the AZA4ICE pilot areas (linked to A.1.2) - Application of BLUEfasma circularity self-assessment tool to measure stakeholders circularity (linked to D.2.2.1)
Deliverables	✓ Define LiRRIE plan ✓ Organisation of the 1st LiRRIE event ✓ Final version of LiRRIE vision ✓ Exchange on AZA4ICE methodology ✓ Application of BLUEfasma circularity self-assessment tool

The ***step-by-step approach*** follows:

➢ **STEP 1:** DEFINE LiRRIE PLAN

Activities	Following the present LiRRIE methodology, every LiRRIE initiator establishes a solid LiRRIE plan with necessary time frame and resources. The plan provides main LiRRIE objectives and goals, activities, stakeholders roles etc. within the expected time frame (Gantt Chart) including milestones. The general time frame of the several LiRRIE phases is described in the present methodology and this should be followed since it is in accordance with the AZA4ICE Application Form and the timing of the deliverables. However, slight

	deviations can be occurred based on the national-regional needs of each LiRRIE.
Deliverables	LiRRIE plan including objectives, activities, partner roles, agreements and time frame.

➢ **STEP 2:** FRAME LiRRIE

Activities	The organisation of the 1st LiRRIE event is of high importance for the progress and the successful implementation of the LiRRIE. The event has a dual objective; a) to frame the LiRRIE in presence of the LiRRIE forum and b) to cross-fertilise ideas and data. The first objective is described in this step, while the cross-fertilisation is described in the next step. The 1st LiRRIE event should begin with the: – Presentation of the identified challenges, needs, barriers and opportunities and the user driven problem/opportunity to be tackled during the LiRRIE. – Presentation of the draft LiRRIE vision. – Presentation of LiRRIE plan. – Presentation of the AZA4ICE methodology. The above presentations introduce the stakeholders to the main content of the AZA4ICE project and the LiRRIE plan. In this way, the LiRRIE initiator frames the LiRRIE and all members become integral part of the participatory process.
Deliverables	Report on the 1st LiRRIE event corresponding sessions and the interaction with stakeholders emphasising on their reaction (e.g. what found interesting, if they were participating with questions and comments). This report will be incorporated in the internal deliverable "D.2.2.2 - LiRRIEs denouement" per partner (chapter X.X. Frame and Cross-fertilise - X.X.X 1st LiRRIE event).

➢ **STEP 3:** CROSS-FERTILISE IDEAS AND DATA

Activities	During the 1st LiRRIE event, the cross-fertilisation of ideas and data occurs among the LiRRIE members under the coordination and guidance of the LiRRIE initiator. This part of the event demands the active participation of all LiRRIE members. After the presentations carried out during the previous step "Frame LiRRIE", the LiRRIE initiator starts a dialogue among the stakeholders to express their opinion on the draft version of the LiRRIE vision. It is important that all stakeholders participate in this process, since the aim is to ***fine–tune LiRRIE vision and shape the final version***. Towards to this vision, LiRRIE work will be carried out. Then, the LiRRIE initiator launches another round of ***exchange concerning the stakeholders' ideas on the presented AZA4ICE methodology***. Their ideas, comments, concerns, etc are reported to be taken into account for methodology's adaptation/improvement. Next, the LiRRIE initiator and the technical personnel of each partner (staff members and/or external experts) coordinate the **collection of stakeholders' data for the AZA4ICE pilot areas** (linked to A.1.2). The stakeholders should be informed well in advance (since the invitation to the event) about the data that they are expected to provide. The type of the data varies based on the type of the stakeholder. Last, this event offers a great chance to the LiRRIE initiator to apply the **BLUEfasma circularity self-assessment tool to measure stakeholders' circularity** (linked to D.2.2.1). The tool is applicable for SMEs and companies acting in the any stage of the value chain of the aquaculture sector. Thus, at the end of the event, LiRRIE initiator supports the SMEs and companies who participate in the event to fill in the online tool (the time needed is around 10 min).

Deliverables	Report on the 1st LiRRIE event corresponding sessions and the interaction with stakeholders emphasising on their input. This report will be incorporated in the internal deliverable "D.2.2.2 - LiRRIEs denouement" per partner (chapter X.X. Frame and Cross-fertilise - X.X.X 1st LiRRIE event). Measurement of businesses circularity level and willingness to invest in blue CE based on the BLUEfasma circularity self-assessment tool composes a separate deliverable, D.2.2.1.

➢ **STEP 4:** EVENT'S EVALUATION

Activities	After every LiRRIE event, an evaluation survey will be sent to the participants to collect their feedback to be valorised for improving the next event. The evaluation survey is shared through the AZA4ICE official website (using the website's dedicated functionality).
Deliverables	Short presentation of event's evaluation results. This presentation will be incorporated in the internal deliverable "D.2.2.2 - LiRRIEs denouement" per partner (chapter X.X. Frame and Cross-fertilise - X.X.X 1st LiRRIE event).

4.4 PHASE 4 – DEEPEN

DEEPEN	
Start: March 2025	End: June 2025

The main elements of ***Phase 4 – Deepen*** are shown below:

Responsible	LiRRIE initiator (AZ4ICE partners)
Contributors	Members of LiRRIE forum
Aim	To deepen LiRRIE members' knowledge in CE practices and opportunities in the aquaculture sector, as well as in the current legal/regulatory context and licensing processes that frame aquaculture development activities and relevant innovative circular production systems (e.g. IMTA/RAS). This phase will enhance LiRRIE members' relevant capacity which facilitate later the co-development of the AZA4ICE Action Plans.
How - approach	LiRRIE initiator organises the **2nd LiRRIE event** and the active participation of the members of LiRRIE forum should be ensured. The preparation of the event should be well-organised and the invitation to the LiRRIE members should be sent well in advance to allow them save the date and get prepared. The invitation should include details on the event format and the expected type of stakeholders' participation. The event includes the following: - Educational/training/mentoring modules on CE in aquaculture (linked to A.2.4) - Analysis of the current legal/regulatory context and licensing processes that frame aquaculture development activities and relevant innovative circular production systems (e.g. IMTA/RAS) (linked to A.2.3) - Application of BLUEfasma circularity self-assessment tool to measure stakeholders' circularity (linked to D.2.2.1)
Deliverables	✓ Educational and training material (D.2.4.1) ✓ Application of BLUEfasma circularity self-assessment tool

The ***step-by-step approach*** follows:

➢ **STEP 1:** EDUCATE AND TRAIN

Activities	Aiming to increase stakeholders' knowledge and skills, LiRRIE initiator organises the 2nd LiRRIE event offering to the LiRRIE members **educational/training/mentoring modules on CE in aquaculture (linked to A.2.4)**. LiRRIE initiator content-wise adapts the modules to each stakeholder type to effectively transfer targeted knowledge/know-how/expertise. Indicatively: – Educate LiRRIEs members on CE - Present the analysis of the current legal/regulatory context and licensing processes that frame aquaculture development activities and relevant innovative circular production systems (e.g. IMTA/RAS) (linked to A.2.3) – For public stakeholders: mentoring and best practices on aquaculture management-monitoring across and beyond Euro-MED – For private stakeholders: training on circular practices, innovative circular production models, waste management reduction, economic recovery of aquaculture waste, collaboration between supply chains & sectors, symbiosis. Such practices are available in BLUEfasma Knowledge Base. LiRRIE initiator will further identify relevant practices. – Mentoring for new businesses & upgrading existing ones to circular. Knowledge in BLUEfasma capacity building instrument will be used. PPs will conduct events evaluation to collect participants' feedback for improvements. The educational and training material will be available online via project's website. Material includes presentations, tools, literature, user manuals, demonstrative videos, useful sources etc.

Deliverables	Report on the 2nd LiRRIE event. This report will be incorporated in the internal deliverable "D.2.2.2 - LiRRIEs denouement" per partner (chapter X.X. Deepen - X.X.X 2nd LiRRIE event). Also, the educational and training material used for the need of the 2nd LiRRIE event composes the D.2.4.1.

➢ **STEP 2:** MEASURE CIRCULARITY

Activities	Similarly to the 1st LiRRIE event, this event offers a great chance to the LiRRIE initiator to apply the **BLUEfasma circularity self-assessment tool to measure stakeholders' circularity** (linked to D.2.2.1) to any private stakeholder who did not participate in the 1st LiRRIE event and did not already use the tool. The tool is applicable for SMEs and companies acting in the any stage of the value chain of the aquaculture sector. Thus, at the end of the event, LiRRIE initiator supports the SMEs and companies who participate in the event to fill in the online tool (the time needed is around 10 min).
Deliverables	Measurement of businesses circularity level and willingness to invest in blue CE based on the BLUEfasma circularity self-assessment tool. This input is incorporated in D.2.2.1.

➢ **STEP 3:** EVENT'S EVALUATION

Activities	After every LiRRIE event, an evaluation survey will be sent to the participants to collect their feedback to be valorised for improving the next event. The evaluation survey is shared through the AZA4ICE official website (using the website's dedicated functionality).
Deliverables	Short presentation of event's evaluation results. This presentation will be included in the internal deliverable

	"D.2.2.2 - LiRRIEs denouement" per partner (chapter X.X. Frame and Cross-fertilise - X.X.X 1st LiRRIE event).

4.5 PHASE 5 – CO-DECIDE AND CO-CONSTRUCT

CO-DECIDE AND CO-CONSTRUCT	
Start: July 2025	End: November 2025

The main elements of ***Phase 5 – Co-decide and Co-construct*** are shown below:

Responsible	LiRRIE initiator (AZ4ICE partners)
Contributors	Members of LiRRIE forum
Aim	To co-decide and co-construct the C-AZA results (linked to A.1.2), the common transnational Strategy for drafting the AZA4ICE Action Plans (D.3.2.1) and the AZA4ICE Action Plan (D.3.2.2).
How - approach	LiRRIE initiator organises the **3rd LiRRIE event** and the active participation of the members of LiRRIE forum should be ensured. The preparation of the event should be well-organised and the invitation to the LiRRIE members should be sent well in advance to allow them save the date and get prepared (review material sent along with the invitation, collect request data, etc). The invitation should include details on the event format and the expected type of stakeholders' participation. The event includes the following: - Presentation of C-AZA results produced from the pilot testing of the AZA4ICE methodology in the pilot area in A1.2.

	- Discussion on C-AZA results and stakeholders' feedback used as input to A1.3 and internal deliverable D.1.3.1. - Presentation and co-decision on the common transnational Strategy for drafting the AZA4ICE Action Plans (D.3.2.1) - Co-construct the AZA4ICE Action Plan based on the transnational Strategy approved before (linked to D.3.2.2)
Deliverables	✓ Stakeholders' feedback on C-AZA results (linked to A1.3 and internal deliverable D.1.3.1). ✓ Final version of the common transnational Strategy for drafting the AZA4ICE Action Plans (D.3.2.1). ✓ First version of the AZA4ICE Action Plan (D.3.2.2).

The ***step-by-step approach*** follows:

➢ **STEP 1:** Co-decision and co-construction

Activities	The organisation of the 3rd LiRRIE event is the core of the LiRRIE, since in this event the **co-decision of two main project outputs, the C-AZA results and the AZA4ICE Action Plan,** takes place. The 3rd LiRRIE event should begin with the presentation of C-AZA results, as these are produced from the implementation of the AZA4ICE methodology in the pilot area in A1.2. After the results presentation, LiRRIE initiator launches a discussion among stakeholders facilitating them to express their opinion and objections (if any) on the C-AZA results. For the feedback collection, a targeted survey has been developed by IMC in the framework of D.1.3.1 with specific evaluation criteria per target group. This survey can be filled-in by the participants during the event or ex-post (in the framework of the next LiRRIE phase "Evaluate an adjust).

	Next, LiRRIE initiator presents the draft version of the common transnational **Strategy for drafting the AZA4ICE Action Plans (D.3.2.1)**, as it is drafted by the AZA4ICE partnership. The Strategy details the steps to be followed, actors to be involved and their roles, actors' interactions needed before and after Plan's drafting; to ensure its successful development and inclusiveness. A round of discussion follows with the active participation of stakeholders. Their suggestions and comments are being incorporated in the Strategy and thus the **final version is co-decided**. After the collaborative work carried out by the LiRRIE members on the Strategy, the co-development of the **first version of the AZA4ICE Action Plan (D.3.2.2)** ensues. LiRRIE cumulative knowledge and experience gained by the analysis of the current territorial needs; the legislative and licensing framework; the educational, training, mentoring events; discussions and exchanges between the members and external sources; best practices from other areas inside and outside Euro-MED; will be valorised for drafting the AZA4ICE Action Plan for the transition to Inclusive and Circular Economy in aquaculture sector.
Deliverables	Report on the 3rd LiRRIE event and the stakeholders' participation. This report will be incorporated in the internal deliverable "D.2.2.2 - LiRRIEs denouement" per partner (chapter X.X. Co-decide and Co-construct - X.X.X 3rd LiRRIE event). Also, the final version of the Strategy for drafting the AZA4ICE Action Plans composes D.3.2.1. Further, the first draft version of the AZA4ICE Action Plan composes D.3.2.2.

➢ **STEP 2:** EVENT'S EVALUATION

Activities	After every LiRRIE event, an evaluation survey will be sent to the participants to collect their feedback to be valorised for improving the next event. The evaluation survey is shared through the AZA4ICE official website (using the website's dedicated functionality).
Deliverables	Short presentation of event's evaluation results. This presentation will be incorporated in the internal deliverable "D.2.2.2 - LiRRIEs denouement" per partner (chapter X.X. Frame and Cross-fertilise - X.X.X 3rd LiRRIE event).

4.6 PHASE 6 – EVALUATE AND ADJUST

EVALUATE AND ADJUST	
Start: December 2025	End: January 2026

The main elements of ***Phase 6 – Evaluate and Adjust*** are shown below:

Responsible	LiRRIE initiator (AZ4ICE partners)
Contributors	Members of LiRRIE forum
Aim	To collect LiRRIE members' evaluation feedback concerning the C-AZA results and the first version of the AZA4ICE Action Plan, and adjust these outputs accordingly.
How - approach	LiRRIE initiator systematises the collection of the LiRRIE members' evaluation feedback concerning the C-AZA results. The C-AZA results have been presented and discussed among the LiRRIE members during the 3rd LiRRIE event (of the previous LiRRIE phase). LiRRIE

	initiator gets stakeholders feedback including users' acceptance and satisfaction on the results. **For the feedback collection, a targeted survey has been developed by IMC in the framework of D.1.3.1 with specific evaluation criteria per target group.** This targeted survey can be sent by email communication to LiRRIE members or in any other way which is considered more convenient for the collection and the analysis of the evaluation results (e.g. Google form). *If LiRRIE initiator considers it more efficient, the LiRRIE members can respond to the survey in presence during the 3rd LiRRIE event*. LiRRIE members respond to the targeted survey identifying the potential impact of C-AZA. The analysis of stakeholders' evaluation feedback on C-AZA results is presented in the internal deliverable D.1.3.1. Also, LiRRIE initiator sends the first draft version of the AZA4ICE Action Plan (D.3.2.2) - which was co-developed in the 3rd LiRRIE event – to the LiRRIE members for review. Taking into account LiRRIE members' answers and the cumulative knowledge and experience gained during the AZA4ICE project, LiRRIE initiator adjusts the draft Action Plan and delivers the first version of the Action Plan for the transition to Inclusive and Circular Economy in aquaculture sector.
Deliverables	✓ Analysis of stakeholders' evaluation on C-AZA results (linked to A1.3 and internal deliverable D.1.3.1). ✓ First version of the AZA4ICE Action Plan (D.3.2.2).

4.7 PHASE 7 – INTENSIFY AND DISSEMINATE

INTESIFY AND DISSEMINATE	
Start: February 2026	End: March 2026

The main elements of ***Phase 7 – Intensify and Disseminate*** are shown below:

Responsible	LiRRIE initiator (AZ4ICE partners)
Contributors	Members of LiRRIE forum and general public
Aim	To intensify the transition to Inclusive and Circular Economy in aquaculture sector and disseminate AZA4ICE outputs.
How - approach	LiRRIE initiator presents the first version of the **AZA4ICE Action Plan (D.3.2.2)** and launces **an open public consultation** to get feedback for the final delivery of the Action Plans. LiRRIE initiator chooses to proceed with face-to-face (4th LiRRIE event) and/or digital consultation. LiRRIE initiator disseminates the **"Guide with circular aquaculture business practices and opportunities" (D.3.1.1)**; focusing on the transition of the private sector and facilitating businesses' operational change. Dissemination through project communication channels and/or an event (4th LiRRIE event). For uptaking the AZA4ICE Action Plans after the project's end, AZA4ICE partnership will develop a Memorandum of Understanding (MoU) to be signed by PPs and the relevant public agencies, policy and decision makers in the involved areas. LiRRIE initiator engages the LiRRIE members who represent the aforementioned target groups in signing the MoU and in parallel seeks for engaging more stakeholders

	beyond the LiRRIE forum. This is done through face-to-face communication (a collective event such as a 4th LiRRIE event and/or bilateral meetings) and follow-up phone/online communication.
Deliverables	✓ Final version of the AZA4ICE Action Plan (D.3.2.2) incorporating the open public consultation feedback. ✓ Signed MoU.

The ***step-by-step approach*** follows:

➢ **STEP 1:** Open public consultation

Activities	LiRRIE initiator launches the open public consultation of the first version of the AZA4ICE Action Plan (D.3.2.2) through face-to-face and/or digital modality. The first option is achieved via the organisation of the 4th LiRRIE event, while for the digital modality the most appropriate project digital communication channels are used. In both modalities, LiRRIE initiator should ensure equal opportunities for all to contribute to the shaping of the final AZA4ICE Action Plan, meaning that the invitation is not restricted to the LiRRIE forum, but it is open to public. Also, the format in both modalities is that the first version of the AZA4ICE Action Plan (D.3.2.2) is presented and then the stakeholders' feedback is requested for the finalisation of the Action Plan. In general, meeting people face-to-face can create a more personal approach by bringing the stakeholders together to discuss the consultation issue. There is more opportunity for interaction, to ask questions, listen to others' opinions, build trust and reach a consensus. As a result, the feedback is likely to be richer and more in-depth.
Deliverables	Report on the open consultation process and the stakeholders' participation. This report will be included in the internal deliverable "D.2.2.2 - LiRRIEs

	denouement" per partner (chapter X.X. Intensify and Disseminate - X.X.X Open public consultation). Also, the final version of the AZA4ICE Action Plan composes D.3.2.2.

➢ **STEP 2:** Facilitating businesses' operational change

Activities	Disseminate the "Guide with circular aquaculture business practices and opportunities" (D.3.1.1) through project communication channels and/or an event, the 4th LiRRIE event. This document includes guidelines to support existing aquaculture businesses to become circular and trigger the creation of new circular ones. The guide includes successful circular aquaculture business practices and models, as well as opportunities (gaps in the market, funding, financing, mentoring); thus should be disseminated among the corresponding target groups.

➢ **STEP 3:** MoU signing

Activities	LiRRIE initiator engages public agencies, policy and decision makers relevant to AZA4ICE content (being members of LiRRIE forum and beyond) to sign the AZA4ICE MoU. LiRRIE initiator will go beyond the ones already involved in LiRRIEs reaching higher policy level actors at regional and national level. With the objective to set the ground for the uptake of the AZA4ICE Action Plans in the Euro-MED area, AZA4ICE partnership will develop an MoU to be signed by PPs and the stakeholders expressing a convergence of will for Action Plans uptaking after the project's end. PPs will also commit themselves in supporting public actors in their country regarding the uptake of the AZA4ICE Action Plan and the efficient identification of Allocated Zones for Circular Aquaculture in the future.

	The MoU signing is done through face-to-face communication (a collective event, the 4th LiRRIE event and/or bilateral meetings) and follow-up phone/online communication.
Deliverables	Short report on the MoU signing process and the stakeholders' participation. This report will be included in the internal deliverable "D.2.2.2 - LiRRIEs denouement" per partner (chapter X.X. Intensify and Disseminate - X.X.X MoU signing). Also, the collection of signatures composes D.3.3.1.

➢ **STEP 4:** EVENT'S EVALUATION

Activities	After every LiRRIE event, an evaluation survey will be sent to the participants to collect their feedback to be valorised for improvement. In case of organising the 4th LiRRIE event, the evaluation survey is shared through the AZA4ICE official website (using the website's dedicated functionality).
Deliverables	Short presentation of event's evaluation results. This presentation will be incorporated in the internal deliverable "D.2.2.2 - LiRRIEs denouement" per partner (chapter X.X. Frame and Cross-fertilise - X.X.X 4th LiRRIE event).

TABLES AND FIGURES

LIST OF SOURCES

Alasoini, T. 2011. Workplace Development as Part of Broad-based Innovation Policy: Exploiting and Exploring Three Types of Knowledge. Nordic Journal of Working Life Studies, 1, 23–43.

Almirall, E., Wareham, J., 2011. Living Labs: arbiters of mid-and ground-level innovation. Technol. Anal. Strat. Manag. 23 (1), 87-102.

Ballon, P., Schuurman, D., 2015. Living labs: concepts, tools and cases. Info 17 (4).

Bergvall-Kareborn, B., Hoist, M., Stahlbrost, A., 2009. Concept Design with a Living Lab Approach, in: 2009 42nd Hawaii International Conference on System Sciences. Presented at the 2009 42nd Hawaii International Conference on System Sciences, pp. 1–10. https://doi.org/10.1109/HICSS.2009.123

Bergvall-Kareborn, B., Stahlbrost, A., 2009. Living Lab: an open and citizen-centric approach for innovation. Int. J. Innovat. Reg. Dev. 1 (4), 356-370.

Bergvall-Kåreborn, B., Eriksson, C.I., Ståhlbrost, A., Svensson, J., 2009. A milieu for innovation: defining living labs. In: ISPIM Innovation Symposium.

Budweg, S., Schaffers, H., Ruland, R., Kristensen, K., Prinz, W., 2011. Enhancing collaboration in communities of professionals using a Living Lab approach. Prod. Plann. Contr. 22 (5-6), 594-609.

Carayannis et al.: The Quintuple Helix innovation model: global warming as a challenge and driver for innovation. Journal of Innovation and Entrepreneurship 2012 1:2.

Cleland, B., Mulvenna, M., Galbraith, B., Wallace, J.G., Martin, S., 2012. Innovation of eParticipation Strategies Using Living Labs as Intermediaries. Electron. J. E-Gov. 10, 120– 132.

Clermont, F., Fionda, F., Molinari, F., Molino, F., & Nossen, V. (2013). Guidelines on Cross-border Living Labs. Retrieved 5th of June 2013 from http://www.alcotra-innovation.eu/progetto/doc/Final_version_D_3.1_long_12_aprile_2012.pdf

Compagnucci, L., Spigarelli, F., Coelho, J., Duarte, C., Living Labs and user engagement for innovation and sustainability, Journal of Cleaner Production, Volume 289, 2021, 125721, ISSN 0959-6526, https://doi.org/10.1016/j.jclepro.2020.125721.

Council of Europe (2011) Involving citizens and communities in securing societal progress for the well-being of all, Strasbourg: Council of Europe. European Commission, 2011:9

Dell'Era, C., Landoni, P., 2014. Living Lab: a methodology between user-centred design and participatory design. Creativ. Innov. Manag. 23 (2), 137e154.

Dvarioniene, J., Gurauskiene, I., Gecevicius, G., Trummer, D.R., Selada, C., Marques, I., Cosmi, C., 2015. Stakeholders involvement for energy conscious communities: the Energy Labs experience in 10 European communities. Renew. Energy 75, 512-518.

Dutilleul, B., Birrer, F.A.J., Mensink, W., 2010. Unpacking European living labs: analysing innovation's social dimensions. Cent. Eur. J. Public Policy 4, 60e85.

Edwards-Schachter, M.E., Matti, C.E., Alcantara, E., 2012. Fostering quality of life through social innovation: a living lab methodology study case. Rev. Pol. Res. 29 (6), 672-692.

ENoLL, 2018. Bill Mitchell, Father of the Living Lab Concept, Passed Away This Weekend. http://www.openlivinglabs.eu/news/call-papers-living-labsopenlivinglab-days-2018 (22.02.2018).

Eriksson, M., Niitamo, V.-P., Kulkki, S., Hribernik, K., 2006. Living labs as a multicontextual R&D methodology. In: The 12th International Conference Ldots.

European Commission, 2009. Living Labs for User-Driven Open Innovation, an Overview of the Living Labs Methodology, Activities and Achievements.

European Commission The Three Essential Steps on Co-Creation: https://ec.europa.eu/esf/transnationality/content/three-essential-steps-co-creation

Evans, J., Jones, R., Karvonen, A., Millard, L., Wendler, J., 2015. Living labs and coproduction: university campuses as platforms for sustainability science. Curr. Opin. Environ. Sustain. 16, 1-6.

Feurstein, K., Hesmer, A., Hribernik, K.A., Thoben, K.D., Schumacher, J., 2008. Living Labs: a New Development Strategy. European Living Labs-a new approach for human centric regional innovation, pp. 1-14.

Følstad, A., 2008a. Living labs for innovation and development of information and communication technology: a literature review. Electron. J. Virt. Org. Network. 10, 99-131.

Følstad, A., 2008b. Towards a living lab for development of online community services. Electron. J. Virt. Org. Network. 10, 47-58.

Fourati-Jamoussi, F., Dubois, M.J.F., Agn_es, M., Leroux, V., Sauv_ee, L., 2019. 2. Sustainable development as a driver for educational innovation in engineering school: the case of UniLaSalle. Eur. J. Eng. Educ. 44 (4), 570e588.

Franz, Y., Tausz, K., Thiel, S.-K., 2015. Contextuality and Co-creation matter: a qualitative case study comparison of living lab concepts in urban research. Technol. Innov. Manag. Rev. 5, 48e55. https://doi.org/10.22215/timreview/952.

Gourville, J. T. 2005. The curse of innovation: Why innovative new products fail. MSI Report, 5(117), 3-23.

Gray, M., Mangyoku, M., Serra, A., Sanchez, L., Aragall, F., 2014. Integrating design for all in living labs. Technol. Innov. Manag. Rev. 4, 50e59. https://doi.org/10.22215/timreview793.

Guimont, D., Lapointe, D., 2016. Empowering local tourism providers to innovate through a living lab process: does scale matter? Technol. Innovat. Manag. Rev. 6 (11), 18-25.

Guzman, J.G., del Carpio, A.F., Colomo-Palacios, R., de Diego, M.V., 2013. Living labs for user-driven innovation: a process reference model. Res. Technol. Manag. 56 (3), 29-39.

Guzman, J.G., del Carpio, A.F., Colomo-Palacios, R., de Diego, M.V., 2013. Living labs for user-driven innovation: a process reference model. Res. Technol. Manag. 56 (3), 29-39.

Hakkarainen, L., Hyysalo, S., 2013. How do we keep the living laboratory alive? learning and conflicts in living lab collaboration. Technol. Innovat. Manag. Rev.3 (12), 16-22.

Hossain, M., Leminen, S., Westerlund, M., 2019. A systematic review of living lab literature. J. Clean. Prod. 213, 976-988.

Hyysalo, S., Hakkarainen, L., 2014. What difference does a living lab make? Comparing two health technology innovation projects. CoDesign 10 (3-4), 191-208.

Knight, T., 1749. Reflections upon Catholicons, or Universal Medicines. Printed for T. Osborne in Gray's-Inn, London.

Koning, J. de, Crul, M., Wever, R., 2016. Models of co-creation, in: Service Design Geographies: Proceedings of the ServDes.2016 Conference. Presented at the ServDes. 2016: Fifth Service Design and Innovation conference, Linköping University Electronic Press, pp. 266– 278.

Leminen, S., 2013. Coordination and participation in living lab networks. Technol. Innovat. Manag. Rev. 3 (11), 5-14.

Leminen, S., Westerlund, M., 2016. A framework for understanding the different research avenues of living labs. Int. J. Technol. Market. 11 (4), 399-420.

Leminen, S., Westerlund, M., 2017. Categorization of innovation tools in living labs. Technol. Innovat. Manag. Rev. 7 (1), 15-25 (JUFO 1).

Leminen, S., Westerlund, M., Nystrom, A.G., 2012. Living Labs as open-innovation networks. Technol. Innovat. Manag. Rev. 2 (9), 6-11.

Leminen, S., Nystrom, A.G., Westerlund, M., Kortelainen, M.J., 2016. The effect of network structure on radical innovation in living labs. J. Bus. Ind. Market. 31 (6), 743-757.

Leminen, S., Niitamo, V.P., Westerlund, M., 2017a. A brief history of living labs: from scattered initiatives to global movement. In: OpenLivingLab Days 2017. August 29-September 1, 2017. Krakow, Poland.

Leminen, S., Rajahonka, M., Westerlund, M., 2017b. Towards third-generation living lab networks in cities. Technol. Innovat. Manag. Rev. 7 (11), 21-35.

Malmberg, K., Vaittinen, I., Evans, P., Schuurman, D., Ståhlbröst, A., Vervoort, K., 2017. Living Lab Methodology Handbook. Zenodo. https://doi.org/10.5281/zenodo.1146321

Mastelic, J., Sahakian, M., Bonazzi, R., 2015. How to keep a living lab alive? Info 17, 12e25. https://doi.org/10.1108/info-01-2015-0012.

Molinari, F. (2011). Seven steps to build up a “Cross Border Living Lab”: The LEADERS approach, Ptuj, Slovenia - 31st May 2011

Mulder, I., Velthausz, D., Kriens, M., 2008. The living labs harmonization cube: communicating living lab's essentials. Electron. J. Virt. Org. Network. 10, 1-14.

Mulder, K.F., 2007. Innovation for sustainable development: from environmental design to transition management. Sustain. Sci. 2 (2), 253e263.

Nesterova, N., Quak, H., 2016. A City Logistics Living Lab: A Methodological Approach. Transp. Res. Procedia, The 2nd International Conference “Green Cities - Green Logistics for Greener Cities”, 2-3 March 2016, Szczecin, Poland 16, 403–417. https://doi.org/10.1016/j.trpro.2016.11.038

Nystrom, A.G., Leminen, S., Westerlund, M., Kortelainen, M., 2014. Actor roles and role patterns influencing innovation in living labs. Ind. Market. Manag. 43 (3), 483-495.

Osterwalder, A. (Nov 2006). Business Model Template. Retrieved 15th of May 2013 from http://www.slideshare.net/Alex.Osterwalder/business-model-template

Osterwalder, A., & Pigneur, Y. (2010). Business Model Generation: A Handbook for Visionaries, Game Changers, and Challenger. John Wiley & Sons

Pascu, C., van Lieshout, M., 2009. User-led, citizen innovation at the interface of services. Info 11, 82e96. https://doi.org/10.1108/14636690910996731.

Peltomaki, A., 2008. Foreword. In Living Labs for user-driven open innovation: an overview of the Living Labs methodology, activities and achievements. Eur. Comm. Luxemb. Off. Off. Publ. Eur. Communities 5.

Pino, M., Benveniste, S., Kerherv_e, H., Picard, R., Legouverneur, G., Cristancho- Lacroix, V., Wu, Y.H., Damn_ee, S., Wrobel, J., Rigaud, A.-S., 2014. Contribution of the Living Lab approach to the development, assessment and provision of assistive technologies for supporting older adults with cognitive disorders. Stud. Inform. Universalis 11, 34e62.

Rits, O., Schuurman, D., Ballon, P., 2015. Exploring the benefits of integrating business model research within living lab projects. Technol. Innovat. Manag. Rev. 5 (12), 19-27.

RRI Policies in The Netherlands, a brief characterization, http://www.rritrends.resagora.eu/uploads/27/RRI%20in%20the%20Netherlands%201st%20Report_final.pdf and https://www.nrin.nl/ri-collection/ri-enterprises/research-consortia/responsible-research-and-innovation-inpractice/

RRI in Denmark by Innovationsfonden, https://innovationsfonden.dk/sites/default/files/2018-08/krav-omansvarlig-forskning-innovationsfonden-rri.pdf

RRI in Norway by the Research Council of Norway, https://www.forskningsradet.no/prognettiktpluss/Responsible_Research_and_Innovation_RRI/1254026382879

RRI in Australia https://www.eait.uq.edu.au/responsible-research-and-innovation-practice-rripractice-australian-context

Schaffers, H., Turkama, P., 2012. Living Labs for cross-border systemic innovation. Technol. Innovat. Manag. Rev. 2 (9), 25-30.

Schaffers, H., Cordoba, M. G., Hongisto, P., Kallai, T., Merz, C., & Van Rensburg, J. (2007). Exploring business models for open innovation in rural Living Labs. 13th International Conference on Concurrent Enterprising. Sophia: ICE'2007

Schuurman, D., De Marez, L., 2012. Structuring user involvement in panel-based living labs. Technol. Innovat. Manag. Rev. 2 (9), 31-38.

Schuurman, D., De Moor, K., De Marez, L., Evens, T., 2011. A Living Lab research approach for mobile TV. Telematics Inf. 28 (4), 271-282.

Schuurman, D. 2015. Bridging the gap between Open and User Innovation?: exploring the value of Living Labs as a means to structure user contri¬bution and manage distributed innovation (Doctoral dissertation, Ghent University), available at https://biblio.ugent.be/publication/5931264/file/5931265.pdf

Ståhlbröst, A., 2008. Forming future IT: the living lab way of user involvement. Luleå University of Technology Department of Business Administration and Social Sciences Division of Informatics.

Ståhlbrost, A., 2013. A living lab as a service: creating value for micro-enterprises through collaboration and innovation. Technol. Innov. Manag. Rev. 3, 37e42. https://doi.org/10.22215/timreview744.

Ståhlbrost, A., Bergvall-Kåreborn, B., 2011. Exploring users motivation in innovation communities. Int. J. Enterpren. Innovat. Manag. 14 (4), 298-314.

Ståhlbröst, A., & Holst, M. (2011). The Living Lab Methodology Framework. Retrieved 6th of June 2013 from http://www.ltu.se/cms_fs/1.101555!/file/LivingLabsMethodologyBook_web.pdf

Tukiainen, T., Leminen, S., Westerlund, M., 2015. Cities as collaborative innovation platforms. Technol. Innovat. Manag. Rev. 5 (10), 16-23.

United Nations General Assembly, 2015. Transforming our world: the 2030 agenda for sustainable development", 25 September.

van der Have, R.P., Rubalcaba, L., 2016. Social innovation research: an emerging area of innovation studies? Res. Pol. 45 (9), 1923-1935.

Veeckman, C., Schuurman, D., Leminen, S., Westerlund, M., 2013. Linking living lab characteristics and their outcomes: towards a conceptual framework. Technol. Innovat. Manag. Rev. 3 (12), 6-15.

Vicini, S., Bellini, S., Sanna, A., 2012. How to co-create internet of things-enabled services for smarter cities, SMART 2012.

https://www.researchgate.net/publication/234129213_How_to_co-create_internet_of_things-enabled_services_for_smarter_cities

Voytenko, Y., McCormick, K., Evans, J., Schliwa, G., 2016. Urban living labs for sustainability and low carbon cities in Europe: towards a research agenda. J. Clean. Prod. 123, 45-54.

Westerlund, M., Leminen, S., 2011. Managing the challenges of becoming an open innovation company: experiences from living labs. Technol. Innovat. Manag. Rev. 1 (1), 19

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