



PROJECT H2020

LIVERUR

Living Lab Research Concept in Rural Areas

DELIVERABLE 3.5:

**Report on the development of
innovative models**



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TABLE OF CONTENTS

INTRODUCTION.....	10
OBJECTIVES.....	11
1 LIVING LAB AS A FRAMEWORK TO IMPROVE RURAL INNOVATION.....	12
1.1 Circular Economy inspired open innovation ecosystem in rural & peri urban areas	12
1.2 Overview of Open Innovation 1.0 and Open Innovation 2.0	14
1.3 10 types of Innovation	15
1.4 The evolutionary steps of Open Innovation in LIVERUR	16
2 DEVELOPING INNOVATIVE MODELS IN RURAL CIRCULAR ECONOMY: THE BASIC MISSION AND ROLE OF CIRCULAR RURAL LIVING LABS.....	17

2.1. Basic requirements from the Circular Rural Living Labs	17
2.2. Integrating the 4 layers: the four main pillars, the Living Lab essentials, the Circular Economy (CE) principles with the Open Innovation`s four main headings.....	18
2.2.1. The four pillars in the upcoming LIVERUR Circular Rural Living Labs (T3.2.)	18
2.2.2. Organisational, contextual and technological fundamentals of RLLs (T3.3.).....	19
2.2.3. The transition from Lean to Circular Living Labs (T3.4.).....	19
2.3.4. Adaptation of the Open Innovation`s main headings into the Circular Rural Living Labs	20
3 LIVING LABS ARE ONE EXAMPLE OF THE OPEN INNOVATION 2.0 ECOSYSTEM DEVELOPMENT	21
4 MEASURING THE INNOVATION BY TRL @ CIRCULAR RURAL LIVING LABS	22
4.1 Technology sustainability: TRL at Rural Innovation and Circular Economy.....	22
4.2. Financial sustainability: Enhancing Rural Innovation in the Circular Economy at RLL level	23
4.2.1. Rethinking the linear economy to serve new market segments.....	23
4.2.2. New technology is a significant enabler of the circular economy: Innovation outcomes and opportunities for Rural Living Labs	24
4.2.3. Five business models driving the rural circular economy.....	25
4.3 Best Practice: An example of resource recovery from INTERFACE collaborating with fishermen in the Philippines by ING Economic Department .	28
4.4 Best Practice: An example of AgroTech innovation by The Rural Innovation Lab from New Zealand	29

4.5 What did we learn from the Case Studies?	30
4.6 Measuring the Rural Innovation at Circular Rural Living Labs (CRLs)	31
5 PRE-ASSESSMENT OF THE 13 CIRCULAR LIVING LABS'S CONCEPTS BY THE CIRCULAR ECONOMY INSPIRED OPEN INNOVATION (COI) ECOSYSTEM AND MODEL THROUGH RURAL LIVING LABS	32
5.1 The List and project name of each LIVERUR piloting areas (by T4.1).....	32
5.2 Pre-assessment of 13 LIVERUR supported Rural Living Labs: Circular concepts are done or not yet?.....	32
CONCLUSIONS	36
REFERENCES	38

FIGURES

Figure 1. 10 types of Innovation.....	15
Figure 2. 10 types of Innovation: “How” of Innovation in rural dimension?	16
Figure 3. The Ten Types of Innovation® framework on iPad	20
Figure 4. Finance - Process - Offering - Delivery in Innovation, the layers of the app .	21
Figure 5. The CE inspired Open Innovation ecosystem and model through Rural Living Labs.....	22
Figure 6. Traditional market segments vs New market segments	24

Figure 7. How the technologies benefit the circular economy	25
Figure 8. Five (5) Business models in the Circular Economy	27
Figure 9. Resource recovery and Product as a Service (PaaS) Business model	28
Figure 10. The proposed achievement for LIVERUR at TRL level 7	30
Figure 11. Evolution of sustainable oriented innovation and collaboration (adapting and integrating).....	31

TABLES

Table 1. List of Partners and piloting topics...32
Table 2. Pre-assessment of 20 selected Rural Living Lab pilot projects.....35

EXECUTIVE SUMMARY

Purpose – Objective: Development of innovative models in existing territorial rural business areas in the consortium (Lead role: TRA).

Input: Every partner will contribute according to their expertise.

Activity: T3.5 develop an integration technique for all the actors in existing territorial rural business areas to a transition into the circular economy. In the middle of the business are the Consumers and all the aspects of the Sustainability in the Circular Economy: **1. Circular Supplies 2. Resource Recovery, 3. Product Life Extension 4. Sharing Platforms 5. Product as a Service 6. The emerging Business model in the circular economy as a Rural Circular Economy framework.**

Design/methodology/approach – *In the previous T3.2, T3.3 and T3.4., it was explored how Rural Living Labs have been emerged based on Best Practices, at the intersection of transition management from linear to circular economy through, user involvement, participatory & co-creative design, open innovation, experimentation, TRL in innovation etc... It is then suggested that the LEAN and Circular BMC would be a complementary tool in Living Lab development (T3.4.). Based on the 5 basic circular business*

models, this task making the first pre-assessment about the basic concepts of the planned 13 LIVERUR circular rural Living Labs.

Findings – An integrated technique and model (as the outcomes of T3.2, T3.3 and T3.4) is designed where not only a few innovative models would be presented, analysed but also the concepts of the 13 new circular rural living labs would be pre-assessed as well.

Originality/value – Circular Open Innovation (COI) requires innovations at all levels (e.g., process, product, organisation, business model) to enable systemic change, but it also requires changes from the Rural Living Lab's strategy, engagement with society, and the way in which value is created.

Keywords - Circular Economy; circular oriented innovation; sustainable oriented innovation; collaborative innovation; circular drivers and barriers; circular experimentation, Rural Living Labs, Circular Open Innovation (COI), product innovation, service innovation , process innovation.

INTRODUCTION

LIVERUR combines relevant rural topics (Agriculture, Tourism, Innovation, Energy & Environment, Food, Water, Mobility, Entrepreneurship, Social Innovation etc.) for **future challenges in rural/remote/mountain areas** to give them real and sustainable perspectives in order not to force them to leave their living areas.

We are collaborating on a unique initiative and open innovation approach (called **Living Lab**) providing knowledge transfer from our research results, reusable/ replicable methods and tools to carry out such a transformation (technological, socio-economic, human-centric) for all partners in their targeted territories.

LIVERUR project aims at bringing rural innovation along with high impact to the broad spectrum to **the agricultural activities, entrepreneurship, job creation, digital skills improvement, shared and circular economies along with new business models and prototypes for better decision-making and community engagement.**

The urbanisation, as a general tendency today means significant changes in our living standards, but we must keep the nature-centric, ecological lifestyles, values of the tourism / tangible and intangible cultural heritage

in our villages where we were born. **Our traditional family-centric social behaviour is coming from rural communities since centuries**, the sensitivity for social innovation is originated from our villages and the common wish: to keep them more sustainable as our primary mission comes from our roots.

OBJECTIVES

The circular economy refers to a development strategy of the rural communities that allows economic growth by optimising **the use of natural resources** (raw materials, water), **minimising environmental** pressures & climate change, transforming supply chains (seed, food, craft, wood etc..) **and consumption patterns and redesigning production systems** so that they are **restorative or regenerative by intention and design**. **A transition from lean to a (more) circular economy requires a systemic approach that considers the interconnections that exist within and between sectors, institutions and local actors (Quadruple Helix governance).**

The aim of this task is to reflect on **the main characteristics and the territorial model of the new rural living labs for a circular rural economy, which directs the piloting actions through a local lens to promote closer interaction between actors, by optimising the use of resources, and between production processes and social and cultural matrices.**

Why we are using territorial rural in our business partnerships? It is explained by the fact that these years, the rural business partnerships are incorporated in a new trans-territorial dimension. "Rural territorial" or "territorial rural" definitions exists also in the literature. (e.g. Zonneveld, W, Stead, D (2007) European territorial cooperation and the concept of urban–rural relationships. Planning, Practice & Research 22(3): 439–453.). "Territorial" correspond to the strategic planning & large projects in statistical regions, "rural" means area-based spatially broad definition.

1 LIVING LAB AS A FRAMEWORK TO IMPROVE RURAL INNOVATION

According to the LIVERUR main objectives to use the Living Lab as an Instrument and Framework to build a new integrated rural economy perspective, model for deploying and replicating new rural innovations in the selected piloting regions, Herselman and Cunningham [2011] propose this definition :

“Living Labs are environments, a methodology or an approach which caters for user-driven open innovation within real-life rural and urban settings/communities, where users can collaborate with multiple committed stakeholders (whether NGOs, SMMEs, industrial, academic/research, government institutions or donors) in one or more locations, to become co-creators or co-designers of innovative ideas, processes or products within multidisciplinary environments. Successful deployments can result in improved processes or service delivery, new business models, products or services, and can be replicated (with necessary socio-cultural adaptation) to improve the overall quality of life and wider socio-economic impact (including entrepreneurship) in participating and other communities”.

Leveraging Living Labs methodologies and Living Labs Network through RAIN platform, LIVERUR provides a valuable opportunity to collaborate, co-create, prototype and test new products and services, technologies, processes, business models or ideas customised for the local/national and global markets in the transition to the circular economy.

In this task, the following chapters will not only offer and integration technique to build and evaluate innovative models in rural innovation but also pre-assess the new 13 Circular Rural Living Labs focused around social and technological innovation and their Technology Readiness Level (TRL).

1.1 Circular Economy inspired open innovation ecosystem in rural & peri urban areas

According to the CE definitions and main principles, the circularity of goods (raw materials, by-products) and recycling the waste (food, water, etc.) offers a huge potential for a revolutionary change in all sectors and global innovation in technologies , organisations and business models , or in social innovation, to ensure the sustainability in rural and peri-urban area as well at worldwide level (Boons and Lüdeke-Freund, 2013¹; Ghisellini et al., 2016²; Bocken et al., 2016³).

At same time the circularity of the practices and processes fostering the development of new products, new type of CE business models , like Platform as a Service (PaaS) and open innovation platforms (innovation ecosystems) at global level (Lewandowsky⁴; Gorissen et al., 2016⁵).

1 Boons, F., & Lüdeke-Freund, F. (2013). Business models for sustainable innovation: state-of-the-art and steps towards a research agenda. *Journal of Cleaner Production*, 45, 9-19.

2 Ghisellini, P., Cialani, C., & Ulgiati, S. (2016). A review on circular economy: the expected transition to a balanced interplay of environmental and economic systems. *Journal of Cleaner Production*, 114, 11-32

3 Bocken, N. M., de Pauw, I., Bakker, C., & van der Grinten, B. (2016). Product design and business model strategies for a circular economy. *Journal of Industrial and Production Engineering*, 33(5), 308-320.

4 Lewandowski, M. (2016). Designing the business models for circular economy—Towards the conceptual framework. *Sustainability*, 8(1), 43.

5 Gorissen, L., Vrancken, K., & Manshoven, S. (2016). Transition thinking and business model innovation—towards a transformative business model and a new role for the reuse centres of Limburg, Belgium. *Sustainability*, 8(2), 112

LIVERUR demonstrates well there is a growing interest and need in the rural communities, and hopefully would be celebrating the benefits and showcasing successful exhibits of CE.

More piloting actions and connected research and innovation works are required to begin to understand the complexities of this potentially world-changing phenomenon fully.

The early phase discussions with users have identified that innovation in the CE debate often means dealing with **radical changes**, particularly **in the way resources are managed and shared between actors, thus inspiring open and collaborative approaches to innovation and technological development.**

With the growing realisation of **the benefits of Open Innovation across the rural economy**, CE in turn can bring about **new business model innovation, invite new and radical resource efficiencies, extend product life-cycles through re-use, re-manufacturing, re-furbishing, new design approaches** (such as cradle-to-cradle) **and radically change the rural or peri-urban's products and services** (Planing, 2015⁶). The new business models in CE not only give new alternatives and collaborations for the main actors in various sectors, but also are optimising the scenarios by using raw materials & natural resources by recycling (Smith et al., 2⁷; Schaltegger and Wagner, 2011⁸).

When the private sector is enough motivated by start-ups, new ventures, small and medium enterprises (SMEs) and large corporations, the CE inspired innovations and business models would restructure the local economy. Local tech labs (such as Rural Living Labs) are needed to use the common power of the new PPPP collaborations and to commercialise the new practices & experiences. **The local groups of actors in the rural business and innovation ecosystems companies and their shareholders could enter into a new dimension of “profit” making environments and to share and reinvest in social sectors and social innovation as an expression of social responsibility.** This is a new challenge thanks to the new opportunities of CE in the rural and peri-urban context as well.

All the new experimentations through **circular rural living labs require a strong** relationship and cooperation between the main actors, from ideation till commoditisation. For example, **while CE becomes a main driver in the local economies, the local actors could co-design, interact, and share the resources by emerging the innovative practices collaboratively.**

From this perspective, the question remains on how to reconcile competition with cooperation/ collaboration, how to protect and manage intellectual property rights (IPRs), **how the CE powered innovation ecosystems could use the open innovation approaches, how the Rural Living Labs could design a participative governance model to improve and monitor the new value added products and processes.**

Many of these tensions and challenges are already being explored in the Open Innovation and field management (Geels, 2011⁹; Smith et al., 2014¹⁰), and **LIVERUR** community is keen to encompass these perspectives.

6 Planing, P. (2015). Business model innovation in circular economy reasons for non-acceptance of circular business models. *Open journal of business model innovation*, 1, 11.

7 Smith, A., Voß, J. P., & Grin, J. (2010). Innovation studies and sustainability transitions: The allure of the multi-level perspective and its challenges. *Research policy*, 39(4), 435-448.

8 Schaltegger, S., & Wagner, M. (2011). Sustainable entrepreneurship and sustainability innovation: categories and interactions. *Business strategy and the environment*, 20(4), 222-237.

9 Geels, F. W. (2011). The multi-level perspective on sustainability transitions: Responses to seven criticisms. *Environmental innovation and societal transitions*, 1(1), 24-40.

10 Smith, A., Fressoli, M., & Thomas, H. (2014). Grassroots innovation movements: challenges and contributions. *Journal of Cleaner Production*, 63, 114-124.

LIVERUR focussing on the horizontal and vertical levels of Open Innovation and the Circular Economy needs in rural and peri-urban areas, to adding the social impacts as a new dimension, which imply the access of the social actors as well into the circular businesses (Murray et al., 2017¹¹). The project will measure what are the implications of radically new business and governance models and **how we do business for rural farmers, cooperatives, family businesses, employees, communities and civil societies? Will, the innovations of the rural circular economy, just improve business value and protect or grow the role of the environment, or will they also contribute to healthier, more resilient and more prosperous communities and societies accordingly?**

This Task (T3.5.) and other tasks in WP2, WP3, WP4, WP5 and WP6 recognize the relevance of sharing knowledge and capabilities in line with the Open Innovation agenda. We hence wish to debate the interaction between Open Innovation and CE, highlighting the social innovation dimension of CE as well (more in RAIN platform).

We are particularly interested in questioning how CE can inspire rural people in rural communities to work together in innovative ways and methodologies (such as Circular Rural Living Labs) to bring about positive social, economic and environmental changes.

1.2 Overview of Open Innovation 1.0 and Open Innovation 2.0

Open Innovation 1.0 refers to new forms of collaboration between firms along value chains in order to enhance experimentation and research and development capabilities. **The fundamental idea of open innovation 1.0 refers to the need for firms to connect their internal innovation with external ideas coming from other institutional actors, including suppliers, clients and public labs.**

An example of open innovation 1.0 documented by Chesbrough (2003)¹² Is the Xerox Palo Alto Research and Development Research Centre (Xerox PARC), which developed many of the ideas and innovations of the information and communications technology revolution – including the Ethernet network protocol (3Com), publishing technology (that led to Adobe) and graphical user interface for personal computers – yet did not profit directly from such technology. Instead, Xerox licensed many of these innovations and allowed employees to create their own companies.

Open innovation 2.0 is based on the idea that innovation should involve not only large institutional players such as companies and research and development and innovation labs but also end-users and civic actors¹³. Although this is an evolving term, the basis of open innovation 2.0 is the possibility of creating interdependence among different actors in order to foster innovation. **Open innovation 2.0 thus benefits from developments in social networks, Internet resources and new tools such as the use of big data to foster more fluid forms of interaction.**

11 Murray, A., Skene, K., & Haynes, K. (2017). The circular economy: An interdisciplinary exploration of the concept and application in a global context. *Journal of Business Ethics*, 140(3), 369-380.

12 Chesbrough, H.W., 2003. *Open innovation: The new imperative for creating and profiting from technology*. Harvard Business School Press, Boston

13 [Open Innovation Strategy and Policy Group \(OISPG\) Open Innovation 2.0 Conference](https://ec.europa.eu/digital-single-market/en/news/open-innovation-20-conference-2014) (Dublin, 12.06.2014). <https://ec.europa.eu/digital-single-market/en/news/open-innovation-20-conference-2014>

In practice, Open Innovation 2.0 requires building connective infrastructure such as open data, web-based platforms and fab labs and/or Living Labs **in order to create knowledge interchanges between different forms of expertise and to seek the cross-pollination of ideas with a broader range of actors**. Open innovation 1.0 and open innovation 2.0 differ from **commons-based peer production**, in that they retain their aim to **capture value through private mechanisms in urban and rural areas as well**.

1.3 10 types of Innovation

In **LIVERUR** project, due to the complexity of the main goals (circular, rural, open innovation, living lab etc.) at vertical and horizontal level, the innovation must covers different areas. Therefore the 10 types of Innovation, developed by Chicago based Design and Innovation consultants, Doblin Inc¹⁴, are the most suitable to plan and measuring the achievements of **LIVERUR** Circular Rural Living Labs. Doblin gives 10 different types of innovation under four pillars where we must add the Open Innovation characters as well.

- ✓ **Finance**, incorporate new business models and networks / innovation ecosystems
- ✓ **Process**, the combination of “processes” and “core processes” to add value
- ✓ **Offerings**, containing “Product performance”, “Product system” and “Service”
- ✓ **Delivery**, covering channel, brand and customer experience

Here is a diagram to illustrate the 10 types of innovation

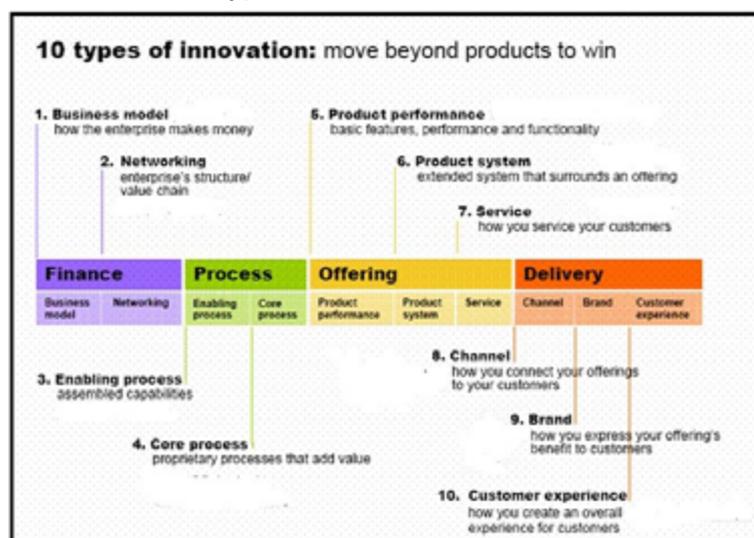


Figure 1. 10 types of Innovation. Source: Doblin Inc.

Many open innovation actions focus **on one or two areas**, but Doblin claims that if the core teams focus on a broader range of innovations which have relevance to their target market, the chances of success can be increased. To illustrate this, Doblin says that **some project initiators/ owners can innovate across 7 of the 10 types of innovation**.

What and how we could recognise any of the mentioned innovation types in the new 13 **LIVERUR** piloting areas?

Larry Keeley and his team at Doblin Group became popular by their concepts of **“Ten Types” of innovation**. Keeley and his team created a very nice graphic that captures many of the different

14 10 types of Innovation. More: <https://doblin.com/ten-types>

good linkage with the rural community as well as the urban areas where resources are plentiful; they are literate, communicative, and they understand how the rural economic and social system operates and therefore can participate effectively in it.

The implementation of open innovation as a way to interact with internal and external actors (idea owners, developers, users, stakeholders, researchers, startups, family-owned businesses, producers, suppliers, logistic, transport, packaging and technology companies, civil society, cooperatives, social enterprises, municipalities, policymakers, regulators, NGOs, associations etc.) in rural and peri-urban areas is of growing interest as more and more realize that **innovation is too complex to be mastered by our own.**

How could we understand the complexity of the Rural Circular Economy and Open Innovation, which is fully supported by user-driven ICT enabled Rural Living Labs?

2 DEVELOPING INNOVATIVE MODELS IN RURAL CIRCULAR ECONOMY: THE BASIC MISSION AND ROLE OF CIRCULAR RURAL LIVING LABS

Based on an established list of needs, each Circular Rural Living Labs shall consider a variety of applications and processes in rural and peri-urban areas that could be integrated into one well defined local system, and that are viable on a small scale (farm to rural community level).

2.1. Basic requirements from the Circular Rural Living Labs

- 1) The **TRL of the technologies considered can vary at the start.** All LIVERUR branded Circular Rural Living Labs shall test and demonstrate **the combination of these in a circular configuration. The integrated system shall achieve at least TRL 7 or higher level.** TRL 6 is still a critical point.
- 2) Each Circular Rural Living Labs shall focus on a single system that should be common in Europe and **offer high replication potential**, and can be combined with sustainable management of natural areas and/or use of marginal lands. **A complete assessment (economic, environmental and social) of the integrated system shall be carried out. Each Rural Living Labs shall include a draft business model and a set of policy options and recommendations.**
- 3) The new Circular Rural Living Labs shall fall **under the concept of the ‘multi-actor approach based on Quadruple Helix model**, ensuring solid collaboration between relevant actors such as farmers or farmers associations, AgroTech industry (including small businesses), technology providers, research centers or public authorities. The piloting areas should include a task to internal clusters (food, tourism, craft etc.)
- 4) To boost the development of a rural economy, **there is a need for new types of investment models based on the real business potentials that can be replicated easily in a variety of locations and contexts.** The Circular Rural Living Labs should be **the driver and boost the relatively low levels of investment**, risk and technical sophistication in the targeted rural areas.

- 5) A wider range of **rural entrepreneurs** needs to get involved in **the emerging and more digital rural - based business** sectors, including farmers, family-owned businesses, their associations, startups, and small rural business. This will help to diversify and revitalise the economy and create quality jobs in rural areas. Circular Rural Living Labs need to do more support the local training, services, tools in their respective territories. They should, therefore, have a range of options to choose from and be able to select the approach that best suits local needs and assets using the RAIN platform.
- 6) To create a **new economic model that is based on the Circular Economy as opposed to the linear ‘take-use-dispose’ model and strives toward zero-waste**. The design by Circular Rural Living Labs will incorporate local industries that convert the outputs of any process into the inputs of another, thus creating new work and innovation ecosystem’s opportunities for the local communities.

2.2. Integrating the 4 layers: the four main pillars, the Living Lab essentials, the Circular Economy (CE) principles with the Open Innovation’s four main headings

In order to start **designing for a real-world dealing with real-life issues - a Living Lab approach** will be taken, aiming to provide sustainable well-being and communication for all. First steps to reach these goals will be taken by **contributing to the improvement of the socio-economy of the rural community as a whole and specific target groups (people, students, entrepreneurs, professionals) in the targeted areas**, offering affordable (wireless or radio network such as SigFox and LoRaWan etc.) communication, **new services and digital applications offerings that truly contribute to the most demanding/compelling needs of the people in the rural piloting areas**.

Looking beyond the circular rural economy, the current “take, make and dispose of” extractive linear economy model would be changed to the circular economy, which can be restorative and regenerative by co-design. Relying on system-wide innovation, it aims to redefine products and services to design waste out while minimising negative impacts on the essential water-food-energy infrastructures as well as the shared spaces and facilities. The transition from Lean to Circular Economy reminds us of the necessity of another transition: to the transition to renewable energy. By those components, we could build added value and capital in economic, natural and social levels as well.

Let’s summarise the main components of the Circular Rural Living Lab innovation model developed in the previous WP3 tasks.

2.2.1. The four pillars in the upcoming LIVERUR Circular Rural Living Labs (T3.2.)

*The basic pillars in the news Circular Rural Living Labs in LIVERUR should be based on **environment, national priorities, socio-economic drivers and innovation goals**, therefore LIVERUR project defined four (4) main drivers in rural areas (T3.2.):*

1. **Environment and Resilience**
2. **Resource efficiency efficacy and management**
3. **Competitiveness of SMEs & rural value chains**
4. **Openness to new markets and technologies**

To applying a holistic approach, designing and testing the sustainability of the Piloting concepts (one by one) in **LIVERUR** then a model for its replication elsewhere, the horizontal goal is stimulating local entrepreneurship, and bringing the Living Lab to the people to develop innovative products/services, and study the impact and social behavior (changes) of the offerings in context. (See Fig.5).

2.2.2. Organisational, contextual and technological fundamentals of RLLs (T3.3.)

The Living Lab Harmonization Cube is a useful technique that enables the definition of a shared reference of methods and tools that were mentioned in T3.3. The harmonization cube not only represents the most critical perspectives of a Living Lab but **also enables specifying bridges between existing Living Labs**. More specifically, it helps to learn from each other, benchmark the validation of user behavior studies, exchange best practices, and interconnect existing Living Labs. Next, to facilitate a common ground for sharing, the cube model recognizes the degree of harmonization of used methods and tools in Living Labs. T3.3 the harmonization cube aiming to be used in multiple domains and across several Living Labs, facilitating a common ground for sharing the essentials to keep (the network of) Rural Living Labs as well.

After reading through all definitions, discussions and visions on open innovation, six prominent perspectives were defined that typify a Living Lab (see also Mulder, Fahy, Hribernik, Velthausz, Feurstein, et al., 2007¹⁵; Living Lab Roadmap). It was concluded that the following six views upon a Living Lab communicate the essentials:

1. User involvement
2. Service creation
3. Infrastructure,
4. Governance
5. Innovation outcomes
6. Methods & tools

The harmonization cube identifies these exchange possibilities and explicitly defines interoperability elements from **organizational, technological, and contextual perspectives** in which different standards are relevant. (See Fig.5.)

2.2.3. The transition from Lean to Circular Living Labs (T3.4.)

The Common Exploitation Booster service program (2015-2018), lead by META-Group/Italy, harmonised with the EC and **proposed the usage of LEAN Canvas**, which outlines several prescriptions and form the building blocks for the activities. It enables **both new and existing businesses to focus on operational as well as strategic management and marketing plans**.

Lean Canvas uses the same 9 blocks concept except they've been modified slightly **to suit the needs/ purposes/requirements of a Lean Startup**.

A comparison among Business Model Canvas vs LEAN Canvas includes :

1. Target
2. Focus

¹⁵ *The Living Labs Harmonization Cube: Communicating Living Lab's Essentials*. Available from: https://www.researchgate.net/publication/228375282_The_Living_Labs_Harmonization_Cube_Communicating_Living_Lab's_Essentials

- 3. Customers
- 4. Approach
- 5. Competition
- 6. Application

Using the **Circular Business Model Canvas** template of the french CircuLab, the following elements can reflect the circularity of RLLs and the Circular Economy main principles:

- 1. **Multiactor involvement,**
- 2. **Sustainable differential advantage,**
- 3. **Range of Applications,**
- 4. **Commercial Viability,**
- 5. **Serving Customer needs,**
- 6. **Scalability,**
- 7. ***Transferability to other regions and/or sectors with similar preconditions,***
- 8. **TRL level improvement.**

Extra information on cost structure and revenue streams within the Circular Business Model canvas could also gain additional data/information.

It is recommended to **LIVERUR** community to work with the Circular Business Model Canvas during the set-up and experimentations of the new Circular Rural Living Lab. A detailed Guideline has been provided by TRA (WP3 Leader) to all piloting partners. (See: Fig.5)

2.3.4. Adaptation of the Open Innovation`s main headings into the Circular Rural Living Labs

Ten types of Innovation, developed by DOBLIN, as a subsidiary of Deloitte, can be used as a tool for self-assessment for each Rural Living Labs.(Fig 3-4.).



Figure 3. The Ten Types of Innovation® framework on iPad. Source: Doblin Inc.

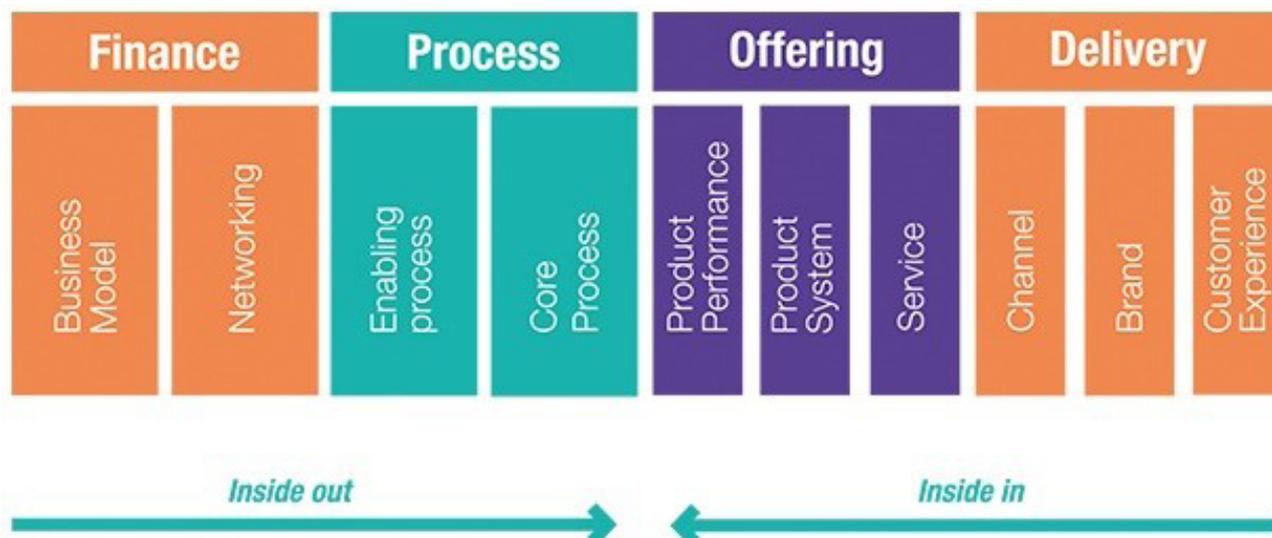


Figure 4. Finance - Process - Offering - Delivery in Innovation¹⁶, the layers of the app. Source: Doblin Inc.

The Ten Types of Innovation® framework provides a way to identify new opportunities beyond products and develop viable innovations.

The registered users can use the Ten Types to help their innovation efforts in many ways. It can be a diagnostic tool to assess how the users are approaching innovation internally, it can help to analyze their own competitive environment, and it can reveal gaps and potential opportunities for doing something different and upending the market.

(<https://doblin.com/ten-types>)

Download from: <https://apps.apple.com/app/ten-types-of-innovation/id897223603>

3 LIVING LABS ARE ONE EXAMPLE OF THE OPEN INNOVATION 2.0 ECOSYSTEM DEVELOPMENT

Living Labs are one example in the Open Innovation 2.0¹⁷ Ecosystem development (beyond traditional testbeds that have usually been technology-driven) – all **Living Lab experiences have in typical a user-centric co-design process for development and implementation of innovative ICT-based products and services in a rural and urban context as well.**

Living Labs are being instrumental to the integration of RDI with territorial development policy, assuming different possible configurations (which depend on the structure of the underlying innovation system): as vertical **tools for promoting user-driven RDI in a given sector in rural innovation** (e.g. AgriTech, eHealth, Mobility, Smart villages, Cultural Heritage ,eInclusion, Craft, Traditional local products, eco-tourism etc.); as **‘orchestration’ agents between individual users, citizens, grassroots communities (bottom-up) and the other 4P stakeholders and as territorial**

16 Keeley, L., Walters, H., Pikkell, R., and Quinn, B. (2013). [Ten types of innovation: The discipline of building breakthroughs](#). John Wiley & Sons.

17 <https://ec.europa.eu/digital-single-market/en/news/living-labs-and-open-innovation-20>, Published on 27 January 2016.

innovation or “Smart Regional” models; as the leading four pillars which determine the rural innovation, as **Environment and Resilience, Resource efficiency efficacy and management, Competitiveness of SMAEs & rural value chains, Openness to new markets and technologies.**

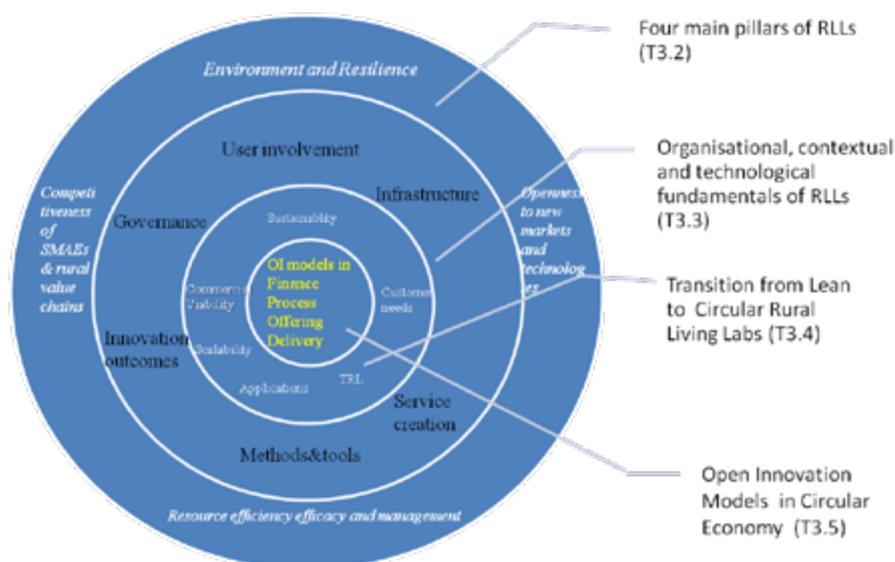


Figure 5. The CE inspired Open Innovation ecosystem and model through Rural Living Labs.

The CE inspired (open) innovation ecosystems and models through Rural Living Labs are incorporated into one integrated scheme (Fig. 5) where all the sub-components are together: the four main pillars of **LIVERUR** to be addressed in rural innovation (T3.2.), the organisational, contextual and technological fundamentals of Rural Living Labs (T3.3.), the main principles of the Circular Economy (T3.4.) and adaptation of the Open Innovation’s four main headings, such as **Finance, Process, Offerings and Delivery**. (T3.5.)

4 MEASURING THE INNOVATION BY TRL @ CIRCULAR RURAL LIVING LABS

4.1 Technology sustainability: TRL at Rural Innovation and Circular Economy

To better understand the challenges of Technology Readiness Level (TRL) in the context of Rural Innovation and Circular Economy, here is a summary of TRL and its correlation to H2020.

The Technology Readiness Level (TRL) scale was initially defined by NASA in the 1990s as a means for measuring or indicating the maturity of a given technology. The TRL spans over nine levels as follows:

- TRL 1 – Basic principles observed
- TRL 2 – Technology concept formulated
- TRL 3 – Experimental proof of concept
- TRL 4 – Technology validated in lab
- TRL 5 – Technology validated in a relevant environment (industrially relevant environment in the case of key enabling technologies)

- TRL 6 – Technology demonstrated in a relevant environment (industrially relevant environment in the case of key enabling technologies)
- TRL 7 – System prototype demonstration in an operational environment
- TRL 8 – System complete and qualified
- TRL 9 – Actual system is proven in an operational environment (competitive manufacturing in the case of key enabling technologies; or in space).

TRL scales follow the various stages of the product/service/process development. There is a need to achieve the necessary awareness between the context between the TRL levels.

To be able to make differentiation among the research and innovation phases, TRL scale of 1-9 is an ideal tool to measuring the research & innovation progress of the new product & service development in rural areas as well.

TRL is a handy tool to use for self-assessment as well, in order to plan good milestones and setting specific evaluation measures for progress. Since the TRL scale is self-declared, it is important to define the various stages.

The TRL scale for Horizon 2020 is re-defined in Annex G of the Grant Agreement. “The European Commission advised EU-funded research and innovation projects to adopt the scale in 2010. TRLs are consequently used in the EU Horizon 2020 program¹⁸.

In case of LIVERUR, the “lower boundary “ (TRL 3-5) is not a recommended level for More Research & Less Innovation-intensive pilot projects, because the final results (products/services/process) have to positioned in higher TRL levels (at least TRL 6 and more) as LIVERUR is a RIA type project. Therefore it is more appropriate to get a higher probability of getting to the market, sustainability, replicability and scalability. (More in D5.1).

4.2. Financial sustainability: Enhancing Rural Innovation in the Circular Economy at RLL level

4.2.1. Rethinking the linear economy to serve new market segments

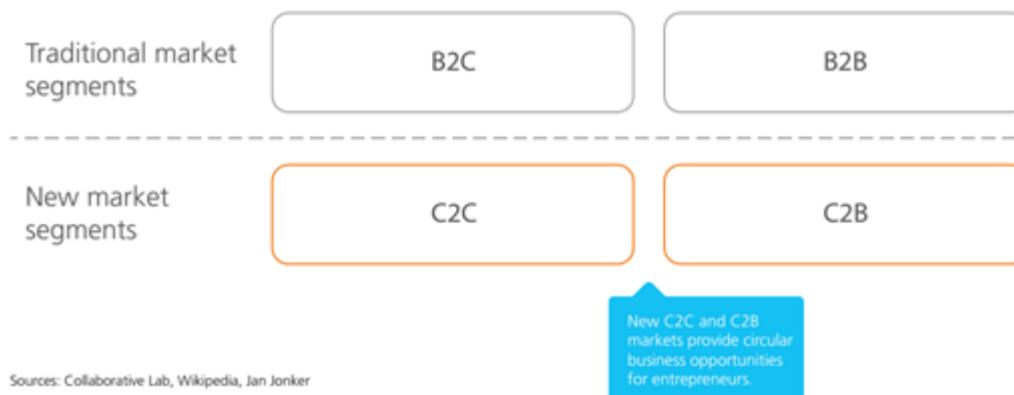
The circular economy models give “lessons to learn” in redefining production processes and supply chains in ways that generate economic and environmental efficiencies. They, however, are less successful in describing its impact on consumer behaviour. The sharing economy, however, adds the human aspects to the circular economy and provides insights into **how demand and supply meet in the local/regional/global market place in ways that are more recourse efficient and environmentally friendly.**

The sharing economy and creates business opportunities in new market segments

- The sharing economy creates new forms of market transactions and segments. Traditionally markets are divided into Business to Business (B2B) or Business to Consumer (B2C) markets. Sharing, however, becomes increasingly popular among consumers themselves, which creates Consumer to Consumer (C2C) markets. This trend is accelerated by internet technology, which enables the emergence of Peer to Peer (P2P) platforms through which consumers find the products and services in the local community that are available for sharing. Sometimes consumers

¹⁸ Link: https://ec.europa.eu/research/participants/data/ref/h2020/other/wp/2016_2017/annexes/h2020-wp1617-annex-g-trl_en.pdf , https://www.earto.eu/wp-content/uploads/The_TRL_Scale_as_a_R_I_Policy_Tool_-_EARTO_Recommendations_-_Final.pdf

become producers themselves and sell their products to business as well (so-called prosumers). As a result, a new Consumer to Business market segment arises (C2B). Think of consumers that generate solar power with solar panels and sell the electricity that they don't use to the grid operator.



Sources: Collaborative Lab, Wikipedia, Jan Jonker

Figure 6. Traditional market segments vs New market segments. Source: Collaborative Lab, Jan Jonker.

These new markets provide many circular business opportunities for entrepreneurs. They also threaten current business models in the B2C and B2B markets. Therefore it is critical that businesses explore the impact of the circular economy on their business models and define appropriate strategies in response.

4.2.2. New technology is a significant enabler of the circular economy: Innovation outcomes and opportunities for Rural Living Labs

Although energy and commodity-intensive technology are one of the main drivers of the sharp increase in CO emissions since the industrial revolution, it is also increasingly providing solutions. On the supply side, energy-saving technology helps to reduce the energy intensity, and renewable energy provides alternatives for high carbon energy sources in rural context as well. More generally, miniaturisation and de-materialisation of many products and services are reducing the resource intensity of economic activity. **Case by Case studies must be done at each targeted LIVERUR territories. Asset-sharing, product and process innovation creates substantial cost reductions and economic gains.** Investments in eco-efficiency could have cumulative millions of EURO cost reduction. **In the demand-driven economies, the personal networks and the ICT based network technologies gives facilitation in the design, experiment and sales techniques by the most effective ways.**

Cultural shifts in favour of sustainable products are also stimulating the demand for new technological solutions. It still has to be seen how far these demand shifts will turn out to be structural rather than merely cyclical, but so far the speed of adjustment is impressive.

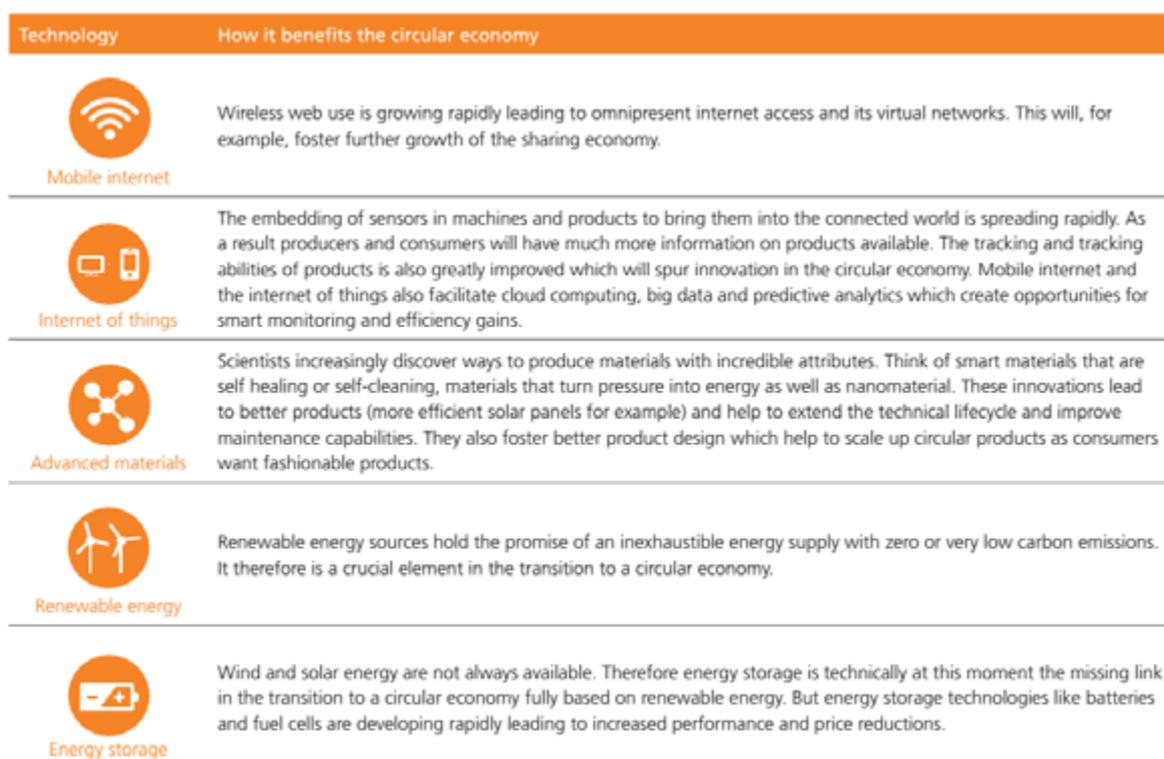


Figure 7. How the technologies benefit the circular economy. Source: McKinsey, KPMG and ING Netherlands.

Overall, **technology and the ability to innovate are important prerequisites and enablers for a circular economy both on the supply as the demand side**. The new technologies already provide many technologies for the circular economy, and there are many more to come as the trend has only just begun. (Fig.7.).

4.2.3. Five business models driving the rural circular economy

Business models are used to describe and classify businesses, especially in an entrepreneurial setting, and are used to explore possibilities for future development. The circular economy in many respects is very different from the traditional linear way of producing in generally and in rural context as well. Conventional rural business models have relatively short term horizons as they merely provide solutions for today's agricultural problems. **Circular rural business models are more future-oriented as they provide solutions for the local's problems of tomorrow**. In order to be successful in major innovations and in the business models, the users' involvement in the rural communities is likely to be required. A more and more in-depth analysis will be done in T4.3-T4.4.

The main elements in the new rural business models mentioned by Accenture (2014)¹⁹:

Principles for value creation: Circular business models open the way to incorporate many principles for value creation. Three main values have to take into account: financial, environmental and social business values. Creating impact is a central theme in these models.

Co-operation: Companies in circular supply chains often co-operate beyond traditional buyer-supplier relationships that characterize linear supply chains. By the usage of the Quadruple Helix governance model, four main types of actors must collaborate and co-create in the strong innovation ecosystems.

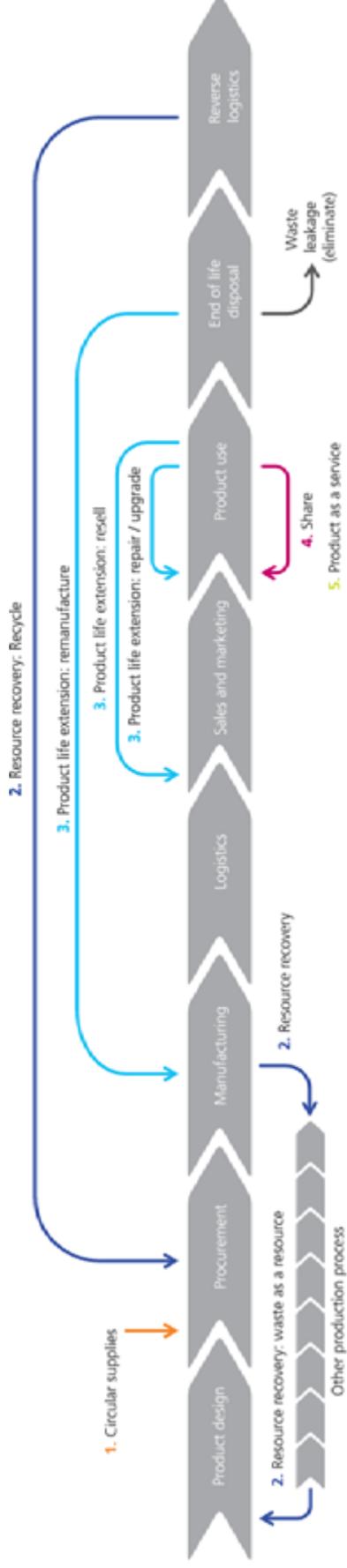
¹⁹ Accenture: Circular Advantage: Innovative business models and Technologies to Create a Value in a World without Limits to Growth, Accenture Strategy, 2014.

Transaction: Newmarket segments arise in which consumers interact with other consumers (C2C) and in which economic agents act both as manufacturers as well as a consumers (C2B). Money is the main, but not necessarily the sole, medium of exchange as goods or services are, for example, exchanging against energy, time or waste.

Ownership: Access to a service is more important than ownership of a product that delivers the service.

Success measurement: Success is measured in a cost-benefit analysis that incorporated financial and non-financial values for all the stakeholders involved as well as society at large.

There are five underlying business models in the circular economy.



1 Circular supplies

This business model is based on supplying fully renewable, recyclable or biodegradable resource inputs that underpin circular production and consumption systems. Through it companies replace linear resource approaches and phase out the use of scarce resources while cutting waste and removing inefficiencies.

2 Resource recovery

This business model recovers embedded value at the end of a product life cycle to feed into another one. This business model promotes return flows and transforms waste into value through innovative recycling and upcycling services.

3 Product life extension

This business model allows companies to extend the lifecycle of products and assets. Values that would normally be lost at the end of the life cycle are maintained or improved by repairing, upgrading, remanufacturing or the remarketing of products. And additional revenue is generated thanks to extended usage.

4 Sharing platforms

This business model promotes a platform for collaboration among product users, either individuals or organisations. These facilitate the sharing of overcapacity or underutilisation, increasing productivity and user value creation.

5 Product as a service

This business model provides an alternative to the traditional model of "buy and own". Products are used by one or many customers through a lease or pay-for-use arrangement. With a 'product as a service' business model product longevity, reusability and sharing are no longer seen as cannibalisation risks, but instead drivers of revenues and costs reduction.

Note: product as a service can be applied at any level in the supply chain and therefore is indicated in the graph.

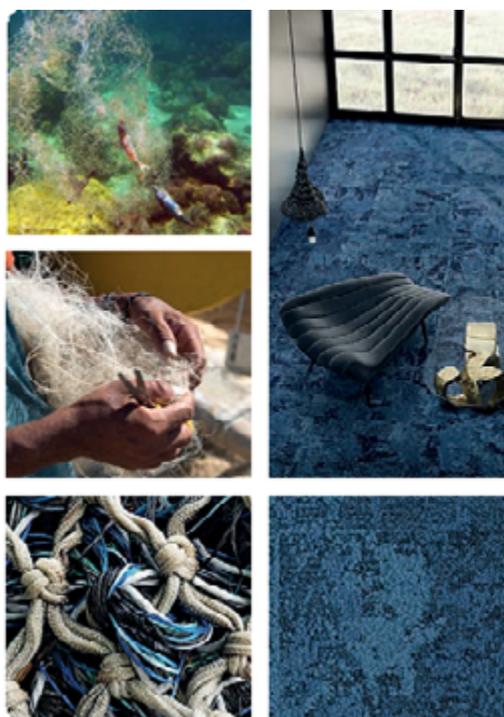
Source: Accenture (2014, page 12-14)

Figure 8. Five (5) Business models in the Circular Economy. Source: ING Netherlands.

4.3 Best Practice: An example of resource recovery from INTERFACE collaborating with fishermen in the Philippines by ING Economic Department²⁰

“The Interface is the world market leader in carpet tiles and listed on the Nasdaq stock exchange. For years it leads the Dow Jones Sustainability Index. It applies many of the circular principles in its business such as design for reassembly, product life extension and recycling of materials. Interface, together with the Zoological Society of London, has been dedicated to designing and proving an inclusive business model called NetWorks.

Net-Works provides a source of income for small fishing villages in the Philippines while cleaning up their beaches and waters of discarded fishing nets that threaten their livelihood and the very precious double barrier reef off their shore. Discarded fishing nets are collected and sold to Interface’s trusted yarn supplier and partner, Aquafil. Since 2011 they’ve been re-purposing waste nylon from discarded fishing nets, and other sources, including yarn, reclaimed through Interface take.”



Net Works	
Business models	Resource Recovery and Product as a Service.
Value creation	Financial values (stable inflow of raw materials that produce a sustainable carpet tile that people highly value) alongside environmental and social values.
Co-operation	Through close cooperation with local partners and fishermen communities in the Philippines are strengthened.
Transaction	Fishermen get a fair price for the nets they collect. Users that return old carpet tiles can get a voucher for new ones.
Ownership	Not applicable in this particular case.
Inclusiveness of success	Success is not limited to sourcing benefits (constant stream raw materials at stable prices). The social and ecological benefits are obvious and highly valued.

Figure 9. Resource recovery and Product as a Service (PaaS) Business model. Source: ING.

²⁰ ING Economics Department: Rethinking finance in a circular economy Rethinking finance in a circular economy Financial implications of circular business models Page 30. May, 2015 <https://www.ingwb.com/media/1383724/rethinking-finance-in-a-circular-economy-report.pdf>

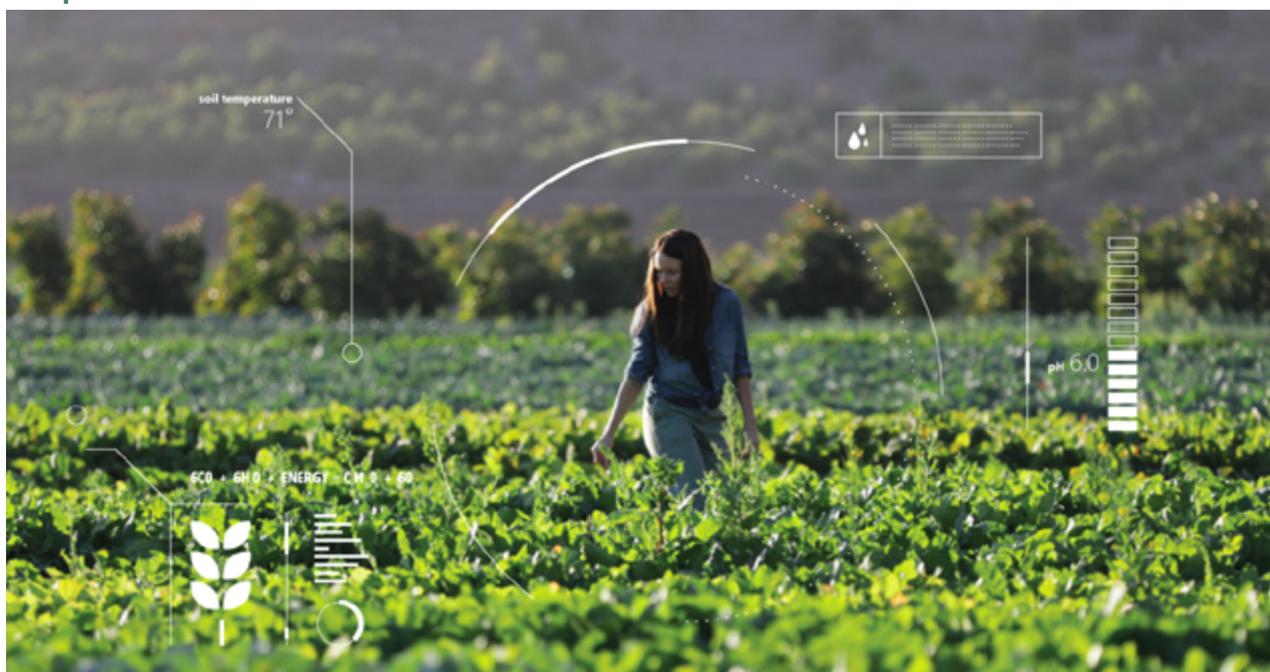
4.4 Best Practice: An example of AgroTech innovation by The Rural Innovation Lab from New Zealand

Let's take a look at first to the newly established "Rural Innovation Lab" as an example in New Zealand. (The Rural Innovation Lab was launched on 26th of February 2019.)

Insights - Best Practice

The main goal of the Rural Innovation Lab is: **Enabling the digital transformation of New Zealand's primary sector and supporting environmentally-sound economic growth for the Manawatū - Whanganui Region.**

The Manawatu-Whanganui Farmers and Growers Innovation Collaborative are piloting the Rural Innovation Lab to help farmers and growers access and understand the latest technology **on-farm to make timely decisions, maximise resources for production, minimise waste and reduce environmental footprints.**



The stakeholders in the Rural Innovation Lab are Tech leader (Microsoft), University (Massey University), Dairy Farm of Massey University (The Factory), Business Incubator (e-centre Massey) also Collaborators (Federated Farmers) and Partners (HORIZON Regional Council) etc..

"In New Zealand, we have the opportunity for our farmers and growers to be seen on the global stage as smart, innovative and responsible for our agrifood exports around the world, via the practical implementation of technologies such as Cloud Solutions, Artificial Intelligence, The-Internet-of-Things and Blockchain." — Dairy Farmer Mat Hocken (Chair, The Rural Innovation Lab)

Expected achievements: TRL8 – Industrial scale-up and TRL9 – Commercialisation.

Follow them: <https://twitter.com/ruralinnovate/> and <https://www.ruralilab.net.nz>.

4.5 What did we learn from the Case Studies?

They understood that multiple criteria should be used to develop the main innovative projects, such as resource recovery, and deployment of emerging and future ICT technologies in the Lab environment to develop new products & systems & processes, therefore they are supporting the apps which includes:

- Solving a real problem for farmers &/or growers
- Enhancing cultural &/or social capital
- Scalable for quick use
- Innovative & sustainable
- Engaging with & creating outcomes for users and stakeholders

The Technology Readiness Level 1-9 is associated with the basic expectations of H2020 from each project consortiums. (See Fig.10.).

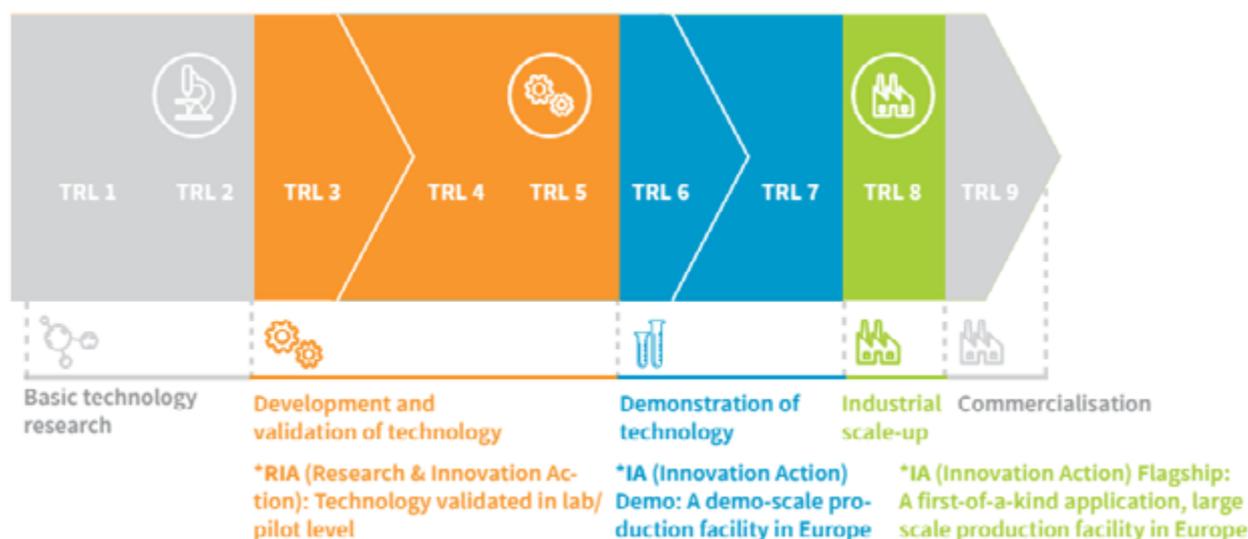


Figure 10. The proposed achievement for LIVERUR at TRL level 7. Source: EARTO.²¹

As LIVERUR is a Research and Innovation (RIA) type EU project, at TRL level **ALL Piloting partners have to achieve TRL5 (Technology validated in lab/pilot level) by the H2020 Guideline**, but as TRL5 doesn't give guarantee for demonstration of technology, high impact, sustainability and exploitation, and TRL6 is still critical by the real practices & experiments, the WP3 leader and LIVERUR IMC recommend to achieve **TRL7 (Demo: A demo-scale production facility in Europe/ and beyond) for the new 13 Circular Rural Living Labs**.

From the Common Exploitation Booster pilot services, it was realised that the “Valley of Death” is relevant at TRL6, as this is ostensibly the reason why the TRL scale has been adopted by the European Commission (i.e. the shift of funding towards commercialisation). This asks for explicit attention to **pilot production** in which **scale up of a prototype towards low rate first production** is funded. It underpins the need to make a distinction between three different research & innovation activities, i.e., fundamental, industrial, and **experimental**, but also requires specific attention to **small scale production and readiness of production and application development by digital technologies**. When developing the readiness of a production/deployment process for a new technology together with the development of the product & service & process itself, it is necessary to enable scaling of production amounts from **single demonstrators to small series**. **This is often possible in dedicated research and innovation infrastructures, such as Rural Living Labs.**

²¹ EARTO: The TRL Scale as a Research & Innovation Policy Tool, Earto Recommendations, 2014.

4.6 Measuring the Rural Innovation at Circular Rural Living Labs (CRLs)

Bridging the “valley of death” also means solving societal challenges thanks to Rural Living Labs. The LIVERUR consortium is placing emphasis on interactions and convergence across and between the different technologies, non-technological disciplines and their relations to societal challenges. User needs will be taken into account in all fields. Circular Rural Living Labs’ core activities are based on interactions between disciplines, transdisciplinary and user-centric approaches. Hence, the CRLs provides the knowledge and expertise needed to solve societal challenges by binding various technologies together, connecting one technology to various applications useful to different rural contexts. The connecting technologies in the 13 rural living lab pilot areas to non-technological disciplines incorporating the user perspective into development while looking at solutions that could bridge commercial interests and societal needs. CRLs also provides a resource of specialized and highly skilled personnel and know-how without which the bridging between so many different disciplines & knowledge necessary to solve societal challenges would not be possible through RAIN platform and its Tools & Services.

Measurement of Innovation Performance @ LIVERUR CRLs: in order to Increase Potential Impact of Sustainable Innovation²²:

- ✓ **Level of Collaboration** (among the main actors/partners and collaborators at Circular Rural Living Labs: *High level of Collaboration or Low level of Collaboration*)
- ✓ **The intensity of innovation:** *Incremental vs Radical Innovation*
- ✓ **Focus areas:** *Product focus (Eco design & efficiency) or New market opportunities (Closed-loop or Product-service systems) or System innovation: for societal change - Circular Oriented Innovation*
- ✓ **Time horizon**

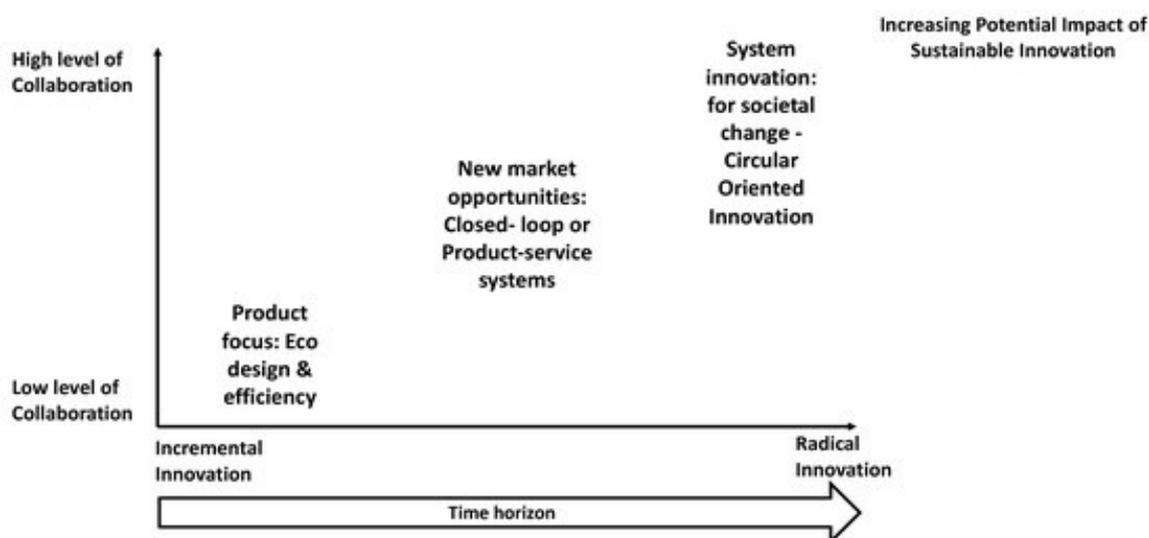


Figure 11. Evolution of sustainable oriented innovation and collaboration (adapting and integrating). Source: Brown-Bocken-Balkenende, 2019.

Circular Open Innovation (COI) requires innovations at all levels (e.g., process, product, organisation, business model) to enable systemic change, but it also requires changes from the Rural Living Lab’s strategy, engagement with society, and the way in which value is created.

²² Phil Brown, Nancy Bocken, Ruud Balkenende: Why Do Companies Pursue Collaborative Circular Oriented Innovation? Sustainability 2019, 11(3), 635; <https://doi.org/10.3390/su11030635>

5 PRE-ASSESSMENT OF THE 13 CIRCULAR LIVING LABS'S CONCEPTS BY THE CIRCULAR ECONOMY INSPIRED OPEN INNOVATION (COI) ECOSYSTEM AND MODEL THROUGH RURAL LIVING LABS

5.1 The List and project name of each LIVERUR piloting areas (by T4.1)

	Partner (country), region	Project name
1	RMB (AT), South Burgenland	Living Lab Südburgenland
2	ADRI (ES), Vega del Segura	The circular rural business model for biowaste
3	UHLA (CZ) Posumavi	Šumavaproduct s.r.o.
4	UHLA (CZ) Posumavi	Turistická oblast Pošumaví
5	TRA (MT), Gozo	Circular Rural Living Lab Malta
6	FRCT (PT) Terceira Island	Happy Cows Project
7	UL (SI), Slovenia	SRS Padna – Historian houses
8	UL (SI), Slovenia	SRS Solčava – Logarska dolina
9	UL (SI), Slovenia	SRS Kungota – House of all generations
10	CRAPL (FR), West of France	The energetic transition for farms in West FR
11	CRAPL (FR), West of France	Agricult. biomethane product unit to the energy transition
12	ZSA (LV), Latvia	Smart Collaboration for Agriculture
13	ZEKA (TR), Manisa	Olive Excellence Center
14	UCT (IT), Trasimeno	The efficiency of processes in rural tourism
15	E 35 (IT), Reggio Emilia	Cooperativa di Comu-nità 'Valle Dei Cavalieri.'
16	E 35 (IT), Reggio Emilia	Parco commestibile Edible Park for citizens
17	DAR (TN), Quedhref	Kolna Kesra
18	CRAB (FR), Brittany	Metha BDC
19	CRAB (FR), Brittany	Air and Energy Territorial Plan
20	CRAB (FR), Brittany	Dairy Territorial Value

Table 1. List of Partners and piloting topics.

5.2 Pre-assessment of 13 LIVERUR supported Rural Living Labs: Circular concepts are done or not yet?

The structure of matrix: The CE inspired (open) innovation ecosystem incorporates all the sub-components to one integrated scheme in Circular Rural Living Labs (Fig..): 1) the four main pillars of **LIVERUR** to be addressed in rural innovation (T3.2.), 2) the organisational, contextual and technological fundamentals of Rural Living Labs (T3.3.), 3) the main principles of the Circular Economy (T3.4.) and 4) the adaptation of the Open Innovation's four main headings, such as Finance, Process, Offerings and Delivery. (T3.5.)

1) The four main pillars of **LIVERUR** to be addressed in rural innovation

Environment and Resilience	Resource efficiency efficacy and management	Competitiveness of SMAEs & rural value chains	Openness to new markets and technologies
The 4 pillars of LIVERUR			

2) The organisational, contextual and technological fundamentals of Rural Living Labs

User involvement	Infrastructure	Service creation	Methods&Tools	Innovation outcomes	Governance
Organisational, contextual and technological fundamentals of RLLs					

3) The main principles of the Circular Economy

Sustainability	Customer needs	Commercial viability	Applications	Scalability	TRL
The Circular Economy main principles					

4) The adaptation of the Open Innovation`s four main headings

Finance	Process	Offering	Delivery
Open Innovation models in Circular Economy			

The all - "hard" and "soft"- dimensions and components/sub-components for (open) innovation in rural areas are identified and applied to delineate the drivers and barriers for **user-driven circular oriented rural innovation**. Our findings indicate that **LIVERUR** RLLs should be conducted by entrepreneurially-minded actors through sharing a vision, enthusiasm, and crucially, a credible proposition for a sustainable circular economy in their targeted areas.

Partner (country), region	Project name	Environment and Resilience	Resource efficiency and management chains	Competitiveness of SMEs & rural value chains	Openness to new markets and technologies	User involvement	Infrastructure	Service creation	Methods & Tools	Innovation outcomes	Governance	Sustainability	Customer needs	Commercial viability	Applications	Scalability	TRL	Finance/Process	Offering/Delivery
The 4 pillars of LIVEKUR																			
Organisational, contextual and technological fundamentals of Rural Living Labs										The Circular Economy main principles									
1	RMB (AT), South Burgenland	X	X	X	X	?	X	X	?	?	?	?	X	X	?	?	?	?	?
2	AJRI (ES), Vega del Segura	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3	UHLA (CZ), Posumavi s.r.o.	?	?	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4	UHLA (CZ), Turuncka jeblart Posumavi	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
5	TRA (MT), Circular Rural Living Lab Malta	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	PRCT (PT), Happy Cows Project	X	X	X	X	X	X	?	X	?	X	?	X	X	?	?	?	?	?
7	UL (SI), SRS Padna - Historian houses	X	?	X	X	X	X	?	X	?	X	?	X	?	?	?	?	?	?
8	UL (SI), SRS Solcava - Logaraka dolina	?	?	X	X	X	X	X	X	X	X	?	X	?	?	?	?	?	?
9	UL (SI), SRS Kungota - House of all generations	?	?	X	X	X	X	?	X	?	X	?	X	?	?	?	?	?	?
10	URAPL (FR), West of France farms in West FR	X	X	X	X	X	X	X	X	X	X	X	X	X	?	?	X	?	?

Partner (country), region	Project name	Environment and Resilience	Resource efficiency and management	Competitiveness of SMEs & rural value chains	Openness to new markets and technologies	User involvement	Infrastructure	Service creation	Methods & Tools	Innovation outcomes	Governance	Sustainability	Customer needs	Commercial viability	Applications	Scalability	TRL	Finance	Process	Offering	Delivery
11K RAFL (FR), West of France	Agricult. biomethane product unit to the energy transition	X	X	X	X	X	X	X	X	X	X	X	X	X	?	?	X	?	?	?	?
12ZSA (LV), Latvia	Smart Collaboration for Agriculture	X	?	X	X	X	X	?	X	?	X	?	X	?	?	?	?	?	?	?	?
13ZKA (TR), Manisa	Ulire Excellence Center	Y	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
14UCT (IT), Tuscino	Efficiency of processes in rural tourism	X	X	X	X	X	X	?	X	X	X	?	X	X	?	?	X (TRL3)	?	?	?	?
15E-35 (IT), Reggio Emilia	Cooperativa di Comunità 'Valle dei Cavalieri'	X	X	X	X	X	X	X	X	X	X	X	X	?	?	?	X	?	?	?	?
16E-35 (IT), Reggio Emilia	Parco comensabile Edible Park for citizens	X	X	X	X	X	X	X	X	?	X	?	X	X	?	?	?	?	?	?	?
17DAR (EN), Quednef	Kolna Aera	X	X	X	X	X	X	X	X	X	X	X	X	X	X	?	?	?	?	?	?
18E-35 (FR), Brittany	Metis SUD	X	X	X	X	X	X	X	X	X	X	S	X	X	?	?	?	?	?	?	?
19E-35 (FR), Brittany	Air and Energy Territorial Plan	X	X	X	X	X	X	X	X	X	X	X	X	X	?	?	?	?	?	?	?
20E-35 (FR), Brittany	Dairy Territorial Value	X	X	X	X	X	X	X	X	X	X	X	X	X	?	?	?	?	?	?	?

Table 2. Pre-assessment of 20 selected Rural Living Lab pilot projects.

CONCLUSIONS

Rural Innovation in the Digital Transformation era provides both profound economic and societal transformations, that cannot be separated. **LIVERUR** project represents an Open co-creation process, Open to all the Citizens in rural/remote, mountain and peri-urban areas., Open to the local and global markets, in order to guarantee that **none is left behind in this profoundly transformative process.**

The LIVERUR consortium is placing emphasis on peer-to-peer and multi stakeholders interactions and convergence across and between the different technologies, non-technological disciplines and their relations to societal challenges.

User needs will be taken into account in all fields of rural economies.

Circular Rural Living Labs' core activities are based on interactions between disciplines, transdisciplinary and user-centric approaches.

The new 13 Circular Rural Living Labs provide **the knowledge and expertise needed to solve societal challenges by binding various technologies together, connecting one technology to various applications useful to different rural contexts.**

The connecting technologies in the 13 rural living lab pilot areas to non-technological disciplines **incorporating the user perspective into development, while looking at solutions that could bridge commercial interests and societal needs.**

CRLs also provide a **resource of specialized and highly skilled personnel and know-how** without which the bridging between so many different disciplines & knowledge necessary to solve societal challenges would not be possible through **RAIN platform and its Tools & Services.**

The integrated (open) innovation model with its layers and sub-components as a tool of self-assessment can be used by each of the multi-actors, managed by Circular Rural Living Labs in LIVERUR project.

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