

**H2020 MSCA-ITN-2018**

**ReTraCE Project**

**Realising the Transition to the Circular Economy**

**D4.2**

**Mapping stakeholder interactions for  
designing CE policies in regional contexts**

Acronym:

**ReTraCE**

Title: Realising the Transition towards the Circular Economy: Models, Methods and Applications

Coordinator: The University of Sheffield

Reference: 814247

Program: H2020-MSCA-ITN-2018

Start: 1<sup>st</sup> November 2018

Duration: 48 months Website:

[www.retrace-itn.eu](http://www.retrace-itn.eu)

Consortium:

The University of Sheffield (USFD)  
Università degli Studi di Napoli Parthenope  
University of Kassel (UniKassel)  
South East European Research Centre (SEERC)  
Academy of Business in Society (ABIS)  
Högskolan Dalarna (HDA)  
University of Kent (UniKent)  
Tata Steel UK Limited (Tata)  
Olympia Electronics SA (OE)  
Erasmus University Rotterdam (EUR)

## **Deliverable**

Number: **D4.2**

Title: Maps of stakeholders and interactions for designing policies for CE implementation

Lead beneficiary: SEERC

Work package: WP4

Dissemination level: Public (PU)

Nature: Report

Due date: 29.02.2020

Submission date: 06.04.2020

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## EXECUTIVE SUMMARY

At present, one of the most significant discussions taking place in the global economy focuses on tackling climate and environmental-related challenges. This discussion concerns all spheres of human activity, and it is this generation's defining task (European Commission, 2019). In order to accomplish that, the entire socio-economic system must be transformed, hence the transition from a linear to a more circular and regenerative economy is an absolute necessity. The new Circular Economy Action Plan 2020, adopted by the European Commission, describes this transition in the following way:

*“The transition to the circular economy will be systemic, deep and transformative, in the EU and beyond. It will be disruptive at times, so it has to be fair. It will require an alignment and cooperation of all stakeholders at all levels - EU, national, regional and local, and international”.*

European Commission (2020) Circular Economy Action Plan

The transition is regarded as systemic, not only by policymakers, but also by academics and practitioners; moreover, the involvement, alignment and cooperation of all stakeholders is necessary for a successful outcome. However, debates continue about how best to achieve this. For example, there are questions about the categorisation of stakeholders, their roles and responsibilities in the transition and the essential interactions between them. In addition, little attention has been paid to developing models for mapping and identifying stakeholders when implementing Circular Economy policies at the regional level. This report seeks to remedy these issues by analysing the academic literature and relevant policy documents and making the first attempt to adjust existing models for stakeholder mapping in the Circular Economy scenario. A new model is therefore proposed, which promotes the emergence and deployment of trilateral networks, hybrid organisations and development/co-operation platforms. The adaptation of this model to some case studies concerned with the implementation of Circular Economy practices in a regional context is then illustrated.

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## **LIST OF ABBREVIATIONS/ACRONYMS USED**

<b>CE</b>	Circular Economy
<b>EC</b>	European Commission
<b>EIP</b>	Eco-Industrial Park
<b>EU</b>	European Union
<b>IE</b>	Industrial Ecology
<b>IPSS</b>	industrial park of Salaise-Sablons
<b>LCA</b>	Life-cycle assessment
<b>MNCs</b>	Multi-national companies
<b>NGOs</b>	Non-governmental organisations
<b>PSS</b>	Product-Service system model
<b>QNH</b>	Quintuple Helix
<b>QRH</b>	Quadruple Helix
<b>RIS</b>	Regional Innovation Systems
<b>RIS3</b>	Research and Innovation Strategies for Smart Specialisation
<b>R&amp;D</b>	Research and Development
<b>R&amp;D&amp;I</b>	Research and Development and Innovation
<b>SMEs</b>	Small and medium-sized enterprises
<b>SNA</b>	Social Network Analysis
<b>TH</b>	Triple Helix
<b>US</b>	United States
<b>WP</b>	Work Package

## INTRODUCTION

The Circular Economy (CE) aims to achieve sustainable development by re-thinking business models such that the concept of “waste” is reconsidered and replaced with “reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes [...]” (Kirchherr et al., 2017). In doing this, the CE paradigm recognises the unsustainability of the current linear model in its three interacting dimensions (environmental, social and economic). However, when tackling complex problems that require systemic changes, such as the aforementioned unsustainability, it is equally important to assess the potential environmental, social and economic risks associated with these changes. In other words, for the solutions to be successful, appropriate risk assessment and management should be carried out to ensure that the potential negative consequences of the transition towards a CE are addressed, and that strategies for the mitigation of the consequences are put in place. Therefore, implicit in the CE proposition is the need to design **adaptation strategies** in order to develop the resilience of all the different stakeholders involved in, or affected by, the transition’s design. In particular, these considerations are necessary at all levels of the transition, including the design of policies for the (gradual) implementation of the CE.

In recent decades, the environmental management literature exhibits a growing focus on **stakeholder participation** for environmental decision-making (and policy-making) processes (Abelson et al., 2007; Gregory et al., 2020; Hansen and Mäenpää, 2008; Reed, 2008; Reed et al., 2009), as well as, in sustainability policymaking (Kua, 2016). Stakeholder participation can help improve the quality of project (or policy) design, by facilitating positive interactions and the exchange of knowledge between relevant parties (Luyet, 2012). In other words, proper policy design for environmental matters should first consider all active and passive stakeholders in order to then identify and address associated risks. The World Bank (1996, p. 3) defines stakeholder participation as “a process through which stakeholders influence and share control over development initiatives and the decision and resources which affect them”. Therefore, stakeholder participation entails making a choice of “relevant” stakeholders, understanding them and their interactions, and understanding how they should be appropriately involved in the decision-making process.

In order to map the relevant stakeholders whose involvement is necessary for the transition towards the CE, appropriate models must be introduced. With this in mind, a brief overview of some innovation models which effectively describe stakeholders’ participation in a regional context is provided. More specifically, the Triple, Quadruple and Quintuple Helix models are introduced. The Triple Helix model represents the traditional academia-industry-government nexus; the Quadruple Helix model builds upon the Triple Helix model by taking the social dimension into consideration, hence including civil society. Finally, the Quintuple Helix model encompasses the spatial dimension, with the natural environment acting as a driver for innovation. However, the models,

as such, cannot be immediately adopted without first adapting them to a CE policy context. Hence, an adaptation of the Quintuple Helix model is introduced. This adaptation can support the CE implementation in the regional context. Additionally, the importance of hybrid organisations and development/co-operation platforms is highlighted.

This report is structured as follows: Chapter 1 gives an overview of the three innovation-based models (the Triple, Quadruple and Quintuple Helix) and describes the actors involved. Chapter 2 offers an overview of methods for carrying out a stakeholder analysis, from stakeholder identification, to stakeholder categorisation and the identification of inter-stakeholder relationships. Chapter 3 proposes a new model to be used for CE implementation at a regional level, consisting of an adaptation of the Quintuple Helix model. Finally, Chapter 4 presents case studies of where the mobilisation of all Quintuple Helix stakeholders was needed in order to achieve the desired result, showing a practical application of the model to some real-world scenarios.



## **CHAPTER 1: THE EUROPEAN REGIONAL INNOVATION SYSTEM**

The achievement of tangible outcomes on CE implementation requires effective and efficient policy-making processes, which implies the integration of various policy interventions (Giraldo Nohra and Barbero, 2018). According to Boas et al. (2015), this cannot be accomplished with one-size-fits-all solutions, neither within traditional organisational boundaries (Frey, 2013); a tailored approach is very much needed. As also demonstrated in the previous D3.1 report from this project, the regional dimension seems to be the optimal one for promoting CE policies. At the same time, the role of regions is widely recognised in EU policies for driving innovation and development. Notably, the Smart Specialisation Directive (2012) aims at enabling European regions to foster their development and innovation through tailored strategies based on specific strengths.

In this regard, the promotion of cross-network cooperation among various stakeholders, aimed at promoting CE-based innovation in a regional context, is a necessity (Ruggieri et al., 2016). Within this context, in the CE academic community there is wide agreement on the fact that the required systemic change for CE implementation needs to cover multiple institutional spheres (Ghisellini et al., 2016).

Traditionally, the Triple Helix (TH) model has represented a viable framework for characterising innovation systems at a regional level. The TH model recognises the significance of the institutional spheres of industry, governments and academia, their relations and the production of knowledge (Ranga and Etzkowitz, 2013; Etzkowitz and Leydesdorff, 2000). Triple Helix systems can contribute to systemic innovations that transcend the technologies and capabilities of their specific spheres in a knowledge-based economy (Anttonen et al., 2018).

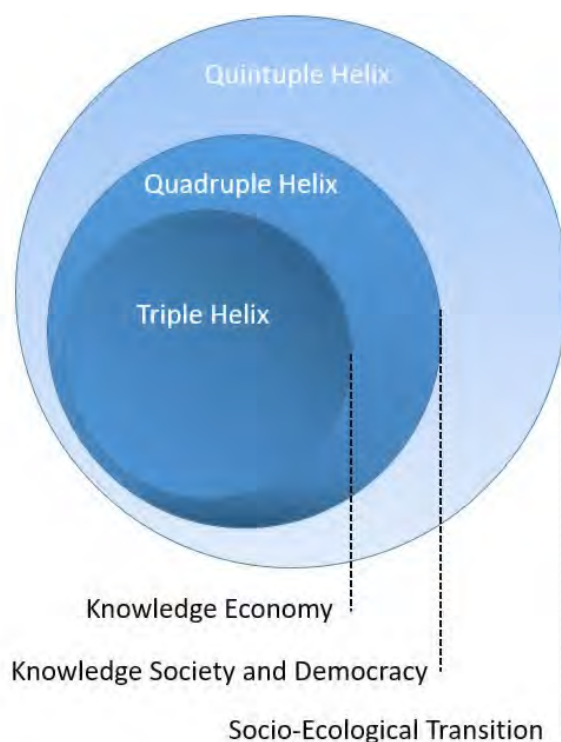
Previous innovation policies have been predominantly oriented towards the traditional processes based on the TH model including the collaboration between academia, government and industry. Moreover, because of the regional context of integration and institutional settings, the regional level has been considered as the most suitable geographical level for innovation processes to take place (Doloreux and Parto, 2005). Nevertheless, the current European innovation systems have been criticised as being *“too biased and undemocratic due to their exclusion of civil society”* (Campbell et al., 2015). Therefore, new stakeholders (i.e. society) shall be considered in the current innovation systems; in turn, the institutional arrangements in the TH model must be complemented in order to fit new trends and global challenges. As an outcome of this, the Quadruple Helix (QRH) model has been developed. Such model promotes the perspective of the *knowledge society* and *knowledge democracy* for knowledge production and innovation.

At the same time, several international organisations and policy-makers have acknowledged the fact that human advance and progress over the past centuries (and across different political systems) have been achieved at the cost of the environment. In that context, Franc and Karadžija, (2019) state that *“achieving sustainable development is an imperative in the era of globalisation, digitalisation and fast technological progress”*. They suggest the need for a new equilibrium, such that the population continues to reach its full potential *“without producing irreversible, adverse effects on the carrying capacity of the environment upon which it depends”*. Therefore, there is a need for a comprehensive and

environmentally sensitive model of innovation that underlines the socio-ecological transition of society and the economy in the 21<sup>st</sup> century.

The Quintuple Helix (QNH) model was introduced as a model that established nature as a principal constituent for innovation and the knowledge production required for the shift to a bio-based society. Many evolutionary innovations are inspired by the biological and ecological systems, and countless economic, social and technological innovations are in fact an outcome of adapting or even imitating the effects of nature – and this is what the QNH is highlighting. The QNH model is extending the already existing nexus of the QRH by including the natural environment, which in this framework is seen as a trigger that can initiate and generate innovation and knowledge production, hence making opportunities to fortify the knowledge economy.

Taking into account the above mentioned needs, the following of this chapter focuses on the description of the Triple, Quadruple and Quintuple Helix innovation models, mostly in an European policy context.



**Figure 1:** Knowledge production and innovation (source: Carayannis et al., 2012)

## **1.1 Innovation Policy and Regional Innovation Systems in Europe**

According to Grundel and Dahlström (2016) “*innovation policy is mainly driven by economic growth and economic development agendas, where new innovations are seen as drivers of economic growth and development. In this way, innovation policy is used as an important tool for governmental institutions to enhance and support*

*innovations on different geographical scales to promote economic growth*". An essential part of this is the concept of Regional Innovation Systems (RIS) which gained momentum in the early 1990s. This concept of RIS is affiliated to the rise of regional clusters and regional innovation policy, in which the regional level is considered as the most suitable geographical level for implementing innovation policy, as opposed to the previous forms of innovation policies that were concentrated on the national level (Lundvall, 1992). Considering this, an innovation is a result of the social processes in which innovation happens with the interaction among different actors. Furthermore, in regional science, the result of an innovation process is closely linked to the geographical (regional) context and institutional settings (Doloreux and Parto, 2005). Hence, a RIS can be considered as an institutional arrangement established to support innovation in businesses in a particular region (Asheim, 2007). To date, innovation policy aimed at supporting innovation systems has been mostly dominated by a TH configuration, focused on interaction between universities, government and industry (Etzkowitz and Leydesdorff, 2000).

Nowadays, the prominence of the RIS concept is increasing following the introduction of the EC directive for European regions to develop the RIS3 – Research and Innovation Strategies for Smart Specialisation. European regions are devising Smart Specialisation strategies to benefit from their own unique resources and receive funding from the European structural funds. "Smart Specialization strategies mainly build on strengthening pre-existing specialisations at the regional level with the aim of reaching the European 2020 goals in research and innovation" (Carayannis and Rakhmatullin, 2014). Several European regions have focused their Smart Specialisation strategies, specifically their research and innovation strategies, towards the development of CE politics in one or several industrial sectors. Hence, the debate about Smart Specialisation and innovation policy and is closely related to CE policymaking (Grundel and Dahlström, 2016).

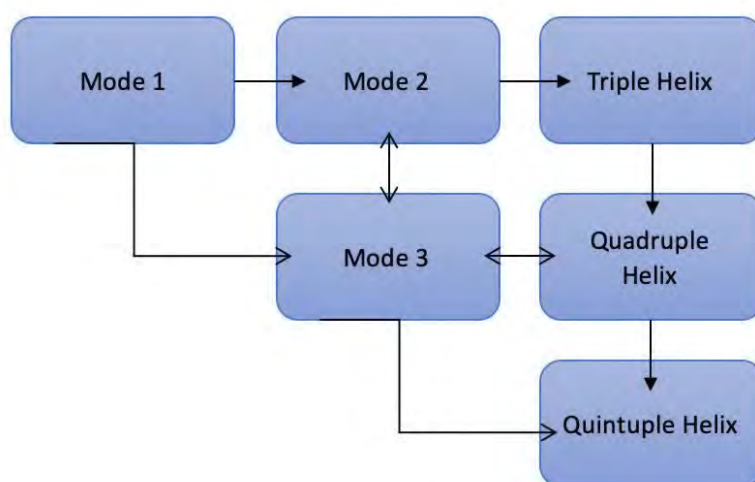
## **1.2 The Triple Helix Model: Reference Framework**

Initially conceived by Etzkowitz and Leydesdorff in the 1990s, the Triple Helix approach considers innovation as a multi-faceted process, which does not occur in a single institution, but rather in trilateral networks composed of the interacting *helices* of industry, academia and government. Across time, helices become "*ever more closely interwoven, eventually fusing into a triple helix structure*" (Bellgardt et al., 2014).

In a TH network, each helix has a specific role. The role of science in earlier dominant innovation policies has been considered as the basis for technological development, mostly satisfying the development of new products. In this traditional context, innovation was seen as knowledge possessed by talented individuals and/or research groups (Arnkil et al., 2010). In the innovation literature, this is known as *mode 1* knowledge production (Carayannis and Campbell, 2012). Here universities functioned as neutral *support structures for innovation* (Etzkowitz, 2003), producing fundamental knowledge, providing research findings and training personnel for higher-ranking institutions. *Mode 2* policies broaden the innovation process not only to goods and products, but also to services, ideas and practices. In this mode 2, "*universities produce knowledge in transdisciplinary*

*processes, then utilise and market it; they establish and support spin-offs, and perform quasi entrepreneurial functions, hence the term entrepreneurial universities” (Etzkowitz, 2003). Moreover, universities are “actively involved in the utilisation and capitalisation of the knowledge they have generated and play a key role in the networks that foster innovation: the communicative, interactive networks between industry and government”.*

Simultaneously, industrial actors are very often undertaking activities which were once exclusively conducted in the academic sector: “*These include maintaining their own research and development facilities, constantly increasing the skill level of their staff by offering training and professional development and sharing knowledge with each other. The high degree of overlap between the institutions leads to a mutual exchange of skills in the areas usually covered by the other helices; in the terminology of the triple helix concept, this is referred to as hybridization or taking the role of the other*” (Etzkowitz, 2003). The related models of knowledge creation and innovation creativity are presented in Figure 1.2.



**Figure 1.2:** The evolution of the models of knowledge creation (source: Carayannis et al., 2012)

The elements of the TH system are the institutional spheres of academia, industry and government; stakeholders within these spheres are categorized as in Table 1 (Carayannis and Rakhmatullin, 2014).

**Table 1:** Triple Helix actors’ category

Category of Actors	Description
R&D innovators	These actors can be found in all spheres. In the universities they are represented by research groups and interdisciplinary research centres; in industry they are represented by the company’s R&D divisions/departments, and in the government, they are the public research organisations and mission-oriented research laboratories. Additionally, they can be found in the non-profit sector.

Non-R&D innovators	These actors are mainly linked to industry, although they exist in various forms in government and in universities. They encompass actors that take part in the following activities: design, production marketing, sales, technology adoption, incremental change, combining existing knowledge in new ways, interaction with users, acquisition of patents and licenses.
Hybrid institutions (organisations)	These actors are also defined as “multi-sphere” institutions. Institutions more associated with universities are, for instance, the interdisciplinary research centres or technology transfer offices in universities. Those associated with industry are the research labs of the companies, industry-university research consortia, business support institutions encompassing science parks and business/technology incubators. In addition, those associated with the government are publicly funded research or innovation centres.

**Source:** CoR (2016)

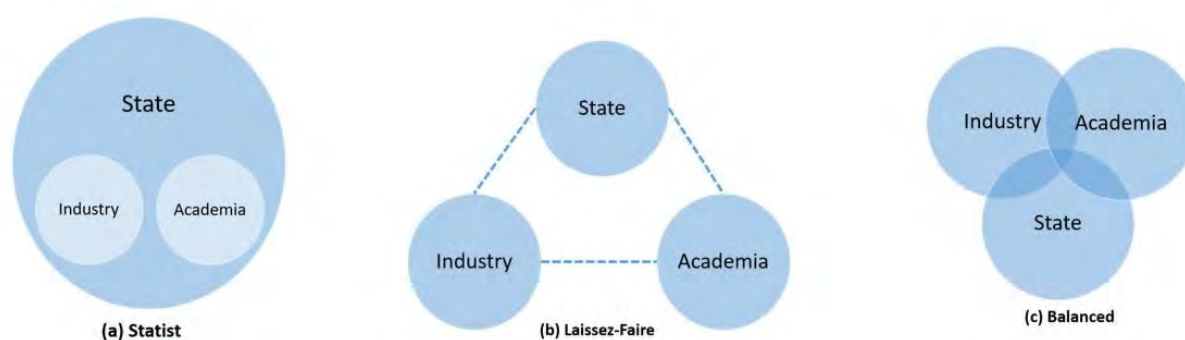
Considering the relationships among TH stakeholders, Carayannis and Rakhmatullin (2014) introduce two key types of relationship as the social evolutionary mechanisms inducing change in TH systems:

- **Objective-based collaboration:** including delivery of R&D and consultancy services, development of competencies, establishment of new markets or merging of existing ones, creating and changing organisations and/or institutions, technology transfer, incubation activities, financing, networking, negotiation,
- **Functional substitution:** these types of relationships are developed when each institutional sphere assumes “the role of the other” in addition to their traditional functions. This role may focus on filling gaps that appear when another sphere is weak or, or incapable, reluctant to undertake its traditional function.

Taking into consideration the types of relationship between the helices, scholars have developed a vast amount of literature exploring the theoretical concept of the TH. On the other hand, practitioners and policymakers have applied the TH model in three different settings, each one of them a diverse institutional arrangement (Figure 1.3).

In the *statist* regime (a), the government dominates by driving the innovative capacity of academia and industry in a predefined policy context. In the *laissez-faire* regime (b), the three helices are detached from one another, and the interaction between them is limited. In this regime, industry is leading the innovative capacity in a framework ruled by the government and academia is contributing knowledge. In the *balanced* regime, the helices are the closest to each other and their sections of influence are so diffuse that this leads to new organizational arrangements and connections at the intersection point (*innovation in innovation*). These can refer to collaborative R&D projects or “hybrid” forms of organisations (incubators, venture capitalists) (Ranga and Etzkowitz, 2013).





**Figure 1.3:** Three models of a Triple Helix (source: Ranga and Etzkowitz, 2013)

In different economies, the role of different actors can vary to a large extent, along with the general strategies for innovative development. For instance, in Russia, China, Latin American and Eastern European countries, the government plays a dominant role and such an arrangement follows a “top to bottom” innovation strategy approach, corresponding to the *statist* regime (Ranga and Etzkowitz, 2013). On the other hand, in the US and many Western European countries, a *laissezfaire* regime exists, which is characterised by limited government intervention and limited control over academia. In such contexts, universities are more active in initiating innovation, but industry is still the driving force. This corresponds to a “bottom-top” innovation strategy approach (Dubina, 2015). In the context of CE implementation, these regimes could be also identified in countries that are already making some progress towards the transition.

On the one side of the spectrum is the so-called top-down-approach. According to Ghisellini et al. (2016), in China CE has been through the two most-recent 5-year plans, and by the promulgation of a large body of legislative packages (such as the Chinese CE promotion law). Consequently, the instruments that are being used for the implementation of the CE are more “command and control” in nature rather than being market oriented. On the other side of the spectrum is the bottom-up approach, which appears to summarise the transition in Europe. Indeed, in these countries, EU directives and national laws place a great emphasis on a market-based transition (Genovese et al., 2017). Also, the shift towards CE is championed by grassroots movements, initiatives of NGOs, environmental organisations, civil society. Japan can be found somewhere in the middle of the spectrum where efforts towards the CE are emanating from a close collaboration among society, the state and industry.

Even though the TH model is probably the most widely adopted, it is not comprehensive enough when it comes to complex scenarios such as the devising of CE policies. By focusing on the industry-government-university nexus, it disregards the social dimension. Hence, the “societal voice” is not fully accounted for in the process; as discussed above, this dimension can be of pivotal importance in devising CE interventions, especially in bottom-up settings. Therefore, the need for a more inclusive model arises.

### **1.3 The Quadruple Helix Model**

A QRH model can be perceived as a broadening of the TH model by incorporating a fourth helix — civil society — in the innovation system. Going back to Figure 1.2, where the evolution of the models of knowledge creation was depicted, the concepts of mode 1 and mode 2 knowledge production systems are expanded into *mode 3*, comprising Innovation Networks and Knowledge Clusters for knowledge creation, diffusion and use (Carayannis and Campbell, 2009 and 2010).

In that respect, mode 3 is considered as a *“multi-layered, multi-modal, multi-nodal, and multi-lateral system, encompassing mutually complementary and reinforcing innovation networks and knowledge clusters consisting of human and intellectual capital, shaped by social capital and underpinned by financial capital”* (Carayannis et. al., 2017). The notion of mode 3 highlights the concurrence and co-evolution of different knowledge and innovation modes and acknowledges such diversity as indispensable for advancing societies and economies. This so-called pluralism accentuates the process of mutual cross-learning from different knowledge modes. Mode 3 incites interdisciplinary thinking and transdisciplinary application of interdisciplinary knowledge (Carayannis and Campbell, 2010).

According to Carayannis et al., (2012) the QRH model is anchored on the TH model by including the public as the fourth helix, more precisely being expressed as the *“media-based and culture-based public” and civil society*. This fourth helix is linked with *“media”, “creative industries”, “culture”, “values”, “lifestyles”, “art”, and perhaps also the notion of the “creative class”* (Carayannis and Campbell, 2009).

Public participation is highlighted as a democratic right by environmentalists and pressure groups (Reed, 2008) as well at the supranational level by international organisations. At the EU level, inclusive growth is considered as an important driver for the transformation of society. This is specifically pointed out in the Smart Specialisation platform (Forey et. al., 2012) where the inclusion of civil society in an open dialogue is highlighted as significant throughout the innovation process. The new EU Green Deal is also strongly supporting the inclusion of society in order to have a Just Transition: *“the European Pillar of Social Rights will guide action in ensuring that no one is left behind”* (European Commission, 2019).

This can be seen even from the introductory lines of the communication where they phrase the new EU Green Deal as a *“new growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use”*. The following two excerpts from the same Communication also strengthen these concepts.

*“Conventional approaches will not be sufficient. Emphasising experimentation, and working across sectors and disciplines, the EU’s research and innovation agenda will take the systemic approach needed to achieve the aims of the Green Deal. The Horizon Europe programme will also involve local communities in working towards a more sustainable future, in initiatives that seek to combine societal pull and technology push”*.

“Pro-active re-skilling and upskilling are necessary to reap the benefits of the ecological transition. *The proposed European Social Fund+ will play an important role in helping Europe’s workforce to acquire the skills they need to transfer from declining sectors to growing sectors and to adapt to new processes. The Skills Agenda and the Youth Guarantee will be updated to enhance employability in the green economy*”.

#### **1.4 Quadruple Helix and The Smart Specialisation Agenda**

The Smart Specialisation agenda is the underlying concept of the current EU industrial development strategy, representing a vision for regional growth trajectories established on existing place-based capabilities. The main goal is to leverage existing strengths, unveil hidden opportunities and create new strategies that regions can build on for competitive advantage in high value-added activities. In this respect, the Smart Specialisation concept leverages on the place-based principle. It acknowledges and builds on the differences across European regions including their different economic and industrial configurations, preconditions and challenges. It recognises their diverse policy challenges for promoting innovation, competitiveness, growth and different stages of economic and industrial development. According to CoR (2019) the Smart Specialisation is “*a process of priority-setting in national and regional research and innovation strategies in order to build ‘place-based’ competitive advantages and help regions and countries develop an innovation-driven economic transformation agenda*”. In simple terms, countries and regions are identifying strategic sectors of current and/or prospective competitive advantage where they can innovate, specialise and build capacity that will vary from region to region. These kinds of efforts are considered as being very collaborative and involve different groups of stakeholders including different ministries, regional administrations, universities, industry associations, companies, and ideally civil society organisations.

According to CoR (2019) the concept of Smart Specialisation is grounded on the following key aspects:

- *“Diversification based on knowledge flows from a firm-level process where knowledge, core competences and resources from existing industries are used in new industries and where entrepreneurs combine their knowledge with knowledge from other industries or knowledge providers.*
- *Strengthening and exploiting the “connectivity” between related activities within a region as well as between the region and other regions that can bring in new knowledge and resources related to existing activities in the region.*
- *Economic activities are linked to place identity, not only economically, but also physically, socially, environmentally and culturally, so interactions between these factors bind the economic activities to the specific place.”*

The first two features are captured by the TH model where cooperation between and within knowledge institutions and businesses defines and develops the flows of knowledge. Public authorities support this process by strengthening stakeholder dialogue, their involvement in the planning process and the formation of public-private partnerships.



The QRH approach widens the TH approach by acknowledging the active role of civil society not only as consumers, but as innovation users as well. Therefore, such an approach acknowledges the contribution to the innovation cycle deriving from the inclusion of civil society. Within this framework, civil society is not intended as a mere user (e.g., citizens not only demand innovative products and services) but they become an important element of the innovation system. Businesses and academia are mainly there to support civil society in innovation activities (e.g. provide tools, information, development forums and skills needed for user innovation activities). The government helix establishes the regulatory framework, but also provides the financial support for devising and applying innovation strategies and policies. Companies and public organisations are also users of the innovations from civil society. In this respect, the QRH framework is broadening the concept of innovation. This is fundamental for Smart Specialisation, in order to acknowledge the possibility of other types of innovation beyond those firmly based on science or technology. It is worth noting that this entails flexibility, process adaptation, re-skilling and possible redistribution of power among involved stakeholders (CoR, 2019).

In the EC view, except the obvious environmental benefits, the CE can boost competitiveness by protecting industries against resource scarcity and volatile prices. Additionally, the CE can contribute to: innovation and new business opportunities; more efficient ways of producing and consuming; the creation of local jobs at all skill levels; social integration and cohesion. Considering all these, the CE is becoming one of the highest priorities for the EU, and hence is included in the RIS3 (CoR, 2019).

## **1.5 Society Matters**

The need for a wider societal engagement in innovation policy (as specified by the QRH model) is widely acknowledged (Dahlström and Hedin, 2010). Foray et al., (2012) argues that an extended version of TH model is required. Such a model should be based on the principles of the QRH system, including innovation users or similar groups representing consumers, NGOs, citizens and workers. In this RIS3 Guide devised by Foray et al., (2012), the participation of the civil society in the industry-government-academia nexus of the innovation process is expected to be strengthened, in order to further enhance the innovation potential of European regions: *“In the Open Innovation era, where social innovation and ecological innovation entail behavioural change at the individual and societal levels... the regional governance system should be opened to new stakeholder groups coming from the civil society that can foster a culture of constructive challenge to regional status quo”*. The final users of innovation, which are representative of the demand perspective, are added as a fourth group of actors in *“the traditional, joint-action management model of the triple helix, based on the interaction among the academic world, public authorities, and the business community”*.

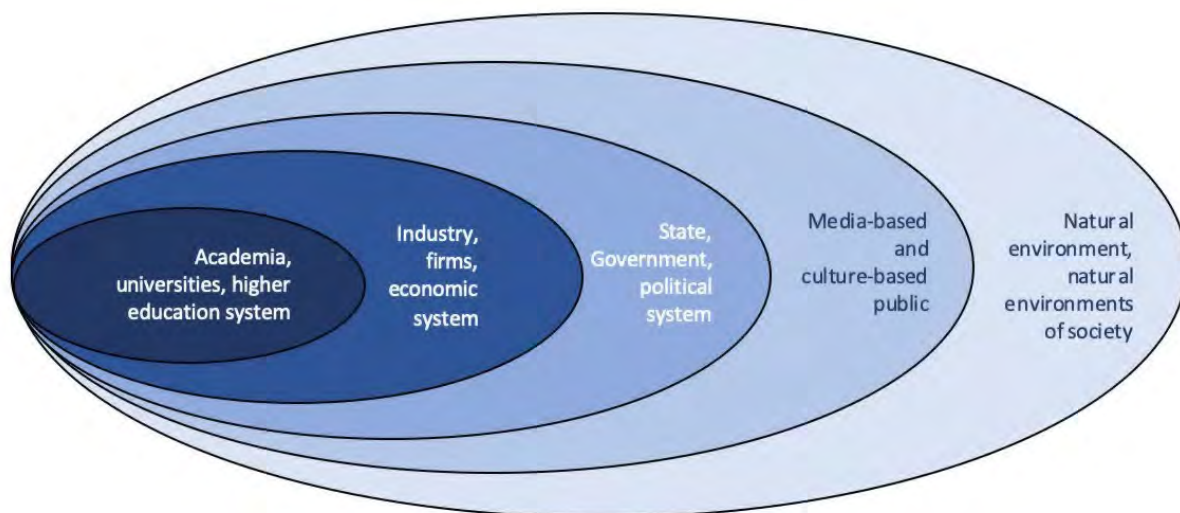
In that context, Carayannis et. al., (2017) argue that the QRH Innovation System Framework can act as *“an architectural innovation blueprint that engages simultaneously four sectoral perspectives. The inter-sectoral and intra-sectoral, as well as the inter-regional and intra-regional knowledge and learning interfaces that are embedded in the Quadruple Helix architectural blueprint determine its efficacy and sustainability. A combination of*

*these four perspectives aims for the conceptualisation, contextualisation, design, implementation, and evolution of (smart, sustainable, and inclusive) growth-driving entrepreneurship and innovation ecosystems (as well as clusters, networks, and other agglomerations) at the regional level".* They are also emphasising the bottom-up approach that is represented by the QRH Innovation System Framework, inferred from the inclusion of civil society as the fourth pillar of the model. Nevertheless, they are also pinpointing the need for suitable mechanisms ensured by policymakers in order to unleash the full potential and benefits from this inclusive model (i.e. crowd-sourcing and crowd-funding capabilities in instruments and initiatives). The social networking abilities will increase the probability and impact of knowledge serendipity and knowledge arbitrage events (happy accidents), which will in turn function as *"triggers, catalysts and accelerators of exploration and exploitation dynamics that could substantially empower any Quadruple Helix strategy"*.

In theoretical but also in practical terms, the transition towards the CE is a complex paradigm shift, intrinsically systemic, which can only be fully successful if all sides are involved working in the same direction. In particular, given the involvement of the whole socio-economic system, rather than the productive system alone, the role of the society in general not only as consumers is vital for the transition; hence, the extension from the TH to the QRH model in that context is also vital.

## **1.6 The Quintuple Helix Model**

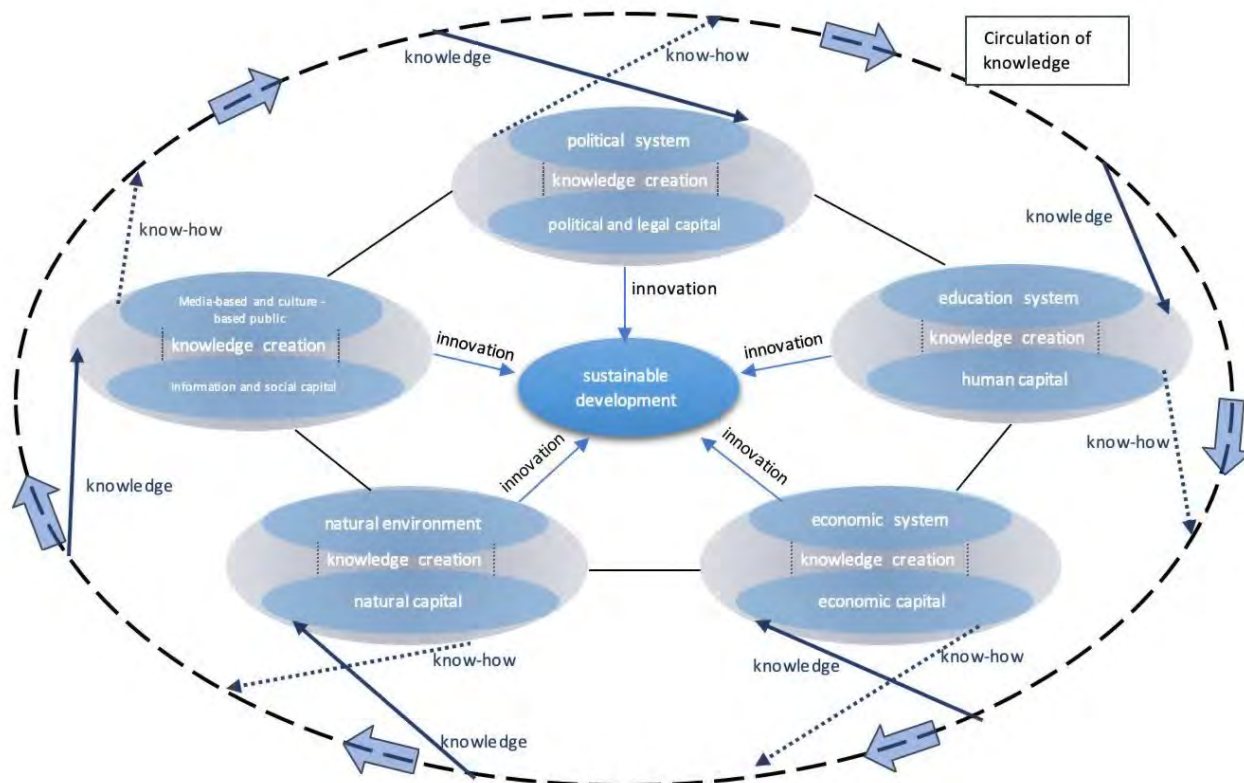
In 2010 Carayannis and Campbell (2010) extended the QRH into the QNH by including the natural environment as a new component and new subsystem for knowledge and innovation models. With the inclusion of the fifth component, sustainable development and social ecology became constituents for social innovation and knowledge production. *"The Quintuple Helix furthermore outlines what sustainable development might mean and imply for 'eco-innovation' and 'eco-entrepreneurship' in the current situation and for our future"* (Carayannis and Campbell, 2010). The most relevant element of the QNH is the resource of knowledge, which, via circulation between the five subsystems, alters innovation and know-how. These five subsystems (or, equivalently, helices), are presented in Figure 1.4 and described below.



**Figure 1.4:** The subsystems of the Quintuple Helix model (source: Carayannis et al., 2012)

- i. **The education system:** In this helix the human capital of a state (for example, students, teachers, scientists/ researchers, academic entrepreneurs) is being created through research and knowledge transfer activities.
- ii. **The economic system:** This helix concentrates on the economic capital of a state (for example, entrepreneurship capabilities, equipment, products, technology and capital).
- iii. **The political system:** This subsystem is concerned with the whole articulation of the state. This helix also includes political and legal capital (for example, ideas, laws, plans and politicians).
- iv. **The media-based and culture-based public:** This subsystem integrates two types of capital: via the culture-based public (for example tradition and values) the social capital, and via the media-based public (for example, television, internet and newspapers) the capital of information (for example novel communication and social networks).
- v. **The natural environment:** This subsystem is pivotal for sustainable development and provides the natural capital (for example, resources, plants and a variety of animals) (Carayannis et al., 2012).

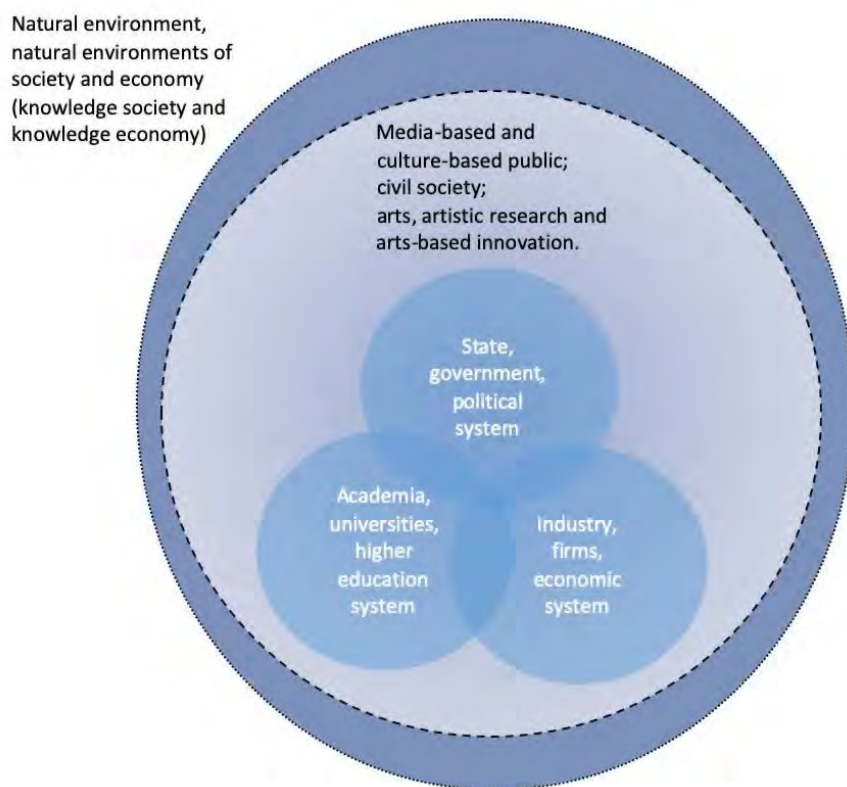
This so-called Cumulative QNH Model is introduced as a theoretical and practical model for knowledge exchange with the purpose of generating and promoting sustainable development (Figure 1.5). The resource of knowledge is circulating between subsystems (within a state or between states), meaning it is considered as both input and output. As stated by Carayannis et al., (2006): *“On the one hand, knowledge serves as an input or resource for advanced societies and economies, which increasingly depend on knowledge. On the other hand, knowledge production (knowledge creation) also generates knowledge as an output, which then is being fed back (recycled) as a knowledge input”*.



**Figure 1.5:** The Quintuple Helix model and its functions (source: Carayannis et al., 2012)

According to CoR (2019) the QNH adds the spatial dimension to the model, assuming that the *“identity of a territory is shaped by the physical place with its landscape, environment, physical infrastructure and buildings... the natural environments of society and the economy become drivers for knowledge production and innovation, so defining potential opportunities for the knowledge economy and industrial development”*. Different authors present the five helices in different ways; Dubina (2015) depicts the initial TH model as the core of the QRH model, with both of them being embraced by the QNH model (Figure 1.6).





**Figure 1.6:** The concept of the Quintuple Innovation Helix (source: Dubina, 2015)

## **1.7 Environment Matters as Well**

In view of the current challenges that the EU is facing, it needs to make constant efforts to devise and modify policies and measures that foster innovation, encompassing the need for a more sustainable society and for the preservation of natural ecosystems (Franc and Karadžija, 2019). Such efforts are evident in the recent CE Action Plan and EU Green Deal. The introduction of these policy packages could imply that the EU is considering the *environment* as an important and decisive subsystem.

Being a problem-oriented model explicitly designed for implementing socio-ecological transformations, the QNH could be a suitable model to be adopted when devising CE policies (Carayannis et al., 2012). According to Grundel and Dahlström (2016), “*the transformation to a sustainable society requires a change in both innovation and environmental policy to involve further stakeholders in innovation systems*” thus extending the triple helix into quadruple and quintuple helix systems. They continue that “*research and international policy point towards the importance of involvement from further stakeholders in environmental decision-making processes. This involvement can be seen not only as a democratic right but also as a way of creating durability and credibility in the decisions made...A transformation of this kind calls for a larger transition of societal functions and not just the economy, requiring knowledge from different spheres of society.*”

The QNH model is represented by four groups of stakeholders: academia, industry, government and civil society – along with the environment. Hence, even though the knowledge is created by the first four helices, the natural environment must be explicitly accounted for in the knowledge production process.

### **Chapter 1: Key take-away box**

The transition towards a CE is a systemic change: in addition to the targeted actions affecting each stage of the value chain and key sectors (i.e. mining, forestry, steel industry), it is also essential to create conditions where societal resources can be fully mobilised. Innovation plays a vital role in this change. Indeed, rethinking ways of producing, consuming and transforming waste into products that will be consumed again compels novel technologies, services, process and business models. Therefore, support for research and innovation is a cornerstone in fostering the transition, and this will also contribute to the competitiveness and modernisation of the EU economy (CoR, 2019).

This can be also seen from the new Research and Innovation framework programme Horizon Europe; in the launch document, CE is mentioned over 130 times. Furthermore, the introductory lines of the EU Green Deal communication from the EC state that *“tackling climate and environmental related challenges is this generation’s defining task”*. However, the Commission is aiming to turn this defining task and urgent challenge into a unique opportunity (European Commission, 2019).

The recent efforts of the EU clearly indicate the emergence of the QNH model in the EU policy discourse, and this model might be the useful to drive the transition towards a CE. As already explained above, the QNH is a participatory stakeholder approach that requires a new constellation of stakeholders, and the methodology that will now be presented in Chapter 2 can be used to ensure all relevant stakeholders are accounted for. In Chapter 3 the innovation models presented in Chapter 1 will be adapted to the CE context, and a proposed model will be introduced that can be used in the regional context.

## **CHAPTER 2: STAKEHOLDER ANALYSIS**

In order to properly address the World Bank’s (1996) definition of stakeholder participation (see Introduction), it is important to begin by running a proper stakeholder analysis. This should include: (1) the identification of all relevant stakeholders (i.e. it should not leave anyone out); (2) the exploration and identification of their specific incentives, interests, experiences, knowledge and power (i.e. *how are they affected, or can contribute, to the design of the strategies in question?*); and (3) an investigation of the relationships between stakeholders and their consequent involvement in the appropriate stages of decision making. Finally, Kua (2016) proposes a framework for sustainability policy making which aims to address the dynamic nature of stakeholder interests and roles through

a fourth step: managing stakeholder roles. Although this fourth step will not be discussed further in this report owing to a lack of appropriate methods to implement it, the importance of addressing stakeholder role management throughout the stakeholder analysis process is recognised.

This chapter offers an overview of methods available for the application of a stakeholder analysis. First, methods for stakeholder inclusion are introduced (Table 2). Second, the classification of stakeholders is addressed through the consideration of different categorisation strategies that might be more, or less, relevant depending on the type of strategy (or policy) that is to be designed (Table 3). Finally, methods for the identification of meaningful interactions and relationships between included stakeholders are presented (Table 4).

## **2.1 Stakeholder Identification and Categorisation**

Different methods for stakeholder identification have different goals, benefits and drawbacks. These positive and negative aspects may refer to the differing quality or quantity of the method's outputs or the costs attached to the application of each method. Moreover, some methods may be more suitable for different sub-stages of the stakeholder identification step. In fact, many "stakeholder identification" approaches require pre-identified stakeholders as an input (Reed et al., 2009). However, this is usually not a trivial task, and so a combination of methods might be desirable. Four different methods are presented in Table 2, together with their strengths and weaknesses.

The second step in a stakeholder analysis is to understand and differentiate between stakeholders. This requires developing an understanding of how the different stakeholders and stakeholder groups are affected by, or can affect, the decision/policy in question, as well as their interests and perspectives. Several methods are available for developing this level of understanding, some more systematic than others. The most systematic methods rely on the categorisation of stakeholders with respect to categories that are typically useful in achieving some goal in a specific setting. As an example, Table 2 includes an approach (namely the "bottom-line approach" which is part of the LCA-based method)<sup>1</sup> for the systematic categorisation of stakeholders with respect to: a) their connection to one or more dimension of sustainability, and b) the local or global nature of their interests and position. This is a good example of a highly systematic differentiation of stakeholders. Other methods, that are not so systematic, include methods that rely on the qualitative information obtained through close interaction with stakeholders (e.g. through in-depth interviews). Table 3 provides summarises some of the principal stakeholder categorisation methods, together with their strengths and weaknesses. Given the variety of strengths and weaknesses associated with these

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<sup>1</sup> Although this method can be understood as a stakeholder classification tool (i.e. step 2 in a stakeholder analysis), it can also be used in step 1 (stakeholder identification stage) (step 1).

methods, different goals will be best suited to different methods and, often, a combination of more than one method will prove particularly useful.

The identification of relationships between stakeholders or stakeholder groups is, in general, an exploration into the existence, quality (type) or quantity (strength) of these relationships. Therefore, most available methods for the identification of inter-stakeholder relationships are based on different scales through which the quality, quantity or lack of a relationship may be identified. Four different methods for this inter-stakeholder relationship identification are summarised in Table 4.



**Table 2:** A summary of methods for stakeholder identification. Based on Kua (2016) and Reed et al. (2009)

Method	Overview	Strength	Weaknesses
Life-cycle assessment (LCA) & Bottom-line	It consists of two tasks, the order of which is interchangeable: i) Application of an LCA logic to the target process and identification of per-life-cycle-stage stakeholders. ii) Identification and classification of stakeholders based on the dimensions of sustainability and the local-global nature of the stakeholder involvement.	Very systematic. Highly cost effective. No pre-identified stakeholders needed. Explicit consideration of sustainability dimensions.	The overlook of important qualitative aspects may happen as a result of not combining the LCA approach with other methods.
Brainstorming sessions	These can be summarised as organised discussions of a pre-determined topic in a focus-group like setting. This method aims at collecting large amounts of qualitative information on stakeholders, their interests and their knowledge.	Offers deep understanding of complex processes. Convenient for creation of comprehensive stakeholder categories and classification criteria.	Requires a high level of preparation. Requires a skilled facilitator.
Snowball mapping	Aims at ultimately achieving the identification of all relevant stakeholders, starting by interacting with the most accessible ones first (base stakeholders). The expectation is to be able to extract from them information on further stakeholders, as well as, contact information of stakeholders already in their social networks.	Fast and straightforward (undemanding of resources, time and expertise). Easy access to base stakeholder social network (snowballing). Most suitable for completing a list of stakeholders.	Potentially biased outcome due to the use of the snowballing technique. Not very strong on its own (combination with other methods is desirable).
Semistructured interviews	This method aims at providing detailed, reliable and comparable information on stakeholder incentives, interests and perspectives in an interview setting. They consist of both open and closed questions in order to allow for the discovery of new relevant insights, without allowing the conversation to diverge too much from the essence of the focus.	High quality of output data. Aids the identification of new problems and insights that might be overlooked otherwise. Capability to boost relationship building with other stakeholders.	High level of preparation and involvement required. Not particularly time or cost effective. Difficult to arrive at interstakeholder consensus.

**Table 3:** A summary of methods for stakeholder categorisation. Based on Mitchell et al. (1997); Reed et al. (2009).

Method	Overview	Strengths	Weaknesses
Interest/influence matrices	Classification of stakeholders with respect to two axes (interest and power/influence). More generally, other scales may be used in order to better align with the specific process.	Quick identification of influence-dynamics of stakeholder system – systematic basis for determining future stakeholder involvement and its levels.  Convenient visual representation of classification (ease of communication to stakeholders).	Not enough depth of information offered (lack of qualitative insights).  Narrow scope of classification: Potential to overlook the involvement of relevant stakeholders.
Stakeholder-led categorisation	Stakeholders themselves decide on categories for stakeholder classification. This method is carried out through a brainstorming session or semi-structured interviews (see Table 2).	Enhances stakeholder familiarity with, and understanding of, categories. This also means that stakeholders are able to provide better insights.	Potential to result in non-coherent categories due to different perspectives (particularly when using semi-structured interviews).  Lack of systematicity.
Q methodology	Stakeholders are asked to rank certain statements about a target topic in order of importance (using questionnaires or structured interviews). They are then classified with respect to their responses.	Systematic.  Identification of stakeholder viewpoints and existing social discourses.	Social discourses and perspectives not addressed by questionnaire (or interview) cannot be identified. This may result in relevant discourses and perspectives being overlooked.
Radical transactiveness	Using a snowball mapping (see Table 2) approach, stakeholders are categorised with the aim of identifying fringe stakeholders.	Future-focused perspective – risk assessment.  Identification of fringe stakeholders.	Potential classification bias stemming from snowball mapping method.
Salience method	Each stakeholder is rated according to 3 attributes (power, legitimacy and urgency). They are then categorised according to the 3 attributes and where they intersect (in a Venn diagram fashion). A total of 8 stakeholder roles emerge (see Mitchell et al., 1997).	Systematic.  Good tool for decision on level of involvement of stakeholders.	Not enough depth of information offered (lack of qualitative insights).

**Table 4:** A summary of methods for inter-stakeholder relationship identification. Based on Hollingsworth (2000); Reed et al. (2009); Wasserman

Method	Overview	Strength	Weaknesses
Actorlinkage matrices	A table (matrix) containing all (relevant) stakeholders listed down and along the first column and row. Each box is then filled with information about the relationship between the corresponding stakeholders (e.g. strength – from weak, W, to medium, M, to strong, S). For relationships for which not enough information is available, the boxes are typically left blank.	Cost-effective & easy application.  Significant freedom regarding the stakeholders that are included in the method.  Flexibility regarding data collection (brainstorming sessions, questionnaires, interviews etc.)	May prioritise some stakeholders and overlook other relevant stakeholders (and relationships).  Difficult to interpret/describe when too many relationships are considered.  Not enough depth of information offered (lack of qualitative insights).
Social network analysis (SNA)	Aims at understanding and representing the network of target stakeholders. In its representation, nodes correspond to stakeholders and the lines (or arrows) connecting them represent relationships (or flows) between them (see Wasserman and Faust, 1994). Varying colours and line-thicknesses are used to represent a varying quality or quantity regarding the stakeholders or their inter-relationships. Data is collected through questionnaires or interviews.	"Aids differentiation between influential and peripheral stakeholders.  Provides insights into the boundary and structure of the stakeholder network."	Questionnaire (or interview) could become a hassle for the respondents. Compounded, proportionally, according to the amount of information (variables) to be included.  Time-consuming  Need for a specialist to apply correctly.
Knowledge mapping	Used in conjunction with SNA. Semi-structured interviews (see Table 2) are used in order to learn about existing interactions and knowledge. This allows for the identification of (potentially) particular fruitful future interactions.	Completes SNA and can provide information of a greater depth.	Information given by different stakeholders could be of a different kind. Therefore, it may be difficult to determine clear connections between them.
Institutional analysis	Institutional perspective on inter-stakeholder relationships. It studies the internal (e.g. norms) and external (e.g. laws) workings of institutions, as well as their origins, associated actors and their interactions and impacts on others (such as people, society, community etc.) For a more detailed account, see Hollingsworth, 2000.	New perspective.  Aids the identification of potential institutional barriers or challenges."  Knowledge of institutional context within which stakeholders operate and its effect on their relationships.	Information given by different stakeholders could be of a different kind. Therefore, it may be difficult to determine clear connections between them.  Mixed methods (survey + interviews) desirable.  Time-consuming (partly due to all of the prior research necessary).

## **Chapter 2: Key take-away box**

In summary, a good stakeholder analysis requires a substantial amount of planning and demands a high level of involvement from the person or institution carrying it out. The different methods discussed throughout this chapter all have their place, provided their strengths outweigh their weaknesses in the specific context in which they are applied. However, in most cases, a combination of more than one method at each step in the stakeholder analysis will render the most useful outcomes. Moreover, as discussed in the first chapter, the stakeholder analysis should be understood as an ongoing process given the dynamic nature of stakeholders' interests, perspectives, power and so on. Finally, despite it being critical, a good stakeholder analysis is only the starting point in an extended process of policy making that utilises regional innovation systems and models such as the Triple, Quadruple and Quintuple helix. In particular, the Quintuple helix model is central to policy design in the context of a CE (see Chapter 1).

### **CHAPTER 3: REGIONAL INNOVATION MODELS FOR THE TRANSITION TOWARDS A CIRCULAR ECONOMY**

Both research and practical experience have highlighted the transition towards the CE to be systemic in essence, requiring the efforts of multiple stakeholders. However, far too little attention has been paid to the development of specific models that can lead the transition. This chapter will seek to remedy this issue by adapting the Triple, Quadruple and Quintuple Helix models that were previously described in Chapter 1, in order to propose a new model that can be adopted for CE implementation in a regional context.

The **CE-centric QNH model** will be introduced, along with an explanation of the stakeholders involved. The model will adopt a balanced approach, where each helix and corresponding stakeholder will have different roles, although each of these roles is equally important for the successful implementation of the CE. In this model, the subsystem of the natural environment will be considered as a driver for innovation and the transition. Hence, the environment will be represented as the nucleus of the model, which should inspire and trigger actions by the remaining four subsystems. This aspect will be the novelty of the model, along with the introduction of development and co-operation platforms, which should play a pivotal role in the transition.

Furthermore, stakeholder mapping will be performed using the CE-centric QNH model. In order to map the stakeholders, relevant actors will firstly be identified at the regional level, and the corresponding (non-exhaustive) list of these actors will be part of the annexes. Similarly, an additional (non-exhaustive) list of stakeholders relevant to consumer engagement in the Circular Economy will be part of the annexes. The information presented on the stakeholders relevant to consumer engagement that are identified will be briefly analysed based on the following dimensions:

- their motivation for involvement in the CE
- possible interactions with other stakeholders
- whether they can act as an enabler or barrier for the transition towards CE

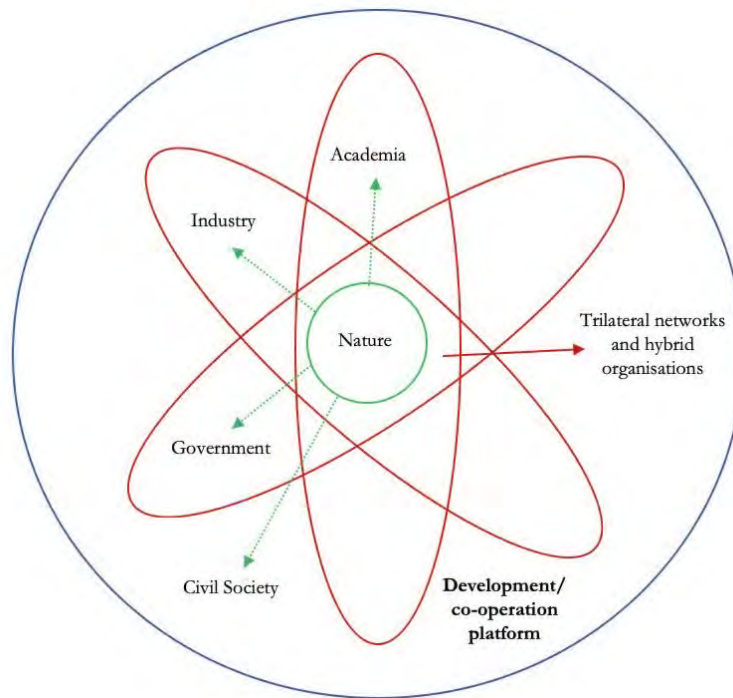
Finally, from circular business model examples, an attempt to identify the related stakeholders will be made. The stakeholders will be grouped into the following categories: consumers, manufacturers (OEMs), suppliers, service providers, government and NGOs. These stakeholder groups will be also described based on the abovementioned dimensions.

### **3.1 The Ce-Centric QNH Model: Introduction**

This report proposes a **CE-centric QNH model** (Figure 3.1) for mapping the stakeholders involved in the transition towards a CE. The model has the three helices from the traditional Triple Helix constellation, i.e. industry (economic system), government (political system) and academia (higher education system). In Figure 1.3, these helices are represented according to a *balanced* regime. The model allows the emergence trilateral networks.

The model is based on the following previous seminal contributions from the literature. First of all, the model recognises the fundamental role of the social dimension (i.e. society), as specified by Arnkil et al., (2010) in the *public-sector-centred living lab* model and in the *Citizen-centred QRH model*. The former is focused on the advance of public organisations and services, where users/citizens partake in the development work of public services together with R&D experts. The latter is aimed at developing innovation that is relevant for the citizens; therefore the owner of the innovation process can be also represented by a group of citizens. Correspondingly, the first model represents the top-down approach, while the second one is leaning more towards the bottom-up perspective. The CE-centric QNH model is situated in the middle of the spectrum, hence representing the balanced approach, where every helix has a specific role to play, each with its own importance and magnitude. The last model used as a reference here is the QNH model, as depicted by Dubina (2015) in Figure 1.6. This figure represents the natural environment as the fifth helix of the model, which does not contain any stakeholders that can undertake tangible actions, but acts more like a driver for innovation and inspiration of the remaining stakeholders.

On the other hand, the CE-centric QNH model on the other hand depicts the natural environment (the spatial dimension of the model) as being the nucleus of the model. As such, the QNH model is an ecologically-sensitive model suitable for driving a socio-ecological transition. Nature is not perceived as a mere *helix*; it is seen at the centre of the model as a driver of innovation, influencing and inspiring the other helices. This a pivotal feature of the model, which allows it to drive the transition towards a Circular Economy given that, in a CE context, innovations, technological solutions and production methods should be true to nature, regenerative and restorative by design. Correspondingly, the boundaries of the model are delineated by the borders of the civil society helix, since it is this helix that consists of individuals who can undertake actual activities.



**Figure 3.1:** The CE-centric QNH model (Source: Adapted using models from: Ranga and Etzkowitz, 2013; Arnkil et al., 2010 and Dubina, 2015).

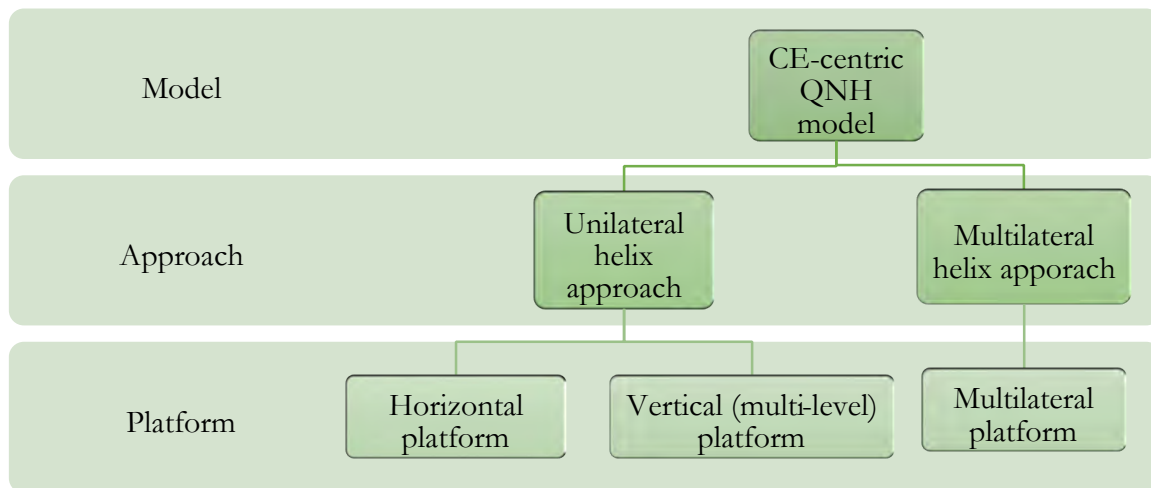
Another concept that is adopted in the model is the one of development/co-operation platforms. Arnkil et al. (2010) suggest that these “*could be seen as a supplement to traditional cluster and regional innovation policy and as a new kind of intermediary organisation that supports the involvement of users in the R&D&I activities*”. In the presented model, development/cooperation might exist within one helix (i.e. unilateral approach) or between more helices (i.e. multilateral approach), as depicted in Figure 3.2.

Within the unilateral helix approach, the following types of platforms might exist, depending on the type of cooperation among the involved actors:

- Horizontal platforms, which exists between same level actors (i.e. cooperation platform between research institutions);
- Vertical (multi-level) platform which exists between different level of actors (i.e. cooperation platform between local, regional and national public authorities).

On the other hand, multilateral platforms, being grounded on the multilateral helix approach, occur between actors from different helices (i.e. research institutions, government, industry, NGOs).





**Figure 3.2:** CE-centric QNH model: proposed approaches and platform

### **3.2 Stakeholders Mapping for The Ce-Centric QNH Model**

This section moves on to map stakeholders identified by the CE-centred QNH model, focusing on the implementation of CE policies at the regional level. For that purpose, relevant regional stakeholders were initially identified following an internet search. A snowball mapping method was then used to identify the stakeholders within each group (academia, government, industry, civil society). Within each group, the most prominent stakeholders were listed. Following this, related stakeholders were identified and hence a non-exhaustive list was prepared (available in the Annexes). Additionally, considering that the ReTraCE Project relies upon a wide and diverse network of Project Partners, consortium members were also added to the list of stakeholders corresponding to the appropriate category. The majority of the stakeholders were located in Europe and Asia. Geographical representation was however sought by including stakeholders not only from leading CE countries, but also from developing countries that have just started to make efforts toward CE implementation.

The academia helix was represented by the academic community, faculties, research institutions and schools. Related actors that were taking actions towards the CE transition are identified and listed in Annex A.

The industry helix (i.e. the economic system) was comprised of businesses, including both Small and Medium-sized and Multi-National enterprises. Related stakeholders are identified and listed in Annex B.

The government sector, or the political system, includes the state, government, local, regional and national authorities, as well as EU and other international organisations in the public sector. The actors that are part of this system (mostly focusing on the regional level), were identified and accordingly listed in Annex C.



Finally, the civil sphere was represented by the public, NGOs or the public media. Related actors were identified and listed in Annex D. Some further stakeholders could prove relevant to the civil sphere through consumer engagement/representation in relation to CE initiatives. A list can be found in Annex G; Section 3.3 provides further details on the criteria followed for the construction of this list.

Some stakeholders were situated between two or more helices and, as a result, are categorised as hybrid organisations (Annex E). Some of these institutions include interdisciplinary research centres or technology transfer offices in universities, research labs of companies, industryuniversity research consortia, business support institutions encompassing science parks and business/technology incubators and publicly funded research or innovation centres. In addition, there were stakeholders that were acting as platforms or networks between multiple stakeholders, either within one or across more helices. These stakeholders were presented in Annex F.

### **3.3 Stakeholders Involved in A Circular Economy Through Consumer Engagement or Representation**

There need for policies, the wider culture and the institutional context to be supportive if successful behavioural change is to be achieved, has been widely recognised (Jackson, 2005; Reisch and Thøgersen, 2015). Additionally, stakeholder participation is recognised as being an essential element of good decision-making and policy making with an environmental (Abelson et al., 2007; Gregory et al., 2020; Hansen and Mäenpää, 2008; Reed, 2008; Reed et al., 2009) and sustainability (Kua, 2016) focus. The stakeholder categories recognised as being significantly involved in shaping the context within which consumer behaviour takes place (in one form or another) are: (1,2) *European or national trade and business/industry associations*; (3,4) *consumer associations*; (5,6) *NGOs, in particular focusing on CE/sustainable consumption*; (7) *national public authorities* (8) *independent repair services/associations*; (9) *standardisation/certification/verification bodies*; (10) *eco-labelling bodies/institutions and* (11) *academics specialising in consumer-related policy and behavioural economics* (Cerulli-Harms et al., 2018). In order to aid the process of stakeholder identification and mapping, some basic information about these stakeholders was gathered (Annex G). The 11 aforementioned stakeholder categories, deemed relevant to consumer engagement in the CE by Cerulli-Harms et al. (2018), were used as a basis for identifying examples of these stakeholders (Annex G). The list is presented in a table providing for each stakeholder: a short overview, an explanation of the motivation for their involvement in the CE, their interactions with other stakeholders and whether they are enablers or barriers to the implementation of a CE.

### **3.4 Stakeholder Interactions in Ce From Bottom-Up Initiatives**

In this subsection, stakeholder categories recognised as being significantly involved in shaping the context within which consumer behaviour takes place are described, in order to provide illustrations of how the stakeholders interact in the circular business models. As the circular business models are identified as key enablers for successful transition to the CE, the analysis of how they interact from the bottom-up perspective can provide further understanding of how

different stakeholders in the value creation process. The key stakeholders presented include the civil society helix (consumers, NGOs), industry helix (manufacturers, suppliers, service providers, and investors), and government helix.

### 3.4.1 Consumers' Interactions with Other Stakeholders

In a traditional linear economy, consumers are positioned at the end of the supply chain. However, one of the major changes associated with the adoption of circular business models will concern consumption patterns (Antikainen & Valkokari, 2016). For instance, the adoption of business models based on a Product-Service Systems (PSS) concept will change the relationship between consumers and products substantially as they will pay for access to products and services rather than product ownership.

There are several circular business models that involve consumers as key actors in driving the transition. In these business models, consumers collaborate and interact with local governments or service providers in order to facilitate the circular flow of materials. The recycling business models rely on consumers for collection of recyclable materials, although the extent to which consumers are involved in the waste collection process varies by municipalities, regions, and countries. In countries like the Netherlands and Germany, consumers can bring back empty glasses and plastic bottles to a deposit to receive money in return. In other countries in Europe or Asia, where the incentive scheme is not readily implemented or widely offered by retailers, consumers are required by municipalities to separate recyclable materials for collection.

Consumers are also directly involved in the value co-creation process with business actors in the repair and maintenance models, as well as reuse and redistribution ones. Users are required to visit repair shops to maintain their products, or return broken parts to a collection point. Alternatively, they need to request that damaged or used products are collected by service providers that are capable of performing reverse logistics operations. In this sense, the extended life of a product depends on consumers' willingness to repair the broken parts. In the reuse and redistribution models, clothing or other used products need to be sent back by consumers to be mended. These products can then be redistributed in the second-hand market.

Consumers are also the essential players in sharing platforms. The concept of a sharing platform is driven by collaboration among consumers. For instance, in the case of the car-pooling platform Blablacar, users who have empty seats in their car travelling between big cities can offer rides to registered users who need to travel. In this way, consumers collaborate with the platform provider and other consumers to create value. As such, in this model, the consumers can be both buyers and sellers (Nadeem et al., 2020).

#### *Barriers and enablers*

Pearce (2009) emphasises that not all customers are eligible to adopt new ways of consumption. More specifically, he identifies certain types of customers who are suitable for remanufactured products. These types of customers include not only those driven by environmental motivations,

but also those who are sensitive to price and who have lower expectations about new equipment. Customers who also want to avoid re-approving, re-specifying or re-certifying a product, as well as those who wish to keep using a discontinued product, are identified as types of customers who are more suitable for remanufactured products.

On the other hand, the concept of circularity and its benefits are not widely acknowledged by consumers. The lack of awareness, and prices which are often not competitive enough when compared to non-circular products or services, tend to drive down consumer demand for circular products (Houston et al., 2019). Moreover, adopting circular consumption requires more than simply switching from less sustainable products to more sustainable ones. The process poses challenges as the consumers are required to transform their behaviours from purchasing behaviours, to repairing and reusing ones, in order to keep the embedded value of the product as long as possible.

In fact, Singhal et al. (2019, p. 7296) argue that “the concept of a circular economy can be realized only if remanufactured products are widely accepted by the consumers. Therefore, it is essential for the remanufacturing firms and government to understand the market scenario of remanufactured products through consumers’ perception.”

#### *Motivation for engagement*

Financial incentives, convenience, and the absence of penalties may motivate consumers to engage in circular activities. Borrello et al. (2019) conducted a case study on organic food waste take-back mechanisms involving 1270 Italian households. They conclude that programmes that are sufficiently rewarding will lead to increased consumer engagement. On the other hand, the survey has identified that consumers will trade-off monetary incentives in exchange for collection of food waste at home rather than taking it back to retailers by themselves

### 3.4.2 NGOs Interactions with Other Stakeholders

Non-Governmental Organisations (NGOs), especially those characterised by a strong environmental focus, can directly engage with companies and social enterprises in the promotion of circular business models. For instance, WWF has partnered with Mondi, an Italian wood processing company, to promote the CE business case across Europe in the forest sector, and find ways to implement policies to foster circular practices in the sector (Dammer et al., 2016). Nonprofit organisations with specific environmental agendas, such as Ocean Conservancy, bring together multinational corporations and enterprises to find solutions to reduce plastic waste. They engage with multiple stakeholders surrounding the ocean waste issue, educate the public, and mobilise individual actors and communities to find pragmatic solutions (Ocean Conservancy, 2020). Think tanks also engage with industry experts and governments to build business cases and framework to achieve circularity and provide platforms for multi-stakeholder engagement (Ellen MacArthur Foundation, 2016). The Ellen MacArthur Foundation has championed the concept of circularity by commissioning consulting companies to produce reports on CE that identify sources of value creation, and broadly communicated the limitations of a linear economy. They have also

interacted with governmental organisations to provide expert knowledge and insights on CE related issues (Ellen MacArthur Foundation, 2020b).

### *Barriers and enablers*

Systemic barriers stemming from a linear economy and competitive value chain ecosystems can pose a challenge to the establishment of close collaboration within and across industries. The lack of sectoral consensus, as well as low public awareness and knowledge, also act as barriers to new CE initiatives (Hart et al., 2019). Existing laws and regulations related to the handling of waste, which do not achieve high quality recycling, also hinder NGOs efforts to promote the recycling and reuse of materials (Govindan & Hasanagic, 2018). As non-profit organisations do not represent sectorial or industrial interests, they can engage across different value chain actors and industries to form close partnerships with shared CE focused agenda. The Ellen MacArthur Foundation takes a global, cross-sectoral approach to tackle barriers to the CE that businesses cannot overcome in isolation. NGOs can also act as a reference point for governmental organisations by providing resources for a successful transition to the CE, ranging from the analysis of economic benefits, to examples of successful circular business cases.

### *Motivations for engagement*

NGOs who advocate environmental preservation and societal well-being are motivated to promote the circular economy concept when the circular economy principles and practices are aligned with the mission of the organisation. Non-profit organisations with a specific purpose, such as ocean conservation, have clear incentives to promote CE initiatives that design out plastic waste. Besides, NGOs with strong sustainability-oriented purposes, think tanks or other NGOs that engage in economic analysis and research are also motivated to participate in government-led projects to share knowledge and insights on the specific topic of the circular economy.

### 3.4.3 (Re)Manufacturers' and Original Equipment Manufacturers Interactions with Other Stakeholders

In the circular business models that employ a reuse and redistribution strategy, companies collect used products, enhance and modify them, and deliver them to new consumers. As such, manufacturers are extending the lifecycle of their products, through the creation of platforms for selling second-hand goods, both online and in stores. An example of a company operating according to this business model is provided by Nudie Jeans, a Swedish menswear company, selling second-hand jeans in their stores after collecting, washing and mending the used jeans (Nudie Jeans, 2020).

Manufacturers or OEMs are the main actors in the refurbishment and remanufacturing models, as well as in repair and maintenance models, albeit to a lesser degree. In the case of Renault, the French auto-mobile company works closely with its subsidiary, Indra, to dismantle the components from used and broken cars and to use the parts in the remanufacturing process. The advantage of

remanufacturing using components dismantled from disposed cars is that the company's product design engineers can work in close collaboration with Idra. Therefore, the knowledge acquired in the remanufacturing process can be used to redesign car components for easy dismantling and reuse (Guldmann, 2014). Remanufacturing business models can also involve different actors, such as approved third parties or independents. Approved third parties can be selected by the OEMs to refurbish or remanufacture the products and are granted access to technical drawings or spare parts. On the other hand, independent third parties face challenges associated with procurement of spare parts and legal restrictions (Conseil Européen De Remanufacture, n.d.).

Some manufacturers who have greater capacity for maintenance than stand-alone service providers also endorse the product-service system business model. Phillips offers leasing services in their lighting division, where the products are owned and maintained by the company and the customers pay per illumination instead of buying the lamps (Philips, n.d.)

### *Barriers and Enablers*

Technological barriers are significant for manufacturers in the adoption of remanufacturing business models. In order to restore broken or used products to a condition that may be acceptable to consumers, remanufacturing requires technological expertise and knowledge of the product. Another challenging but significant aspect of Product Service System (PSS) or remanufacturing models is efficient product retrieval (Pearce, 2009; Seitz, 2007; Besch, 2005; Ravi, 2005; Linder & Williander, 2017). For manufacturing companies, reliability of resources flows, as well as production planning, are essential. However, lack of reliability and fluctuation of returned material supply poses challenges for manufacturing companies to allocate resources and labour for remanufacturing (Östlin et al., 2009). The manufacturing companies also have product category restrictions as some parts are incompatible for use with other types of products. The importance of product design is also highlighted since most of the products subject to remanufacturing are not designed for the process, and thus pose challenges to manufacturers who engage in remanufacturing activities (Prendeville & Bocken, 2017). Lastly, lack of supporting regulations, especially for innovative business models, are identified by the literature as a major barrier to circular business model adoption (Linder & Williander, 2017; Stahel, 2010).

For the manufacturing companies to adopt circular business models, stakeholder interviews suggest that high-level commitment is key (Houston et al., 2019). The commitment of top management is likely to bring an organisational change and systemic transformation to enable successful transition to circular business models. High-level management can endorse long-term planning and investment which allows for the organisational transformation to take place.

### *Motivations for engagement*

Companies who engage in different types of circular business models have incentives to manufacture products that offer a longer service life, especially for products that are used intensively and those that are cost- and material-effective (Tukker & Tischner, 2006). Manufacturers who seek to increase resource productivity may also find circular business models attractive. Materials and energy usage may be reduced up to 80 percent when adopting a PSS model



with remanufacturing (Nasr and Thurston, 2006; Nasr, 2011), while resulting in higher profitability than in original equipment manufacturer production (Gray and Charter, 2007; Pearce, 2009). Recent research has aptly identified potential drivers for companies to adopt circularity. Linder and Williander (2017) summarise several drivers or motivations for implementing circular business models, in particular the PSS model. These motivations include: cost savings in manufacturing; enhanced customer relations; improved understanding of customer behaviour; improved margins; and increased brand protection.

### 3.4.4 Suppliers' Interactions with Other Stakeholders

Virgin material suppliers, or suppliers of parts to manufacturers, are crucial actors in closed loop business models. There are increasing an number of companies, such as Royal DSM, who operates on circular principles and provides solutions for the biofuel industry (Royal DSM, n.d.). More companies are offering replacements for virgin materials extracted from scarce resources. They provide fully renewable, recyclable or biodegradable materials to manufacturers. Suppliers also provide raw materials processed from waste to close the loop. Waste Free Oceans (WFO), based in Brussels, collaborates with local fishermen and communities to collect ocean plastics and turn them into a product dedicated for specific brands or businesses. From the onset of the project, they collaborate with businesses to examine which type of product to make from plastics and decide on which regions to collect plastics (Waste Free Oceans, n.d.). Aquafil, an Italian nylon manufacturer takes used carpets or industrial plastic waste and turns them into nylon thread for clothes manufacturing by global companies like Adidas AG, Levi Strauss & Co. Instead of extracting gold and copper from land, the Brussels-based company Umicore extracts gold and copper from electronic waste. The Swiss firm Batrec removes zinc and ferro-manganese from batteries (Ellen MacArthur Foundation, 2012).

For refurbishing and remanufacturing, parts suppliers also engage in value creation processes with manufacturers. Besides remanufacturing activities, Renault is active in the recycling/upcycling business through their involvement with Indra, a car dismantling specialist. Indra is a joint subsidiary of Renault and it collaborates with a waste management firm, SITA, to provide Renault with raw materials and spare parts for repairs. A network of more than 300 approved vehicle dismantlers supplies scrap cars across France (Guldmann, 2014), establishing a wide collaborative network.

#### *Barriers and enablers*

In closed loop and remanufacturing models, material suppliers as well as parts suppliers face challenges associated with resource recovery. Reliance on the secondary waste market for capacity building, the unpredictability of resource recovery, and quality acceptance, all act as barriers to the adoption of circular business models by suppliers (Linder & Williander, 2015). In addition, the suppliers need to align their business incentives with other partners such as manufacturers and service providers for the waste retrieval. This partnership restriction can act as a barrier to successful transition (Mont et al., 2006). Accordingly, Lapko et al. (2019) pinpoint the need for consistent harmonization of legislation in the international arena to support closing the loops of

materials and circular economy in general, suggesting that the government has an essential role in this sense.

#### *Motivations for engagement*

Raw material suppliers or material processing companies who depend on imports of commodity materials can find opportunities to decrease the dependency on single materials. They can invest in technology to develop quality materials from recycled materials and ease their dependency on virgin material imports with highly fluctuating pricing (Geissdoerfer et al., 2018). Engaging in circular supplies also can mean active and close partnerships with other stakeholders in the value chain network. The benefits of the circular supplies with positive environmental benefits need to be actively communicated and acknowledged by suppliers as well as end-consumers for the market to grow. Furthermore, as demonstrated by Renault, circular business models enable material and part suppliers to collaborate with manufacturers from an earlier stage of product development leading to a closer relationship. (Guldmann, 2014).

#### 3.4.5 Service Providers' Interactions with Other Stakeholders

Value delivery is essential for circular business models that slow the loop. To extend the life of a product, either by changing ownership or by repairing or remanufacturing, reverse and forward logistics as well as repair and refurbishment services are essential to add value by extending product life. Companies can engage with service providers who have capabilities to carry out forward and reverse logistics to collect broken or damaged products, deliver to the manufacturers or OEM companies, and have them returned to customers.

The external service providers with repair capabilities can offer repair and maintenance of products and create and capture value from an extended product life cycle. Together with customers, the service providers and manufacturers co-create value by extending the product life and slowing the resource loop. It is also crucial for companies and manufacturers to design products for easy repair and maintenance.

For example, a Dutch carpet manufacture, Desso, offers customers a carpet leasing service. Since the company does not have the capabilities to operate the new business model, they collaborated with De Lage Landen, who provides leasing, business and consumer finance solutions. Desso sees the leasing option, which includes installation, cleaning, maintenance and, eventually, removal, as an important element in the company's transition to a circular economy (Desso, 2020).

For the recycling business model, waste collection and processing, as well as logistics, can be carried out by service providers to facilitate successful closing of the loop. A small independent service company such as Amaryllis offers recycling, renovation, reuse and disposal of office furniture and equipment. Amaryllis also offers a reuse and recycling scheme to attract companies, on the basis of a profit-sharing mechanism (Guldmann, 2014).

### *Barriers and enablers*

A relatively small market and lack of proven track record can be substantial barriers for service providers to invest heavily on building capabilities to carry out services related to the circular economy (Eccles et al., 2019). The logistics service providers are the key enabler in closing the loop in circular economy and yet implementation of reverse logistics, at scale, face a challenges as specific requirements vary across industries and product types (Ellen MacArthur Foundation, 2016). The absence of a regulatory framework for extending producer responsibilities can be another barrier to extend services related to extending product life (Linder & Williander, 2017).

On the other hand, leveraging existing forward logistics capabilities and service knowhow enables service providers to extend their business to offer reverse logistics and close the loop. The shift of ownership from consumers to manufacturers can help overcome the return-flow challenges as consumers are required to return products to designated service providers. In this case, the service providers are not required to incentivise consumers to return or sort products or materials (Ellen MacArthur Foundation, 2016).

### *Motivations for engagement*

In a closed loop business model (or other forms of business models that require recovery of used products), there are two important supply chains: forward and reverse chains. New business opportunities open up for the service providers to engage in activities along the reverse cycle for new source of value creation (Wells & Seitz, 2005). Besides waste collection, the service providers can extend their businesses by also undertaking to sort, process, quality check, and refurbish materials.

#### 3.4.6 Investors' Interactions with Other Stakeholders

Investors are the key actors in enabling the bottom-up emergence of circular business models, especially for start-ups who depend upon external financing for initial investment. Circular startups can apply for external investment directly from financial institutions, or for specific funding opportunities offered by CE-oriented private investors. For instance, Circularity Capital is a specialist private equity firm investing in SMEs in Europe who engage activities related to the circular economy (Circularity Capital, 2010). They have invested in 3 circular businesses, including AI-driven food waste reduction technology, since 2018.

Large investment firms can also collaborate with non-governmental organisations to initiate investment projects. The world's largest asset manager, BlackRock, has become a global partner of the Ellen MacArthur Foundation and has launched its BGF Circular Economy Fund. The Foundation provides BlackRock with expert insights as well as useful guidance on the circular economy and its key practices. BlackRock uses this knowledge base provided by the foundation to draw up investment methodology, as well as to inform investors about different opportunities. The engagement of a significant mainstream investment firm such as BlackRock sends a strong signal



to the investment community, and thus provides a new level of legitimacy (Ellen MacArthur Foundation, 2019; Kaplan, 2019).

#### *Barriers and enablers*

Investors or asset managers still privilege linear economic systems and models over circular alternatives. These investors point to a lack of institutional support, and consistent regulatory frameworks, as key challenges facing circular businesses which impede their financial viability (Eccles et al., 2019). In addition, investors who operate by focusing on short-term targets find it difficult to invest in projects where the financial returns occur over the long term and require longterm collaborations. The absence of proven track records, and insufficient business cases, also hinder investors when considering the investment potential of circular businesses (Hart et al., 2019).

Financial incentives, driven by policy designed to support the transition to a CE, as well as consistent regulatory frameworks, can drive investors to seek opportunities in circular business models. In addition, public awareness and encouragement, demonstrated by large public investment in the CE, can also drive private investors to actively invest in start-ups and SMEs engaging in a circular economy (Rizos et al., 2015). Collaborative initiatives that draw in investments from public and private funding can support different businesses to gain access to capital (Bet et al, 2018).

#### *Motivations for engagement*

Investors or shareholders can find incentives to engage in the CE especially in businesses where there is a need to reduce supply risk and to provide alternative business opportunities in the long term. In addition, shareholders of a company may find that circular business models might be characterised by structurally lower costs than linear ones. This can be a very relevant reason for actively endorsing newly proposed business models (Geissdoerfer et al., 2018). Also, Investors can find non-financial motivations, such as satisfaction for business with a purposeful vision. Asset managers with long-term perspectives can also be motivated to diversify their portfolio and invest in businesses that adhere to the circular economy principles. They also face growing demand by asset owners for their investors to engage in sustainable investing strategies following the global trend to reduce negative environmental impacts (Eccles et al., 2019).

### 3.4.7 Governmental Interactions with Other Stakeholders

Besides providing environmental guidelines on recycling, national or regional governments, or local municipalities, also collect waste or recyclable materials and ship them to service providers for sorting and processing. The service providers can be also contracted by local municipalities to carry out collection and sorting. It is the role of governments to provide facilities for waste disposal by consumers. Local governments can also support circular business initiatives by sponsoring CE

projects. For instance, the government of Kerala funded the mission to clean ocean plastics as part of their waste management programme. In addition, they also paid for shredding machines operated by Clean Kerala Company (CKS) who sources and distributes the shredded plastics to be used for road pavement. Local governments can also take an active role in initiating circular economy projects. For instance, the municipality of Dordrecht, a city in South Holland, collaborated with Clean Tech Delta and Metabolic, a networking company and a consulting agency, to conduct project Dordrecht Circulair. To aid the program undertaken by the municipality for job creation and waste management, Metabolic assessed circular business cases and provided the municipality with insights for future investment agenda. Specifically, they analysed the city's waste streams and proposed the most promising circular business models (Metabolic, n.d.).

### *Barriers and enablers*

Although industry actors point to the absence of regulatory frameworks to support the CE transition, the lack of collaboration within an industry and a csectoral consensus also acts as a barrier to achieve regulatory reform to support CE activities (Hat et al., 2019). A low level of interest, knowledge, and engagement throughout the value chain is also identified as a key challenge (Hart et al., 2019; Rizos et al., 2015) to promote CE. Despite the efforts by local governments to foster development of circular businesses, if consumers, suppliers, and business leaders alike demonstrate no interest in participating in government-led CE initiatives, it is difficult to scale up the circular business models to achieve regional circularity. Lack of proven business models and frameworks for successful implementation of circular principles in the industry is also identified as a barrier (Govindan & Hasanagic, 2018; Lewandowski, 2016; Scheinberg et al., 2016).

On the other hand, social concern for public health as a result of overconsumption of energy and resources can be a driver for national and local government authorities to actively devise regulatory frameworks to incentivise circular activities. The growing pressure from non-governmental organisations and consumers to tackle climate change issues can also drive governments to engage in initiatives related to the CE. Furthermore, industry experts and non-governmental organisations can build successful case studies of circular business models, ranging from fully commercial projects to pilot projects, and communicate them to government authorities. This practice is essential to aid evidence-based policy making for a successful transition to CE (Hart et al., 2019).

### *Motivations for engagement*

Government actors can be motivated to actively lead the transformation to CE by various economic and social incentives. For instance, implementation of the circular economy is projected to have positive employment effects (Bouton et al., 2016). In addition, retaining the value of local production, instead of relying on imports for materials supply, can also motivate local governments to take on the CE-related initiatives (Geissdoerfer et al., 2018). Governments can be also interested in supply risk reduction to stabilise the economy. Furthermore, the demonstration of working business models that are sustainable and in accordance with the long-term vision of sustainable development can prompt further engagement from other stakeholders. Consequently, government actors are motivated to collaborate with industries to lead pilot projects related to CE.

### **Chapter 3: Key take-away box**

The transition towards the CE is a systemic change requiring the effort and involvement of multiple stakeholders, within the government-academia-industry nexus, and also wider civil society. Some of these stakeholders are presented in the annexes of this document. This chapter attempts to put forward a model that can be used for CE implementation in a regional context so that relevant stakeholders can be mobilised for a successful transition. The CE-centric QNH model has the natural environment as its nucleus, acting as a driver for innovation and a trigger for action. The remaining QRH stakeholders are represented by separate helices. Civil society acts as the overarching helix, and intersections between two or more helices give rise to the hybrid organisations. These hybrid organisations appear to be very effective and frequent, along with networks and/or platforms promoting collaboration across stakeholders.

## **CHAPTER 4: CASE STUDIES**

Chapter 3 performed an initial stakeholder mapping based on the proposed CE-centric QNH model. The actors identified were categorised and presented in the Annexes. This chapter will apply the CE-centric QNH model to existing scenarios; the model will be employed to identify and map stakeholders and their interactions.

Four case studies will be presented: first, a bike sharing service in the city of Amsterdam; second an example of an Italian Industrial Symbiosis network; third, the potential transformation of the industrial park of Salaise-Sablons (IPSS) into an Eco-Industrial Park; and finally, the planned transformation of the Galician economy along circular lines.

### **4.1 A Product-Service System from The Netherlands**

Increasing utilisation of existing products can narrow the resource utilisation loop and help to increase resource productivity (Lacy & Rutqvist, 2016). Bike-sharing business cases offer key insights in the mobility transition from an ownership-based model, to a Product-Service system (PSS) model which has been identified as one of the circular business model archetypes (LüdekeFreund et al., 2019). Waes et al. (2018) examines innovative bike sharing business models in Dutch cities through comparative case studies. They stress the importance of public parking space as a critical resource factor for a one-way floating system, which allows the customers to take and drop a bike anywhere, since the availability of bikes around the city is a key switching factor for consumers. Consequently, local government authorities or city actors play an important role in the implementation process in the examples provided. For instance, when Flickbike first introduced their bike-sharing service in the city of Amsterdam, the municipality of Amsterdam allowed them to launch the service. However, when it became apparent that multiple providers were taking up the public space, the municipality of Amsterdam temporarily banned service providers from using public parking areas to station their bikes due to lack of clear rules for bike parking (Waes et al., 2018). Since uncontrolled bike parking can lead to filling up public parking spaces and blocking pavements, close collaboration between local authorities and service providers is required to take account of different local stakeholder interests. The service providers also engage with local workplaces to outsource maintenance and repair of the bikes. Other key stakeholders involved in the model include private sector investors or local governments who provide initial investment or public funding. This funding is used to secure resources such as bikes, fixed stations, and personnel for distribution and repair, as well as developing digital infrastructure (Waes et al., 2018).

This example, although only small in scale and involving one city/district, demonstrates the involvement of multiple actors, each with their own roles and responsibilities. Analysing the business case through the CE-centric QNH model introduced in Chapter 3.1 enables us to map the key stakeholders engaged in the transition process: the government authorities, industry, and civil society who are the users of the CE-driven innovation. The fifth helix, the environment, on

the other hand is the beneficiary where the transition to the PSS model in the mobility sector leads to environmental benefits.

## **4.2 An Italian Industrial Symbiosis Network**

An industrial symbiosis pilot project was developed within the Green Economy and Sustainable Development project in the Emilia-Romagna region in 2013. The main objectives of the project were the development of collaborative relations between local enterprises, academic institutions, industrial research organisations and civil society, in order to boost the transition to a CE. This was the first attempt to establish an Industrial Symbiosis network in the region; the focus of the project was on the collection and reuse of agro-industrial waste and residues, mainly oriented towards solutions involving the production of materials with high added value (European Environment Agency, 2019). The project started the Eco-Industrial Park (EIP) experimentation from the topdown perspective and continued in the form of facilitation by spreading the knowledge and culture of Industrial Ecology (IE), aspiring to engage traditionally disconnected industrial actors and stakeholders on a regional scale. Furthermore, the experimentation occurred during a period when the notions associated with IE had already gained momentum in the region. The prospects for the realisation of EIP practices were related to the potential economic benefits that could be attained at the regional scale (Susur et al., 2019).

For this project, a wide network of diverse stakeholders emerged; this is showed in Table 5. All of the stakeholders involved were mapped using the CE-centric QNH model proposed in Chapter 3. It is apparent that all four helices were represented. Not only was the representation of the four helices necessary for the success of this project, but the emergence of the hybrid organisations was also evident.

The research centres, traditionally being part of the academia helix, nowadays are shifting towards the hybrid organisations, considering the involvement of industrial partners and public institutions. Considering the fact that these research centres are part of the Emilia Romagna Region's High Technology Network, they have the potential to be considered as a development/co-operation platform. The civil sphere is represented by the stakeholder ENEA, acting as a multilateral platform taking into account the societal voice. Finally, bearing in mind the nature of the project and the environmental benefits associated with its realisation, the environment was indeed the nucleus and driver behind this project.

**Table 5:** Involved Stakeholders and their mapping into the CE-centric QNH model

Stakeholder	Category/Roles in the Green Economy and Sustainable Development Project	The CE-centric QNH model mapping
Emilia–Romagna Regional Government	Governmental institution	Government
Regional Planning Office of Rimini	Governmental institution	Government
Consortium for Innovation and Technology Transfer of Emilia-Romagna (Aster)	Intermediary organisation – main synergy facilitator, playing the lead role in conducting the EIP experimentation	Traditionally falling into the academia helix, in this case a hybrid organisation
Environment Society Social Cooperative (Coop Formula Ambiente)	Intermediary organisation	Industry
Italian Union of Chambers of Commerce, Industry, Handicraft and Agriculture (Unioncamere)	Intermediary organisation – providing the financing	Industry
Agricultural Cooperative Conserve Italia	Intermediary organisation	Industry
Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA)	Universities and research centres – synergy facilitator, acquired with relevant technological, scientific and research skills. Also, responsible for disseminating the knowledge about the EIP practices to the industrial actors	Traditionally falling into the academia helix, in this case acting as a multilateral platform linked with the 4 helices
Energy and Environment Laboratory Piacenza (LEAP)	Universities and research centres	Traditionally falling into the academia helix, in this case a hybrid organisation



MatER Research Centre of Politecnico di Milano	Universities and research centres	Academia
Emilia-Romagna High Technology Network:	Universities and research centres - synergy facilitator, acquired with	Traditionally falling into the academia
Centre for industrial agro-food research (Ciri Agrifood)	relevant technological, scientific and research skills	helix, in this case a hybrid organisation
Emilia-Romagna High Technology Network: Centre for renewable sources, environment, sea and energy research (CIRI Frame)	Universities and research centres - synergy facilitator, acquired with relevant technological, scientific and research skills	Traditionally falling into the academia helix, in this case a hybrid organisation
Emilia-Romagna High Technology Network: Centre for advanced industrial material research (CIRI Mam)	Universities and research centres - synergy facilitator, acquired with relevant technological, scientific and research skills	Traditionally falling into the academia helix, in this case a hybrid organisation
Emilia-Romagna High Technology Network: Research Centre for packaging (CIPACK)	Universities and research centres - synergy facilitator, acquired with relevant technological, scientific and research skills	Traditionally falling into the academia helix, in this case a hybrid organisation
Agricoltori Riunti Piacentini (ARP)	Private industrial actor	Industry
Barilla & R Fratelli	Private industrial actor	Industry
The cooperative multi-business industrial group CCPL	Private industrial actor	Industry
General Machine Company (CGM)	Private industrial actor	Industry
Schmack Biogas	Private industrial actor	Industry
Valfrutta-Conserve Italia	Private industrial actor	Industry

### **4.3 A French Eco-Industrial Park**

The industrial park of Salaise-Sablons (IPSS), established in 1977, is situated near the city of Lyon on the shores of the River Rhône. This region, also known as the Chemical Valley because of the existence of several chemical and pharmaceutical companies, has 22 enterprises and 900 employees. The majority of the companies are focused on manufacturing, mostly related to chemical, recycling and raw material transformation. Other companies focus on the construction, transportation, food and logistics sectors. These stakeholders represent the industry helix in the CE-centric QNH model. The organisation that manages the IPSS activities in order to advance the environmental performance of the park is Syndicat Mixte, which is a joint venture of various public authorities of different types. Syndicat Mixte represents the government helix.

In order to transform the IPSS into an EIP, several arrangements are needed. One of these is represented by concentrated efforts to target companies that can be easily integrated into the IPSS supply chain. This is a managerial task that shall be undertaken by Syndicat Mixte, in conjunction with dissemination activities regarding the advantages of implementing and expanding the industrial symbiosis mechanisms via educational and promotional initiatives. Additionally, Syndicat Mixte can play a key role in creating technical conditions to allow industrial symbiosis mechanisms and establish cooperation with other organisations, specifically with research and development centres. This could introduce the academic helix, or perhaps a hybrid organisation that may overlap with other helices. Furthermore, the promotion of sustainable logistical practices will also contribute to the transformation of the IPSS to an EIP. The current transportation patterns pose problems arising from excessive road use, hence alternative arrangements are necessary. This can be achieved by enabling an increased use of the harbour, employing a multimodal system grounded on efficient public transportation and encouraging walking and cycling as a means of transportation (i.e. soft models). Taking into account the territorial and environmental characteristics of the site, recreational and cultural facilities for the workforce can be established, in order to attract improve the attractiveness of the site towards new users (Ribeiro et al., 2018).

#### **4.4 The Strategy for Circular Economy In Galicia (Spain)**

In 2019 the Government of Galicia (Spain) approved a strategy document called Estratexia Galega de Economía Circular (EGEC), which was an ambitious plan to transform the Galician economy into a circular economy. The EGEC emerges from the need to promote and ease the transition towards a circular economy and it aims to develop the strategic framework defined by the European Commission and adapt it to the economic, social and environmental particularities of Galicia (European Commission, 2018; Rodríguez, 2019). Although the EGEC is still a draft policy that is still subject to public review (as of 2020), the document presents very interesting insights about the implementation of CE policy at local level. The EGEC is based on a holistic strategy that has the ambition to implement a paradigm of a circular economy in Galicia. This implementation is motivated by: (1) the need to adapt to a changing international context that is also adopting circular economy strategies with a special emphasis on the EU initiatives to promote the adoption of a circular economy at the EU level, (2) by a context of resource scarcity that is expected to affect the EU economy, and (3) by a recognised environmental crisis. At a Galician level, the EGEC is also expected to promote the reindustrialization of rural areas, support economic growth, job creation, and to stop the exodus from rural areas in Galicia.

However, the EGEC also reproduces an eco-modernist understanding of the concept of circular economy. This understanding recognises the environmental crisis in which we live, but also seeks to perpetuate the market-based capitalism and maintain the principles of a free-market and economic growth as a pathway towards sustainable development. The EGEC is also disconnected to the existing environmental conflicts and debates within the Galician society, crafting a policy proposal strongly influenced by stakeholders from academic, political and business spheres, and free of influence from environmental NGOs and other civil society organizations. This practice is also reflected in the expected impact of the EGEC, that focuses on issues such as generating growth, encouraging financial and material efficiency, and opening up new markets. However, it does not explicitly address other issues such as public health concerns caused by pollution, the question of social justice when implementing this transition, or how to reframe the idea of societal welfare beyond the mere generation of employment.

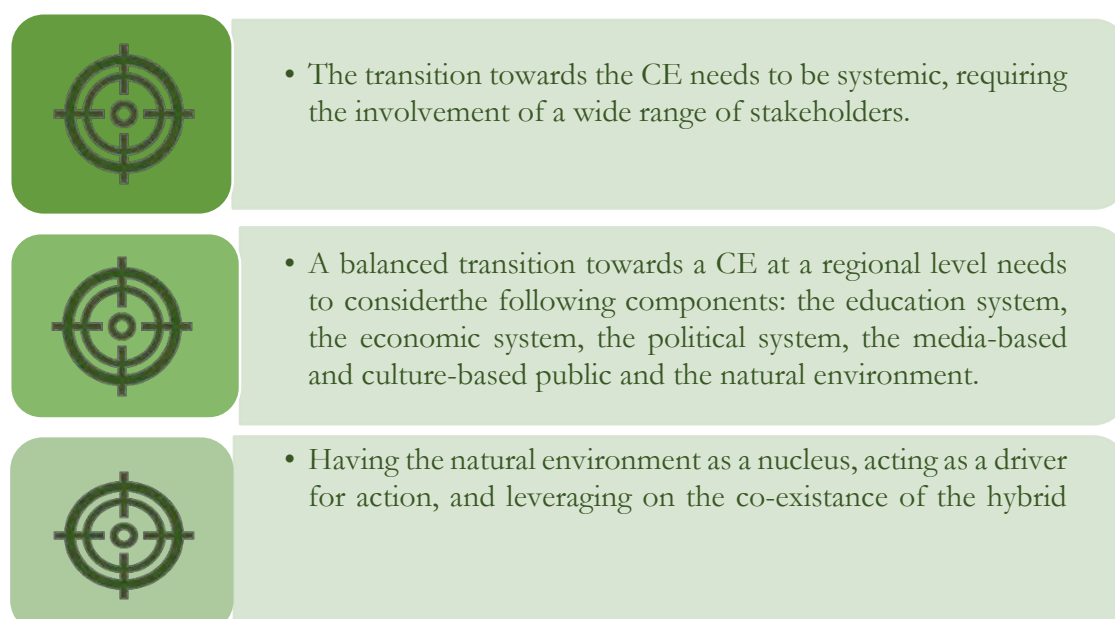
It is therefore apparent that an application of the CE-centric QNH model could allow the Government of Galicia to get a better understanding of stakeholders which need to be mobilised in order to develop a more participatory strategy for the transition towards a circular region.

## 5. CONCLUSIONS

This report was undertaken by ReTraCE WP4 in order to develop and introduce a viable model for stakeholder mapping in the context of regional CE implementation. For that purpose, Chapter 1 analysed the evolution and development of the Triple, Quadruple and Quintuple Helix models and their applications to date, predominantly in the EU policy-making process. Hence, the first chapter was laying the theoretical dimensions of the report. Chapter 2 was methodological in focus, outlining the tools that are available to carry out a stakeholder analysis, including the identification of stakeholders and their categorisation. A brief overview of the methods was presented, along with their strengths and weaknesses. Chapter 3 was the focus of the report, since **The CE-centric QNH model** was introduced as a possible model to be used in order to map all relevant stakeholders for the process of CE implementation in the regional context. Based on the traditional TH nexus (academia-industry-government), the model was extended in order to reflect the importance of the social dimension of the transition. However, the nucleus of the model was the environment, acting as a driver for commitment and action to tackle climate and environmentalrelated concerns. Existing concepts such as trilateral networks, hybrid organisations and development/co-operation platforms were also acknowledged as vital for a successful and fair transition. Stakeholder mapping was performed using the CE-centric QNH model, and the relevant stakeholders were grouped accordingly and presented as part of the Annexes. In addition, an overview of the stakeholders involved through consumer engagement in the CE was provided. These actors were analysed based on a pre-defined set of dimensions and included in the Annexes; following a bottom-up approach, several groups of stakeholders were identified and analysed based on the same set of pre-defined dimensions, emphasising the role of the new circular business models for the transition towards a CE. Finally, several case studies were presented, showing the involvement of Quintuple Helix actors and the roles they played in the different scenarios.

Figure 5 outlines the key take-aways from the report.

**Figure 5:** Key take-aways



organisations and development/co-operation platforms, the proposed **CE-centric QNH model** can be a reference framework for the implementation of the CE at a regional level.



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## APPENDICES/ANNEXES

### A. ACADEMIA

Stakeholder	Country of establishment	Description/Relevance to CE
Aalto University	Finland	Part of the Päijät-Häme Circular Economy Cooperation Group (former name PäijätHäme bioeconomy group) which has been developing the Action Plan since 2018. It also acts as a regional stakeholder group for the BIOREGIO project.
AGH Faculty of Management	Poland	Leading the ce4reg Project funded by H2020 (MSCA), looking at The Circular Economy Conception Towards Ecoinnovations And Sustainability Of Regions.
Ben Gurion University of the Negev	Israel	Research and case-study design and expertise in sustainability research (Part of R2π – tRansition from linear 2 circular: Policy and Innovation is a three-year project within the environment theme of Horizon 2020 (H2020).)
Ecole d'ingénieurs ESTIA – Institute of Advanced Industrial Technology	France	French engineering and research graduate school, Partner of the Interreg Europe RETRACE Project (RETRACE – A Systemic Approach for Regions Transitioning towards a Circular Economy).
ESCP Europe Business School	France	Members of Expert Group for investigating risk and relationship management practices in circular supply chains – identified by WP1
Institute for research in circular economy and environment “Ernest Lupan” (IRCEM)	Romania	An independent non-governmental organization, formed as a research think tank, accelerates the transition to circularity, starting from the bottom with concentrated actions consisting in the development of practical and scalable solutions, national campaigns, communicating and involving us to spread the circular message and sustainable development.
Institute of Innovation and Circular Economy, Asia University	Taiwan	Innovation and Circular Economy (CE) Institute's mission is to become a leading international source of original and seminal research, expertise and knowledge on the CE and the particular policy and business contexts within which this system operates.
Jerusalem Institute for Policy Research	Israel	<a href="#">Jerusalem Institute for Policy Research</a> Think-and-Do Tank with experience in Policy-making and implementation. (Part of R2π – tRansition from linear 2 circular: Policy and Innovation is a three-year project within the environment theme of Horizon 2020 (H2020).)

Laboratory of Heat and Environmental Engineering - AUTH (Aristotle University of Thessaloniki)	Greece	Partner of the Interreg Europe BIOREGIO Project (Regional CE models and best available technologies for biological streams 2017-2021). Contributed to the development of the Action plan towards Bio-Based Circular Economy for the Region of Central Macedonia.
Lahti University of Applied Sciences	Finland	Partner of the Interreg Europe BIOREGIO Project (Regional CE models and best available technologies for biological streams 2017-2021). Contributed to the
		development of the Päijät-Häme Bio-based Circular Economy Action Plan
Leeds University Business School (LUBS)	UK	Project Partner
LUT University	Finland	Part of the Päijät-Häme Circular Economy Cooperation Group (former name PäijätHäme bioeconomy group) which has been developing the Action Plan since 2018. It also acts as a regional stakeholder group for the BIOREGIO project.
Politecnico di Torino - Polytechnic University of Turin	Italy	Partner of the Interreg Europe RETRACE Project (RETRACE – A Systemic Approach for Regions Transitioning towards a Circular Economy).
Shanghai Jiao Tong University	People's Republic of China	Project Partner
Slovak University of Agriculture in Nitra	Slovakia	Partner of the Interreg Europe BIOREGIO Project (Regional CE models and best available technologies for biological streams 2017-2021). Contributed to the development of the Action plan towards Circular Bioeconomy in the Nitra self-governing region
The University of Exeter	UK	Project Partner
University of Gävle	Sweden	Members of Expert Group for investigating risk and relationship management practices in circular supply chains – identified by WP1
University of Helsinki	Finland	Part of the Päijät-Häme Circular Economy Cooperation Group (former name PäijätHäme bioeconomy group) which has been developing the Action Plan since 2018. It also acts as a regional stakeholder group for the BIOREGIO project.
University of Ulsan	South Korea	Project Partner
Utrecht University	The Netherlands	Members of Expert Group for investigating risk and relationship management practices in circular supply chains – identified by WP1

## B. INDUSTRY

Stakeholder	Country of establishment	Description/Relevance to CE
A&C Ecotech	Italy	Project partner: a company specialised in the recovery and disposal of technological waste, authorised to collect, store and transport hazardous and non-hazardous special waste.
Association for Environment and Safety in Aquitaine - APESA	France	APESA is the reference technology centre in French region “Nouvelle Aquitaine” for all topics related to ecological transition. Partner of the Interreg Europe RETRACE Project (RETRACE – A Systemic Approach for Regions Transitioning towards a Circular Economy).
Bosch	Germany	Project partner: The Bosch Group is a leading global supplier of technology and services. The Bosch Thermotechnology division is responsible for all activities involving heating technology and hot-water solutions.
COGEI Srl.	Italy	Project Partner: a company founded in 1992 to operate in the field of environmental protection. Its mission is the design, planning, construction and management of purification plants for civil and industrial uses, sewerage and water purification waste.
Creation Development EcoEntreprises (CD2E)	France	A regional center of excellence for eco-activities, with an international influence, the cd2e supports companies, environmental players and economic sectors in the Hauts-de-France region towards eco-transition, by providing concrete solutions to today's challenges. Partner of Interreg Europe CircE Project (European regions toward Circular Economy) with the aim to strengthen the diffusion of Circular Economy (CE) in Europe, consistently with the European Commission's Circular Economy Package (2015).
Croatian Business Council for Sustainable Development (HR BCSD)	Croatia	Promotes sustainable development in the private sector and represents business on the issue of sustainable development. <a href="https://www.csreurope.org/croatian-business-councilsustainable-development">https://www.csreurope.org/croatian-business-councilsustainable-development</a>
Esco Italia	Italy	Project partner: the leading Italian Energy Service Company on national scene.
Polyeco S.A	Greece	Fully licensed waste management and valorisation industry in Greece.
Proteg SPA	Italy	Project partner: a company specialised in the collection and further processing of animal by-products (ABP), slaughterhouse waste and food of animal origin unfit for human consumption, and the recovery of animal and vegetable oils and fats.

The Greek Association of RES (Renewable Energy Sources) Electricity Producers (GAREP)	Greece	A private, non-profit organisation founded in March 1997. According to its Statutes, members of GAREP are legal persons (companies) based in Greece, whose aim and objectives are linked to the construction and operation of commercial RES installations. While a formal organization, this can also be regarded as an example of an unilateral – horizontal platform within the industry helix.
SERVE	Greece	Project Partner: Association of Information Technology Companies of Northern Greece
		The association of Information Technology Companies of Northern Greece (SERVE) was founded in April 1994 and is a private non-profit organisation based in Thessaloniki. Throughout its operation, it is the only collective body to represent the interests and interests of IT companies operating in the region of Macedonia, Thrace and Thessaly. While a formal organization, this can also be regarded as an example of an unilateral – horizontal platform within the industry helix.
SEV Business Council for Sustainable Development (SEVBCSD)	Greece	Founded in 2008 by members of the Hellenic Federation of Enterprises (SEV), aiming to be the powerful and dynamic leverage of enterprises who are willing and able to play a leading role in the promotion of Sustainable Development in the Greek business community. By constantly supporting sustainability as being imperative to long-term business success, SEVBCSD promotes business models in line with the global sustainability goals. While a formal organization, this can also be regarded as an example of an unilateral – horizontal platform within the industry helix.
Shifting Paradigms	The Netherlands	The circular economy concept offers a promising set of strategies to redefine development through the lens of metabolic efficiency and set course on a resource efficient and low-carbon future. Shifting Paradigms maps out and visualises the resource flows and asset utilisation in an organisation or jurisdiction. From there stakeholder can set priorities and identify the most promising circular economy opportunities. Rather than optimising the individual elements of a linear “take-make-waste” supply chain, Shifting Paradigms focusses on the interaction between the elements in a system and across sectors.
SMA Solar Technology	Germany	Project partner: a leading global specialist for photovoltaic system technology.
Solvay SA	Belgium	Project partner: a multi-specialty chemical company, committed to developing chemistry that addresses key societal challenges.

## C. GOVERNMENT

Stakeholder	Country of establishment	Description/Relevance to CE
Agency for the Environment and Energy Management (ADEME)	France	Supporting the <a href="http://www.economiecirculaire.org">www.economiecirculaire.org</a> and <a href="http://www.circulareconomy.org">www.circulareconomy.org</a> the Network's international portal which consists of a large database on good practices used by companies and local authorities in the field of circular economy.
Alentejo Regional Coordination and Development Commission (CCDRA)	Portugal	Comissão de Coordenação e Desenvolvimento Regional do Alentejo - Integrated in the Ministry of Planning and Infrastructures and jointly managed by the Ministry of Environment, (CCDR-A) is a decentralised body of the central government. Its mission is to promote in an integrated and sustainable way the development of the Alentejo region (NUT II).
Azores Regional Government	Portugal	<a href="#">Governo da Região Autónoma dos Açores</a> Azores Government – regional government of the autonomus region of Azores – NUT II.
<a href="#">Black Sea Trade and Development Bank (BSTDB)</a>	Greece, but operating in the Black Sea Region	An international financial institution. Recently BSTDB with the Nordic Investment Bank have agreed a new loan programme to support Green Transition in South-East Europe.
City of Heinola	Finland	Part of the Päijät-Häme Circular Economy Cooperation Group (former name PäijätHäme bioeconomy group) which has been developing the Action Plan since 2018. It also acts as a regional stakeholder group for the BIOREGIO project.
City of Lahti	Finland	Part of the Päijät-Häme Circular Economy Cooperation Group (former name PäijätHäme bioeconomy group) which has been developing the Action Plan since 2018. It also acts as a regional stakeholder group for the BIOREGIO project.
City of Nijmegen - Arnhem-Nijmegen	The Netherlands	City of Nijmegen - Arnhem-Nijmegen: most circular region Netherlands ( <a href="https://www.globe-eu.org/wp-content/uploads/Presentatie-Harriet-Tiemens-19-maart2019-EU-Globe-1.pdf">https://www.globe-eu.org/wp-content/uploads/Presentatie-Harriet-Tiemens-19-maart2019-EU-Globe-1.pdf</a> )
City of Zadar – Administrative Department for EU Funds	Croatia	It is part of the GROW Green Project (H2020). The main objective of the project is to develop and implement the so-called NBS "Nature based Solutions" strategies to provide cost-effective and long-term solutions to address societal challenges such as climate change, water security, food security, human health, etc. The project seeks to evaluate and develop innovative, a cost-effective and sustainable approach to achieving this.

City of Zagreb – City Office of Economy, Energy and Environmental Protection	Croatia	By the City of Zagreb City Assembly Decision of October 30, 2008, the City of Zagreb, became one of the first European capitals to accept the Covenant of Mayors Agreement thereby stating its support to the great initiative of connecting the mayors of energy-conscious European cities in a permanent network with the aim of exchanging experience in implementing effective measures to improve energy efficiency in urban environments.
Comissão de Coordenação e	Portugal	A deconcentrated body of the Ministry of Territorial Cohesion, in coordination with the Minister of State

Desenvolvimento Regional do Centro The Center's Coordination and Regional Development Commission (CCDRC)		Modernisation and Public Administration, with regard to the relationship with local authorities, and with the Minister of the Environment and Climate Action, in matters of environment and spatial planning, endowed with financial and administrative autonomy, has the mission of executing the policies of environment, spatial planning and cities and regional development at the level of NUTS II. Partner of the Interreg Europe Project REPLACE (Regional Policy Actions for CE).
Concello de Allariz, the Municipality of Allariz	Spain	Project Partner
Conseil Régional Nouvelle-Aquitaine	France	The Region ensures the construction and monitoring of waste planning, from their reduction to their recovery, and is also committed to the development of the circular economy, centered on recycling and reuse. The goal: to reduce the impact of waste on the environment. ( <a href="https://www.nouvelle-aquitaine.fr/actions/nouveauterritoire-nouveaux-defis/coordonner-gestion-dechetsdevelopper-economie-circulaire.html">https://www.nouvelle-aquitaine.fr/actions/nouveauterritoire-nouveaux-defis/coordonner-gestion-dechetsdevelopper-economie-circulaire.html</a> ). Also the Region of Aquitaine established and supports the <a href="#">the Network of Circular Economy and Innovation in New Aquitaine (RECITA)</a> which accompanies this rise in power, with nearly 80 structures and more than 610 members. This network is open to all socio-economic actors in the territory (companies, communities, researchers, networks, civil society).
Crete Region	Greece	Partner of the Interreg Europe Project REPLACE (Regional Policy Actions for CE).
Department of Economic Development, Taipei City Government	Taiwan	Prepared the Circular Taipei: Leading Taipei towards sustainable resource, environmental, economic, culture, and social development.



Department of Environment and Natural Resources (DENR)	Philippines	Supporting projects with: overall objective to promote sustainable development in the Philippines and specific objective to support the Philippine Government in implementing SCP related policies. <a href="https://www.switchasia.eu/policy-support-component/psc-philippines/">https://www.switchasia.eu/policy-support-component/psc-philippines/</a>
Deputy Regional Ministry of Environment Ministry of Sustainable Development of Castilla-La Mancha	Spain	Partner of the Interreg Europe BIOREGIO Project (Regional CE models and best available technologies for biological streams 2017-2021). Contributed to the development of the Action Plan Towards a circular economy based on biological streams (2020-2021)
Eco-Gozo Directorate	Malta	Part of the Ministry of Gozo, responsible for the environmental issues for the Gozo island.
Environment and Natural Resource Economic Section (SEASSA) of the Economic Planning Unit (EPU)	Malaysia	Seksyen Ekonomi Alam Sekitar dan Sumber Asli (SEASSA) supporting programme that aims at up-scaling SCP best practices through strengthening the enabling policy environment (policy instruments mix) to address a change of behaviour and patterns in industry, of consumers, and in key economic sectors <a href="https://www.switch-asia.eu/policy-support-component/psc-malaysia/">https://www.switch-asia.eu/policy-support-component/psc-malaysia/</a>

European Bank for Reconstruction and Development (EBRD)	London, but international operations	An international financial institution founded in 1991, owned by 65 countries and two intergovernmental institutions (the EU and the EIB). As a multilateral developmental investment bank, the EBRD uses investment as a tool to build market economies. The Green Economy Transition (GET) approach is the Bank's strategy for helping <a href="#">countries where the EBRD works</a> build low carbon and resilient economies
European Commission	Belgium, EU	Being the executive branch of the European Union, responsible for proposing legislation, implementing decisions, upholding the EU treaties and managing the day-to-day business of the EU, the Council is a vital institution for the CE policy making.
European Council	Belgium, EU	It is a collective body that defines the European Union's overall political direction and priorities, hence another EU important institution.
European Economic and Social Committee (EESC)	Belgium, EU	Consultative body of the EU, working in many policy areas including the sustainable development area focusing on CE. The European Circular Economy Stakeholder Platform is a joint initiative by the European Commission and the EESC.

European Investment Bank (EIB)	Luxembourg, EU	The transition towards a circular economy can help reduce environmental impact, but also bring major economic benefits, contributing to innovation, growth and job creation. The EU bank embraces the potential of a circular economy and we support the public and private sector in their circular transition
European Parliament	Belgium, EU	Being the legislative branch of the EU it is a crucially important institution. MEPs Assistants' of the EP are already members of Expert Group for investigating risk and relationship management practices in circular supply chains – identified by WP1
Federal Ministry for Sustainability and Tourism	Austria	<a href="#">Federal Ministry for Sustainability and Tourism</a>
Finnish Forest Centre	Finland	The Finnish Forest Centre is a state-funded organisation covering the whole country. Part of the Päijät-Häme Circular Economy Cooperation Group (former name Päijät-Häme bioeconomy group) which has been developing the Action Plan since 2018. It also acts as a regional stakeholder group for the BIOREGIO project.
Government of Catalonia, Ministry of Territory and Sustainability	Spain	Partner of Interreg Europe CircE Project (European regions toward Circular Economy) with the aim to strengthen the diffusion of Circular Economy (CE) in Europe, consistently with the European Commission's Circular Economy Package (2015).
Government Office for Development and European Cohesion Policy in Slovenia	Slovenia	This organisation is responsible for European Cohesion Policy, Development, European Territorial Cooperation and International Financial Mechanisms. Partner of the Interreg Europe RETRACE Project (RETRACE – A Systemic Approach for Regions Transitioning towards a Circular Economy).
Häme Centre for Economic Development,	Finland	Part of the Päijät-Häme Circular Economy Cooperation Group (former name Päijät-Häme bioeconomy group) which

Transport and the Environment		has been developing the Action Plan since 2018. It also acts as a regional stakeholder group for the BIOREGIO project.
Lazio Region	Italy	Partner of the Interreg Europe Project REPLACE (Regional Policy Actions for CE).
Lodzkie Region	Poland	Partner of the Interreg Europe Project REPLACE (Regional Policy Actions for CE).
Lombardy Region	Italy	Partner of Interreg Europe CircE Project (European regions toward Circular Economy) with the aim to strengthen the diffusion of Circular Economy (CE) in Europe, consistently with the European Commission's Circular Economy Package (2015).

London Waste and Recycling Board (LWARB)	UK	A partnership of the Mayor of London and the London boroughs to improve waste and resource management. It has two programmes and one of them is Circular London. Also Partner of Interreg Europe CircE Project (European regions toward Circular Economy) with the aim to strengthen the diffusion of Circular Economy (CE) in Europe, consistently with the European Commission's Circular Economy Package (2015).
Marshal's Office of Lower Silesia Voivodeship	Poland	Partner of Interreg Europe CircE Project (European regions toward Circular Economy) with the aim to strengthen the diffusion of Circular Economy (CE) in Europe, consistently with the European Commission's Circular Economy Package (2015).
Ministry of Ecological and Solidarity Transition	France	Supporting the Circular Economy Roadmap (FREC) and supporting the <a href="http://www.economiecirculaire.org">www.economiecirculaire.org</a> and <a href="http://www.circulareconomy.org">www.circulareconomy.org</a> the Network's international portal which consists of a large database on good practices used by companies and local authorities in the field of circular economy.
Ministry of Energy, Science, Technology, Environment & Climate Change (MESTECC)	Malaysia	Ministry dealing with environmental issues.
Ministry of Environment	Indonesia	Supporting projects with the aim to strengthen the development and implementation of national policies on Sustainable Consumption and Production in Indonesia. <a href="https://www.switch-asia.eu/policy-supportcomponent/psc-indonesia/">https://www.switch-asia.eu/policy-supportcomponent/psc-indonesia/</a>
Ministry of Environment & Energy (YPEKA)	Greece	ΥΠΟΥΡΓΕΙΟ ΠΕΡΙΒΑΛΛΟΝΤΟΣ ΚΑΙ ΕΝΕΡΓΕΙΑΣ – made the <a href="#">National Circular Economy Strategy</a>
Municipality of Capannori	Italy	The First Case of the Application of the 'Zero Waste Strategy' in Italy <a href="https://www.comune.capannori.lu.it/home/">https://www.comune.capannori.lu.it/home/</a>
Nitra Self-Governing Region Office	Slovakia	Partner of the Interreg Europe BIOREGIO Project (Regional CE models and best available technologies for biological streams 2017-2021). Contributed to the development of the Action plan towards Circular Bioeconomy in the Nitra self-governing region
Nordic Council of Ministers	Denmark, but consist of Sweden,	The official body for inter-governmental co-operation in the Nordic Region. It seeks Nordic solutions wherever and whenever the countries can achieve more together than by

	Denmark, Norway, Finland, Iceland, in addition to the self-governing areas of Greenland, the Faroe Islands and Åland	working on their own. Established the Nordic Innovation, with the vision to make the Nordic region the most sustainable and integrated region in the world by 2030.
Nordic Innovation	Norway, but consist of Sweden, Denmark, Norway, Finland, Iceland, in addition to the self-governing areas of Greenland, the Faroe Islands and Åland	An organisation under the Nordic Council of Ministers, which is the official intergovernmental body for cooperation in the Nordic region. Nordic Innovation aims to make the Nordics a pioneering region for sustainable growth and works to promote entrepreneurship, innovation and competitiveness in Nordic business. While a formal institution, it could also be interpreted as an horizontal platform.
North-East Regional Development Agency (ADR)	Romania	ADR is a generator of economic and social development of the North-East Region. It acquired the status of Intermediate Body for the implementation of the Regional Operational Program at the region level. ADR develops strategies, attracts resources, implements financing programs and offers services for stimulating sustainable economic development and partnerships. Partner of the Interreg Europe RETRACE Project (RETRACE – A Systemic Approach for Regions Transitioning towards a Circular Economy) and REPLACE (Regional Policy Actions for CE).
OekoBusiness Wien	Austria	OekoBusiness Wien was launched in 1998 by the Municipal Department for Environmental Protection on behalf of the Vienna City Administration.
Office of the National Economic and Social Development Council	Thailand	Supporting with objective to support the Thai government in selecting, adapting and implementing suitable economic and regulatory policy instruments to promote SCP, hereby enhancing the long-term sustainability of Thai consumption and production patterns. Also preparing the The National Economic and Social Development Plan. <a href="https://www.switch-asia.eu/policy-supportcomponent/psc-thailand/">https://www.switch-asia.eu/policy-supportcomponent/psc-thailand/</a>

Organisation for Economic CoOperation and Development (OECD), Unit for Water Governance and Circular Economy	Paris, but International member countries	An international organisation that works to build better policies for better lives. The goal is to shape policies that foster prosperity, equality, opportunity and well-being for all. They have OECD Programme on Cities and Circular Economy within the Cities, Urban Policies, and Sustainable Development Division - OECD Centre for Entrepreneurship, SMEs, Regions and Cities
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OVAM	Belgium	OVAM is a Flemish government service that ensures that we deal with waste, materials and soil in Flanders in a wellconsidered and environmentally conscious manner. We give direction to waste, materials and soil policy and in this way influence the implementation of legislation.
Päijät-Häme Regional Council	Finland	Partner of the Interreg Europe BIOREGIO Project (Regional CE models and best available technologies for biological streams 2017-2021). Contributed to the development of the Päijät-Häme Bio-based Circular Economy Action Plan
Pays de la Loire Regional Council	France	Partner of the Interreg Europe BIOREGIO Project (Regional CE models and best available technologies for biological streams 2017-2021). Contributed to the development of the Pays de la Loire Bio-based Circular Economy Action Plan.
Piedmont Region – Directorate for regional system competitiveness	Italy	Regione Piemonte is a regional authority with a wide scope of legislative and policy competences. Partner of the Interreg Europe RETRACE Project (RETRACE – A Systemic Approach for Regions Transitioning towards a Circular Economy).
Province of Fryslân	The Netherlands	Partner of the Interreg Europe Project REPLACE (Regional Policy Actions for CE).
Province of Gelderland	The Netherlands	Partner of Interreg Europe CircE Project (European regions toward Circular Economy) with the aim to strengthen the diffusion of Circular Economy (CE) in Europe, consistently with the European Commission's Circular Economy Package (2015).
RÉGION Normandie	France	RÉGION Normandie – part of its regional actions is to develop the circular economy in the Normandy Region ( <a href="https://www.normandie.fr/developper-leconomiecirculaire">https://www.normandie.fr/developper-leconomiecirculaire</a> ).
Region of Central Macedonia	Greece	Partner of the Interreg Europe BIOREGIO Project (Regional CE models and best available technologies for biological streams 2017-2021). Contributed to the development of the Action plan towards Bio-Based Circular Economy for the Region of Central Macedonia.

Regional Committee of Circular Economy (CREC)	France	CREC was set up at the instigation of the Normandy Region, the State (DREAL, DIRECCTE) and ADEME to support the development of the circular economy in the Normandy territory. Its objective is to promote and support the dynamics of the various fields of the circular economy by bringing together a community of Norman actors.
Regional Council of Auvergne-Rhône-Alpes Region	France	supporting the ECLAIRA ( <a href="https://www.eclaira.org/static/eclaira-the-network.html">https://www.eclaira.org/static/eclaira-the-network.html</a> ): the circular economy network in Auvergne-Rhône-Alpes region.
Regional Council of Provence-Alpes-Côte d'Azur	France	The South Region has made the climate emergency its priority! In 2017, it launched a major Climate Plan composed of 100 concrete actions. Objective: to encourage new forms of mobility, massively develop renewable energies, support companies wishing to act for the planet, preserve our natural heritage while improving the well-being of the inhabitants. New call for projects on Circular economy territory 2019:

		<a href="https://www.maregionsud.fr/aides-et-appels-a-projets/detail/territoire-economie-circulaire-2019-pour-ledeveloppement-dune-economie-circulaire-dans-lesterritoires">https://www.maregionsud.fr/aides-et-appels-a-projets/detail/territoire-economie-circulaire-2019-pour-ledeveloppement-dune-economie-circulaire-dans-lesterritoires</a>
Regional Development Fund of Central Macedonia (Managing Authority of the Operational Programme)	Greece	Partner of the Interreg Europe BIOREGIO Project (Regional CE models and best available technologies for biological streams 2017-2021). Contributed to the development of the Action plan towards Bio-Based Circular Economy for the Region of Central Macedonia.
Regional Development Institute, IP-RAM	Portugal	<a href="#">Instituto de Desenvolvimento Regional, IP-RAM</a> IDR, IP-RAM's mission is the coordination of planning and monitoring activities of the regional development model, as well as the coordination and management of the intervention of community funds in RAM .
Regional Directorate for Spatial Planning and Environment (DROTA)	Portugal	Direção Regional de Ordenamento do Território e Ambiente - is a Regional Directorate in the dependence of the Regional Secretariat of the Environment and Natural Resources (SRA) of the Madeira Government.
Regional Government of Madeira	Portugal	<a href="#">Governo da Região Autónoma da Madeira</a> - The Government of the Autonomous Region of Madeira is the local government of this Portuguese autonomous region.
Scottish Government	UK	Prepared the Circular Economy Strategy for Scotland: Making Things Last.
Sheffield City Council	UK	Project partner
Social and Economic Council of Greece (OKE)	Greece	Social and Economic Council of Greece (OKE) – attended the 1st Circular Economy Forum in Greece



Sofia Municipality	Bulgaria	Partner of Interreg Europe CircE Project (European regions toward Circular Economy) with the aim to strengthen the diffusion of Circular Economy (CE) in Europe, consistently with the European Commission's Circular Economy Package (2015).
The Centre for Renewable Energy Sources and Saving (CRES)	Greece	The Greek national entity for the promotion of renewable energy sources, rational use of energy and energy conservation. In the modern demanding energy sector CRES is dynamically active, in the frame of the national and Community policy and legislation, for the protection of the environment and sustainable development. Working in the state of the art of technology development, CRES implements innovative projects and significant activities for the promotion and market penetration of new energy technologies. There are also part of the Project H2020 - PUBLEnEf: Support Public Authorities for Implementing Energy Efficiency Policies. <a href="http://www.cres.gr/kape/projects_PUBLEnEf_uk.htm">http://www.cres.gr/kape/projects_PUBLEnEf_uk.htm</a>
The EasternMidlands Waste Region (EMWR)	Ireland	One of Ireland's three waste management regions. The framework for the prevention and management of waste is set out in the Waste Management Plan, a statutory document underpinned by national and EU waste legislation. The responsibility for implementing the Plan in this region is the Eastern-Midlands Waste Regional Office (EMWRO) and the region's constituent local authorities. The EMWRO is situated in Dublin City Council, the lead authority for the region.
The Government of the Brussels-Capital Region	Belgium	The Government of the Brussels-Capital Region adopted the Brussels Regional Program for a Circular Economy 2016 – 2020 (BRPCE)
The Hellenic Recycling Agency (HRA)	Greece	Is the competent authority of the Ministry of Environment & Energy for the design and implementation of recycling policy in Greece. It is responsible for approving national alternative management systems for each product and for controlling the progress of recycling within the Hellenic territory.
The Ministry of Economic Development of Poland	Poland	<a href="#">The Ministry of Economic Development of Poland</a> Policy making and implementation. (Part of R2π – tRansition from linear 2 circular: Policy and Innovation is a three-year project within the environment theme of Horizon 2020 (H2020).)
The Norte Portugal Regional Coordination and Development Commission (CCDRN)	Portugal	<a href="#">CCDRN – Comissão de Coordenação e Desenvolvimento Regional do Norte</a> is a public institution that works towards the integrated and sustainable development of the Norte Region of Portugal, contributing to the country's competitiveness and cohesion.
The Southern Region Waste Management Office (SRWMO).	Ireland	The Southern Waste Region comprises the 10 local authority areas of Carlow, Clare, Cork County, Cork City, Limerick City & County, Kerry, Kilkenny, Tipperary,

		Waterford City & County and Wexford. The Region covers 42% of the land mass of the country. Limerick City & County Council and Tipperary County Council are the lead authorities for the Region and manage the Southern Region Waste Management Office (SRWMO).
The Algarve Regional Coordination and Development Commission (CCDR Alg)	Portugal	Comissão de Coordenação e Desenvolvimento Regional do Algarve - Integrated in the Ministry of Planning and Infrastructures and jointly managed by the Ministry of Environment, (CCDR-Alg) is a decentralised body of the central government.
The Association of Greek Regions (EN.P.E.)	Greece	The Association of Greek Regions (EN.P.E.) is the representative body of the thirteen (13) Regions Greece. Among other purposes it has the purpose perform coordination of the Regions for taking preventive and repressive measures against the climate change and its consequences and the environmental protection always in cooperation with competent bodies of the government and the European Union. While a formal institution, it could also be interpreted as an horizontal platform.
The Lisbon Regional Coordination and Development Commission (CCDR-LVT)	Portugal	Comissão de Coordenação e Desenvolvimento Regional de Lisboa e Vale do Tejo - Integrated in the Ministry of Planning and Infrastructures and jointly managed by the Ministry of Environment, (CCDR-LVT) is a decentralised body of central government. Its mission is to promote an integrated and sustainable development of the Lisbon region (NUT II).
Umweltbundesamt – Environment Agency	Austria	Umweltbundesamt – Environment Agency <a href="https://www.umweltbundesamt.at/en/">https://www.umweltbundesamt.at/en/</a>
UN – Economic and Social Commission for Asia and the Pacific (ESCAP) - Environment and Development Division	Thailand, though representative for Asia	To demonstrate the benefits of circular economy at the local level, ESCAP supports countries in the region with a “ <a href="#">closing the loop</a> ” application in regional countries aiming to mobilise the informal economy to recover plastic waste and reduce marine pollution.
UNIDO-UNEP	Kenya, though its international	United Nations Industrial Development Organisation – United Nations Environment Programme - the leading global environmental authority that sets the global environmental agenda, promotes the coherent implementation of the environmental dimension of sustainable development within the United Nations system, and serves as an authoritative advocate for the global environment.
Wallonie Service Public SPW	Belgium	Wallonie Service Public SPW launching the Green Deal Purchasing and the Circular Economy in Wallonie <a href="http://economiecirculaire.wallonie.be/green-deal">http://economiecirculaire.wallonie.be/green-deal</a> <a href="http://economiecirculaire.wallonie.be/legislation">http://economiecirculaire.wallonie.be/legislation</a>

#### D. CIVIL SPHERE, MEDIA-BASED AND CULTURE-BASED PUBLIC

Stakeholder	Country of establishment	Description/Relevance to CE
Bond Beter Leefmilieu	Belgium	Bond Beter Leefmilieu is a NGO which wants a <i>Flanders in which everyone lives well without weighing on the environment, nature or health</i> . CE represents one of their main themes.
Circular Economy Asia	Malaysia, though representative of Asia	Circular Economy Asia (CEA) is one of many companies, organisations and individuals working towards a sustainable and circular world. Our grand vision is only achievable through our mission, the strategy we implement to achieve our goals.
EKODA	Lithuania	The association for ecologic design united Lithuanian artists, designers, business whose work heavily incorporate sensibilities of ecologic design, renewable resources and circular economy.
HUBBUB	UK	A charity that creates environmental campaigns with a difference. They started many projects in the UK. <a href="https://www.hubbub.org.uk/what-we-do">https://www.hubbub.org.uk/what-we-do</a>
Let's do it Greece	Greece	The country's largest volunteer action, environmental campaign, organised entirely by volunteers, young people who love volunteering and altruism.
MAVA Foundation pour la Nature	Switzerland	Supporting the Circular Economy Transition initiative, that aims at accelerating the transition of Switzerland to a Circular Economy. It currently takes place in 5 Swiss cities - Basel, Bern, Geneva, Lausanne, and Zurich.
The Ellen MacArthur Foundation	UK, though global reach	The Ellen MacArthur Foundation works with business, government and academia to build a framework for an economy that is restorative and regenerative by design. <a href="https://www.ellenmacarthurfoundation.org/">https://www.ellenmacarthurfoundation.org/</a>
The Mother Earth's Heroes Show	Germany	A podcast where we want to find bulletproof role models which are able to inspire our society to promote a positive change. We are not interested in disrupting industries, we disrupt the planet. Disrupting the planet means to rapidly change the status quo.
Žiedinė ekonomika	Lithuania	The NGO Žiedinė ekonomika focuses its efforts on expanding awareness of circular economy among Lithuanian business and the government.

## E. HYBRID ORGANISATIONS

Stakeholder	Country of establishment	Description/Relevance to Circular Economy (CE) <sup>a</sup>	Helices involved
ADENE	Portugal	Energy Agency is the national energy agency, a private, non-profit and public utility association whose mission is to develop activities of public interest in the area of energy, efficient use of water and energy, Energy efficiency in mobility.	Industry, civil society
Azaro Foundation	Spain	Azaro Fundazioa is an organisation whose goal is to promote the creation of new businesses and improve the competitiveness of business fabric in its immediate surroundings, preferably in the Lea Artibai region. Partner of the Interreg Europe RETRACE Project (RETRACE – A Systemic Approach for Regions Transitioning towards a Circular Economy).	Industry (business support organization), government (state owned)
Beaz	Spain	Beaz is a public company of the Provincial Council of Bizkaia which aims to support enterprises and entrepreneurs in their efforts to create new projects, innovate and internationalise. Partner of the Interreg Europe RETRACE Project (RETRACE – A Systemic Approach for Regions Transitioning towards a Circular Economy).	Industry, government
Circle Economy	The Netherlands	ReTraCE ITN project partner. A social enterprise, organised as a cooperative, Circle Economy accelerates the transition to circularity through on the ground, action focused, development of practical and scalable solutions and international campaigns, communications, and engagement, focused on spreading the circular message.	Industry, civil society



Circular Economy Transition	Switzerland	A pioneer initiative that aims at accelerating the transition of Switzerland to a CE. It currently takes place in five Swiss cities - Basel, Bern, Geneva, Lausanne, and Zurich. In close collaboration with all Impact Hubs throughout Switzerland, <a href="#">sanu durabilitas</a> and with the support of the <a href="#">MAVA foundation</a> , this initiative will contribute to drive the new paradigm for the future of business, policy making and society through four main pillars.	Predominantly industry – acting as business support organization (incubator and business lab), though also organising events for civil society and delivering recommendations for academia and government.
Hamburgisches WeltWirtschaftsInstitut gemeinnützige GmbH – Hamburg Institute of International Economics	Germany	An independent economic research institute based on a non-profit making public-private partnership. Shareholders of the Institute are the University of Hamburg and the Hamburg Chamber of Commerce. Partner of the Interreg Europe REPLACE Project (REPLACE - REgional PoLicy Actions for Circular Economy).	Academia, government
National Research and Development Institute for Chemistry and Petrochemistry (ICECHIM)	Romania	Partner of the Interreg Europe BIOREGIO Project (Regional CE models and best available technologies for biological streams 2017-2021). Contributed to the development of the Action Plan Towards Bio-Based Circular Economy.	Academia, government
LABIO Ltd	Finland	The largest biogas production and refining plant in Finland and it produces the domestic, renewable product biogas from waste. Owned by Lahti Aqua Ltd. and Päijät-Häme Waste Management Ltd., both state owned. Part of the Päijät-Häme Circular Economy Cooperation Group (former name PäijätHäme Bioeconomy Group). It also acts as a regional stakeholder group for the BIOREGIO project.	Industry, government
Lahden Työn Paikka	Finland	A social enterprise owned by the City of Lahti. Part of the Päijät-Häme Circular Economy Cooperation Group (former name PäijätHäme Bioeconomy Group). It also acts as a regional stakeholder group for the BIOREGIO project.	Civil society, industry, overnment

Lahti Energy Ltd	Finland	Lahti Energy, an energy company fully owned by the City of Lahti develops new energy solutions and services in areas such as decentralised renewable energy production and electric traffic. Part of the Päijät-Häme Circular Economy Cooperation Group (former name PäijätHäme Bioeconomy Group). It also acts as a regional stakeholder group for the BIOREGIO project.	Industry, government
LIPOR	Portugal	Intermunicipal Waste Management of Greater Porto is responsible for the management, recovery and treatment of the Municipal Waste produced in the eight associated municipalities: Espinho, Gondomar, Maia, Matosinhos, Porto, Póvoa de Varzim, Valongo and Vila do Conde.	Industry, government
National Science Centre	Poland	An executive agency established to support scientific activity in the field of basic research, i.e. empirical or theoretical work aimed primarily at acquiring new knowledge about the foundations of phenomena and observable facts	Government, academia
		without focusing on direct commercial application. Partly funding the ce4reg Project funded by H2020 (MSCA), looking at The Circular Economy Conception Towards Ecoinnovations And Sustainability Of Regions.	
Nexa - Regional Agency for Investment, Development and Innovation	France	A mixed economy company (public-private partnership). Partner of the Interreg Europe Project REPLACE (Regional Policy Actions for CE).	Government, industry
Päijät-Häme Waste Management Ltd	Finland	A limited liability company owned by 10 municipalities. It is tasked with providing the following waste management services for these municipalities: reception and processing of waste, provision of advice on the service and the sorting of waste and invoicing for the municipal waste charge. Part of the Päijät-Häme Circular Economy Cooperation Group (former name PäijätHäme Bioeconomy Group). It also acts as a regional stakeholder group for the BIOREGIO project.	Industry, but owned by the state
Recovery Insulation Ltd.	UK	ReTraCE ITN project partner. A social enterprise/for profit share capital company	Industry, civil society





The Collaborating Centre for Sustainable Consumption and Production	Germany	CE experts who network with industry and policy makers.	Industry, government
The European Policy Centre	Belgium	The European Policy Centre is an independent, not-for-profit think tank. It provides resources for stimulating European integration through analysis and debate, supporting and challenging European decision-makers at all levels to make informed decisions based on sound evidence and analysis, and providing a platform for engaging partners, stakeholders and citizens in EU policymaking and in the debate about the future of Europe.	At the intersection between academia and government, it offers a platform for engaging civil society and industry
The Institute for Circular Economy (ICE)	Bulgaria	A consultancy and project management NGO, active at the intersection of CE, biomimicry, energy efficiency, renewable energy generation and sustainable development.	Industry, civil society
The National Institute of Circular Economy	France, although it partners all around the world	The Institute is made up of companies, communities, associations and universities. Its mission is to unite all public and private stakeholders to promote the CE and accelerate its development.	Industry, academia, civil society



## F. DEVELOPMENT/CO-OPERATION PLATFORMS

Platform	U		M	Country of establishment	Description/Relevance to Circular Economy (CE) <sup>a</sup>	Helices involved
	H	V	M			
African Circular Economy Network (ACEN)	Multilateral			South Africa, but representative of Africa	The vision of ACEN is to build a restorative African economy that generates well-being and prosperity inclusive of all its people through new forms of economic production and consumption which maintain and regenerate its environmental resources. It is Registered as a Non-Profit Organisation.	Industry, academia, civil society
Association of Cities and Regions for sustainable Resource management (ACR+)	Predominantly unilateral – vertical & horizontal, though it is moving towards multilateral opening to other key players from the other helices			Belgium (Brussels), though it operates beyond across and	An international network of cities and regions sharing the aim of promoting sustainable resource management and accelerating the transition towards a CE on their territories and beyond.	Predominately government: municipal and regional authorities, although it is open to the involvement of academia, industry and civil society
Association of Flemish cities and municipalities VVSG	Unilateral, horizontal			Belgium	VVSG is an association of all 308 Flemish municipalities and cities, representing their interests offering advice, training and many other services.	Government
Association of Municipalities and Towns of Slovenia	Unilateral, horizontal			Slovenia	Partner of Interreg Europe CircE Project (European regions toward Circular Economy) with the aim to strengthening the diffusion of CE in Europe, consistent with the European Commission's Circular Economy Package (2015).	Government

Association of the Chambers of Agriculture of the	Unilateral, horizontal, though it is	France	Partner of the Interreg Europe BIOREGIO Project (Regional CE models and best available technologies for biological streams 2017-2021). Contributed to the development of the Pays de la Loire Bio-based Circular Economy Action Plan.	Government, though it works in cooperation with academia, and industry
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Atlantic Area - AC3A	moving towards multilateral			
CEC4EUROPE – CE Coalition for Europe	Unilateral, horizontal	Austria, although it is for the whole EU	A network of European scientists and researchers. CEC4Europe endorses the importance of closing loops and boosting resource efficiency, but at the same time, aims to achieve a more scientifically and fact-based approach.	Academia
Circular Europe Network (CEN)	Unilateral, Vertical & Horizontal	Belgium, though it is for the whole EU	Circular Europe Network <a href="#">ACR+</a> wants to support local and regional authorities in being ambitious on CE and will therefore support and help them to adopt aspiring CE strategies. That is why ACR+ decided to launch a specific initiative on CE planning by cities and regions: the Circular Europe Network (CEN). The Circular Europe Network builds on the expertise of European front runners within the ACR+ network in order to gather, analyse and exchange information on efficient CE strategies implemented by cities and regions.	Government: local and regional authorities
Circular Flanders	Multilateral	Belgium	Circular Flanders is the hub and the inspiration for the Flemish CE. It is a partnership of governments, companies, civil society, and the knowledge community that will take action together. These organisations are the core of our partnership.	Academia, government, industry, civil society
Circular Futures-Plattform Kreislaufwirtschaft Österreich	Multilateral	Austria	The objective of the platform is to establish a solution-oriented multi-stakeholder platform as a think tank, incubator, and catalyst for projects and initiatives necessary for a successful transition to a CE in Austria.	Academia, industry, government, civil society



Council of European Municipalities and Regions (CCRE, CEMR)	Unilateral, vertical & horizontal	Belgium, EU	The largest organisation of local and regional governments in Europe. One of the goals is to “contribute to the thought process of the European Commission’s services to move towards a CE: improve the use of natural resources, the implementation of waste legislation and its possible revisions”	Government, local and regional
CSR Europe	Unilateral, horizontal	Belgium	CSR Europe is the leading industry platform in Europe promoting sustainable and responsible business practices and dialogue with European policy institutions. CSR Europe is the	Industry

			leading European business network for Corporate Sustainability and Responsibility.	
Cyprus Circular Economy Platform	Multilateral	Cyprus	Aims to collect CE good practices and events from all across Cyprus and all stakeholders that can contribute to the transition to a CE. If you are an industry, enterprise, local authority, public body, association, NGO and you have a good practice to demonstrate or an event to share, regarding CE, this is the place!	Academia, government, industry, civil society
Ecopreneur.eu, (European Sustainable Business Federation)	Unilateral, horizontal	Belgium, although it operates in the EU	Sets a course towards sustainable economic policies on the European level to support the economic and societal transformation across Europe and beyond. Ecopreneur.eu is a non-profit non-governmental organization. Through Ecopreneur.eu these associations strengthen the voice of sustainable business in Brussels. Under the umbrella of Ecopreneur over 3000 businesses are represented, mostly SMEs, that strive to deliver sustainable products and services.	Industry
ENCORE	Unilateral, horizontal	Germany, though it’s for whole EU	ENCORE is a political platform and forum for Environment Ministers and other relevant political leaders of the regions of Europe relating to environmental and sustainable development issues.	Government



ENEA	Multilateral	Italy	ReTraCE ITN project partner. National Agency for New Technologies, Energy and Sustainable Economic Development, a public body aimed at research, technological innovation and the provision of advanced services to enterprises, public administrations and citizens in the sector of energy, the environment and sustainable economic development.	Academia, industry, government, civil society
EU Covenant of Mayors for Climate & Energy	Unilateral, horizontal	Belgium, EU, but also international offices	The EU Covenant of Mayors for Climate & Energy brings together thousands of local governments voluntarily committed to implementing EU climate and energy objectives.	Government, local
European Committee of the Regions (CoR)	Unilateral, vertical & horizontal	Belgium, EU	The European Committee of the Regions is the European Union's assembly of local and regional representatives that provides sub-national authorities with a direct voice within the EU's institutional framework.	Government, local and regional
European Recycling Platform (ERP)	Unilateral, horizontal	France	ReTraCE ITN project partner. Founded in 2002 as the first pan-European organization to implement the European Union's regulations on the recycling of electrical and electronic waste (WEEE Directive). ERP now manages a consolidated network and has developed vast international expertise, expanding its recycling services to include batteries as well as packaging.	Industry
Federation of Recycling and Energy Recovery Industries and Enterprises	Unilateral, horizontal	Greece	SEPAN (former SEVIAN) was established by companies operating in Greece to engage in industrial activity in the area of waste recycling and recovery of by-products and secondary raw materials.	Industry



ICLEI East Asia - Local Governments for Sustainability	Unilateral, vertical & horizontal	South Korea, though focus on East Asia	The leading global network of over 1500 cities, towns and regions committed to building a sustainable future. Based in Seoul, ICLEI East Asia supports Members from China, Chinese Taipei, Japan, Korea and Mongolia pursuing <a href="#">The 5 ICLEI Pathways</a> . ICLEI-Local Governments for Sustainability plans to initiate the Green Circular Cities Coalition, presenting an opportunity for cities across the world to become global leaders in urban CE transition.	Government, local, municipal and regional authorities
Implementation and Enforcement of Environmental Law (IMPEL)	Unilateral, Horizontal	Belgium, EU + other non-EU countries	European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL) is an informal network of European regulators concerned with the implementation and enforcement of environmental legislation.	Government, regulators
Interreg	Multilateral	France, but throughout the EU	Interreg Europe helps regional and local governments across Europe to develop and deliver better policy. By creating an environment and opportunities for sharing solutions, we aim to ensure that government investment, innovation and implementation efforts all lead to integrated and sustainable impacts for people and places.	Academia, industry, government, civil society, but predominantly focused on local, regional and national authorities
Italian Circular Economy Stakeholder Platform (ICEPS)	Multilateral	Virtual	Created in 2018 as a mirror of the European Circular Economy Stakeholder Platform (ECESP) initiative, it promotes the Italian way for CE through the involvement of Italian stakeholders involved in the topic.	Academia, industry, government, civil society



Lahti Region Development LADEC Ltd	Unilateral, horizontal	Finland	Finland and Scandinavia's leading Cleantech Park. Focused on environmental technology, LADEC promotes the establishment and development of growth companies and investments to the Lahti region and cultivates innovative activity in the area. The cluster gives small and medium-sized enterprises advice and services that help them to network and internationalise their business. For foreign companies the cluster represents a gateway for finding partners in Finland. LADEC has also invested in venture capital services exclusively for cleantech companies. Mainly owned by the City of Lahti.	Industry, though state owned (Government)
RECITA	Multilateral	France	Nouvelle-Aquitaine's CE and innovation network, allows you to discover, activate, share or carry out CE projects in the fields of: mobility, energy, synergies, services, etc. This network is open to all socio-economic actors in the territory (companies, communities, researchers, networks, civil society).	Academia, government, industry, civil society
Regional Studies Association (RSA)	Multilateral	London, but it operates internationally	The RSA is a registered charity that works with researchers and policymakers across all career stages and geographical regions in the field of regional studies and science. It is a learned society with an international network of academics, policy makers and practitioner members.	Academia, government, industry – though being a charity it is mostly focused on contributing to the civil sphere.
The EEB European Environmental Bureau	Unilateral, Horizontal	Belgium, although it's for the whole EU	The largest network of environmental citizens' organisations in Europe. It currently consists of around 150 member organisations in more than 30 countries (all EU Member States plus some accession and neighboring countries), including a growing number of European networks, and representing some 30 million individual members and supporters.	Civil society
The European Circular Economy Stakeholder Platform	Multilateral	Virtual	The Platform was launched as a joint initiative by the European Commission and the European Economic and Social Committee (EESC) in March 2017. The Platform brings together stakeholders active in the field of the CE in Europe.	Academia, industry, government, civil society



The Network of Regional Governments for Sustainable Development (nrg4SD) – now Regions4	Unilateral, horizontal	Belgium, although it's global	A global network that solely represents regional governments (states, regions and provinces) in the fields of climate change, biodiversity and sustainable development, particularly following the mandates of the UN conventions and agendas.	Regional governments
The Päijät-Häme grain cluster	Unilateral, horizontal	Finland	The Päijät-Häme grain cluster functions as a cooperation network for grain producers and related industry. The purpose of the Päijät-Häme Grain Cluster is to promote the regional networking of the cluster companies and the farmer members. Part of the Päijät-Häme Circular Economy Cooperation Group (former name PäijätHäme Bioeconomy Group). It also acts as a regional stakeholder group for the BIOREGIO project.	Industry
The Policy Learning Platform	Unilateral, Horizontal & Vertical	France, but throughout the whole EU	The Policy Learning Platform is the second action of the Interreg Europe programme, established to boost EU-wide policy learning and capitalise on practices from regional development policies. The platform is a space for continuous learning where the policymaking community in Europe can tap into the knowhow of experts and peers.	Government



The Shift	Multilateral	Belgium	The Shift is the Belgian meeting point for sustainability. Together with members and partners it seeks to realise the transition to a more sustainable society and economy. Started the Wallonia Green Deal that will Contribute to Wallonia's transition to a CE.	Academia, government, industry, civil society
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## G. STAKEHOLDERS RELEVANT TO CONSUMER ENGAGEMENT IN THE CIRCULAR ECONOMY

Stakeholder	Overview <sup>a</sup>	Motivation(s) for Circular Economy (CE) involvement <sup>a</sup>	Barrier/Enabler	Interaction with other stakeholders
European Sustainable Business Federation ( <a href="http://euricaaisbl.eu/">euricaaisbl.eu/</a> )	“...sets a course towards sustainable economic policies on the European level to support the economic and societal transformation across Europe and beyond”	To be the voice of sustainable businesses (mainly SMEs) in Europe and, therefore, support and inform about what needs to be done in terms of EU policy for enabling the transition.	Enabler	<b>Sustainable businesses</b> in EU (mainly SMEs): Representation <b>EU policymakers</b> : Knowledge sharing; “advising”; communicating
European Recycling Industries’ Confederation (EuRIC) ( <a href="http://euric-aisbl.eu/">euric-aisbl.eu/</a> )	“... Confederation representing the interests of the European recycling industries. EuRIC brings together European and National recycling Associations from more than 19 EU and EFTA countries.”	Support of a value chain approach; aims at <b>nurturing constructive relationships</b> at all levels with stakeholders that benefit from recycling activities.	Enabler	i. <b>Public authorities</b> ii. <b>Manufacturers</b> iii. <b>Producer responsibility schemes</b> iv. <b>Academia</b> v. <b>NGOs</b>

European Plastics Converters (EuPC) ( <a href="https://plasticsconverters.eu/">plasticsconverters.eu/</a> )	“...the professional representative body of plastics converters in Europe, whose activity embraces all sectors of the plastics converting industry, including recycling.”	Representation of plastic converters in EU including all sectors of the industry. EuPC believes that the plastics industry has the potential to offer sustainabilityrelated benefits to our economy and works towards an effective transition to a CE.	Enabler	<p>All industries (stakeholders) relevant to ensuring the best possible transition towards a CE. These include the following industries:</p> <ul style="list-style-type: none"> <li>i. <b>Packaging</b>, ii. <b>Automotive</b>, iii. <b>Construction</b> and iv. <b>Technical parts.</b></li> </ul>
European Federation of Waste Management and Environmental Services (FEAD) ( <a href="https://fead.be">fead.be</a> )	“...represents the private waste and resource management industry across Europe.”	To work for the continuous improvement of the (policy) framework conditions aimed at boosting the recycling markets in Europe. To do this, it works to gather expertise and current information from its members.	Enabler	<p><b>Members:</b> Companies (3000), National waste management federations (20), Employes (320,000), Recycling and sorting centres (2400), Composting sites (1100), Waste-toenergy plants, Controlled landfills (900).</p> <p><b>EU policymakers.</b></p>



The European Organisation for Packaging and the Environment (EROPEN) ( <a href="http://europenpackaging.eu">europenpackaging.eu</a> )	“...an industry organization presenting the opinion of the packaging supply chain in Europe on topics related to packaging and the environment”	“...aims to achieve a fully accessible European market for packaging and packaged products, while protecting the product and the environment.”	Enabler	<p><b>EU policymakers:</b> Cooperation for the development of CE-enabling legislation from a packaging perspective.</p> <p><b>Members (council of):</b> Representation and knowledge sharing</p>
Confederation of European Waste-to-Energy Plants (EROPEN) ( <a href="http://cewep.eu">cewep.eu</a> )	“...umbrella association of the operators of Waste-to-Energy (incineration with energy recovery) plants, representing [...] up more than 80% of the Waste-to-Energy capacity in Europe”	“Contributing to European environmental and energy legislation that can affect Waste-to-Energy Plants”	Enabler	<p>“Close and permanent contact with the <b>European Institutions</b>”</p> <p>“Participation in on-going studies (UNEP, OECD and EU)”</p> <p><b>EU policymakers:</b> “Careful analysis and proactive contributions to EU environment and energy policy”</p>
FEICA ( <a href="http://feica.eu">feica.eu</a> )	“...member-oriented, valuedriven organisation representing the European adhesive and sealant sector”	“Sustainability and Circular Economy” is one of their four strategic areas	Enabler	“Engaging with <b>legislators</b> and providing guidance to the <b>industry</b> on EU regulatory affairs and the safe use of our products”



The European Consumer Organisation (BEUC) ( <a href="http://beuc.eu/">beuc.eu/</a> )	...umbrella group in Brussels for national consumer organisations in Europe with the “main task [...] to represent them at European level and defend the interests of all Europe’s consumers”	Ensuring the sustainability (in its three dimensions) of EU consumer policy for all consumers.  “promotion and defence of consumer general interests”	Enabler	<b>Members:</b> Knowledge and experience insights.  “day-to-day contact with <b>consumers</b> at grass roots level”
ANEC ( <a href="http://anec.eu">anec.eu</a> )	“...European consumer voice in standardisation. We represent the European consumer interest in the creation of technical standards, especially those developed to support the implementation of European laws and public policies.”	To ensure that focus of CE-transition attempts is kept on the objectives: “objective remains socially acceptable reduction of the use of resources, and of environmental and human health impacts”  “...member of PROMPT, a project that aims to reduce the premature obsolescence of products.”	Enabler	<b>Members:</b> Knowledge and experience insights.  <b>Other organisations and projects</b> (see BEUC)  <b>EU policymakers.</b>
Surfrider Foundation Europe ( <a href="http://surfrider.eu/en/">surfrider.eu/en/</a> )	“...non-profit organisation”  “It currently has over 13,000 members and is active across 9 countries through its volunteer-run branches.”	“...to protect and showcase the importance of lakes, rivers, the ocean, waves, and coastlines”	Enabler	“All (3) social actors”:  <b>Individual citizens</b>  <b>Public and private sectors</b>



Zero Waste Europe ( <a href="http://zerowasteurope.eu">zerowasteurope.eu</a> )	“...brings together and represents the European municipalities that have openly committed to [...] redesigning the relationship between people and waste”	“...work on a wide range of projects and policy areas with the single objective of advancing the zero waste future for Europe.”	Enabler	<b>EU policymakers</b>  <b>Grass-roots</b> implementation of zero waste projects.
Friends of the Earth Europe ( <a href="http://foceurope.org">foceurope.org</a> )	“...largest grassroots environmental network in Europe, uniting more than 30 national organisations with thousands of local groups.”	They “campaign on today's most urgent environmental and social issues”  They “challenge the current model of economic and corporate globalization, and promote solutions that will help to create environmentally sustainable and socially just societies”	Enabler	<b>European and EU policymakers:</b> influence and create environmental awareness.  <b>Institutions, media &amp; the public:</b> providing regular information
European Environmental Citizens Organisation for Standardisation (ECOS) ( <a href="http://ecostandard.org">ecostandard.org</a> )	“...promotes and defends environmental interests in the development of standards at European and international level, as well as in the development of technical environmental product policies.”	“...works to ensure that reliable, harmonised standards promote preparation for reuse and materialefficient recycling, in order to achieve appropriate waste management and prevent landfilling or incineration of valuable resources”	Enabler	<b>Members</b> (loosely defined): networking, visibility, information sharing and workshops

European Environmental Bureau (EEB) ( <a href="http://eeb.org">eeb.org</a> )	“Europe’s largest network of environmental citizens’ organisations.” They “bring together around 150 civil society organisations from more than 30 European countries.”	They “stand for sustainable development, environmental justice & participatory democracy.”	Enabler	<p><b>Members</b> – environmental civil society organisations across Europe.</p> <p>They work with “like-minded stakeholders” to promote their ideas on sustainability etc.</p> <p>They produce publications with the aim of offering information on environmental topics.</p>
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CE100 Members (EMcAF) ( <a href="http://ellenmacarthurfoundation.org/ourwork/activities/ce100">ellenmacarthurfoundation.org/ourwork/activities/ce100</a> )	“...pre-competitive space to learn, share knowledge, and put ideas into practice.”	Recognition that a successful feature of CE in businesses’ strategies requires working “collectively to build new markets” – The facilitation of such collaborations is this platform’s purpose.	Enabler	“opportunities that bring together <b>business, innovators, cities and governments, universities, and thought leaders.</b> ”
Governmental Economic Policy Council, Greece (through the National Action Plan on Circular Economy) ( <a href="http://government.gov.gr">government.gov.gr</a> )	“[...] supporting circular consumption patterns of reusing, re-storing and re-pairing rather than buying new products, especially for electrical and electronic devices [...]”	-	-	-

Ministry for Ecological and Solidary Transition, France ( <a href="https://www.ecologiquesolidaire.gouv.fr/sites/default/files/FREC%20anglais.pdf">https://www.ecologiquesolidaire.gouv.fr/sites/default/files/FREC%20anglais.pdf</a> )	(the “Circular Economy roadmap of France: 50 measures for a 100% circular economy”)	They believe “we must move towards a different type of economy, where we consume in moderation, where products have a longer lifetime, where we limit waste, and where we are able to transform waste into new resources”.	Enabler	-
Ministry of Environment, Portugal ( <a href="https://circulareconomy.europa.eu/platform/sites/default/files/strategy_-_portuguese_action_plan_paec_en_version_3.pdf">https://circulareconomy.europa.eu/platform/sites/default/files/strategy_-_portuguese_action_plan_paec_en_version_3.pdf</a> )	“Leading the transition: A circular economy action plan for Portugal”	They have set certain goals for 2050 (“A carbon neutral economy”, “Knowledge as impulse”, “inclusive and resilient economic prosperity” and “A flourishing, responsible, dynamic and inclusive society”) attempting a transition towards a circular economy	Enabler	The successful achievement of their goals requires the involvement of <b>government, users/consumers, companies, regional and local authorities</b> and <b>municipalities</b> . Also an <b>inter-ministerial group</b> (“science, technology and higher education;
				economy; environment, agriculture, forestry and rural development”)

Ministry for the Environment, Land and Sea Ministry of Economic Development, Italy ( <a href="https://circulareconomy.europa.eu/platform/sites/default/files/strategy_-_towards_a_model_eng_completo.pdf">https://circulareconomy.europa.eu/platform/sites/default/files/strategy_-_towards_a_model_eng_completo.pdf</a> )	“Towards a Model of Circular Economy for Italy - Overview and Strategic Framework”	The document calls for a "change of paradigm" for Italy's economy, for a new way to consume, produce and do business”	Enabler	Through the “SUN - Symbiosis User Network”: “meeting of the various stakeholders involved, the creation and sharing of knowledge, and the identification of new opportunities for economic, social, and territorial development in our country”
Government of the Netherlands (through the document) ( <a href="https://circulareconomy.europa.eu/platform/sites/default/files/17037circulaire_economie_en.pdf">https://circulareconomy.europa.eu/platform/sites/default/files/17037circulaire_economie_en.pdf</a> )	“A Circular Economy in the Netherlands by 2050”  “Goals: [...] Ensure sustainable production and consumption (e.g., reducing global food waste by half, through sustainable government assignments and sustainability education) [...]”;	Aimed at developing a circular economy in the Netherlands by 2050. The ambition of the Cabinet is to realise, together with a variety of stakeholders, an (interim) objective of a 50% reduction in the use of primary raw materials (minerals, fossil and metals) by 2030”	Enabler	-

Redress, Hong Kong ( <a href="http://redress.com.hk">redress.com.hk</a> )	“Redress is an environmental charity with a mission to prevent and transform textile waste to catalyse a circular economy and reduce fashion's water, chemical and carbon footprints”	“Work to change mindsets and practices to stop the creation of textile waste now and in the future, as well as creating systems and partnerships that generate and showcase value in existing waste”	Enabler	They “work with <b>designers, textile and garment manufacturers, retailers, schools and universities, governments, NGOs and media organisations</b> on seminars, workshops, research, retail collaborations and through [...] recycled textile standard”
The Rediscovery Centre, Ireland ( <a href="http://rediscoverycentre.ie">rediscoverycentre.ie</a> )	“... is the National Centre for the Circular Economy in Ireland. A creative movement connecting people, ideas and resources to support greener low-carbon living”	“The Centre’s translational research activities support national waste prevention and climate action policy and advocate for a more resilient and equitable society.”	Enabler	“education team offer interactive and experiential workshops for <b>primary, secondary, and third level students</b> which cover wide ranging environmental and STEM (Science, Technology, Engineering & Maths) topics”
Zero Waste Scotland, UK ( <a href="http://zerowastescotland.org.uk">zerowastescotland.org.uk</a> )	“Our mission is to influence and enable change – from gathering evidence and informing policy, to motivating practical behaviour change in individuals and organisations through our programmes and brands”	Among others, they have programmes through which they aim to aid emerging businesses that are in line with CE strategies in order to boost their success. They also gather evidence, inform policy and engage with the public in order to drive behavioural change.	Enabler	<b>Businesses</b>  <b>Policymakers</b>  <b>Individuals and organisations</b>

Action for Community & Environment (ACE), UK ( <a href="http://ace.org.uk">ace.org.uk</a> )	Mission: “Creating proenvironmental behaviour change, supporting	Their mission is aligned with a CE	Enabler	<b>Community</b> engagement: events, sessions, community-led action, entrepreneurship and hubs.
	communities to take action and working with businesses to adopt best practice in environmental sustainability”			<p>“Working with <b>businesses</b>”: training, inspiration and so on.</p> <p><b>Companies/organisations:</b> Training in “waste and resource management”, “waste and carbon audits”, “how to write an environmental policy”, “resource business training”.</p>
Foundation for Circular Economy, Hungary ( <a href="http://circularfoundation.org">circularfoundation.org</a> )  <a href="https://www.circulareconomyclub.com/organizations/foundation-for-circulareconomy-hungary/">https://www.circulareconomyclub.com/organizations/foundation-for-circulareconomy-hungary/</a>	Through their “Circular Hungary Program” they aim, among other things, at “improving conditions and environment at technological, regulatory, market, consumer behaviour and financing levels for circular products, practices and projects”	-	Enabler	-





Flustix ( <a href="https://flustix.com">flustix.com</a> )	“Flustix is a certification body for plastic-free and partially plastic-free products as well as goods made from recycled plastics”	“goal is to reduce the use of consumer plastics which account for 80 percent of plastic waste found in nature.”	Enabler	“By making plastic reduction clearly visible for <b>customers</b> , the certification provides guidance and the opportunity to make a plasticaware buying decision”
EU Ecolabel ( <a href="https://ecolabel.eu">ecolabel.eu</a> )	“When developing EU Ecolabel criteria for products, the focus is on the stages where the product has the highest environmental impact, and this differs from product to product.”	“The EU Ecolabel promotes the circular economy by encouraging producers to generate less waste and CO2 during the manufacturing process. The EU Ecolabel criteria also encourages companies to develop products that are durable, easy to repair and recycle”	Enabler	<i>Similar to Flustix but with a different focus</i>
Nordic Swan Ecolabel ( <a href="https://nordic-ecolabel.org">nordic-ecolabel.org</a> )	“The Nordic Swan Ecolabel is one of the founders back in 1994 of the international network for ISO 14024 Type 1 ecolabels, GEN, the Global Ecolabelling Network”	“The Nordic Swan Ecolabel works to reduce the environmental impact from production and consumption of goods – and to make it easy for consumers and professional buyers to choose the environmentally best goods and services”	Enabler	<i>Similar to Flustix and EU Ecolabel but with a different focus</i>