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Innovation platforms fostering low-carbon economy resource mobilisation: A community of practice approach for knowledge triangle integration in EU peripheral regions

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Abstract

Purpose – The purpose of this paper is to highlight the potential of innovation platforms to realise SDGs targets by focussing in sustainable innovation process related to infrastructure and industrialisation.
Design/methodology/approach – Analysis of different policy documents, reports as well as a series of interviews and participatory processes run in 2016–2017 of the EIT Regional Innovation Scheme programme to prototype a knowledge triangle integration (KTI) index.
Findings – Preliminary findings show that EIT Climate-KIC operates as an innovation platform that mobilise resources to increases capabilities for climate innovation.
Practical implications – The paper contributes to a better understanding of the complexity of the efforts needed to tackle climate innovation regarding resource mobilisation for KTI processes by focussing on how platforms work in a bottom-up way.
Originality/value – Mechanisms and processes that consolidate local knowledge and strengthen relational assets with regards to climate innovation are important for the realisation of some of the 169 targets of the 2030 Agenda.

Keywords Climate change, Community of practices, Sustainable Development Goals, European regions, Innovation platforms, Regional innovation

Paper type Research paper

1. Introduction

Innovation has been widely described as an essential process required to find solutions to societal challenges such as global warming and clean energy (European Union, 2016). As part of innovation policy debates, platforms are indicated as mechanisms that facilitate that process by enabling systemic efforts that will also be thematic and spatial (Bloomfield and Steward, 2016; Miedzinski, 2017; Steward, 2012). The connection between Sustainable Development Goals (SDGs) and innovation is more and more present in policy debates (Walz *et al.*, 2017) where the 17 Global Goals, as part of the 2030 Agenda, highlight the potential synergies between defined targets in different but integrated themes.

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This paper addresses the role of innovation platforms as catalysers of transformative processes in European peripheral regions, acknowledging that not all have the same capacities (Tödtling and Trippl, 2005). Transformation into a low carbon economy by 2030 in this context will require strong institutional capacity (Healey *et al.*, 2003), having a systemic instead of a "picking the winner" approach (Asheim *et al.*, 2011) and including new marginalised actors and incorporating new innovation modes such as experimentation (Schot *et al.*, 2018; United Nations, 2016). In doing so, the role of innovation platforms in the context of SDGs is explored by looking at processes on knowledge triangle integration (KTI) as mechanisms to facilitate resource management and foster emerging communities of practices in low carbon economies. Looking at different dimensions of KTI, measuring them across Europe and indexing results for comparison contributes to the discussion about the dynamics of platforms.

The SDGs are increasingly present in the field of innovation in the European Union (EU), highlighting potential synergies of EU programs with the 169 defined targets in the different but integrated goals (Giovannini *et al.*, 2015). The study will look specifically at SDG 9: Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation, whose scope is to enhance research and upgrade technological capabilities. Empirically, emphasis is put on the case of the EIT Regional Innovation Scheme (EIT RIS[1]), an EIT and EIT Climate-KIC[2] programme in the context of peripheral European regions. Focus is put on the emerging practices on combining research, education and business activities driven by the understanding of innovation as a systemic process (Matti and Panny, 2017) by looking at the performance of different actors in activities aimed to foster KTI[3].

The aim of this study is to contribute to a better understanding of the existence of communities of practice and their value for innovation. It will shed light on ways to effectively support technological as well as practice-place-based innovation by exploring regional narratives on the variety of mechanisms for resource mobilisation and knowledge integration.

The structure of the remainder of the paper is as follows: Section 2 provides the conceptual framework of the study, while Section 3 introduces SDGs as part of the broad policy background for innovation platforms. The empirical study (Section 4) is divided into the methodology and the details of the case study. Section 5 develops the outcomes of the analysis, which are discussed in the next section. Finally, Section 6 provides the conclusions.

2. Innovation platforms, an enabling mechanism of knowledge triangle integration

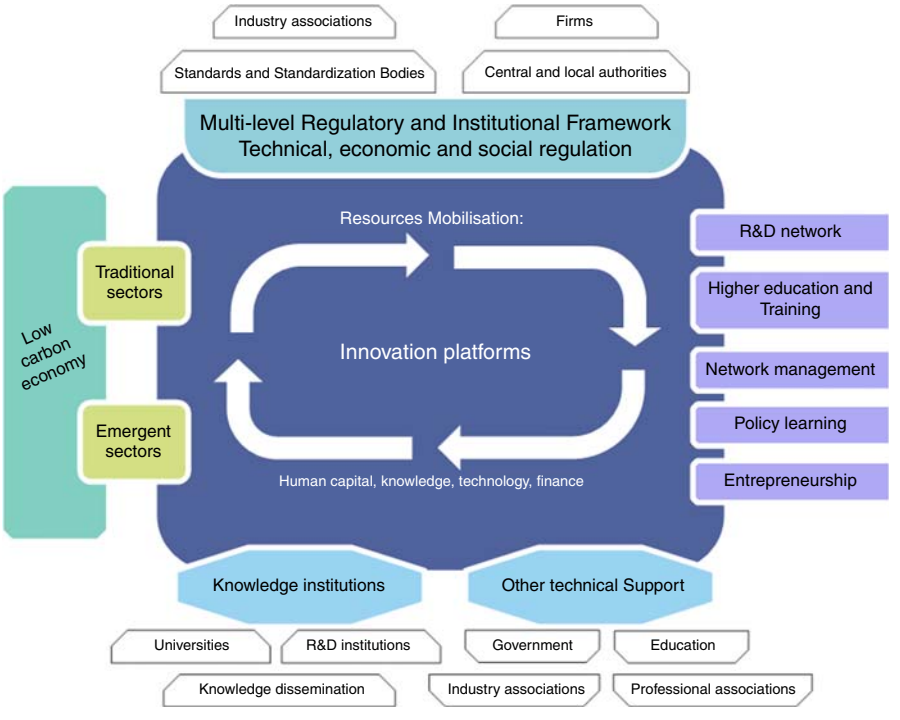
The term platform has become almost ubiquitous in the innovation field. Conceptually, platforms are defined as systemic infrastructures, instituted governance mechanisms, organisations, and organisational innovations. They are also defined as a set of products, services or technologies. Different authors describe two predominant forms of platforms: internal or company-specific, and external or industry-wide (Gawer and Cusumano, 2014). Generally, industry or technological platforms serve the organisation and coordination of distributed (or localised) innovation processes generated in a wide range of industries, and firms featuring high degrees of complexity (Consoli and Patrucco, 2007, 2008; Gawer, 2010).

Innovation platforms can be understood from a more systemic perspective by focussing on their conceptualisation as structures that allow the coordination of a variety of actors by combining individual goals and capacities with shared purposes, norms and expectations. These interactions are based on the ability to maximise the variety of knowledge stemming from otherwise dispersed knowledge bases, while maintaining coherence through a minimum level of hierarchy and clear direction within coordinated actions (Consoli and Patrucco, 2007, 2011). The explicit engagement of different actors is a crucial institutional element to understand the governance of complex knowledge (Consoli and Patrucco, 2007).

Platforms reinforce acquired advantages in different knowledge areas in the search for complementarities (Gawer, 2010). Knowledge is conceptualised across a spectrum, from abstract theoretical (relatively explicit and codified) knowledge to practical (relatively tacit) know-how (Antonelli, 2006; David and Foray, 1995; Whitley, 2000). Since different types of knowledge contain different mixes of the explicit and the tacit, the pathways through which knowledge is diffused and transformed are diverse and, accordingly, underpinned by different pedagogical and replication processes. Actual knowledge and skills are increasingly valued by employers beyond earned credentials and titles on a context of life-long learning and reorientation on non-line careers (Hüsing and Korte, 2017).

From a policy perspective, platforms are similar to public–private partnerships (PPP) regarding dimension, organisational structure and business models. Referred to as a model for PPP management (Consoli and Patrucco, 2008), platforms respond to the ethos of expanding the channels for the circulation of novel know-how by means of network-based strategies. Platforms thus respond to the need to create new knowledge and encourage the diffusion of new best practices (Baldwin and Woodard, 2009; Consoli and Patrucco, 2011). By fostering a knowledgeable community, they have the potential to mobilise and build on existing relational and knowledge resources (i.e. human capital, knowledge, technology) to enable innovations facing climate change challenges (Bloomfield and Steward, 2016; Miedzinski, 2017).

These structures undertake flexible but coordinated activities such as research training, professional education, entrepreneurship (start-ups, spin-offs) and R&D support. Participating organisations within platforms include firms, higher education institutions, vocational education centres, local and national authorities, industry associations, etc. (see Figure 1).



Source: Authors' own elaboration based

Figure 1.
Structure of thematic innovation platforms

As such, interactions within a platform are both "multi- and cross-scales" (i.e. public-private, several industrial sectors, research/education/training), as well as "multi- and cross-level" (i.e. firm/cluster/network/industry, local/regional/national/European).

The role of platforms is especially important to build capacity in places where power dynamics result in weak institutions and great input is needed precisely to strengthen and put together otherwise isolated change agents (Healey *et al.*, 2003). Regional ecosystems can be fed with emerging practices, among them new mechanisms on KTI aimed at fostering pathway creation for new sectors by combining local available assets. Regarding low-carbon economy sectors, the regional innovation process becomes more complex in terms of the multi-level policy mixes that raise issues of coordination underpinning the policy process; these include the mix of actors, levels, policy domains and time (Matti *et al.*, 2016).

Embedded communities of practice within the innovation platforms

Participating organisations interacting in a platform do not only diffuse new best practices but also integrate different visions and values by creating community alignments. More specifically, knowledge flows between actors may be considered as the germ that holds the potential to grow into a community of practice in which people learn collectively and mutually engage in joint enterprises, producing a repertoire of common resources (Wenger *et al.*, 2002). The elements of both innovation platforms and communities of practice provide the grounds for bottom-up innovation as they increase innovation capacities at a structural and individual level.

The escalation of the exchange of knowledge and experiences to an interregional level that involves several partners would develop into a structure too broad, diffuse or diverse to be considered as a single community, thus becoming what Wenger calls a constellation of practice (Wenger, 1998). This author also uses the concept of a global community to understand the importance of these communities in creating global practices without ignoring local specificities (Wenger *et al.*, 2002). Consequently, ascribing a specific typology, defining the stage of a community regardless of whether leadership is individual or co-owned (Webber, 2016), can become a difficult endeavour.

3. The EU policy landscape on sustainable development

The pursuit of a green agenda in Europe has encouraged the broadening of policies for removing or minimising obstacles to the effective exploration and exploitation of new knowledge (Popp, 2010). Proof of this are the Europe 2020 Strategy, the 2030 Climate and Energy Policy Framework, the EU strategy on adaptation to climate change, and regional policies in general that have commented on the role of innovation in bridging a knowledge gap[4].

Sustainable development has been anchored in EU treaties[5] since the first EU Sustainable Development Strategy adopted in 2001, where Millennial Development Goals (MDGs) were introduced; these were revised in 2006 and again in 2009. Later, the Europe 2020 strategy, adopted by the European Commission in 2010, pushed for sustainable growth while prioritising an environmental dimension, among others. However, MDGs were integrated from a development perspective, i.e. the MDG Initiative (2010) covered by the European Development Fund. On the other hand, SDGs had a more comprehensive approach by embedding the concept not just in external actions but in domestically oriented actions as well. SDGs have been mainstreamed in different policy documents[6].

More specifically, regarding the relationship with sustainable industry and innovation (i.e. SDG 9), the EU has established a series of framework instruments such as European Structural and Investment Funds (ESIF), COSME and Horizon 2020[7] (including the European Institute of Innovation and Technology, the EIT). On the other hand, initiatives

aimed at supporting regional development can be divided into two categories: ESIF and European Territorial Cooperation (etc).

Through the European ESIF, almost half the EU funding is channelled. They are jointly managed by the European Commission and EU countries and divided into five specific funds. An important part of the ESIF is the Cohesion funds, aimed at funding transport and environmental projects in countries where the gross national income per inhabitant is less than 90 per cent of the EU average. Also, part of the ESIF, the European Regional Development Fund (ERDF) promotes balanced development in the different regions of the EU.

The European Territorial Cooperation (etc), better known for the Interreg programme, was developed in 1990 as a community Initiative with a budget of just €1 billion, covering exclusively cross-border cooperation; recently this has been extended to transnational and interregional cooperation. Under its wing, the pilot projects of the Regional Innovation Scheme (RIS) were implemented in 2000. The second stage of the RIS programme was developed between 2007 and 2013. The actual RIS3 programme started in 2014 and will be effective until 2020.

To sum up, within the broad framework of EU policies, the territorial focus is a key part of EU policies in terms of broad approaches on sustainable industry and innovation (i.e. H2020, COSME), and major investment in infrastructures (ESIF) and regional development (ERDF, etc.). Countries and regions are then required to match the relationships behind these policies with the approach defined for the SDGs. Mechanisms to facilitate innovation are essential for making those relationships effective in terms of multilevel policy governance systems (Matti *et al.*, 2016; Schot *et al.*, 2018).

Sustainable Development Goals (SDGs), innovation platform and territorial perspectives

Globally, it is worth calling attention to the proliferation of thematic platforms, such as the Sustainable Development Knowledge Platform, aiming to catalyse action regarding SDGs, approved as part of "Transforming our world: the 2030 Agenda for Sustainable Development" by the General Assembly of the United Nations in September 2015. The existence of new actors and processes in innovating for sustainability, as argued by Leach *et al.* (2012), resonates with the potential role of innovation platforms as catalysers of the Agenda 2030.

Sustainable development was first defined in the Brundtland report in 1987, and the term was enshrined in the MDGs in 2000. Contrary to the MDGs (2000–2015), SDGs state the importance of partnerships and collaboration with the private sector. While MDGs are referred to the Kyoto Protocol, SDGs are more aligned with the Paris Agreement. Moreover, SDGs better mainstream environmental concerns such as preservation, climate change and adaptation. SDGs Nos 7, 8, 9, 10, 11 and 13[8] are known as green goals because of their relationship to the environment; reaching their targets needs innovation, especially focussing on capabilities (United Nations, 2017; Walz *et al.*, 2017).

In a globalised world, mechanisms for knowledge dissemination play an important role as the North still holds higher capabilities and better conditions for climate innovation (Jha *et al.*, 2016; Walz *et al.*, 2017). As Leach *et al.* (2012) underline, local and indigenous knowledge are paramount in that regard. Consequently, local processes and implications, together with regional needs, should be triangulated when designing these mechanisms (Clifford and Zaman, 2016; Leach *et al.*, 2012; Schot *et al.*, 2018).

The Global SDG index (0–100), measuring the implementation of SDGs worldwide, shows the state of play of Goals. However, this study only considers nine countries – also part of the RIS programme. In those countries, SDGs 12, 13 and 14 have the lowest values (see Figure 2). However, this paper will focus on SDG 9 as it argues that innovation is a necessary step and will be a transversal topic in the 2030 Agenda.

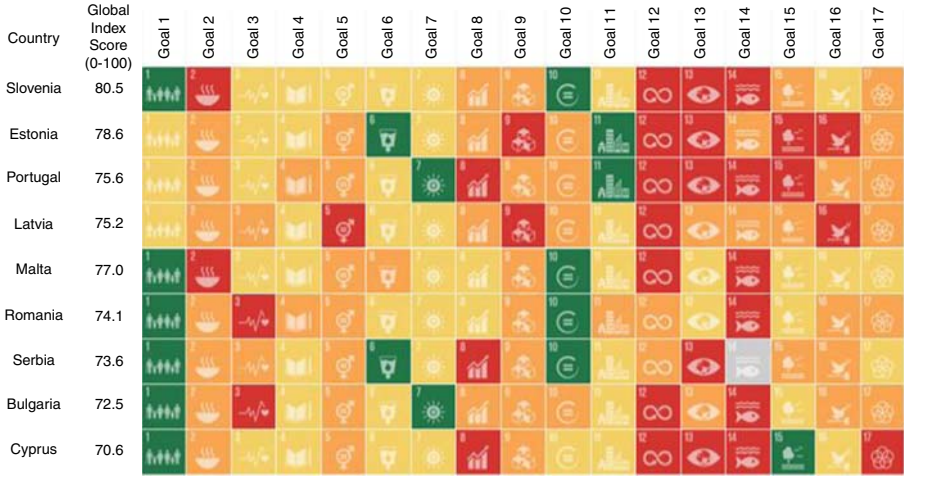


Figure 2.
SDG Index in EIT RIS Climate-KIC countries

Source: Authors' own elaboration based on Sachs *et al*. (2017)

Goal No. 9 calls on countries to foster innovation, to make infrastructure and industries more sustainable by increasing resource efficiency and adopting more environmentally sound technologies and production processes. SDG 9 also seeks to upgrade technology to make industries more sustainable, further highlighting the availability of infrastructure for promoting the digital and knowledge-based economy (European Union, 2016). Building knowledge based infrastructure such as innovation platforms to foster bottom up innovation is paramount for the implementation of SDGs (United Nations, 2017).

In this paper, the role of innovation platforms in the context of sustainable development is explored by analysing the potential of transformative processes on KTI as a mechanism for resource management embedded in the platforms. Different dimensions of KTI will then be analysed in terms of more effective pathways for resource management aimed at fostering sustainable industry and innovation (i.e. SDG 9). In the next section, the empirical study of the EIT RIS is presented by highlighting key aspects of the KTI dimensions in a variety of peripheral EU regions.

4. The empirical study

This empirical research is based on different sources, namely methodological and policy documents, reports, participatory processes run during the implementation of the EIT RIS programme in 2016 and 2017, as well as a series of semi-structured interviews, conducted between June and August 2017. The exploratory study is aimed at identifying patterns of the relationship between activities and regional settings for the emergence of communities of practices on KTI and sustainable development. By doing so, the study seeks to provide evidence on the role of innovation platforms as catalysers of policy agenda by facilitating resource management in a multi-stakeholder context. The study is presented in two steps:

(1) First, the case of the EIT RIS is presented briefly by introducing the overall context and general objectives, the approach on KTI, and the general narrative and overall performance in recent years.

(2) Second, we present a more specific analysis of the cases by applying an institutional assessment of practices and mechanisms for KTI. The first version of this assessment framework on KTI has been developed by TMC Artur Żurek (TMC, 2017) for all the

EIT/KICs based on his interviews with KT actors, EIT/KICs representatives and desk research on websites of universities/organisations active in collaborations with businesses in the context of KICs.

By following the two-step process, this paper aims to introduce the storyline of a regional development programme through a variety of elements related to the definition of innovation platforms. It, then, puts the emphasis on particular aspects of innovation and sustainability in terms of the relationship of the overall objective and performance with the underlying logic of SDG 9.

EIT knowledge innovation communities and regional innovation scheme

The EIT Climate-KIC, one of the EIT Knowledge and Innovation Communities created in 2010, has been characterised since the beginning by its regional, place-based approach to innovation in its structure, in addition to its academic and corporate components. The incorporation of cities and regions as a distinctive element within the organisation, has contributed to recognise a broader, more systemic model of innovation, and emphasised the role of place in addressing the challenges of climate change (Bloomfield and Steward, 2016).

EIT Climate-KIC has gone beyond the "classical" actors of the knowledge triangle to also involve other actors such as public authorities. Conceptually, EIT Climate-KIC views innovation as "research and business, aided by education" (Wilkinson *et al.*, 2017). The three sides of the knowledge triangle are seen to have distinct, but complementary roles (Wilkinson *et al.*, 2017):

(1) research: creating, developing and refining the unique intellectual property that underpins innovation;

(2) business: creating and realising the value of the intellectual property at scale; and

(3) education: developing the human capital by addressing the knowledge and competency gaps in innovation.

The case of the EIT RIS programme

The objective of the EIT RIS programme is to contribute to boosting innovation in European countries and regions that belong to the groups of "modest and moderate" innovators. The EIT considers KTI from two perspectives: as an integration of innovation, education and entrepreneurship activities, or as an integration of actors in the business sector, universities, research organisations and others (Wilkinson *et al.*, 2017).

EIT Climate-KIC's EIT RIS programme activities were started in 2014 by twinning partnerships between EIT Climate-KIC regions and EIT RIS regions, represented by single entities. However, the main caveats of this early implementation model were the limited connectivity of the new partners across EIT Climate-KIC, as well as the limited scope of the regional partnerships acting as the programme facilitators in the new regions. Major steps towards a more partner-driven model were taken in 2016 when a new call for EIT RIS partners was held. The new consortia were selected through a competitive process that led to the presence of the EIT RIS programme in nine countries: Bulgaria, Cyprus, Estonia, Latvia, Malta, Portugal, Romania, Serbia and Slovenia. The existing regions were complemented by a set of new regions represented by consortia spanning the knowledge triangle from the start.

With the aim of facilitating the mechanism of implementing activities and integrating newcomers to the existing community, entities were brought into partnership with EIT Climate-KIC almost from the start; this enabled them to engage with EIT Climate-KIC more easily and substantially with fewer administrative hurdles. At the same time,

"old" EIT RIS regions were asked to further broaden their local partnerships and factor KTI into their thinking. The long term strategy indicates intensification of the work of the local consortia in more targeted ways through the allocation of resources for network developers' roles; these are aimed at expanding and consolidating the relational resources within the programme.

The activities delivered through the EIT RIS programme were set in a context of an emerging community of practice, while putting emphasis on fostering the early development of KTI mechanisms on education and incubation/acceleration (start-ups). Emphasis was also placed on relational assets through mobility programmes and exchanges via two-way expert study visits targeting various cleantech and climate innovation topics. Figure 3 quantifies the number of participants, start-ups and innovation projects taking part in activities run by RIS partners (from 2014 to 2017).

Regarding the process of formation of communities of practices, the professional mobility programme "Pioneers into Practice" played a key role in facilitating regions' integration into EIT Climate-KIC. There was considerable anecdotal evidence for programme participants acting as "ambassadors" for EIT Climate-KIC, and they later became involved as coaches or facilitators themselves or applying to take forward their business ideas developed during the programme in the accelerator. Also, the bilateral study visits produced tangible follow-up projects, common grant applications and valuable contacts that were later utilised in the organisation of further activities. In the programme, countries and EIT RIS partners came from learning-by-doing educational, entrepreneurial and innovation activities targeting diverse stakeholders (students, professionals, officials, start-ups, etc.).

There is some variety in the performance in the programme among regions since they face different conditions for the implementation of the programme and, thereby, the

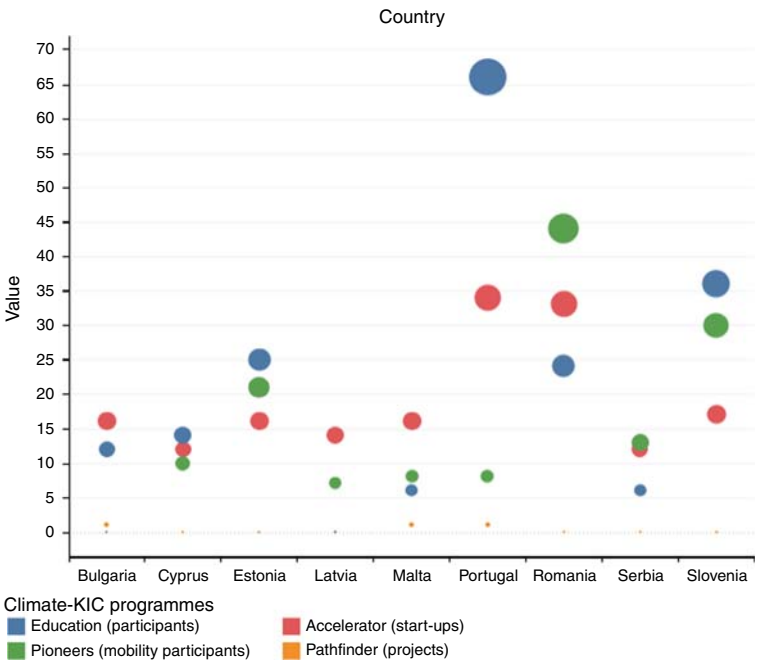


Figure 3.
Results of activities in the EIT RIS Climate-KIC programme 2014-2017

Source: Authors' own elaboration based on Matti and Panny (2017)

adoption of the innovation platform logic in terms of significant coordination efforts, required institutional capacity for KTI and local availability of innovation activities that could accelerate the learning process. However, it is worth noting that variations respond to differences in the number of years of implementation of the programme. Also, the ability of the local programme coordinators to mobilise stakeholders varies considerably, with some entities having more privileged access and/or higher connectivity with a variety of actors.

Institutional assessment on knowledge triangle integration

Early analysis of the activities in the EIT RIS programme reveal some variety in the performance of the different regions based on the level of experience and maturity. In that respect, a deeper analysis of the socio-technical configuration was run to provide a better understanding of practices and mechanisms for KTI in emergent communities of practices. In order to do this, a triangulation of different sources (i.e. policy documents, reports, participatory processes and interviews) was applied to analyse and decouple systemic elements regarding system components process and mechanism in terms of different levels of maturity regarding KTI performance. Four main categories are considered:

(1) Perspective refers to the connection with a broader context; it can be analysed from an occasional cooperation, through joint planning, to a self-driven ecosystem.

(2) Culture and organisation describe a collection of elements including governance system and value setting. Assessment should highlight situations from a neutral, through structured and supportive, to an open system.

(3) Resources indicate the critical mass of assets allocated for delivering the activities from "nothing", through allocated, shared and collocated to openly available resources.

(4) Experience and activities include the variety of actions in terms of complexity, depth and direction from problem solving, through joint idea generation, to constant innovation process.

Table I shows how each category is decoupled in dimensions (a total of 16 for the four categories) to evaluate the level of maturity of KTI performance.

Category	Dimensions
Perspective	Vision
	Strategy
	Planning
	Policies
Culture and organisation	Leadership and governance
	Information flow
	Organisation structure
	Motivation system and Performance assessment
Resources	People
	Mobility
	Financing
	Workspace
Experience and activities	Partners and relationships
	Innovation – deliver new products, services and business models
	Education – equip students with the skills to become entrepreneurial
	Entrepreneurship – create start-ups and accelerate the scaling-up venture

Source: Authors' own elaboration based on TCM (2017)

Table I. Categories and dimensions for institutional assessment on KTI

The level of maturity is evaluated under a scenario-based assessment and uses four situations to value an organisation's stage of maturity. The scenarios are based on the overall strategy of EIT RIS for 2018–2020 (Supjeva and Sereti, 2017), while the background for analysis and interpretation follows the framework related to regional innovation ecosystems formation (Bloomfield and Steward, 2016) and conceptual elements based in the notion of system innovation as a transformative process (Miedzinski, 2017). Table II below shows the applied scale.

The final value of each of the dimensions was calculated by multiplying a score (value ranging from 1 to 4) and a weight (value ranging from 0 – not important – to 3 – extremely important dimension) for each of the dimensions in the nine countries. The final values were aggregated into four categories, namely perspective, culture and organisation, resources, and experience and activities. For a better visual representation, values were rescaled to range between 0 and 1. This prototypal index allows the comparison among different national and regional actors by measuring the performance of key dimensions of KTI. The institutional assessment is essential to identify best practices and tackle main flows. However, a KTI index can become a key instrument not only to better understand the innovation process by transforming outputs into comparable measurements, but also to follow closely the path of linked platforms and communities into orchestrated innovation ecosystems.

5. Results of institutional assessment

Preliminary findings show that EIT Climate-KIC's EIT RIS operates as an innovation platform that mobilises resources for climate change innovation and adaptation while facilitating interaction amongst relevant actors of the knowledge triangle. From the institutional scenario-based assessment of practices and mechanisms for KTI, this study presents an index identifying the gaps but also the best performing categories of nine EIT RIS countries in Europe. The KTI index allows cross-regional and cross-category comparison. Table III shows the aggregated values of all dimensions of KTI into four categories, namely perspective, culture and organisation, resources, and experience and activities. These categories allow the identification of gaps in partnership dynamics and how different actors work together in climate innovation.

This table can be interpreted vertically (per country) or horizontally (per category). From a vertical perspective, countries such as Portugal (the greenest) and Latvia are closer to the open innovation (or innovation ecosystem scenario) than the rest. Results show that countries such as Latvia are highest in the category "perspective" while Portugal scores high in "culture and organisation". This fluctuation between countries responds to the different nature of the partners, the strengths of their organisation and their market objectives. However, further analysis of the components of the categories has to be done to understand existing variations.

On the other hand, from a horizontal (per category) perspective, the lowest category is resources and the highest category for all partners is "experience and activities", corresponding to the activity-based nature of the programme. It showcases that the

Table II. Scenario score for assessment of KTI performance

Scenario	Level of maturity
Collaboration in projects	1 (low)
Institutional interactions between KT actors	2
Joint development and implementation of strategy to develop innovation system	3
Orchestrated innovation ecosystem	4 (high)

Source: Authors' own elaboration based on TCM (2017)

Category	Romania	Slovenia	Latvia	Cyprus	Serbia	Bulgaria	Malta	Portugal	Estonia
Perspective	0.27	0.22	0.51	0.24	0.22	0.33	0.24	0.43	0.30
Culture and Organisation	0.21	0.29	0.31	0.28	0.29	0.25	0.27	0.40	0.25
Resources	0.21	0.25	0.21	0.21	0.25	0.21	0.30	0.33	0.21
Experience and Activities	0.52	0.45	0.53	0.48	0.36	0.47	0.29	0.43	0.34

Source: Authors' own elaboration based on TMC assessment

Table III. Assessment of KTI categories in EIT RIS region

activities that EIT RIS partners do (education activities, Pioneers into Practices, etc.) serve not only to summon a variety of actors but also to increase their experience in doing the activity. As indicated before, the concept of KTI is an open one on the EIT narrative that allows each KIC to approach it in a way that better supports its particular ecosystem. While this tactic gives a certain degree of flexibility to the KICs, it also made it more challenging for the partners to target it in an explicit way, as well assessing what has been done on the topic (Wilkinson *et al.*, 2017). These difficulties are shown in the low perspective and general culture about KTI practices between partners that makes it difficult to organise, plan and implement actions in this regard. Notwithstanding, despite occurring inadvertently, these experiences reinforce the idea of an evolving community of practice precisely because a high rating translates into broader access to common resources and enough maturity to have joint activities. Being *de facto* KTI practitioners result in improving capacities at the platform, country and community level.

6. Discussion

Looking at how innovation platforms work reveals that resources mobilisation and bringing change agents together translates into higher innovation capacity, not only at the platform level but also in regions where they are established, as well as in the communities that are formed around specific topics tackled in the platforms. With that respect, innovation platforms can contribute to consolidate multi-stakeholder mechanisms to face by multi- and cross-level policy agenda.

The "KTI index" is a prototypal index that aggregates four categories and sixteen dimensions. In this study, empirical evidence is presented based on a series of primary and secondary data. The results suggest that EIT Climate KIC Programme operates linking activities as an immature platform, the total average of the KTI index being 0.32 over 1. However, its activity-based nature increases this performance to more than 0.50 as EIT RIS countries perform considerably better when the category "experience & activities" is taken solely (see Figure 4). The EIT RIS community works in different type of activities, using common resources and starting joint activities in four themes: urban transitions, sustainable production systems, sustainable land use and decision metrics and finance.

Based on this exercise, some relevant aspects can be drawn on the potential contribution to implement SDG 9 in Europe. Despite setting specific targets and providing indicators to monitor advancements, SDGs barely refer to the processes "the how" needed

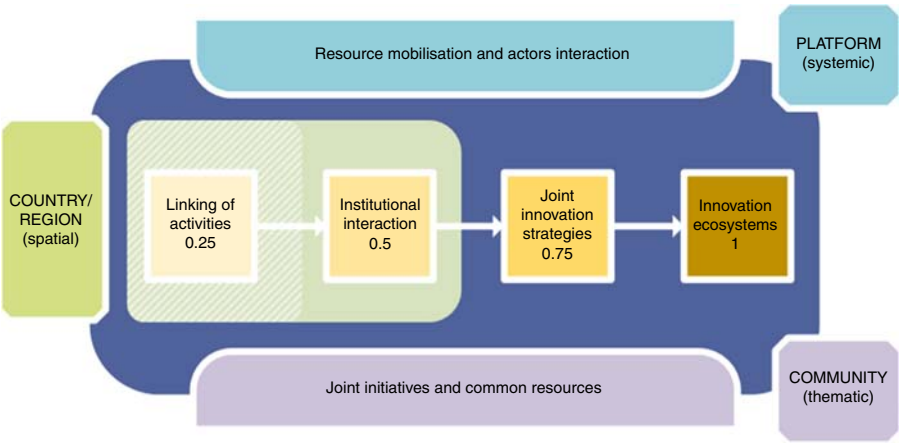


Figure 4.
General results of KTI assessment of the EIT RIS Climate-KIC programme

Source: Authors' own elaboration

to achieve the 2030 Goals. The indicators of the Agenda 2030 and those in the EU SDG Indicator Set (2017) – informing about existing EU indicators in relation to every Goal – do not represent the complexity of innovation in a knowledge system. Regarding SDG 9, expenditure on R&D intensity is one of the most common measures of innovation input. On the other hand, the eco-innovation index helps to comprehensively assess the sustainability of new production processes in Europe. However, these indicators are not enough to explain the process behind measurable outputs, remaining too generic and focussing at the national level.

Table IV showcases how the activities happening in the framework of the EIT RIS programme mobilise different resources that are related to one or several goals of SDG 9.

As innovation is a transversal force across the 17 themes, this paper vindicates the role of innovation platforms – more specifically, EIT Climate KIC EIT RIS – in increasing innovation capacities in European peripheral regions. Focussing on the activities implemented by the EIT, and particularly the EIT Climate-KIC, we can see how they are related to the scope of SDG9 (Wilkinson *et al.*, 2017). The portfolio of KIC activities provides a context to explore different stages of the innovation process by providing their partners with the opportunity to work with a range of other organisations, thus improving their linkage and stimulating a collaborative work. This context facilitates the relational assets and contributes to the underlying learning process of community of practices facing a common multi- and cross-level policy agenda. On the other hand, the mobilisation of

Table IV.
Activities, resource mobilisation for innovation and relation with SDG9 in EIT RIS programme

Activities and experiences	Resources	Scope of SDG 9
Pioneers	Human capital	Enhance research and upgrade technological capabilities
Education	Knowledge	Enhance research and upgrade technological capabilities. Access to information
Accelerator	Technology and finance	Sustainable industrialisation. Access to financial services for small scale enterprises and integration into value chain and market
Pathfinder	Innovation (all resources)	Access to financial services for small scale enterprises and integration into value chain and market. Upgrade infrastructure and industries to make them sustainable

Source: Authors' own elaboration

knowledge and technologies is facilitated through a market-focussed approach for innovation projects; this helps encourage the partners to be more aware of the potential for commercialisation of their projects, similar to building a "culture" of knowledge transfer in universities and research institutes.

Second, activities run by the EIT Climate-KIC RIS programme facilitate the mobilisation of different types and number of resources. For example, the accelerator programme (start-up) mobilises financial and human resources to help participants with converting an innovative idea into a successful business. It does this by providing them with knowledge resources to better understand markets, as well as access to a wider network of customers and potential partners. It also gives them access to seed or growth funding, one of the key issues faced by start-ups in strategic sectors such as building, agriculture and manufacturing that are driven by sustainability transitions strategies.

Finally, regarding upgrading competencies and skills in emergent sectors, EIT Climate-KIC education programmes are aimed at improving the application of practice-based knowledge. More specifically, the mobility programme "Pioneers into practice" uses a KTI context to enable a systemic process. This process is where ideas or technologies are transformed into businesses while investing in the human capital in the field of innovation as part of the territorial perspective driven by regional innovation strategies and multi-level policy framework. On the other hand, graduate school programmes are used more to incorporate elements based in university-industry relationships under the KTI logic embedded in the KICs.

7. Conclusions

This paper presents an exploratory exercise where the role of innovation platforms as catalysers of transformative processes is analysed regarding the contribution to reach SDGs targets, specifically Goal No. 9. In doing so, the concept of community of practice and the context of European peripheral regions provide the background of the empirical study.

The paper's contribution lies in the focus on bottom-up processes that look at the platform and community level, understanding the complexity of the efforts needed to tackle climate innovation. The study contributes to better understand conceptually and empirically the linkages between complex policy settings in terms of multi and cross level interactions and innovation enabling mechanisms. More specifically, KTI allows an approach to resource mobilisation and innovation capacities by focussing on how platforms work in a bottom-up way. Also, zooming into the dynamics of these platforms, the role of individuals within communities of practice around specific topics illustrates how knowledge is embedded at all levels. Thus, remarking the overall contribution of platforms such as Climate KIC and the RIS Community on climate innovation across Europe.

This multi-level approach better relates how capacities and capabilities increase, also reflecting the need to find process-based indicators instead of just focussing on results for measuring SDGs implementation. The Knowledge Triangle Innovation or KTI index used in this paper or other indicators that measure how resources, actors and knowledge are mobilised can be of great use for the implementers and monitors of SDG 9, especially in the European context given the higher innovation capacity and overall more complex innovation national and sub-national systems.

Nevertheless, we acknowledge that further research on the topic is necessary to make final conclusions. In addition, it is difficult to draw a line on which data/activities fall under the umbrella of a specific SDG, also to differentiate which initiatives benefit the implementation of different goals.

Notes

1. The EIT Regional Innovation Scheme (EIT RIS) is the EIT Community's outreach scheme. The objective of the EIT RIS is to contribute to boosting innovation in European countries and regions that belong to the groups of 'modest and moderate' innovators (according to the European Innovation Scoreboard). The EIT Community strives to achieve this objective by engaging local organisations and individuals in KIC activities, transfer good practises and know-how to the local innovation ecosystems and provide tailor-made services to address innovation gaps.
2. The Knowledge and Innovation Communities (KICs) for Climate change is one of several platforms currently active in Europe. Created in 2010 by the European Union competent agency for sustainable growth, Climate-KIC aims at accelerating and stimulating innovation in climate change mitigation and adaptation, by integrating a network of European partners from the private, public and academic sectors.
3. Knowledge Triangle Integration is a core component of the KIC model. As such, all KICs are tackling KTI as a central element of their strategy and operation.
4. Commission Staff Working Document of Communication (COM (2016) 739).
5. Articles 3 (5) and 21 (2) of the Treaty on European Union (TEU).
6. See "Next steps for a sustainable European future" Communication (COM (2016) 739); "Key European action supporting the 2030 Agenda and the Sustainable Development Goals". The accompanying Commission Staff Working Document; and the conclusions of the Council on "A sustainable European future: The EU response to the 2030 Agenda for Sustainable Development" (European Union, 2017).
7. The Horizon 2020 programme, as the biggest EU research and innovation programme, has established clear research lines in the area of energy and low carbon economy.
8. SDG 7 (ensure access to affordable, reliable, sustainable and modern energy for all); SDG 8 (promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all); SDG 9 (build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation); SDG 11 (make cities and human settlements inclusive, safe, resilient and sustainable) and SDG 13 (take urgent action to combat climate change and its impacts).

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