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# *Building policy capacities for tackling grand social challenges: Exploring the boundary-spanning potential of university research in the social sciences*

The emergence of new approaches to regional policy, including the well-known concept of smart specialisation strategies and the need to face grand societal challenges have highlighted the importance of policy capacities among public and private stakeholders. These challenges have increased the pressure on universities and their academic staff to assume more engaged roles within their respective territories. This article explores how social sciences research can contribute to regional policy capacities for tackling social challenges. Specifically, it focuses on the institutional arrangements that universities develop to facilitate engaged research in regions, or what have been labelled «university-based boundary organisations». We suggest that they are a relevant regional instrument due to their integration of knowledge bridging and knowledge coproduction functions. The paper explores how these roles contribute to regional policy capacities through analysis of the case of Orkestra-Basque Institute of Competitiveness, a university-based boundary organisation in the Basque Country.

*El surgimiento de nuevos enfoques de política regional, incluido el conocido concepto de estrategias de especialización inteligente y la necesidad de hacer frente a grandes retos sociales, han puesto de relieve la importancia de las capacidades para el policy-making de los actores públicos y privados. Estos retos han aumentado, además, la presión sobre las universidades y su personal académico para que asuman un papel más comprometido con su territorio. Este artículo explora cómo la investigación en ciencias sociales puede contribuir a las capacidades de política regional para abordar los retos sociales. Específicamente, se centra en los mecanismos institucionales que las universidades desarrollan para facilitar la investigación comprometida en las regiones, o lo que se ha denominado «organizaciones de frontera basadas en universidades». De esta forma, sugerimos que son un instrumento regional relevante debido a su integración de funciones de transmisión y coproducción de conocimiento. El artículo explora cómo estos roles contribuyen a las capacidades de política regional a través del análisis del caso de Orkestra-Instituto Vasco de Competitividad, una organización de frontera universitaria en el País Vasco.*

Eskualde-politikako ikuspegi berrien sorrerak, espezializazio adimenduneko estrategien kontzeptu ezaguna eta gizarte-erronka handiei aurre egiteko beharra barne, agerian utzi du eragile publiko eta pribatuen policy-making-erako gaitasunen garrantzia. Erronka horiek, gainera, areagotu egin dute unibertsitateen eta haien langile akademikoen gaineko presioa, beren lurraldearekin konpromiso handiagoa har dezaten. Artikulu honek gizarte-zientzietako ikerketak gizarte-erronkei aurre egiteko eskualde-politikako gaitasunetan nola lagun dezakeen aztertzen du. Zehazki, unibertsitateek eskualdeetan konprometitutako ikerketa errazteko garatzen dituzten mekanismo instituzionaletan zentratzen da, edo «unibertsitateetan oinarritutako mugako erakundeak» deiturikoan. Horrela, iradokitzen dugu eskualdeko tresna garrantzitsuak direla, ezagutza transmititzeko eta koproduzitzeko funtzioak integratzen dituztelako. Artikuluan, rol horiek eskualde-politikako gaitasunetan nola laguntzen duten aztertzen da, Orkestra-Lehiakortasunerako Euskal Institutuaren kasua aztertuz. Orkestra Euskal Autonomia Erkidegoko unibertsitate-mugako erakundea da.

## ***Table of contents***

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1. Introduction
2. New regional innovation strategies, governance and policy capacities
3. New demands on universities for regional development and addressing social challenges
4. University-based boundary organisations to facilitate regional knowledge co-construction
5. Framework for analysis and case
6. Building policy capacities for the challenge of skills for regional development
7. Conclusions

### References

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## **1. INTRODUCTION**

The emergence of more strategic approaches to regional policy, exemplified by the widespread adoption of ‘smart specialisation strategies’ (S3) across European regions, underscores the crucial importance of policy capabilities (Guzzo & Gianelle, 2021; McCann & Ortega-Argilés, 2016). These collaborative, bottom-up strategies have posed significant challenges for multi-actor and multi-level governance practices and generated capacity-building needs among public and private stakeholders (Estensoro & Larrea, 2016; Perianez Forte & Wilson, 2021). Moreover, as these strategies increasingly seek to drive transformative innovation focused on social

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challenges like the green or demographic transition, the required capabilities to engage with them become relevant to a wider range of actors.

In this context, experimental approaches to regional policy have increased the pressure on universities and their academic staff to assume more engaged roles within their respective territories. The so-called impact agenda has evolved over recent decades to support the production of relevant knowledge that closes long-standing gaps between theory and practice (Boswell & Smith, 2017; Reale *et al.*, 2018). However, this has been more recently complemented by a burgeoning research agenda around the roles that universities can play specifically in regional development.<sup>1</sup> Indeed, the ‘engaged university’ with a developmental role in territorial socioeconomic development has gained special prominence in the context of S3 (Canto-Farachala *et al.*, 2022; Uyarra & Sanchez-Barrioluengo, 2017b). Despite this, understanding of the governance and policy roles of universities remains underdeveloped (Fonseca & Nieth, 2021).

This article explores how social sciences research can contribute to regional policy capacities for tackling social challenges. Specifically, it focuses on the institutional arrangements that universities develop to facilitate engaged research in regions, or what have been labelled «university-based boundary organisations» (Cvitanovic *et al.*, 2018; Parker & Crona, 2012). Boundary organisation is a concept developed primarily in the environmental sciences field to refer to «intermediary organizations that produce information that is useful in policymaking and at the same time qualify as scientific» (Wesseling & Hoppe, 2020). University-based boundary organisations are housed in universities and are generally defined as «new institutional structures that actively facilitate solutions driven and transdisciplinary collaborations with policy-makers and other societal actors to enhance the use of science in decision-making processes» (Cvitanovic *et al.*, 2018: 19). They can include formal organisations, such as research institutes, and other types of arrangements like multipurpose transdisciplinary projects.

Based on these definitions and in the context of recent developments in the roles of universities in regional development more generally, this article proposes the figure of *regional university-based boundary organisations* to articulate university research impact in regional strategies related to societal challenges. We suggest that they are a relevant regional instrument due to their integration of knowledge bridging and knowledge coproduction functions. This enables them to produce regionally relevant policy knowledge and simultaneously generate necessary policy capabilities, thus performing territorial development and governance roles expected from contemporary universities (Hoppe *et al.*, 2013; Fonseca & Nieth, 2021).

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<sup>1</sup> See Aranguren *et al.* (2016a, 2016b), Canto-Farachala *et al.* (2022), Elena-Pérez *et al.* (2017), Goddard *et al.* (2013), Harrison & Turok (2017), Tijssen *et al.* (2021) and Uyarra & Sanchez-Barrioluengo (2017a), among many others.

We characterise regional university-based boundary organisations as *facilitators of regional knowledge co-construction for addressing social challenges* that play three main roles: reflective scientist, intermediary, and facilitator of knowledge co-construction (Pohl *et al.*, 2010). The paper explores how these roles contribute to regional policy capacities through analysis of the case of Orkestra-Basque Institute of Competitiveness, a university-based boundary organisation in the Basque Country. Specifically, we explore research undertaken by Orkestra to address the concrete issue of attracting, training and retaining the skilled people needed to advance with the key societal challenge of transitioning industry towards more environmentally sustainable competitiveness.

## 2. NEW REGIONAL INNOVATION STRATEGIES, GOVERNANCE AND POLICY CAPACITIES

Place-based innovation policies have progressively gained popularity in academic and policy spheres since the notion of national and regional innovation systems emerged in the late 1980s. These approaches, although context sensitive and systemic, do not typically include the strategic prioritisation of specific economic activities, an aspect that was questioned with the emergence in the last decade of the S3 concept at the nexus of industrial and innovation policies (Aranguren *et al.*, 2017). The novelty of S3 is essentially twofold. First, it emphasises the strategic prioritisation of innovation investments, based on the assumption that regions will be more competitive if they specialise in activity areas in which they have existing capabilities and potential. Second, they propagate a process of prioritisation that does not depend on government decision-making, but follows a bottom-up rationale in which regional actors from the quadruple helix interact to ‘discover’ the most suitable strategic priorities. This constitutes a shift in the governance of innovation policy-making and places a greater emphasis on experimentation processes. Thus, the implementation of S3 in Europe has brought to the foreground the relevance of governance and policy capacities (Aranguren *et al.*, 2023; Guzzo & Gianelle, 2021; Perianez Forte & Wilson, 2021).

In parallel with the development of this more strategic approach to regional innovation policy, recent years have seen a growing imperative to address complex societal challenges such as the climate emergency, which has stimulated the emergence of new innovation policy approaches. Among these we can highlight mission-oriented innovation policies (Mazzucato, 2018) and transformative innovation policies (Schot & Steinmueller, 2018). Both are based on similar goals and rationales but differ in how they approach policy governance and the role of government. Mission-oriented innovation policies give a more prominent role to the State in defining missions *ex-ante* (Tödtling *et al.*, 2022), whereas transformative innovation policies highlight the importance of bottom-up approaches and experimenta-

tion. However, both approaches lack consideration of the role of geography and place for transformative change (Coenen *et al.*, 2015; Coenen & Morgan, 2020).

The Europe-wide experiment with the adoption of S3 during the last decade has highlighted some key weaknesses, especially for dealing with complex problems (Aranguren *et al.*, 2023; Benner, 2020; Hassink & Gong, 2019). S3 has maintained a relatively narrow focus on science and technology and has typically failed to incorporate the voice of civil society and facilitate the broader forms of social innovation important for addressing grand societal challenges. This suggests that there is scope for elements of mission-oriented and transformative innovation policy approaches to be articulated at subnational level through a new conceptualisation of S3 that incorporates clearer direction towards grand societal challenges, alongside greater experimentation and inclusiveness (Magro & Wilson, 2024). Yet this will require an upgrading of regional policy capacities.

Indeed, increasing awareness around the relevance of capacities for the development of regional strategies and policies is clearly reflected in scholarly interest in the institutional frameworks, capacities and skills required for delivering transformative innovation (Karo and Kattel, 2015; Uyarra *et al.*, 2020). Although there are different approaches for classifying policy capacities, we can distinguish between capacities related to resources (situated assets) and the dynamic capabilities and competences (skills) necessary to perform governance and policy functions (Borras *et al.*, 2023). Moreover, it is important to bear in mind that contemporary regional strategies and policies are developed not only by government officials and public organisations (institutionalized governance), but by a myriad of public, private and intermediary actors. Thus, governance and policy capacities refer to the capacities of all actors involved in their design and implementation, since they all fit within a broader definition of ‘policymakers’ consistent with bottom-up innovation strategy approaches. Likewise, if citizens need to be involved in the construction of collective responses for addressing social challenges, the capacities of the citizenship to engage in such collective processes also needs to be considered. In this regard governance and policy capacities can be classified as systemic, organisational and individual capacities (Wu *et al.*, 2018).

Regarding transformative capacities, Borras *et al.* (2023) differentiate between four main levels of agency: governance level, policy level, organisation level and individual level.<sup>2</sup> They define what having transformative capacity entails at each of these levels. At the governance level it is the collective capacity for transformation of

<sup>2</sup> Borras *et al.* (2023) provide a holistic view on the key capacities for developing transformative strategies and policies. They note that there are three main bodies of literature that have focused on the issue: innovation literature, which specially focuses on innovation agencies; governance and public administration literature that focuses on overall State capacities (rather than on particular aspects or transformative capacity for sustainability transitions); and literature on sustainability transitions, which focuses more on system level governance and policy capacities, rather than on the public sector.

the whole ecology of organisations and their interactions (society-industry-government). At policy level it is the capacity of the institutional set-up that provides a framework for transformative action, that is the policy goals, strategies, plans and instruments. At organizational level it is the capacity of specific organisations to provide change agency within the wider system, which relates to the development and deployment of dynamic skills when mobilizing internal and external resources. At individual level it is the capacity of individuals when exercising their roles as consumers, citizens and leaders. All agency levels are relevant and need to be considered for building the capacities required for successful regional strategies.

### 3. NEW DEMANDS ON UNIVERSITIES FOR REGIONAL DEVELOPMENT AND ADDRESSING SOCIAL CHALLENGES

Universities have taken on increasing relevance in discourse and action related to the socioeconomic development of their regions over the last decade. Regional, national and international policy strategies, such as S3 and the United Nations' Agenda 2030 attribute key roles to universities for their implementation and achievement. Moreover, over the last decade scholars have proposed different university models such as the *developmental* or *transformative university* that frame their roles as regards sustainable development (Cuesta-Claros *et al.*, 2022).

In the regional context, there has been a call for universities to be 'engaged'. As defined by Goddard *et al.* (2016) the engaged civic university is one that provides opportunities to the society of which it is a part. It actively and broadly engages with its surroundings; it partners with other universities and colleges; and it is managed in a way that ensures its participants are fully engaged with the region. For example, active neighbourhood involvement leverages different types of projects to engage universities with local communities: providing assistance to local firms, policy advice to local governments, as well as becoming involved in community outreach (Breznitz & Feldman, 2012).

Indeed, universities can impact and contribute to regional development in a wide variety of ways that include university-industry collaboration, graduate employment, impacting regional innovation systems and policy roles (Benneworth & Fitjar, 2019). However, while strategies such as university-industry collaborations have been significantly addressed, the policy and governance roles of universities have been less explored (Fonseca, 2019).

Fonseca and Nieth (2021) significantly contribute to that endeavour by identifying the multiple roles that universities can adopt in multi-actor governance processes. These include brokering, networking, triggering learning processes and providing leadership in regional development and governance processes (Bonaccorsi, 2016; Fonseca, 2019; Larrea *et al.*, 2012; Marques *et al.*, 2019; Pugh *et al.*, 2016; Valance *et al.*, 2017). Moreover, through an empirical analysis of three universities,

they identify different policy roles played by universities at different phases of the policy cycle: stakeholder mobilisation, network coordination and facilitation, forum mediation and institutional leadership.

While the impact of universities depends on many internal and external factors and thus strategies to engage in regions need to be context-based (Fonseca & Nieth, 2021; Kempton *et al.*, 2021), specific institutional arrangements and practices can help articulate a more efficient university engagement in the governance of regional strategies. McCowan (2016) notes that universities are changing in this regard and identifies three relevant trends: (i) a movement towards valuing knowledge for its instrumental use rather than for its intrinsic value (instrumentalisation); (ii) a movement towards knowledge application, using theoretical ideas for practice (application); and (iii) becoming more open and purposeful in relation to the «outside world» (opening). Moreover, following Benneworth and Fitjar (2019), the contribution of academics to regional development often depends greatly on individual motivation, which points to the need to integrate individual motivations within innovative institutional mechanisms.

One such approach is to establish specific institutional arrangements that encourage impactful research that is aligned with territorial needs and challenges. Scholarly work on science-policy relationships and environmental sciences have developed a concept that is helpful to conceptualize these arrangements and their roles and impacts on regional policies and strategies: boundary organisations. In spanning the boundaries between academia and government and/or business, such organisations have special potential to enact policy and governance roles through their research function. In the next section, we delve into this concept within a specific regional context.

#### **4. UNIVERSITY-BASED BOUNDARY ORGANISATIONS TO FACILITATE REGIONAL KNOWLEDGE CO-CONSTRUCTION**

##### **4.1. Boundary organisations for the institutionalization of coproduction of science and policy**

Increased demand to produce policy-relevant knowledge has led to the creation of innovative institutional structures that support knowledge exchange between practitioners and scientists (Cvitanovic *et al.*, 2018). These innovations include the incorporation of scientists within public organisations and decision-making agencies, the emergence of new roles such as knowledge brokers, and the adoption of new institutional structures that seek to span the boundary between policy/politics and science.

Academic work regarding the science-policy relationship has developed the concept of boundary organisation. These organisations aim at mediating between science and policy and overcoming some of the limitations that the internal struc-

tures and processes of universities and government/policy organisations present as regards facilitating science-policy engagement. Boundary organisations have three main features (Hoppe *et al.*, 2013; Parker & Crona, 2012): (1) they are characterised by double participation, that is they include collaboration of scientists and policy-makers (the «two worlds»); (2) they have dual accountability, which means that the management of the organisation is accountable to both science and policy representatives; (3) they use boundary objects to generate a symbolic world that will facilitate communication and collaboration between scientists and policymakers.

There are different ways to conceptualize these arrangements and how they produce knowledge. For some, boundary organisations stand «in between» science and policy and approach knowledge production in a space that does not belong to either of the two realms (Pohl *et al.*, 2010).<sup>3</sup> For others, boundary organisations are truly hybrid spaces, where the coproduction of knowledge between academics and non-academics takes place and is actually institutionalized (Wesselink & Hoppe, 2020; Wiegleb & Bruns, 2022). This is the view that this article takes.

The concept has been used in the academic literature to refer to organisations of many types that operate at multiple territorial levels and in several fields, but it has been most notably used to analyse environmental sciences organisations operating at international scale (Gustafsson & Lidskog, 2018). Less frequently, the concept has been used to refer to boundary organisations housed in universities, that is to *university-based boundary organisations* (Cvitanovic *et al.*, 2018; Parker & Crona, 2012).

University-based boundary organisations respond to the attempt of universities to increase their territorial impacts through arrangements such as research institutes or interdisciplinary projects, structures and units. Parker and Crona (2012) conceptualize them by aligning the theory of boundary organisations to features of universities' contexts. They highlight three characteristics of university boundary organisations that may differ from boundary organisations belonging to other contexts (such as international organisations and interinstitutional collaborations). First, following a coproduction perspective they consider that these are not in-between spaces, but hybrid spaces that embody elements of science and policy. Second, they do not serve only two communities (policy and science), as they sometimes involve other types of stakeholders such as industry or funding agencies. Third, they need to manage sometimes irreconcilable needs and demands from various stakeholders. Altogether, they propose the following (Parker & Crona, 2012: 267):

*University-based boundary organizations exist in a hybrid space in which they serve heterogeneous stakeholder groups that embody both scientific and political agendas. These stakeholders, in turn, wield differential abilities to influence the activities and goals of the boundary organization. In this context, boundary man-*

<sup>3</sup> This contrasts with other interactive knowledge approaches where knowledge production takes places in the intersection between the two realms because of a collaborative endeavour.

*agement does not stabilize the 'boundary' between abstract sets of principals in either the science or policy domain. Rather, it is a continuous process of negotiating among tensions derived from inconsistent demands placed on the boundary organization by different stakeholders.*

With this conceptualization of university-based boundary organisations Parker and Crona (2012) provide a frame that facilitates knowledge-building and lesson-sharing around specific organisational attempts to improve the interface between science and policy (e.g. effective strategies for increasing impact or organisational elements that help or hinder science-policy engagement). They also offer a foundation for further conceptualizing university-based boundary organisation in the specific regional context.

#### **4.2. Regional university-based boundary organisations for regional knowledge co-construction**

In the context of burgeoning approaches to place-based strategy-making and specifically S3, universities can «steer» and «drive» regional growth (Pugh *et al.*, 2022) and are called on to perform governance roles that include providing leadership, triggering learning processes, network coordination and facilitation or forum mediation (Fonseca & Nieth, 2021). These roles do not have to necessarily be disconnected from the knowledge production function, especially in the social sciences, and thus a university-based boundary organisation can play a developmental role in its region through the way it performs research and approaches knowledge construction processes. More specifically, we propose that regional university-based boundary organisations can be *facilitators of regional knowledge co-construction for addressing social challenges*.

There is widespread acceptance that societal challenges need responses that build on multiple types of knowledge. For example, interactive ways of producing knowledge that find a balance between different forms of knowledge are seen as an essential condition for research addressing sustainability (Bartels & Wittmayer, 2018; Hart *et al.*, 2015; Pohl *et al.*, 2010). Following this philosophy, universities have moved from Mode 1 towards Mode 2 knowledge generation (Gibbons *et al.*, 1994), that is towards knowledge production in the context of application (McCowan, 2016). Specifically, Parker and Lundgren (2022) propose that universities need to develop new approaches in three features of the knowledge construction processes to contribute to transformative innovation policies: research impact, stakeholder engagement and measures of success. Doing so implies adopting a critical role that acknowledges the political nature of societal transitions and contributes research that sheds light on this political dimension, with its diverging interests, inherent conflicts and underlying power relationships. It means engaging in knowledge construction processes with a diverse set of actors, and specially with marginalized voic-

es, to ensure that knowledge construction is both inclusive and critical in relation to transformation processes.

In regional university-based boundary organisations these challenges are reflected in the development of shared research agendas between stakeholders and researchers (Hart *et al.*, 2015) and the adoption of participatory research approaches such as action research (Karlsen *et al.*, 2012). Indeed, it can be said that regional social challenges need regionally constructed responses. Thus, an organisation that aims at producing relevant research for their region should be concerned with ‘how’ they are constructing knowledge together with other actors. Wiegleb and Bruns (2022), for example, argue for the establishment of «power-sensitive and pluralist» boundary organisations that also give a place to marginalized alternatives, incorporating different theoretical and political accounts of the issues (in this case, environmental issues). These views resonate with earlier voices that have promoted critical and inclusive approaches in innovation and research (e.g. Stirling, 2010) and with critical approaches to policy analysis, where clarifying arguments, mediating, designing spaces for negotiation and facilitating debates are seen as core functions of researchers (Mayer *et al.*, 2013).

On the one hand, research has an instrumental role to produce knowledge that directly informs policy decisions and actions, and universities can enact a relevant policy role through this function, for example contributing to the design of S3 (Fonseca & Nieth, 2021). However, research also has a more conceptual function, contributing to gradually changing how problems are understood and eventually addressed (Head, 2013; Weiss, 1979).<sup>4</sup> As organisations that respond to different agendas and aim to undertake policy relevant research that contributes to societal challenges, a regional university-based boundary organisation should combine and equilibrate the critical and utilitarian components. This way it can: (1) foster transformation that has impacts on practice, pragmatically (Arrona & Larrea, 2018; Bartels & Wittmayer, 2018); and (2) foster Mode 2 knowledge construction processes that are interdisciplinary, applied and pluralistic (Karlsen & Larrea, 2014), and thus integrate diverse types of knowledge in the research process.

How can an academic organisation foster such types of regional knowledge construction processes? To answer this question, we must consider contextual and political factors that can influence boundary work, including political culture, policy domain and policy problem, besides the nature of the boundary itself (Hoppe *et al.*, 2013; Wesselink & Hoppe, 2020). Hence, as Hoppe *et al.* (2013: 296) underline, suc-

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<sup>4</sup> In this line Morlacchi and Martin (2009) noted two components that coexist in science, technology and innovation (STI) research: a utilitarian dimension and a critical one. The critical component is seen «as a process of critical reflection on the core assumptions and values, both explicit and implicit, on which policy-making is based, providing an improved theoretical understanding and thereby influencing the policy debate and policy-making» (p. 573). The authors argued for more presence of the critical dimension in innovation scholarship, a claim that seems to be revitalized with the transformational agenda.

cessful boundary organisations adjust to their territorial (national, regional) contexts and policy and political domains and there are no «imitable ‘best practice models’». However, general lessons and overall features can be identified, and it is important to further identify and learn from different types of strategies for effective engagement and problem-solving through research, where knowledge is already advancing (e.g. Hart *et al.*, 2015; Aranguren & Magro, 2020).

As a complementary lens, we explore these questions through the roles that researchers within regional university-based boundary organisations can play in such processes. We build on the inspiring work of Pohl *et al.* (2010), who analyse the roles of specific researchers in different co-production processes for sustainability and identify three main roles that they play to address the challenges of power relations, inclusiveness and orientation towards a common goal: (1) being reflective scientists, providing validated scientific expertise; (2) being mediators to link different views and thinking styles; and (3) being facilitators, to enhance communicative and deliberative processes that promote a collective learning process.

While these three roles are attributed to researchers in specific knowledge construction processes, they can equally provide a way to think about the functions of regional university-boundary organisations, as such organisations must create the conditions for researchers to play these roles in their specific territorial context. Thus, we can think of regional university-based organisations as *facilitators of regional knowledge co-construction for addressing societal challenges* by enabling the roles of *reflective scientist*, *intermediary* and *facilitator*. These can be enacted through specific knowledge cogeneration processes and/or through diverse sets of independent but aligned activities that, in a systemic way, contribute to generating relevant knowledge and learning around regional challenges.

*Table 1.* **ENABLING ROLES OF REGIONAL UNIVERSITY-BASED BOUNDARY ORGANISATIONS**

Reflective scientist	Providing scientific expertise for addressing relevant regional challenges, in specific knowledge cogeneration processes and/or through diverse set of independent but connected activities
Intermediary	Linking different views and thinking styles around relevant regional challenges among territorial actors and citizens, in specific knowledge cogeneration processes and/or through diverse set of independent but connected activities
Facilitator	Enhancing communicative and deliberative processes to promote collective learning processes, in specific knowledge cogeneration processes and/or through diverse set of independent but connected activities

Source: authors' own elaboration, based on Pohl *et al.* (2010).

## 5. FRAMEWORK FOR ANALYSIS AND CASE

This section explores the case of a regional university-based boundary organisation as an illustration of how different roles can contribute to building regional policy capacities.

### 5.1. Framework for analysis

As described in Section 2, there have been several attempts to identify the regional capacities required for governance and policymaking, most recently focused on transformative innovation policies. We build on the holistic conceptual framework for understanding the transformative capacity of public organisations developed by Borrás *et al.* (2023), in which they distinguish between four main levels of agency in the transformational endeavour: governance level, policy level, organisation level and individual level. A regional university-based boundary organisation can potentially impact all four levels of agency, but for the purposes of this analysis focused on policy capabilities we focus on the organisation level, and specifically on what the authors name dynamic skills.

Borrás *et al.* (2023) define the transformative capacity of an organisation in terms of «the interaction between its purposeful enactment of various roles when exercising change agency, and the deployment and development of its dynamic skills, when mobilizing the internal and external resources at its disposal» (p.5). Thus, there are three constitutive elements relevant in the conceptualization of organizational capacity: roles, situational resources, and skills. Roles are defined as «the variety of specific purposeful tasks that an organization performs enacting institutional work in processes of sustainability transitions». Resources are the internal and external assets which are mobilized by the organization, and include material and immaterial assets, such as human and financial resources, knowledge resources, cultural and legitimacy resources. Lastly, skills refer to the practices and processes of the organization, also regarded as capabilities and competences. They are conceptualized as dynamic because they can evolve, and they include four core types of skills: (i) analytical skills; (ii) operational skills; (iii) coordination skills; (iv) learning and reflection skills.

Analytical skills refer to the ability to produce new knowledge, ideas and future visions. Operational skills refer to all sets of practices needed to put in practice transformation, such as executive capacity, enforcement capacity or administrative and managerial skills. Coordination skills relate to the organisation's capacity to foster and develop multi-actor participation and engagement. Lastly, learning and reflexivity skills are defined as «the ability to develop and incorporate new understandings and adjust its own action accordingly», and can include learning regarding instruments, practices, or even overall regional goals (Borrás, 2011).

For Borrás *et al.* (2023) organisational transformative capacity is defined by the interaction between different types of roles, resources and skills, which are contextual and subject to the specific transition in focus. Hence, the transformative capacity of an organization is about the suitability of the combination of those three elements for a specific initiative, rather than a yes/no answer.

Table 2. CAPACITIES' FRAMEWORK FOR THE CASE ANALYSIS

Organizational transformative capacity	The capacity of specific organisations to perform change agency in institutional and system-wide transformation, related to the development and deployment of roles and dynamic skills when mobilizing internal and external resources			
	Analytical skills	Operational skills	Coordination skills	Learning and reflection skills
	Ability to produce new knowledge, ideas and future visions	Practices needed to put in practice the transformation	Capacity to foster and develop multi-actor participation and engagement	Ability to develop and incorporate new understandings and adjust own action accordingly

Source: adapted from Borrás *et al.* (2023).

The case analysis aims to illustrate and extract learnings from how a regional university-based boundary organisation can contribute to policy capabilities through its organisational transformative capacity.

## 5.2. Orkestra: a regional university-based boundary organization

Orkestra-Basque Institute of Competitiveness has been analysed for its distinctive role in the economic development of the Basque Country region (Aranguren *et al.*, 2021; Aranguren & Magro, 2020; Porter *et al.*, 2016), while the Basque region itself is a highly complex institutional setting that includes different administrative levels and government agencies with policy competences in multiple domains. In such a complex policy setting (Magro *et al.*, 2014) it is especially relevant to explore the role of a regional university-boundary organisation for contributing to policy capacities.

Orkestra is a research institute that was created in 2006 under the umbrella of Deusto University, a midsize private (Jesuit) university in the Basque Country, Spain, with around 9.000 students divided in two campuses (Bilbao and San Sebastian). The mission of Orkestra is to contribute to strengthening the competitiveness of the Basque Country region through research. It has around 40 full-time staff, two-thirds of which have a PhD or are working towards one. It has progressively adopted a transformative approach to research, accompanied by an internal organi-

sation that differs from traditional academic organisational structures (Alcalde *et al.*, 2017). Following Parker and Crona (2012), it has the three core characteristics of a university-based boundary organisation:

- It includes *collaboration between policymakers and scientists*, and specifically among territorially rooted actors that represent scientific and political agendas. This collaboration takes places at two levels: in its governing bodies and in the day-to-day development of research projects. On the one hand, Orkestra has a Board of Directors composed of representatives of the regional stakeholders who fund its research activities on a regular basis: the university, different levels of government administration (regional, provincial, city), and business. On the other hand, most research projects involve collaboration with these and other regional stakeholders (policy makers at different administrative levels, business representatives, intermediary organisations, third sector organisations, etc.). Research agendas are typically established between stakeholders who fund the project and researchers, and in many projects engaged research approaches are developed so that territorial actors are involved at different moments in the research process. The work developed thus needs to meet different types of demands, which as Parker and Crona (2012) note may be conflicting at times.
- It has a *multiple accountability*: to the policy community, to the science community, and to other communities. The Board of Directors is the highest representative body and approves the strategic plans and annual research plans of the institute. The institute also has an Advisory Board composed of external academics whose remit is to advise on the scientific dimension of activities. At the project level, most research projects are funded by different types of territorial actors, which means that the work developed needs to respond to the objectives established in consensus with those actors. In parallel, Orkestra reports annually to its stakeholders through a combination of traditional indicators related to scientific impact and consultative approaches to assess the territorial impact of its work. Thus, across the sum of its activities the organisation is accountable to a mix of scientific and other communities.
- It *produces boundary objects*, which facilitate communication and collaboration between academics and non-academics. Since the institute develops multiple research projects, each one develops its own objects to facilitate communication between researchers and other actors involved in the research process. However, the main boundary object that articulates the collaboration of science and policy transcending all Orkestra's activities is the Competitiveness for Wellbeing conceptual framework, which based on academic knowledge (Orkestra, 2021). The central role of this framework in structuring the annual *Basque Country Competitiveness Report* and a wide range of stakeholder projects and training programmes contributes to creating a shared vocabulary and frame for thinking around competitiveness in the region.

In order to illustrate how a regional university-based boundary organisation can contribute to policy capacities through three enabler roles (reflective scientist, intermediary and facilitator), we reflect on recent work developed by Orkestra around a challenge that has recently taken on great importance in the Basque Country (and elsewhere): the need to attract, train and retain skilled people to advance with the key societal challenge of transitioning industry towards more environmentally sustainable competitiveness. We specifically reflect on a research project developed by Orkestra with the Biscay Provincial Council, a subregional government. It is an ongoing project started in 2022 and we base our analysis on project documents (reports, meeting minutes) and the practical experience of one of the authors who has been part of the research team. Although this analysis approach has limitations, the aim of the case is not building theory but practically illustrating and reflecting on how a boundary organisation can contribute to building regional policy capacities.

## **6. BUILDING POLICY CAPACITIES FOR THE CHALLENGE OF SKILLS FOR REGIONAL DEVELOPMENT**

The global societal challenge of the twin transition for making the economy greener and more digital brings an associated challenge in the labour market, as new occupations and skills needs are emerging. The need for people with the relevant skills to forge the sustainable transition of industry is manifested in place though the (often competing) attempts of regions to attract, retain and train specific skill profiles. This challenge is especially relevant for the Basque region due to two main reasons. Firstly, the Basque economy depends on industrial sectors which are energy-intensive and whose future competitiveness depend on accelerating the twin digital and green transition. Secondly, the region's strong demographic pressure and rapidly aging population exacerbates the increasing demand for skilled people in some fields (such as ICT, environmental technologies, or transition to service-based manufacturing).

These needs have pushed regional and sub-regional policymakers from different policy domains (education, but also economic development and innovation) to adopt multi-actor approaches to finding solutions and developing a holistic regional strategy for talent in the Basque Country. In this context, Orkestra has developed research projects in collaboration with several of the stakeholders working on this challenge. Among them, we can highlight the following as a representation of the variety of policy organisations from different administrative levels involved in this challenge:

- Innovation in the Basque model for talent attraction, retention and dynamization, in collaboration with the regional ministry of Employment and Work.
- Vocational training organisations and their roles in SME innovation, in collaboration with the regional ministry of Education and Vocational Training.

- Commitment for talent, in collaboration with the Biscay Provincial Council (Department of Economic Development).
- Talent in Advanced services, in collaboration with the City Council of Bilbao.

To better illustrate the actions and strategies that Orkestra has implemented to contribute to regional capacities in the field of talent for sustainable industrial transition, we focus on one specific project – Commitment for Talent, in collaboration with the Provincial Council of Biscay – as this project responds to the research question of how to build an intervention model with different actors for reducing the existing talent gaps related to green transition. Therefore, it is a good illustration of how a regional university-based boundary organisation could contribute to building the policy capacities needed to address specific issues related to a key societal challenge. In Table 3 we document the different actions that Orkestra has implemented to contribute to this transformative capacity, categorised by roles and skills.

The first step in the project was to analyse the current and future talent gaps in the Basque Country, based on a literature review, quantitative analysis and future projections (forecasting). In this action, Orkestra played a reflective scientist role that contributed to the analytical skills of the Provincial Council but also to operational skills as this analysis was context-sensitive and provided room for identifying regional challenges and future actions. In addition, this diagnosis was the point of departure for a wide number of interactions and meetings with different regional actors to share the analysis and challenges identified and identify common actions and strategies. This led to building a shared vision and, in this case, Orkestra and its researchers were also playing an intermediary and facilitator role that contributed not only to analytical and operational skills, but also coordination skills.

Once the vision and actions for addressing the talent challenge were identified, a governance model for implementing these actions was established for the project, to which Orkestra contributed with a reflective scientist role through developing and sharing its own research on governance, and with an intermediary and facilitator role through facilitation of workshops and reflection sessions. The governance model established for the project highlighted a complex mapping of actors and goals that were also involved in other projects and initiatives in which Orkestra researchers were also involved. As a result, an internal group of researchers was created within Orkestra to share knowledge and coordinate across different research projects with different stakeholders.

Finally, the governance model incorporated the creation of working groups to develop specific actions involving public and private organisations. Orkestra researchers contributed to these groups with a reflective scientist role that supports both operational skills and learning and reflection skills among policymakers. Moreover, the intermediary role played by researchers throughout the process –

through reflection sessions and continued dialogue with multiple stakeholders including public organisations at different administrative levels – has contributed to learning and reflection skills.

*Table 3.* **ACTIONS AND STRATEGIES THAT HAVE CONTRIBUTED TO POLICY CAPACITIES WITHIN THE ANALYSED PROJECT**

University-boundary roles	Actions and strategies that contributed to different skills			
	Analytical skills	Operational skills	Coordination skills	Learning and reflection skills
Reflective scientist	Providing knowledge about the state-of-art in talent for addressing transitions and future scenarios	Providing context-based knowledge for the regional challenge: diagnosis of the situation and reflection on potential strategy and actions (including leading a group team around a specific action)	Knowledge for developing a shared regional vision in a multi-faceted and multi-actor context. Research on governance adapted to specific challenge and context.	Knowledge about co-generation methodologies
Intermediary and facilitator	Ability to incorporate knowledge in a context-sensitive approach to develop a shared vision	Mapping and interviewing relevant actors	Facilitation of workshops and group teams. Creation of an internal group of researchers within Orkestra to coordinate different research projects with different stakeholders	Reflection sessions and continued dialogue with different stakeholders, including public organisations at different administrative levels

Source: authors' own elaboration.

## 7. CONCLUSIONS

This paper highlights the relevance of regional policy capacities for undertaking specific transformative actions that are needed to address complex social challenges such as the sustainability transition of industry. Such challenges must be articulated at different territorial scales, which implies that relevant policy capacities must be built at different administrative levels. In addition, new approaches to regional innovation policy stress the importance of involving actors other than the state in experimental approaches to policy for transformative change, which implies that policy capacities should extend beyond government.

In this context, universities can contribute to building system wide policy capacities through their different functions, and specifically through their research in the social sciences. Among the types of universities and organisations that perform social sciences research the concept of university-based boundary organisation is highlighted in this paper. We argue that regional university-based boundary organisations can play a relevant role in fostering regional knowledge construction processes to respond to key challenges in ways that are specific to their territories. By doing so, they can contribute to regional capacity building, including organisational transformative capacity building.

As an analytical framework, the article uses the integrative framework of public sector policy capacities for transformative innovation developed by Borrás *et al.* (2023), which defines the transformative capacity of public organisations as composed of three elements: roles, resources and skills. The latter is defined as «the dynamic capabilities or competences, in the formal practices and processes», and includes analytical skills, coordination skills, operational skills and learning and reflexivity. We have combined this framework with reflection on the unique roles played by university-based boundary organisations, and specifically with Pohl *et al.*'s (2010) identification of the roles of reflective scientist, intermediary and facilitator.

Our analysis of the case of Orkestra as a regional university-based boundary organisation illustrates the intersection of these roles with the skills capacities of policymakers in the context of a concrete action oriented to a broader societal challenge. Attracting, retaining and training people with the skills profiles required for sustainability transition is a regionally embedded challenge that requires regional solutions and hence regional policy capacities. Our analysis illustrates how Orkestra's research has sought to facilitate regional knowledge co-construction around this policy issue by performing the roles of reflective scientist, intermediary and facilitator. This contributes to building policy capacities among different administrative levels of government and a range of other regional actors that fit into the contemporary broad definition of policymakers. However, it also implies constructing actions and processes across multiple stakeholders in a medium-long term basis. Performing such roles is therefore challenging since it necessarily responds to diverse and sometimes conflicting interests. In this sense, regional university-based boundary organisations need to constantly balance and reflect on their own practice and how effectively it is contributing to regional challenges.

In this regard, we ought to read the analysed experience – and maybe more generally our own practice – from a critical perspective. We have identified how capacities have been generated within the policy community, through specific actions that have been directed to a multilevel interinstitutional knowledge co-construction process. However, our proposition of boundary organisations as facilitators of regional co-construction of knowledge generation with a transformational aim implies adopting a pluralist approach that should seek to include a wide spectrum of views

in the research and policy processes. This is usually easier to say than to do and indeed it is often necessary to navigate a difficult balance between the critical (research) and relational (action) dimensions when fostering transformation within institutionalized governance (Arrona & Larrea, 2018; Bartels & Wittmayer, 2018). Building processes across multiple stakeholders is a significant first step, but under a transformational aim greater effort should be made to include civil society and marginalized voices in both the problem definition and solution phases of research processes developed in collaboration with policymakers. Pushing in that direction should be on the agenda of the regional university-based boundary organisation (and the critical reflective scientists working there). How to do so in the context of institutionalized regional governance, overcoming the dilemmas and difficulties that this poses to researchers and boundary organisations, merits further research.

Moreover, it is worth noting that Orkestra is a singular organisation that has developed its own way of researching in a particular regional context, and the paper does not aim at proposing it as a best practice or as an example of how research that contributes to regional transformation should be exercised. As previously argued, universities and boundary organizations need to build context-based strategies to impact in practice, considering many internal and contextual and political factors (Fonseca & Nieth, 2021; Kempton *et al.*, 2021, Hoppe *et al.*, 2013). In this respect the paper has focused on highlighting (and illustrating) frameworks to reflect on the roles researchers and regional university-based boundary organisations might play to contribute to regional policy capacities for addressing societal challenges.

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