

Behind the curtains: the invisible hand of formal and informal coordination in innovation policy

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ABSTRACT

This paper sheds light into the policy coordination concept and explores its implications for science, technology and innovation (STI) policies. We develop a framework that brings together insights from institutional and public policy theories with concepts from STI policy and innovation systems. This model is evidenced in two regions, the Basque Country (Spain) and Skåne (Sweden). As a result, the paper discusses different types of STI policy coordination according to the institutional settings (i.e. centralized vs. decentralized, agency-based vs. multi-organizational forms) in which they are embedded.

Policy coordination is an important and often neglected issue in STI policy that has been traditionally studied in the literature of institutional theory and public policy itself. However, little attention has been paid to it in other streams such as STI policy, innovation systems, or the recent developments in territorial strategy approaches. Both theoretical contributions and case studies recognize the role played by public bodies and new governance models in facing policy and institutional failures. This is particularly the case in the regional context, where a huge range of complex and multi-level institutional settings coexist and conflicts among interdependent actors take place.

In this paper we aim at making a step forward and explore which are the coordination modes and mechanisms that might best fit into different STI policy-mixes and contexts. We compare two regions which despite being different in many aspects, have many things in common when it comes to STI policy. The two territories count with economies focused on the international scene, register income per capita levels above the EU average and show intense collective organization concerning social cohesion. As to their research orientation, both regions show a similar pattern in the diversity of research areas covered and have a sophisticated innovation system in which STI activities play an important role.

The paper contributes to the literature by analyzing the benefits and limitations of the coordination modes signaled by scholars in the STI stream and point out which coordination modes and mechanisms might best fit into diverging institutional settings.

Keywords: policy-coordination, STI policy, coordination mechanisms, coordination-mix.

1.- Introduction

Science, Technology and Innovation (STI) policy is an increasingly complex field studied from a huge range of disciplines with different approaches, such as research and innovation policy (Laranja et al., 2008; Borrás, 2009, Flanagan et al., 2011), the innovation systems approach (Lundvall, 1992; Nelson, 1993; Edquist; 1997) or recent developments in territorial strategy approaches (Foray, 2009; McCann and Ortega-Argilés, 2011; Aranguren et al., 2012).

STI policy and the instruments available for its implementation as well as regions have evolved, forming increasingly complex contexts where policy coordination mechanisms have not coevolved (Mytelka and Smith, 2002). This lack of co-evolution is also reflected in the academic sphere, where contributions focusing on coordination failures and the possible mechanisms that may mitigate them are still quite limited both in number and in depth (Weber and Rohracher, 2012). According to the literature, two dimensions of complexity can be distinguished in STI policy: the policy- mix and multi-level governance (Flanagan et al., 2011; Magro and Wilson, 2013). The policy-mix concept denotes the diversity of innovation instruments from different domains that can be applied, while multi-level governance focuses on the levels in which policies are designed and administered (Borrás and Jacobsson, 2004; Howlett et al., 2006; MacKinnon, 2010). We can find STI policies administered at supranational, national, regional or even local levels and instruments belonging to STI domains but also to health, industrial or energy domains, influencing the orientation of regions towards innovation. In this sense, regions can be regarded as policy spaces in which different policies and instruments administered at various levels interact, and as also as the geographical area where their outcomes will be felt (Uyarra and Flanagan, 2010). In this sense, the literature has provided some possible coordination mechanisms such as the creation of centralized agencies, coordination councils, creation of superministries, etc. (Alexander, 1993; Bavkis and Brown, 2010; Boekholt et al., 2002; Bonvillian, 2013; Braun, 2008a; Edler and Kuhlmann, 2008; Griessen and Braun, 2008; Lindner, 2012; OECD, 2010; Pelkonen et al., 2008; Wilson and Souitaris, 2002).

One of the rationales for defining systemic policies is the need to address systemic failures (Edquist, 2011; Kuhlmann and Smits, 2004). It could be expected that due to the systemic nature of STI policies, these should also be managed (i.e. designed, implemented, coordinated and evaluated) systemically. However, there is no evidence suggesting if this is the case or not (Braun, 2008a).

In other words, STI policies are conceived as systemic policies by institutional settings that lack systemic policy-making processes (Braun, 2008a). In fact, it is very common to find (in national or regional domains) policies designed and implemented by an isolated governmental department without any mode of coordination with other (related) policies implemented by other departments or at different levels, mainly due to internalized routines and policy path-dependency (MacKinnon, 2010).

Policy coordination is an important and often neglected issue in STI policy that has been traditionally studied in the literature of institutional theory and public policy (Braun, 2008a; Peters, 2004). Both theoretical contributions and case studies recognize the role played by public bodies and new governance models in facing policy and institutional failures (Edler and Borrás, 2014; Zittoun, 2015). This is particularly the case in the regional context, where a huge range of complex and multi-level institutional settings coexist and conflicts among interdependent actors take place.

The complex STI policy ecosystems described above are organized around multi-domain, multi-level, multi-instrument, multi-layer and multi-actor dimensions. This policy complexity calls for policy coordination, which opens significant challenges (Navarro Arancegui and Magro Montero, 2013; Magro et al., 2014; Nilsson and Moodysson; 2014).

In this paper we aim at making a step forward and explore which are the coordination modes and mechanisms that might best fit into different STI policy-mixes and contexts. We compare two regions which despite being different in many aspects, have many things in common when it comes to STI policy. From a policy perspective the Basque Country is a particular case in the Spanish system. Most competences are transferred and managed by Basque institutions, such as education, health and STI policy and therefore the regional government has developed capabilities in these areas (Walendowski et al., 2011). In this sense, the Basque Country counts with a complex institutional setting where STI policies are the result of the coexisting (and often conflicting) views of multiple governmental organizations, agencies and other intermediating bodies. In turn, Sweden counts with a centralized policy context, in which most decisions are made by few governmental bodies concentrated in Stockholm. In the particular case of STI policy, two main agencies can be distinguished: The Swedish Research Council and the Swedish Governmental Agency for Innovation Systems (VINNOVA), despite the Swedish Energy Agency has increasingly played a more relevant role in the promotion of innovation. In this centralized and agency-based

setting, the Skåne region has managed to create a propitious space for the development of scientific and innovative activities.

The remaining of the paper is structured as follows. The next section will introduce the main forces that influence the complexity associated to STI policies, which ask for the need to coordinate them. Section 3 will then focus on discussing the main findings in the literature in relation to the need to coordinate STI policies. Section 4 discusses the methodology followed in order to gather the data that allow us to conduct that analysis and provides the context for the two regions under analysis. Section 5 evidences the complexity of the STI policy and the coordination mechanisms in both regions. Finally, Section 6 discusses the policy implications resulting from our study and the further research avenues that are derived from it.

2.- Policy complexity and the need for coordination

There is a wide body of literature both from innovation and policy studies that highlights the complex settings with regards STI policy in general and the territorial implications of STI policy in particular (Borrás, 2009; Borrás and Edquist, 2013; Flanagan et al., 2011; Magro and Wilson, 2013; Magro and Nauwelaers, 2015). It is in the intersection of these forces where coordination failures might occur (Magro et al., 2014). Complexity of STI policy can be explained through different dimensions:

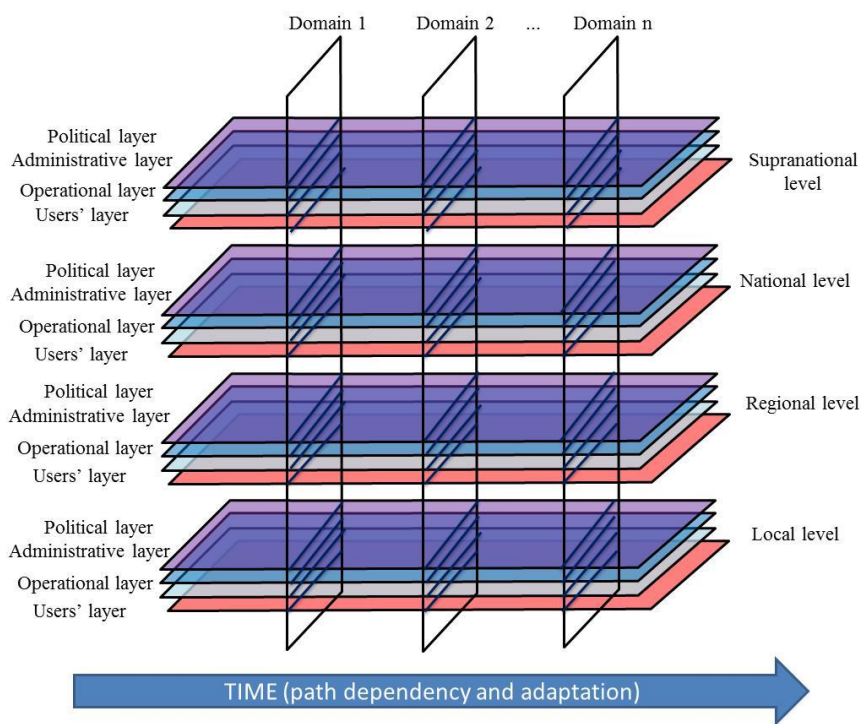
1. The widening and deepening of innovation policy: The evolution from neoclassical to systemic and evolutionary theories of innovation has been accompanied by a broadening and deepening of the innovation policy (Borrás, 2009), which shows an evolution of STI Policy in scope and scale.
 - a. Innovation is not only a duty of STI policy, but it is spread in multiple policy domains, such as industrial policy, environmental policy, health, education, energy, etc. In this sense, STI Policy has evolved from including science and technology to include innovation in a broader sense, due to the need to incorporate softer and non-technological elements of innovation to policy as a result of the evolution to a systemic view (Magro and Wilson, 2013).
2. The policy mix approach: a public intervention aiming at improving or fostering innovative efforts and capabilities is comprised of multiple instruments that, either from a demand or supply side, try to achieve the targets defined by the stated intervention (Borrás and Edquist, 2013; Flanagan et al. 2011; Howlett et al., 2006). Accordingly, failures or problems are not targeted by single and

independent policy actions, but by systemic-oriented innovation policies (Braun, 2008a; Kuhlmann and Smits, 2004).

- a. The co-existence of existence instruments in a given policy space from different policy domains, responds to what it has been designed as the widening and deepening of innovation policy (Borrás, 2009).
 - b. The co-existence of different instruments in a given policy space managed by different institutional levels and responding to different policy rationales.
 - c. As the OECD declares, this set of systemic policies should be “comprehensive and coherent... [and] characterized by a good match between individual instruments” (OECD, 1999, p. 71). However, the evidence shows how the level of compatibility among policy instruments is not always that straightforward, with rising tensions between policy areas (Bachtler et al., 2003; Braun, 2008b; Edler and Kuhlmann, 2008; Griessen and Braun, 2008; Wilson and Souitaris, 2002).
3. Multi-level governance: The process of decentralisation in the governance of innovation policies from national to regional and local levels constitutes another trend that has raised the complexity of the policy system, pleading for multi-level governance processes (Borrás and Jacobsson, 2004; Taylor, 2007). Multi-level governance focuses on the levels in which policies are designed and administered (MacKinnon, 2010; Mastroeni et al., 2013; Weber and Rohracher, 2012).
- a. In this regard, an evolution from horizontal placed based policies that comes from the innovation systems theories is seen in the latest concept of Smart Specialisation approach (Foray, 2009) that combines both vertical approaches (linked to what has been called new industrial policy) with horizontal approaches based on innovation systems theories. This new concept of regional STI policies has also put much emphasis on a new governance model, named as entrepreneurial discovery process.
 - b. This multi-level institutional setting is portrayed in three different policy layers: political, administrative and operative (OECD, 1991). These layers constitute an additional and relevant dimension to add to the policy-mix and multi-level governance, especially for analyzing STI policy coordination (Boekholt et al., 2002; Lindner, 2012).

4. Institutional setting:
 - a. Configuration of various layers, which varies from context to context and from policy to policy.
 - b. Complexity of territorial actors involved in policy processes: Diversity and power of different types of actors.
5. Time dimension:
 - a. Path dependency that affects both policy-mixes and institutional settings and which is very much conditioned by the territorial context.
 - b. Policy-making cycle and stages. Policy complexity and its governance depends very much on the policy-making cycle or in the policy momentum (Aranguren et al., 2016). The number, power and role of different layers will differ from one stage to another.

Figure 1.- Complexity in STI policy



Source: authors' own elaboration

The previous dimensions (i.e. multi-domain, multi-instrument, multi-actor and multi-layer) can be found at multiple levels, such as countries or regions. Every territory has a particular context that leads to a particular interpretation of innovation policy, which is also path-dependent, and hence, variable over time (Wittrock and de Leon, 1986). Aligning strategies that have been defined in different ways across territorial spaces will also make the coordination across borders more difficult. Coordination and coherence is

thus needed across the three layers (political, administrative and operational). The complexity is even higher at the regional level, as regions can be seen as spaces in which different policies are impacting and multi-level institutional settings and actors coexist (Karlsen, 2010).

It is in the intersection of all these dimensions where coordination failures might occur and therefore coordination modes and mechanisms play an important role in policy-making processes (see Figure 1). The combination of these mechanisms in this complex environment it is what we define as coordination-mix (see Magro et al., 2014).

3.- What is the role of coordination in complex policy settings?

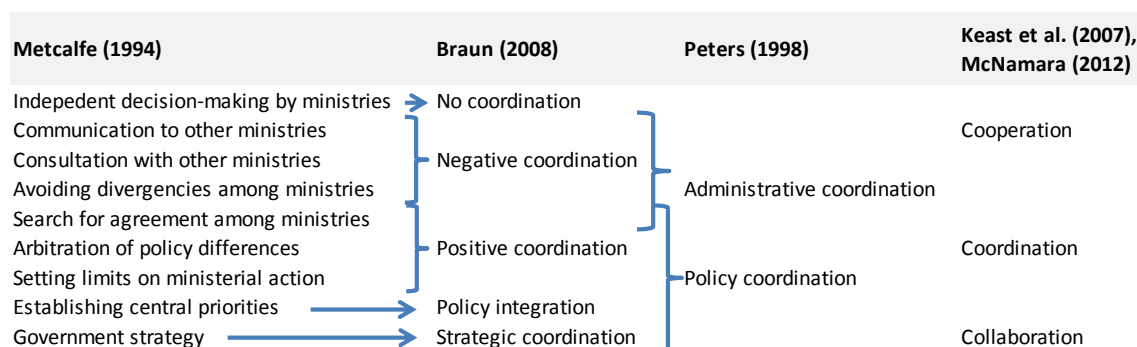
To avoid the redundancies, incoherence and lacunae that might arise from the increasing complexity and interdependence of public policies expressed in the previous section, some kind of policy coordination becomes necessary (Peters, 1998; Lindner, 2012; Braun, 2008a; Candel and Biesbroek, 2016). Diverse strands of literature have tended to denominate the responses that such complexity gives rise to with different headings: policy coordination, policy integration, policy coherence, cross-cutting policy making, joined-up government, whole-of-government, holistic government, horizontal governance, etc. (Geerlings and Stead, 2003; Meijers and Stead, 2004; Bouckaert et al., 2010; Tosun and Lang, 2013). There being no agreed definition of them or of their differences, we will resort to the most used denomination in the literature of public policies: policy coordination.¹

Just as the degree of interdependencies among policies may differ greatly between domains or territorial levels, the level of coordination of the policies can move within a broad spectrum. Metcalfe (1994) elaborates a scale of policy coordination that can be matched with some other attempts to develop a hierarchy or range of achievements in the coordination of policies. Most of these scales have been developed for horizontal coordination (between departments or ministries or agencies within the government),

¹ Policy integration would be the second most used term to refer to this reality. But, even if there have been some interesting attempts to lead it from the domain of environment policy toward more general theorization (see Candel and Biesbroek, 2016), still its main presence takes place in aforementioned field (see Jordan and Lenschow, 2010; Nilsson and Persson, 2003; Stead and Meijers, 2004; Geerlings and Stead, 2003; Tosun and Lang, 2013). Besides, policy integration literature has been focused on horizontal relations and has neglected other types of coordination (Meijers and Stead, 2004; Keast et al., 2007), although it is not an inherent element and policy integration could deal with multi-level relationships (Candel and Biesbroek, 2016).

but could be applied also to vertical relationships (between governments pertaining to different territorial levels).²

Figure 2.- Different understandings of policy coordination



Source: authors' own elaboration

Even if these categories seem attractive, some authors warn us about the different paces at which dimensions of policy integration move (which is somehow concealed by the consequential order that these scales suggest; see Candel and Biesbroek, 2016), their emphasis on consensus rather than on the creation of new more sophisticated policies (Pelkonen et al., 2008). In fact, coordination (or integration) is a multifaceted reality, as the works of Keast et al. (2007) and McNamara (2012) clearly show, and coordination may differ according to the organizational autonomy of the partnering organisations, the formality of the agreement, the key personnel who take part in the process, the type of resources shared or allocated (only information, or also physical or monetary exchanges), and the like.³ Even more, as Candel and Biesbroek (2016) highlight, the lack of clear criteria to distinguish all these categories has made very difficult to apply rigorously them in empirical analysis, and in line with that the literature has tended to analyze coordination processes in isolation, without comparing pattern or mechanisms of coordination occurring across cases, providing limited basis for theory building.

At any rate, coordination can be seen either as an output or as a process. From a processual perspective –the one on which this paper is focused–, coordination would refer to “the instruments and mechanism that aim to enhance the voluntary or forced

² The categories of positive and negative coordination were developed by Scharpf (1994) for multi-level government relationships, but latter on Braun (2008a) adapted them for horizontal relationships.

³ See for instance in McNamara’s work ten elements or dimensions that allow us to distinguish the different level of coordination.

alignment of tasks and efforts of organizations within the public sector” (Bouckaert et al., 2010: 16).⁴

Following Jordan and Lenschow (2010), instruments and mechanism that affect the coordination or integration of the public policies can be classified according to the logics of intervention: institutional, political or cognitive. Within the institutional logic there would be included, first, the interventions affecting the structure of the organisations. Examples of horizontal coordination mechanisms of these types are super-ministries (arisen from the merge of related services), the strengthening of the centre⁵, interdepartmental committees, etc. And examples of vertical coordinational mechanisms could be conferences of presidents, sectoral conferences, bilateral committees... But in addition of these mechanisms that affect the government architecture and interaction of actors, Persson (2004) include within organizational factors those related to resource allocation and budgeting.⁶ Also in the institutional logic could be included all the norm-like mechanisms: law, rules, standard settings, contracts (both transactional and relational), agreements...

Concerning the political logic, as Peters (1998) or Braun (2008b) hold, policy coordination is not only a matter of rationality or functionality, but also a political exercise. In particular, Jordan and Lenschow (2010) outstand the role of political will (and linked to it, the composition of political parties) and leadership. The role and influence of political parties on the policy coordination has been underlined also by Hooghe and Marks (2001) and above all by Bolleyer (2011).

Finally, the cognitive perspective assumes that policy interests are often embedded in a frame of reference or set of ideas and that some procedural instruments seek to target policy maker’s cognition and minds (Jordan and Lenschow, 2010). This is also well acknowledged by Braun (2008a), Edler and Kuhlmann (2008), Lindner (2012) and the OECD related publications (e.g. OECD, 2012; Charbit and Michalun, 2009, Charbit,

⁴ For others, co-ordination is defined as “the act of working together harmoniously” (Malone and Crowston, 1990) or as the process “managing interdependencies among activities” (Peterlin, 2012).

⁵ “The centre refers to the political level of the cabinet, but also to the ‘central agencies’. Central agencies are organizations such as ministries of the Prime Minister, of finance or the civil service that provide few if any services directly to citizens but rather are concerned primarily with providing horizontal services, with regulating and coordinating, within the public sector” (Bouckaert et al., 2010: 19).

⁶ According to Persson (2004: 31), the budgetary process can be an important tool for promoting integration and coordination in a given organisational structure. By affecting all sectors, provides a cyclical opportunity for revision, and operationalises priorities in a very concrete and often quantitative way. Additionally, it could integrate coordination dimensions through various means such providing incentives, rewards and sanctions for better coordination performance.

2011), who draw attention to the role of ideas and refer particularly to advisory bodies, foresight and evaluation procedures.

On the other hand, many of the authors that deal with coordination mechanisms differentiate between hard (formal) and soft (informal) mechanisms. As Hodgson (2006) warns us, these categories are not always clearly delimited neither all the authors use the same criterion to delimitate them. Informal may be referred indistinctly to non-legal nature, unwritten, nonbinding, tacit, spontaneous... In our paper, we will resort to the criterion established by Helmke and Levitsky (2004) to define informal: the ones created, communicated, and enforced outside of officially sanctioned channels, but instead of applying this official nature only to institutions, we will stretch its application field to the other logics of intervention: political and cognitive.⁷

Finally, coordination is a costly process and sometimes the avoidance of redundancies, incoherence and lacunae does not balance the extra cost for co-ordination (Magro et al., 2014; McNamara, 2012; Meijers and Stead, 2004). And if coordination can be economical efficient in the short run, it can be detrimental for experimentalism⁸ and consequently for the long run (Peters, 2006), or at the expense of other desirable goals, such as democracy (Lindner, 2012; León and Pereira, 2011). Even more, long time ago Scharpf (1986) warned us that purposeful institutional change is difficult, and not always promising. For Rayner and Howlett (2009), policies and strategies of integration (or coordination) are “fraught with risks” and for Candel and Biesbroek (2016) are not always feasible. In fact, Flanagan et al. (2011) and Uyarra (2010) consider that coordination instruments and mechanisms are difficult to manage and may introduce further complexity in the system and that ongoing mutual adaptation is the only way to coordination.

Some other authors are more optimistic about the attempts to enhance the policy coordination, and despite its difficulty consider it feasible (Braun, 2008b), or ask for a “a self-reflexive ‘irony’ in the sense that participants must recognize the likelihood of failure but proceed as if success were possible” (Jessop, 1998: 44). This author considers that “(in situation of) complex and continuing interdependence simple, blind-co-evolution based on the ‘invisible hand’ of mutual, ex post adaptation results ill-suited (...) such incrementalism is suboptimal because it is based on short-run localized, ad

⁷ De Soysa and Jütting (2007) share to a large extent this distinction between formal and informal institutions.

⁸ Charbit and Michalun (2009) and Charbit (2011) hold, in the contrary, that experimentation can be a coordination mechanism.

hoc responses” (pp. 29-30). In the same vein Metcalfe (1994: 278) claims that “makeshift arrangements, informal contacts and ad hoc personal networks cannot provide the degree of continuity and resilience required by permanent involvement in the many strands of EU policy-making”. The higher or lower presence of soft/informal or hard/formal ways of coordination is somehow related with the level of development of the regions (Magro et al., 2014). The more developed the territory, the more need for formal institutions (Leftwich and Sen, 2010). Anyway, the functioning of formal institutions requires usually the existence of informal ones, although as Helmke and Levitsky (2004) showed, the relationship between these two sorts of institutions can be instead of complementary, also substitutive, competing or accommodating.

Be that as it may, all authors agree that there is no best coordination choice (Brickman, 1979), that actually in all places there is a mix of coordination forms, no optimal (Keast et al., 2007; McNamara, 2012; 6, P, 2004), that the coordination answer should be decided taking into account the type of interdependence or “gap” and the context existing in each place (Charbit and Michalun, 2009; Charbit, 2011; Metcalfe, 1994; Peters, 2012; Lepori, 2011).

4.- Methodology and context

Two are the geographic areas covered in this study: the Basque Country (Spain) and Scania (Sweden). By comparing the coordination-mixes in these two cases, we aim to shed new light on the effectiveness of policy coordination mixes in different contexts. Both regions are similar in size, with populations of approximately 1.5-2 million inhabitants. The level of education is also quite homogenous, with approximately 40% of the active population aged 25-64 years old having completed tertiary education. Concerning the investment levels in R&D activities, approximately 75% of the investment in R&D activities comes from the business sector in the three regions. Their industrial structure is driven by sectors with clear international orientations (e.g. automotive, food, manufacture of metal products, manufacture of machinery and equipment, computer programming, ICT). This is one of the outcomes of the STI policies developed in these territories, particularly during the 1990s. This public policy intervention also resulted in a comprehensive network of technological and research capabilities.

Table 1.- Contextual factors

	EU28	Spain	Basque Country	Sweden	Skania
NUTS level RIS3	-	NUTS2	NUTS2	NUTS3	NUTS3
Population in 2015 (1000s)	508.451	46.450	2.165	9.747	1.289
GDP per capita in 2014 (PPS)	27.500	25.000	32.700	33.700	28.300
R&D in 2013 (% of GDP)	2,0	1,3	2,1	3,3	3,9
-BERD (% total R&D)	63,5	53,2	75,0	68,9	66,8
-HEIs (% total R&D)	23,6	27,8	17,9	27,2	29,8
-Government (% total R&D)	12,3	19,0	7,1	3,6	3,6
RIS/IUS (ranking)	Follower / Moderate	Moderate	Follower	Leader	Leader
Regional innovation system type	-	-	Thick specialised	-	Thick diversified
Distribution of total added value in 2014 (%)	100,0	100,0	100,0	100,0	100,0
-Agriculture (NACE A code)	1,7	2,8	0,8	1,4	1,3
-Industry (NACE B-E codes)	19,1	17,1	27,0	20,6	16,1
-Construction (NACE F code)	5,7	5,6	6,3	5,5	6,2
-Administration & social services (NACE O-Q codes)	19,4	19,0	18,2	21,6	22,6
-Other services (NACE G-N & R-U codes)	54,2	55,5	47,7	50,9	53,8
Average employment in manufacturing local units in 2013	13,3	10,0	17,4	11,3	10,4

Source: authors' own elaboration based on Eurostat, RIS 2014, IUS 2015

On the one hand, both regions constitute interesting cases for illustrating the mechanisms that respond to the coordination failures that are derived from a complex policy setting where multiple domains, levels, instruments and actors coexist. On the other, they also allow to explore the link between policy complexity and policy coordination. STI policies in both regions are the result of the coexisting (and often conflicting) views of multiple governmental organizations, agencies and intermediating bodies (Bonvillian, 2013; Nauwelaers, 2011), and other performing actors. Our analysis leads us to conclude that STI policies, are often conceived systemically by institutional settings that lack systemic policy-making processes. In addition, our findings show that policy complexity leads to the establishment of more coordination mechanisms. As a result, coordination becomes a complex policy issue to be managed.

The analysis of the coordination-mix is explorative in nature and qualitative in character. In particular, we focus on several dimensions that can reflect the complexity of the STI policy: territorial levels, policy domains in the regional level, organisational levels (layers), political and technical staff, policy phase, policy instruments, non-governmental actors and leadership and the human element.

On the one hand, the analysis draws on several sources of information: existing literature on Basque and Scanian economic policy and on STI policy in particular, official documents (laws, plans, white papers, etc.) and records of the two regions STI policies. On the other, we have conducted about several in-depth interviews with relevant stakeholders involved in the Basque and Scanian STI policy-making processes. In particular, we have primarily focused on engaging with policy-makers from different regional and provincial bodies that either currently or in the past carried out

administrative duties in relation to STI policy. In addition, we have also conversed with other stakeholders which are represented in formal decision making processes at the county and local levels.

5.- The coordination-mix in the Basque Country and Scania

This section is divided into two sub-sections. In the first one we will explore the key dimensions that characterize the policy complexity in each region. In turn, in the second sub-section we will dig into the main coordination mechanisms used in each territory. In this regard, we will first explore how the coordination within the regional government is produced (i.e. intra government coordination). Then second, the coordination with other levels of government (i.e. inter-government coordination) will be evidenced. Finally, the differences observed in the coordination with non-governmental actors will be discussed.

Table 2.- Dimensions of complexity in the Basque Country and in Scania

COMPLEXITY DIMENSIONS	COMPARISON: BASQUE COUNTRY (BC) / SKANIA (SK)
Territorial levels	<p>In BC the regional level prevails; in SK, hourglass shape .</p> <p>In the BC an additional level (i.e. provincial).</p>
Policy domains in the regional level	<p>Much more competences and resources in the BC than in SK</p> <p>→ more policy domains</p>
Organisational levels (layers)	<p>Regional agencies are stronger in the BC than in SK.</p> <p>Even if intermediary agencies are particularly strong at the Swedish national level.</p> <p>There are more R&D and innovation performers and users related to regional policies in the BC.</p>
Political and technical personal	<p>In both regions, political and technical personal are clearly separated groups.</p> <p>Political representatives pertain in this term to the same party in BC.</p>
Policy phase	<p>Although there is a long tradition of innovation strategies in both regions, the current S3 strategy was based in an existing strategy (IISS) launched in 2012 in SK, and in a new strategic process (PCTI) launched in 2015 in the BC.</p> <p>Therefore, the implementation phase has started later in the BC.</p>

Policy instruments	In the BC the regional government uses a few number of policy instruments (mainly subsidies). SK is more prone to use soft and new demand instruments (higher level of sophistication)
Non-governmental actors	In BC relatively stronger role of cluster association and firms. In SK stronger role of universities and the civil society.
Leadership and human element	In BC more formal and organisational relationships; in SK more informal and personal. In BC clear political leadership (now turning to firms); in SK leadership by civil servants. In BC level of competence related not related to market laws; in SK level of competence related to market factors (experts in particular moments in time).

Source: authors' own elaboration

5.1.- Coordination within the regional government (intra government coordination)

In the Basque case, STI policy is mainly framed by the general science, technology and innovation plan 2020 (PCTI 2020). In addition to the PCTI-2020 (which is officially the Basque smart specialization strategy, and has an interdepartmental character) there are many other departmental plans affecting the innovation strategy (e.g. the university plan, the industrialisation plan). However, while the PCTI 2020 is led by the Secretary of Presidency, each of the thematic priorities included in it is led by the corresponding Department (e.g. Energy, Health). Accordingly, there are many departments involved in the official PCTI 2020. The secretary of Presidency has led both the design and implementation of the official smart specialization strategy, but the implementation of individual thematic priorities is in charge of particular departments.

On top of the role of the President and the budget control by the Economy and Finance Department, an interdepartmental committee has been recently set up to coordinate the main departments covered by the smart specialization strategy (at the vice-minister level). In this regard, scarce (formal) coordination mechanisms are found among the abundant intermediary agencies or performers is observed in the Basque case, even if a rationalisation administrative reform has been launched in 2014. Finally, it is necessary to mention that high civil servants are quite professional and stable, leading to the development of capabilities but inertias in the public sector. Similarly, strong boundaries are observed between the political and the administrative layers.

In the Scanian case, its STI policy is framed around the international innovation strategy for Scania - IISS 2014 (i.e. Internationella Innovationsstrategin för Skåne), which is a sub-strategy of the Regional Development plan (called Open Skåne 2030), being completely integrated in it. As compared to the Basque Country, neither strong boundaries between the domains included in the IISS, not between political and administrative layers are observed.

Regarding the governance layers, the most noticeable feature in Scania is the high number of business and innovation supporting institutions, which are very fragmented and overlapped, allegedly co-funded and coordinated by the regional government. In this regard, much of the coordination is of an informal nature.

This is partly due to the institutional framework of the Swedish political sphere, in which high skilled professionals (from outside the political dimension) are attracted to the regional government, depending on the topics to be addressed and their expertise (i.e. on a non-permanent basis). As a result, the regional government manages to operate

quite professionally. However, the government is not able to retain these individuals, and many of them are later on hired by the private sector, provoking a high rotation, in opposition to the stability of employment observed in the Basque/Spanish context.

5.2.- Coordination with other levels of government (inter-government coordination)

In the Basque case, the regional government tries to coordinate its strategies and policies with the EU, by mean of formal and informal mechanisms, even if its innovation policy has less resource dependence than other Spanish regions on national funding. There are several formal coordination mechanisms between the national and regional government, mainly to political agreements. But in fact the regional government elaborated its policy independently and not taking into account the national (i.e. Spanish) one, generally considered less advanced.

The coordination between innovation policies of Basque regional and provincial governments has been scarce. Also a low coordination between the Basque country and other regions is observed (even low cross-border collaboration). Some provincial governments are trying to develop their own smart specialization strategies and get involved in the regional one. Coordination mechanisms have been revisited or launched within the Basque smart specialization strategy, but they are still in early stages. Despite Basque counties and cities have been ignored so far by regional innovation strategies, some of the have recently started to fostering these. There has been a reform to strengthen the participation of municipalities in the governance of the region, and somehow their participation in some governance bodies of the regional smart specialization strategy has been approved, but with minimal real effects.

On the other hand, in the Scanian case, due to its dependence on external funding to develop their R&D and innovation strategy, the regional government tries to align and coordinate it, by either formal or informal mechanisms, with European and national strategies, and even lobby over them. A set of different coordination mechanisms are used: bodies, contracts, setting of conditionalities and standards, co-funding... Anyway, the central government behaves more as catalysts and facilitator than as hierarchical imposers of policy (OECD, 2010).

Inter-council (region) collaboration has a long tradition in Sweden (local federations, common committees...), partly as a response to their lack of resources and need of increase its stakes in negotiations with the central government. In the Öresund region (i.e. partly located in Scania) it is a cross-border collaboration, even if different policy-making and planning cultures make it challenging.

Even if strong local autonomy creates coordination problems (e.g. the dual governance of regional and rural development), vertical coordination with municipalities has also taken place by formal and informal mechanisms. Some municipalities take part in the governance bodies of the regional strategy. This and co-funding policies help might increase their voluntary support to regional policy-making.

5.3.- Coordination with non-governmental actors

Governing bodies have been affected by the regional S3 in the Basque Country. The reshaped Basque S&T Council has incorporated representatives from Basque firms, technological centers and scientific academia (in addition to the universities, and representatives of the regional and provincial governments & agencies). A new scientific advisory board has also been set up, which is quite active and composed by not “usual suspects”.

Although in the design phase of the smart specialization policy the regional government has led the process, in the implementation phase is trying to make a step backward and create steering groups where non-governmental actors (specially, firms, cluster associations and technological centers) have a more relevant role. Universities, by and large, complain about their small role in all the process, despite increasingly they are having a leading role in some of the steering groups. The presence of representatives of civil society is even scarcer, and trade-unions are not present at all.

Except for the scientific advisory board, people taken part in those processes are chosen as representatives of their organisations, and not so much for their personal characteristics and assets. Summing up, it can be concluded that the Basque Country is recognised as a best practice region in design and implementation of its STI policies in general, and in particular in the most recent case of the smart specialization strategy. However, there is a certain risk of lock-in, due to the stability of the individuals and coordination mechanisms involved in the policy-making process.

On the other hand, in the Scanian case, two new inclusive governance structures were established to allow for a broader participation of actors.

- The Research and Innovation Council in Skåne (FIRS - Forsknings- och innovationsrådet): it constitutes the strategic board in the region, on top of representatives from Region Skåne and large municipalities, and also includes higher education institutions and key industrial sectors, which includes higher education institutions and key industrial sectors.

- The Sounding Board for Innovation in Skåne (SIS): it constitutes a more operative organization, trying to coordinate innovation actors in the region. In addition to representatives of the national, regional and local administrations, there are representatives from cluster organizations, incubators, science parks, universities.

Neither FIRS nor SIS have any decision-making power (i.e. they act as advisory boards); and although leadership in them is collective in nature, Region Skåne is the leading organization and acts as coordinator.

As indicated, representatives in the networks are elected primarily for personal properties, and not as representatives for specific organisations or industries (i.e. political parties). This might be beneficial to finding competent individuals, but might result in person-dependence, hindering structural transformations processes to reach out in the whole system, as well as creating a challenge in the future in case of political turns in the region.

Finally, it has to be said that soft coordination mechanisms can be beneficial to achieve consensus, but might at the same time turn to be insufficient to streamline the support structure and increase its effectiveness. It can thus be concluded that STI policies in the region of Scania have been on hold, in particular in the context of the smart specialization strategy, due to several reasons. Accordingly, a risk of non-sustainability in its innovation policies could be taking place.

6.- Conclusions

STI policy has become an increasingly complex field where multiple approaches, instruments and domains coexist. Currently, innovation policy encompasses ingredients and flavors of education, energy, health or environmental policies to mention a few. As a result, failures or problems are not being targeted by single and isolated policy actions, but by intertwined and systemic- oriented innovation policies. These complex STI policy ecosystems are organized around different dimensions, namely multi-domain, multi-instrument, multi-level, multi-layer and multi actor. This calls for policy coordination, which opens significant challenges.

By analyzing the variety of coordination mechanisms responding to the different modes, we can observe that most of them have not yet adopted a systemic perspective in their definition. In fact, most of them are biased towards a unique domain (i.e. S&T). Despite the multi-domain character of STI policies needs to be acknowledged (in theory), this this lack of systemic perspective in their coordination indicates a still narrow

perspective in the management of systemic policies (OECD, 2011b; Morgan, 2013b). In other words, STI policies are conceived systemically by institutional settings that lack systemic policy-making processes.

The main conclusions that can be achieved from this comparative study are the following.

- Policy complexity is not a matter of the diversity in the number of different elements but a matter of their composition: There is not a single understanding of policy complexity.
- Policy complexity leads to new coordination challenges BUT there is not a single recipe for policy coordination.
- Despite all the dimensions of policy complexity influence coordination, the degree of regional resources and competences and leadership are key elements for the effectiveness of coordination.
- Informal coordination mechanisms can be beneficial to achieve consensus, but might lead to sustainability challenges over time.
- Formal mechanisms are structures that might lead to lock-in situations and lack of skilled individuals and adaptive capabilities.
- Need to combine both formal and informal mechanisms for policy effectiveness.

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