

Revisiting the nexus between industrial policy and regional economic resilience in an era of grand societal challenges

Edurne Magro

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Edurne Magro, ORCID: 0000-0002-7495-0119, Orkestra-Basque Institute of Competitiveness and Deusto Business School, University of Deusto, Mundaiz 50, San Sebastián, 20012, Spain.

edurne.magro@orquestra.deusto.es

Abstract

In this paper, we adopt an evolutionary approach to understand the role of industrial policies in developing regional short- and long-term resilience. We take an in-depth look at the different type of policy instruments to categorise the different place-based approaches and industrial policy mixes and explore their role in addressing grand societal challenges. To do so, the paper examines the Basque Country region in Spain, which not only has implemented a long-term industrial policy over the last 40 years but has also demonstrated to be a resilient region during previous crises.

Keywords:

Regional resilience, industrial policy, policy-mixes, grand societal challenges.

JEL codes: O25, O38, R11, R58.

1. Introduction

Regional economic resilience is a concept that became very popular after the Great Recession in 2008, with many scholars and studies attempting to understand why some regions recovered faster than others from the economic crisis. These studies relied on the evolutionary concept of resilience, which differs from other resilience approaches, such as those used in the engineering sciences or the ecological approach. The evolutionary approach defines *resilience* as the ability of a system or a territory to resist, adapt, respond, recover, and/or renew from a shock (Martin, 2012).

Nowadays, due to the economic uncertainty associated with the COVID-19 pandemic, the war in Ukraine and wider geo-political factors that unevenly impact on regions, the concept of regional resilience is attracting increasing attention and will continue to do so in the following years (Gong et al., 2020). Despite the fact that the ability to recover from emergencies and natural disasters is normally explained by using an ecological conceptualisation of resilience (Evenhuis, 2017), we consider that the evolutionary approach can be used to understand recovery from a long-term perspective and to explore the different resilient mechanisms that contribute to reducing regions' vulnerability in the future.

Evolutionary economic geographers have conceptualised regional economic resilience as a multifaceted or multidimensional process (Martin, 2012;

Webber et al., 2018) in which different factors interplay. Given the difficulty in operationalising regional resilience, most academics have focused on analysing either one specific factor or, more commonly, the role of economic structure (Martin and Sunley, 2015), the part innovation has to play (Bristow and Healy, 2017), and to a lesser extent, the importance of institutions and policy (Pugalis et al., 2017) and agency (Bristow and Healy, 2014).

Industrial policies have also gained in popularity in recent years, especially since 2004 when Rodrik reconceptualised them and highlighted the importance of self-discovery as a source for diversification. Building on this idea the *smart specialisation strategies* (S3) that emerged in the last decade and have been widely implemented by European regions, incorporated the notion of entrepreneurial discovery process as a mechanism for generating transformative activities by a compendium of different territorial actors (Foray et al., 2009; Foray, 2019). Given the focus of S3 on innovation, they are considered new policy approaches for regional innovation or can also be understood as strategies at the nexus of innovation and industrial policies (Radošević, 2017). These strategies are now evolving towards addressing sustainability and Sustainable Development Goals (SDGs) (Miedzinski et al., 2021).

Traditional industrial policies are commonly related to short-term and reactive responses to crises, whereas innovation policies would imply a more

anticipatory approach. Meanwhile, complex crises like the present one triggered by COVID-19 and other geo-political events and the current underlying grand societal challenges would require a more holistic response based on a mix of context-sensitive industrial and innovation policies aimed at both short and long-term resilience.

In this paper, we adopt an evolutionary approach to understand the role of industrial policies in developing regional short- and long-term resilience. We take an in-depth look at the different policy instruments in order to categorise the different place-based approaches and industrial policy mixes and explore their role in addressing grand societal challenges. To do so, the paper examines the Basque Country region in Spain, which not only has implemented a long-term industrial policy over the last 40 years but has also demonstrated to be a resilient region during previous crises. Thus, the contribution of this paper is to conceptualise the link between industrial and innovation place-based policy mixes to foster regional resilience as a mean to address grand societal challenges.

First, we explore the concept of resilience by looking closely at the different factors that affect regional economic resilience. Second, we analyse industrial policy rationales together with the evolution and concept of smart specialisation strategies to identify the different elements that could contribute to regional resilience and societal challenges. Finally, the Basque

case is presented and discussed to provide some conclusions and underline possible future challenges.

2. Regional economic resilience and societal challenges

Since the Great Recession in 2008, regional resilience has been widely explored to better understand why the recoverability of regions is uneven (Martin, 2012; Martin et al., 2016; Webber et al., 2018; Boschma, 2015; Bristow and Healy, 2014). Apart from the recent work developed by evolutionary economic geographers, the concept of resilience has also been studied by other disciplines to explain responses to different types of shocks, such as emergencies, macroeconomic fluctuations, or structural changes (Evenhuis, 2017). Among these disciplines, we can highlight the engineering and ecological approaches, both suitable for analysing macroeconomic fluctuations and large emergencies. The former incorporates the idea of returning to the previous equilibrium state; the latter notion deals with the ability to move to a new equilibrium state. By its part, the evolutionary conceptualisation of resilience captures the capacity for renewal and transformation when facing structural changes and profound macroeconomic fluctuations (Evenhuis, 2017). Moreover, the evolutionary resilience construct acknowledges that places are complex and interconnected socio-spatial systems and that shifts are not necessarily consequences of external disturbances but of internal pressures (Davoudi et

al., 2013). However, resilience emerges when systems are challenged by a shock or a crisis (Davoudi, 2012).

It is also useful to explore not only the nature of shocks but also their severity and length of exposure. Manca et al. (2017) distinguished between the processes that should be considered in the face of low, medium, and high-intensity disturbances and their duration. Low-intensity and short-exposure impacts would require stability measures and a return to a previous *status quo*, while profound and long-exposure impacts (such as those linked to grand societal challenges like climate change) need transformation processes, and this is where evolutionary resilience can have a role to play.

Following an evolutionary approach, resilience can therefore be understood as the ability of a region to deal with changes on a continuous basis (Evenhuis, 2017a). Hence, it can be viewed as a dynamic, long-term and path-dependent process, which should take into account the whole region's trajectory (Sensier et al., 2016). Also, resilience is the ability of a system or a territory to resist, adapt, respond, recover, and/or renew itself from a shock (Martin, 2012)

The contribution of the resilience concept to understanding societal challenges is twofold. First, societal challenges could be considered as shocks that impact each territory separately but follow a global trend (e.g., climate change). Due to their complexity and interconnected characteristics, major

societal challenges might trigger other problems (environmental, economic, and social). Second, resilience may be seen as a transformative capability that leads to renewal and reorientation, possibly acting as a driver for change. For this reason, understanding the role played by policies in fostering resilience can help us deal with societal challenges. However, measuring and analysing resilience as a capability is not easy as it depends on different abilities. Davoudi et al. (2013) explain resilience as the combination of four dimensions: preparedness, persistence, adaptability, and transformability. Boschma (2015), for his part, distinguishes between adaptation, defining it as a region's ability to resist shocks in the short run, and adaptability, which is the capacity of a region to develop new paths in the long run. Therefore, adaption contributes to short-term resilience, which corresponds to the resistance and recoverability phases, and adaptability, which is built on a long-term basis, constitutes a key capability for renewal and transformation.

Nevertheless, these dimensions or processes are interlinked. On the one hand, adaptation is needed for regions to be able to respond to certain types of (unexpected) shocks like natural disasters or emergencies. On the other hand, 'slow-burn challenges', which include grand societal challenges, require adaptability. Yet, both types of shocks may coincide in the same place. In the same vein, Angulo (2018) argues that regions that are resilient following an

adaptive view are more likely to be resilient in terms of engineering/ecological approaches. The simultaneity of events with different characteristics adds complexity to the adaptation processes that are necessary for territories to become resilient. Thus, for example, as Gong et al. (2020) point out, short-term resilience to cope with the Covid-19 pandemic is counterproductive to economic resilience. These trade-offs that are typical of disruptive events, such as grand societal challenges, make crises management more complex. But crises can also be regarded as windows of opportunity for transformation (Grillitsch and Sotarauta, 2018), where resilience at multiple scales leverages transformative change (Folke et al., 2010). Therefore, when considering resilience, it is essential to take a holistic and long-term approach in order to deal with constant trade-offs and conflicts.

Once the concept of resilience has been explored and its different dimensions identified, it is also necessary to delve into the mechanisms of change associated with the resilience process. That is, which elements drive the adaptation, reorganisation, and reorientation processes of territories and contribute to developing the different dimensions of resilience. The literature has focused mainly on the productive structure of regions and its relatedness (Boschma, 2015; Martin and Sunley, 2015; Martin et al., 2016, among others)

including technological and vertical relatedness (Cainelli et al., 2018), as the main explanatory factors of regional resilience and regional variance in the speed of recovery. Nonetheless, the complexity of the shocks caused by major societal challenges and their interrelationship demands that greater emphasis be put on public institutions, including policies and governance, as mechanisms that set transformative changes in motion (Bristow and Healy, 2014; Kakderi and Tasopoulou, 2017; Rios et al., 2017; Magro and Valdaliso, 2019, Magro et al., 2022). Hence, in the next section, we examine in more detail the role of policies as drivers for building resilience to be able to respond to key societal issues and, specifically, the role of place-based industrial policies.

3. The role played by industrial policies in generating transformative changes in regions

Industrial policy understood as selective government interventions oriented towards 'picking winners' has been largely questioned since the late 70s. This traditional view of industrial policy is based on a neoclassical, market-failure approach, which can, in some cases, lead to government failure. Furthermore, the debate about the adequacy of industrial policies took place in a time when countries were under deindustrialisation and the only industrial policies developed were those strictly related to manufacturing

activities. These solid arguments and the general adoption of neo-liberal economics brought about a shift towards horizontal industrial policies (Bailey and Tomlinson, 2017) that used generic measures to foster competitiveness and included support programmes for education and training, infrastructure, R&D, and incentives to promote entrepreneurship, among other actions (Bailey et al., 2019). Thus, they were conceived as policies aimed at improving the business environment or business framework conditions.

Recently, especially after the Great Recession in 2008 and 2009, a renewed interest in industrial policies (or industrial strategies) can be found in both the academic literature and policy practice. New industrial policies emerged with a stronger focus on their how-process instead of their why-rationales (Rodrik, 2004; Naudé, 2010; Warwick, 2013). Despite this renewed focus, several scholars (Rodrik 2008; Naudé, 2010) claimed that old market failures would persist, alongside coordination and systemic failures. They argued that industrial policies should be adopted to promote structural change in the economic structure and put the region on a development and growth path. Thus, the 'how' question is relevant to avoid the greatly criticised government interventions that sometimes result in government failure. The development of new industrial policies implies *bounded rationality* by the government and other actors. As a result, concepts like self-discovery and experimentalism

came on the scene of the new industrial policy as processes leading to structural change.

Moreover, these policies introduced the idea of selectiveness in addition to horizontal measures and were not necessarily aimed at certain target industries but rather on specific activities or technologies (Rodrik, 2004; Warwick, 2013). Likewise, industrial policies in their broadest sense are not applied to manufacturing exclusively but also take into account the intersection with other sectors such as agriculture or services (Rodrik, 2004; Naudé, 2010).

In sum, by considering these characteristics, we can define industrial policies as “any type of intervention or government policy that attempts to improve the business environment or to alter the structure of economic activity toward sectors, technologies or tasks that are expected to offer better prospects for economic growth or societal welfare than would occur in the absence of such intervention” (Warwick, 2013: p 16). Consequently, industrial policy not only plays a role in fostering structural change and developing new paths for economic growth but also in contributing to welfare and could therefore be oriented towards grand societal challenges.

The evolution of industrial policies has broadened the spectrum of possible government tools to include ‘softer’ measures that seek to address system and coordination failures. For this reason, former industrial measures from

the financial and economic domains like incentives or monetary policies or older selective measures like those concerning import tariffs have evolved towards more systemic measures, such as cluster policies. This evolution was complemented by the taxonomy of industrial policy developed by Weiss (2015), which links policy measures to stages of development. Weiss distinguishes between industrial policies for low, middle-, and high-income countries. In the case of the first stage, policy instruments were focused on measures to gain market scale such as export incentives, and to attract foreign investment, support training, guarantee financial support to companies to then evolve towards promoting product innovation, technology, and more sophisticated training programmes. In later stage, emphasis has been put on measures to boost science, technology, and innovation (STI) at the knowledge frontier and with a greater focus on agglomeration economies, i.e., more linked to regional development and cluster policies. However, it is also important to acknowledge that territories should not be regarded as isolated systems and that although the predominant measures of later industrial policies concentrate on innovation and recent policies at EU level (i.e. Horizon Europe) are shaped by an 'entrepreneurial state' (Mazzucato, 2013), some activities and sectors might need more defensive and traditional measures to avoid market failures. This leads to complex policy-mixes, understood not only as combination of

instruments but the positioning of these under a long-term strategic framework process-based (Rogge and Reitchard, 2016).

Based on the above, we could link the more recent stage of industrial policy with what are known as *smart specialisation strategies* (S3), which have been widely developed in European regions over the last decade. Although this is deemed a new approach to regional innovation policies, it has similar features to the new industrial policies. More specifically, smart specialisation “is a new word to describe an old phenomenon: the capacity of an economic system (a region, for example) to generate new specialities through the discovery of new domains of opportunity and the local concentration and agglomeration of resources and competences in these domains” (Foray, 2015: 25).

Indeed, when compared to the systemic approaches to innovation, two distinctive aspects of S3 that were already broadly implemented by policy-makers from the 80s clearly coincide with certain characteristics of the new industrial approaches: first, the directionality of smart specialisation strategies, which attempts to concentrate resources in priority areas to transform them, drawing on the regional capabilities (Foray et al., 2009; Foray, 2019); secondly, the entrepreneurial discovery processes that involve actors from the quadruple helix (government, research organisations,

industry, and civil society), which imply implementing bottom-up processes that lead to transformational roadmaps (Foray, 2019).

The inherent transformation capacity of S3 is based on the *related variety* concept (Frenken et al., 2007; Neffke et al., 2011), which links new growth paths in regions to existing regional assets and industries, namely through path renewal or path branching (Isaksen et al., 2018). Nevertheless, *unrelated variety* emerged by the new combination of previously unconnected technologies is also needed to address grand societal challenges (Boschma et al., 2017) and could lead to the emergence of new regional growth paths either by path importation or path creation (Isaksen et al., 2018).

Directionality and the entrepreneurial discovery processes, which are typical features of S3, can act as drivers for change in the region's productive structure and can also be directed towards specific missions and global challenges. Thus, S3 could respond to transformative failures such as directionality and reflexive failures as defined by Weber & Rohracher (2012), but these strategies must be reinforced with policy-mixes that address the other two types of failures that hinder transformative change, i.e., failure in demand articulation and policy coordination. In this sense, it is relevant to incorporate demand-side policies such as public procurement in multi-scalar governance processes that facilitate change. These two factors that are greatly needed for a mission-oriented approach to meet grand societal

challenges are not so explicitly developed in S3, which concentrate more on innovation and R&D and less on development and scaling-up and should be part of a broader industrial policy. New regional growth paths and, more specifically, path creation based on particular industries are approaches that rely on certain crucial policy measures, such as strengthening a relevant scientific knowledge base, updating the training system, or investing in infrastructures (Isaksen et al., 2018), some of which are direct domains of innovation policies whilst others are more representative of industrial policies.

However, new path creation should not be focused only on the productive structure, which is the focus of S3, but on the entire socio-technical system in order to be transformative and address grand societal challenges. Schot and Steinmueller (2018) argue that new innovation policy paradigms should change not only industries structures but skills, consumer behaviours, cultural settings, infrastructures... Stimulating such a wide change requires complex policy mixes that combines the creation of new knowledge and industries in an entrepreneurial way with instruments that destabilise existing regimes (Kivimaa and Kern, 2016). Therefore, S3, which depart from an economic geography approach, should connect with the literature of sociotechnical transitions to deal with grand societal challenges (Coenen et al., 2015).

Finally, it is also important to highlight that policies are self-reinforcing processes and that policy path dependence influences regional growth. When it comes to facing grand societal challenges and long-term resilience, policy change could be a key driver of change. In the next section, we present the Basque Country regional case to explore the long-term role of industrial and innovation policies in regional development and resilience, concentrating on policies which could potentially address major challenges such as climate change. This case provides an example of policy-mixes evolution at the same time that sheds light about future changes needed for addressing grand societal challenges and their link to long term resilience.

4. The Basque Country case

In order to analyse the evolution of regional industrial and innovation policy and their implications for long-term resilience, which could contribute to responding to grand societal challenges, here we carry out a regional case study from a historical and holistic perspective. Our analysis builds on Magro and Valdaliso (2019) and Magro et al. (2022), and it is based on a broad array of qualitative information: official policy documents, reports, academic literature, and interviews with the agents involved in policy processes conducted within different research projects developed from 2008 onwards. In addition, long-term interaction with regional policy processes allowed us to gain a great insight into the confronted arguments among regional policy

makers. An interaction that has been particularly intense during the COVID-19 pandemic and has led to a deep understanding of the policy rationales and recovery strategies, that is to policy-mixes.

The Basque Country is an old industrial region of Europe that has undergone a successful economic transformation over the last 40 years, supported by a highly interventionist regional government that has implemented sustained industrial policies aimed at promoting science, technology, and innovation (OECD, 2011; Navarro et al., 2014; Valdaliso, 2015; Morgan, 2016). This decisive role of the government has contributed to developing policy capabilities within an evolutionary, path-dependent policy process. Its strong commitment to industry and the industrial and STI policies implemented have contributed considerably to increasing the Basque economy's resilience to the various economic crises the region has suffered from the late 1970s until today (Birch et al., 2010; Cueto et al., 2017: 71-73; Cuadrado & Maroto, 2016) and therefore constitutes a good case for exploring long term resilience and an evolutionary view of policy-mixes. Angulo (2018) concludes that despite Spanish provinces have been low resilient to the crisis, the Basque ones, among others, have behaved better than the average. In a different analysis, which includes different factors from the economic structure (socio-demographic and institutional factors), Rios et al. (2017) demonstrate that the Basque Country together with Navarre have been the

most resilient regions in Spain during the Great Recession. This can be indirectly measured through the region's sustained evolution of catching up and convergence with the EU-15 in GDP per capita terms (see Figure 1). In addition, the Basque Country has provided a regional policy response to the economic crisis triggered by the COVID-19 pandemic despite being strongly hit by the health and economic crises and shows short-term resilience (see Figure 2).

INSERT FIGURES 1 & 2 ABOUT HERE

Like many other European regions, the Basque Country has designed a strategy to recover from the COVID-19 crisis that takes into account the policy paradigms for sustainability; that is, closely intertwining the green and digital transitions at the heart of this strategy. In addition, the region has successfully implemented S3 (Aranguren et al., 2016; 2019), which has been its core policy for regional growth in the past decade. Bearing in mind all these features, we examine the long-term industrial strategy of the Basque Country over the last 40 years, especially its responses to the different crises (see table 1). This long-term and historical perspective constitutes several case studies embedded in one contextual case study. However, the main goal of this analysis is not to explore in great detail all the different features of each crisis episode but to build a story around the evolution of industrial policies as drivers of long-term resilience and therefore around their ability

to bring about transformative change, which constitutes the basis for a conceptual discussion around the nexus of industrial policy, policy mixes and regional resilience and their potential to address grand societal challenges.

INSERT TABLE 1 ABOUT HERE

Table 1 summarises the policy responses to the four crises suffered by the Basque Country in the last forty years. More precisely, it informs us of the nature of the shocks and the economic consequences of each crisis for the region, the policy responses established and implemented in each period, the key agents involved in those responses at the regional level, the regional policy governance in each of the periods and the subsequent impact of the policies on the region's policy path. Given that the focus of this paper is on how policy responded, the table distinguishes between the main policy responses following an adaptation strategy – which were directed in the different periods to face the imminent consequences of the crises leading to short-term resilience – and the most relevant policies for adaptability and long-term resilience. In addition, the table includes information about the policy domains and instruments implemented and the government level

responsible for delivering those policies, which are categorised according to key characteristics (horizontal/targeted; supply/demand side).

4.1 First crisis: 1976-1983: economic crisis and industrial restructuring

The first economic crisis, which originated in the global oil crisis, had a great impact on the Spanish economy as the country was also in the midst of a radical political and institutional change. At that time, the region had developed a considerable overspecialisation in certain industries (iron and steel, machinery), which could have triggered a lock-in effect. All these factors, together with the rise in terrorism perpetrated by ETA, put the region in a very unstable situation and business environment, which resulted in many enterprises closing and high unemployment rates in those industries (Aranguren et al., 2012; Magro and Valdaliso, 2019).

In terms of the policies implemented at that time, we can distinguish between those that responded to the immediate crisis, where macroeconomic policies such as the national government's monetary policy (lowering interest rates) can be highlighted, and also some regional policies introduced by the newly created Basque government in 1980. As far as responsive policies are concerned, the Basque government implemented restructuring policies based on financial incentives (loans, aids) oriented toward those industries that were not included in the national support system.

It is worth mentioning that the Basque Country is one of the regions in Europe with relatively strong policy powers and competences as a consequence of the devolution process that started in the 80s. Therefore, that period was the starting point for creating and developing a regional policy architecture that enabled the region's policy path to be created, later reinforced in the following years (Valdaliso et al., 2014; Magro and Valdaliso, 2019).

Concerning the policies that contributed to the region's adaptability, the Basque Country implemented a supply-sided and horizontal technology policy to upgrade the then existing industries and disseminate new technologies like microelectronics. In addition, a new energy policy was launched that sought to diversify the energy mix and promote energy efficiency (Aranguren et al., 2012; Magro and Valdaliso, 2019). A small group of policy entrepreneurs from the regional government together with Research and Technology Organisations (RTOs) supported these policies.

4.2 Second crisis: 1992-1994: economic crisis and transition towards a knowledge-driven economy

Although this second crisis was shorter and less severe than the first one, and Spain's integration in the European Economic Community had positive effects in terms of openness, the Basque economy experienced a rise in unemployment, a decrease in GDP and the closure of many firms, as they lacked the capabilities to compete in the European market.

As in the previous crisis, the Spanish government implemented monetary policies, such as currency devaluation. Complementarily, in order to support the business sector, the Basque government adopted fiscal and financial measures oriented toward restructuring the economy.

Furthermore, the Basque government used the crisis as an opportunity to transform its economy and implemented a set of policy measures to promote diversification towards industries such as aeronautics, ICT, and knowledge-intensive business services (KIBS). This diversification strategy was built on previous regional capabilities and constituted a path extension (Magro and Valdaliso, 2019). This transformation was possible thanks to implementing a policy mix that combined cluster policies, technology, internationalisation, and urban policies, among others. While some of these policies were aimed at specific target industries and, therefore, could be considered targeted industrial policies, horizontal and supply-side policies and instruments still prevailed. This regional transformation (based on path extension and path renewal) was primarily led by a group of policy entrepreneurs from the regional government, though other regional actors from the triple helix (business, RTOs) also played a relevant part. In this regard, the creation of different organisations, such as cluster associations, and public-private partnerships contributed to institutionalising the policy discourse around industrial issues. Until the next crisis, the prosperity and economic growth of

the region guaranteed a stable and solid economic development based on efficiency, science, technology, innovation and diversifying into new industries. This diversification followed the related variety path already established, but also new unrelated diversification based on bioscience and nanotechnologies emerged and required different policies. This diversification was fostered following a rationale that afterwards was one of the key elements of the smart specialisation strategies (S3) concept, which refers to the innovative potential that the combination of General Purpose Technologies such as nanotechnologies has to transform traditional sectors (Foray et al., 2011) The measures introduced to support these diversification processes were a combination of targeted and horizontal policies, mainly oriented to creating STI capabilities towards these new areas. In fact, at this stage, different STI organisations were created to support these development strategies (Valdaliso et al., 2014; Magro and Valdaliso, 2019).

4.3 Third crisis 2008-2015: The Great Recession

After a period of constant economic growth, an acute economic crisis caused by a financial crisis hit the global economies and hence also the Basque region. This crisis led to a change from expansionary government budgets to cuts and austerity in policies, mainly affecting areas such as STI. In a similar way to previous shocks, the national government's response to the crisis was a macroeconomic one, supported by additional measures at the regional

level (albeit not as intense as in the previous periods): in this case, institutions at the European level were the main actors, with the European Central Bank introducing a monetary policy.

In addition to this short-term policy agenda, the Basque government implemented a policy mix that was conditioned by the reduction in public budgets and oriented toward reducing overlaps and concentrating resources on particular areas. Therefore, the policy mix implemented with a long-term view aimed to introduce changes in certain traditional policies (clusters, STI, internationalisation) and promote diversification in three priority areas (biosciences, industry 4.0, and energy). These areas were selected because of the convergence between industrial, scientific and technological capabilities, which led to institutional capabilities, constituting the cornerstone of the Basque smart specialisation strategy. This strategy was built around the triple helix governance and was possible thanks to the experience accumulated and capabilities developed over the past decades. The Basque S3 was the most relevant policy in the region, with a strong focus on STI instruments on the supply side. Cluster and internationalisation strategies, which were crucial for the industrial policy of former periods, were adapted so as to contribute to S3. Thus, responses to this crisis once again placed emphasis on targeted policies as mechanisms for promoting economic transformation and adaptability.

4.4 Fourth crisis: The COVID-19 crisis

In 2020, an unexpected shock of a very different nature as compared to the previous ones hit the global economy. A pandemic caused by coronavirus SARS-CoV-2 resulted in a series of socio-economic impacts such as breaks in the global value chains and sharp drops in production due to the mobility restrictions imposed to save lives and safeguard health, and the uncertainty all this entailed. At the time we wrote this article, the long-term consequences of the crisis, which has become more complex due to additional geo-political factors were still unknown.

In contrast to the previous recession, governments have made a strong consensus this time about investing and injecting public resources to reboot the economy. A salient feature of this policy response has been the firm leadership of the European institutions, providing a solid and unified response to the crisis and demonstrating their usefulness after being questioned because of certain events such as the UK's exit from the EU (Brexit). In this sense, the EU has offered its Members flexibility with regard to the fiscal and monetary measures to support business liquidity and protect employment. These measures have been the main reactive response to the crisis leading to short-term resilience and adaptive processes. In addition, the EU has had a decisive role in promoting adaptability by linking the EU's recovery to long-term strategies which seek to address the most

contested grand societal challenge of the last decades, climate change. Thus, the EU recovery plan (NextGenerationEU) includes a new policy paradigm that combines both the green and digital transitions. Meanwhile, a new EU Industrial strategy has been launched, which constitutes the core element of this new paradigm. In the Basque region, the pandemic has coincided with a new government cycle and a renewed policy agenda. As with the first crisis, the regional government's response to maintain and support businesses in the short run has been a solid one. Apart from loans and other financial instruments that have provided firms with liquidity, it has fostered mechanisms that help implement ICT in firms faster, given that the restrictions implemented to tackle the pandemic have accelerated the ICT transition. Additionally, R&D subsidies for research related to COVID-19 have been granted (Magro et al., 2020).

The Basque government has designed different strategies to achieve recovery in the longer term, although with a transformative aim. Among these strategies, there are two that stand out. The first one is the Basque S3 (STIP2030), which have evolved from the previous S3 and which have placed the green, digital, and socio-demographic transitions at their core, this being the main change. This change could constitute a basis for a new generation of innovation strategies for sustainability . However, the Basque government has also launched an ambitious industrial strategy where the three

transitions are considered not only trends but also opportunities to develop new industrial paths. This industrial strategy includes specific instruments for different policy domains (STI, energy, education, cluster, internationalisation, finance, entrepreneurship, digital, infrastructures, etc.), which makes it a very comprehensive policy mix. In addition, the Basque Law of energy transition and climate change could be included under the industrial policy-mix umbrella. Hence, the Basque government has incorporated stronger directionality in its industrial policy, targeting specific activities (not industries) with the aim of transforming and adapting its economy. Unlike former policies in previous periods, among the instruments incorporated in both the Basque S3 and the Basque Industrial Policy, a greater emphasis has been put on the demand-side instruments, such as public procurement, which shows the potential entrepreneurial role governments may have. But this role is not exclusive to government since these policies rely on an inclusive governance system already functioning in the region.

5. Discussion

The long-term analysis of the case provides an understanding of the evolutionary role of place-based industrial policies and their transformative potential for addressing grand societal challenges. More concretely, the Basque case shows how different policy mixes were adopted during four

different time periods in an evolutionary and accumulative manner. Despite the contextual characteristics of each of the four crises and the situation of the Basque region at those times, two distinct stages of industrial policy development can be distinguished, where both contribute to short- and long-term resilience and to generating transformative changes by creating new regional paths or transforming the already existing ones. Although all the periods analysed have contributed to the region's resilience and transformation, some differences may be observed between the periods in terms of the policy rationales, the combination of instruments, and their directionality, as shown in Figure 3.

INSERT FIGURE 3 ABOUT HERE

Thus, in the first and second crises, which might be considered the early stage of policy development, the policy-mix approach included horizontal and selective policy measures in the fiscal, monetary, labour and financial policy domains that responded directly to the crisis and fostered adaptation processes. Most of the instruments used were on the supply side (subsidies, loans, tax incentives) and followed a market failure rationale which enabled the Basque Country to bounce back from the crisis. We can observe from the case that, in the first stage, the national government was the main body responsible for these measures together with the regional government as

monetary policy was not yet a competence of the European Union at those times.

Additionally, in the early stage of the policy development, adaptability processes were promoted through a combination of policy measures covering several policy domains, such as STI, internationalisation, energy, education, or cluster policies. Along with market rationales, these policies also followed a systemic rationale, e.g., building a sound regional innovation system or developing a cluster policy. Although this systemic approach may be pursued through demand-oriented instruments, such as public procurement of innovation (Smits and Kulhmann, 2004), and these might be adequate mechanisms for change oriented toward societal challenges (Boon and Edler, 2018; Uyarra et al., 2020), the Basque case shows how supply-side instruments were more intensely used at first, leading to diversifying into new industries (i.e., aeronautics, ICT) and upgrading the traditional ones through technology or expanding energy sources. This early stage corresponds to Frame 1 and 2 as explained by Schot and Steinmueller (2018), that means to policies aiming to economic grow and developing innovation systems.

But the Basque case also shows a second policy stage with an evolutionary change in the policy mixes. This shift is not relevant in terms of fostering adaptation, and the use of similar policy mixes in previous crises can also be

observed in the third and fourth subperiods. The most singular characteristic that might be highlighted in this case is the key role of the supranational level (European Commission) together with national and regional ones.

Regarding adaptability-oriented measures, the case illustrates a two-step process. First, smart specialisation strategies were adopted in the region, which constituted the first directional approach to innovation and industrial policy. The implementation of the smart specialisation strategy (S3) in the Basque region provided directionality not only to the STI policy but also to other policies like internationalisation, which dedicated more resources and gave support to the selected S3 priority areas (advanced manufacturing, energy, health, among others). These priority areas, which were based on the pre-existing regional capabilities, were supported by a combination of directional and horizontal measures based on the systemic and evolutionary rationales, seeking to transform the region's economic structure. Complementary initiatives (public but also public-private and private-private) were started to reinforce this directionality (i.e., research demonstration infrastructures); and while demand-side measures, such as public procurement to encourage innovation, were experimentally launched in the priority areas (mainly in health), most policy instruments remained supply-oriented. Moreover, in this first step, the role of clusters became even more relevant as mechanisms that promote learning and interactions among

regional actors from different industries and facilitate their international connection (Aranguren et al., 2019).

Second, a more prominent role was played by industrial policy mixes in addressing grand societal challenges, such as the green transition, and fostering long-term resilience. The pandemic crisis of COVID-19 has given a new boost to the directionality of policies and strategies already defined and implemented at the supranational and national levels (such as the European Green Deal), which in turn influence the regional policy mixes. When examining the Basque case, a shift may be perceived from the S3 as the main regional policy paradigm to a stronger industrial policy-mix of complementary policies. These include not only supply-oriented measures, but also demand-oriented ones, namely green procurement and different government initiatives to articulate and foster markets always oriented to the green, digital and socio-demographic transitions, which have become the cornerstone of the EU policies. In addition, we can observe that at regional level the policy mix includes measures directed to destabilise the existing regime as described by Kivimaa & Kern (2016) such as the Law on energy transition and climate change. In this sense, the current Basque industrial policy mix has been designed to transform the regional economy and contribute to key societal issues. Therefore, the industrial policies implemented in this second stage of development are in response to failures

in terms of transformation (Weber and Rohracher, 2012) as they incorporate not only directionality but also specific mechanisms for articulating demand and coordinating the policy measures needed to address grand societal challenges. In this regard, policy-mixes combine policies and instruments from Frame 1 and 2 with others more aligned with Frame 3 as described by Schot and Steinmueller (2018). The initial adoption of a new policy paradigm in the region has relied on existing networks and institutional configurations, which shows the relevance of place-based structures for addressing grand challenges (Tödting et al., 2021).

The case also shows how constant industrial policies have contributed to developing not only adaptability and transformability but also preparedness and persistence, dimensions that are relevant for dealing with major societal challenges.

6. Conclusions

The evolutionary approach to resilience provides a framework for understanding the underlying transformation processes and their relationship with policies. In this paper, we use a long-term case to analyse the evolution of policy mixes with a strong focus on regional industrial policies and their possible contribution to transformative change. Thus, we argue that *policy mixes* for addressing grand societal challenges should combine short- and long-term processes and instruments from different

frames. In this regard, reactive instruments are crucial not only for regions to bounce back but to produce the desired change or to “build forward better” (Martin, 2021) through adaptability processes supported by targeted and strategic measures.

Among the policies and measures designed to solve market and systemic failures are smart specialisation strategies, which can be regarded as regional transformative strategies and drivers of change. But if they are to be transformative, they also need to incorporate industrial and demand-side measures with directionality towards grand societal challenges and not only to transform regional productive structure.

In addition, the paper discusses how policies from different government levels might contribute to transformative change. Thus, even though policy paradigms might come from the upper policy levels (national and supranational), influencing the policy mixes, they need to be adjusted to the context of each region, which makes the implementation of policy paradigms a place-based issue. Therefore, the ‘entrepreneurial state’ (Mazzucato, 2019) is fragmented into the different policy levels, and policy coordination becomes even more crucial.

Moreover, the case analysis shows that regional policies contribute to long-term resilience, whereas supranational and national policies have a priori a greater impact on short-term resilience. However, the case also shows how

supranational and national policies are also very relevant for changing paradigms that contribute to long-term resilience Short-term policies are more resource-dependent, supply-oriented, and aim to address market failures, while long-term policies, especially at the regional level, are better at helping develop flexibility, i.e., to achieve the transformability needed to face grand societal challenges. For this purpose, they need to evolve from the first policy stage in which systemic and horizontal policies predominate to a second stage where policy mixes respond to the failures by effecting transformation and should concentrate on the demand side. This provides industrial strategies with a new role, putting them back on the policy scene.

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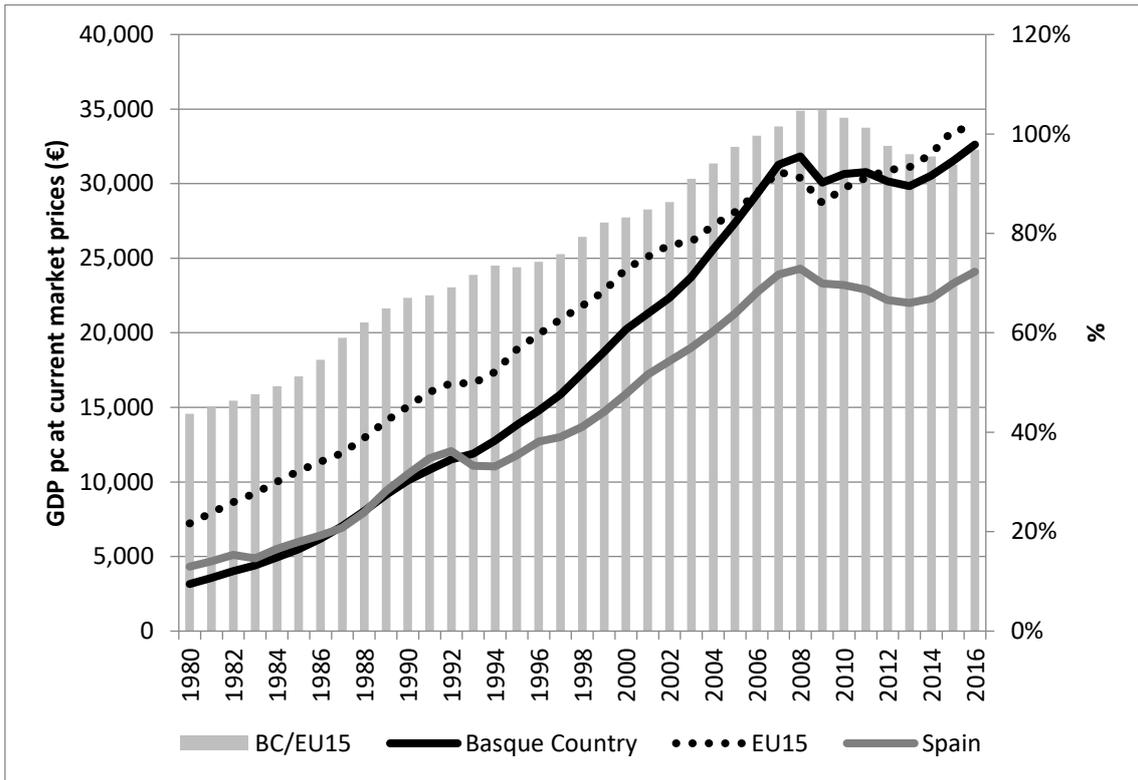
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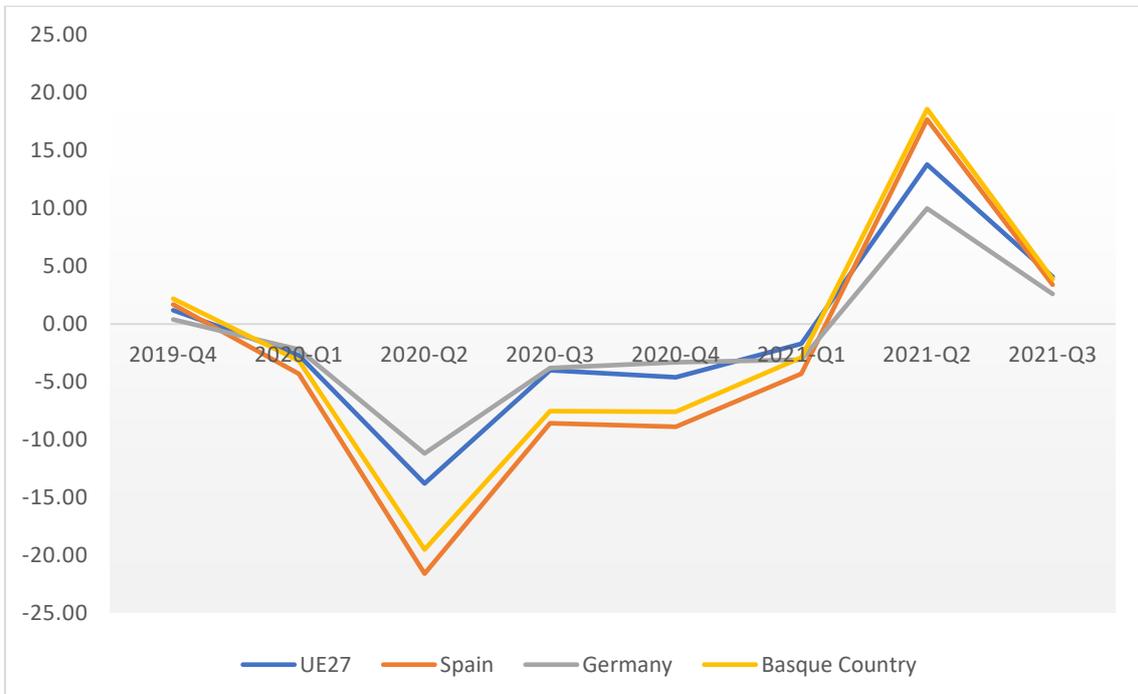
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Figure 1: GDP per capita in the Basque Country, Spain and the EU-15, 1980-2016



Source: Magro et al. (2021)

Figure 2: Interannual variation of GDP (% of change)



Source: Eustat and Eurostat. Own elaboration

Table 1: Basque policy responses to four crises

Crisis (and underlying structural changes)	Consequences	Policy responses and instruments	Key agents	Governance	Impact on growth and the policy path
1976-1983: economic crisis and industrial restructuring; radical political and institutional change in Spain	Decrease in GDP Rise in unemployment Disappearance of firms Danger of lock-in due to the region's economic overspecialisation Socio-economic instability	Adaptation: - Industrial restructuring at the sector and firm level (subsidies and other aids from the Spanish National Government [NG] and the Basque Regional Government [RG]) - Industrial promotion (loans, aids...) (NG and RG) - Currency devaluation (NG) Adaptability (supply side) (RG): - Technology policy (technological upgrading of the main industries at that time) - Energy policy (new energy sources)	NG and RG Institutional entrepreneurs (in the RG and Research and Technology Organisations (RTOs)) RTOs	Government-led response to the crisis	Path extension Policy path creation
1992-1994: short economic crisis (macro disequilibria); single European market (complete openness of the Basque economy): transition from a factor-driven to a knowledge-driven economy	Decrease in GDP Rise in unemployment Disappearance of firms Firms lacking the skills to cope with the advent of the single European market	Adaptation: - Industrial restructuring and promotion (loans, subsidies, and fiscal aids) (RG) - Currency devaluation (NG) Adaptability (new horizontal policies & some targeted policies on the supply side, RG): - Technology policy (upgrading and diversifying into new sectors) - Cluster policy (existing and new sectors, e.g., aeronautics, ICTs) - Internationalisation policy - Policies towards business change (and promotion of new KIBS) - Energy policy (new energy sources) - Urban policy (Bilbao, and new sectors, e.g., creative industries)	NG and RG-Regional Development Agencies (RDAs) (SPRI* and EVE**) Institutional entrepreneurs (in the RG) RTOs Firms	Government-business coalition led by RG whose aim was to react to the crisis and transform the economy	Path extension Path renewal Policy path dependence

* SPRI: Basque Business Development Agency.

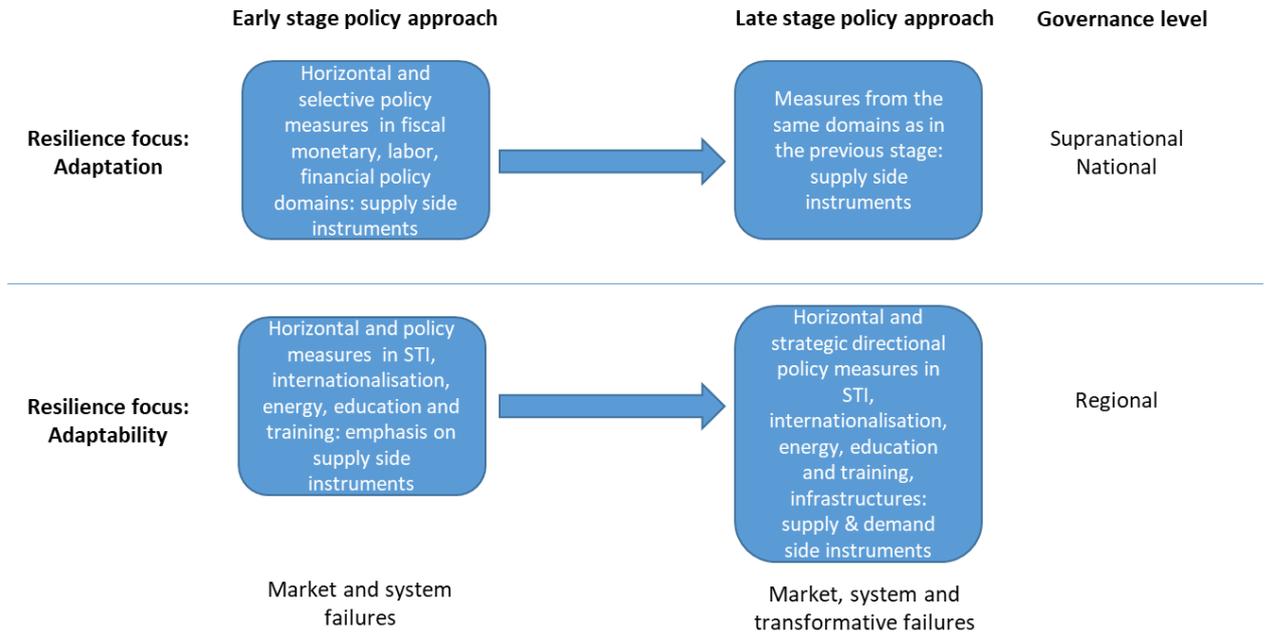
** EVE: Basque Energy Board.

Crisis (and underlying structural changes)	Consequences	Policy responses	Key agents	Governance	Impact on growth and the policy path
2008-2015: financial and economic crisis and fiscal consolidation	Decrease in GDP Rise in unemployment Disappearance of firms Fiscal consolidation: budget cuts	Adaptation <ul style="list-style-type: none"> - Labour market reform and wage cuts (NG) - Reduction of interest rates (ECB) - Scarce financial support granted to firms in crisis (loans, aids, RG) Adaptability (policy change and new policies, new horizontal & targeted policies emphasis on the supply side, RG) <ul style="list-style-type: none"> - Policy change regarding clusters, internationalisation and STI - New policies: S3 (Basque Industry 4.0, Energy and Health), diversification and creation of new sectors (biosciences, clean techs) 	NG and RG-RDAs (SPRI and EVE) Firms and Cluster-associations RTOs and Universities Other (Innobasque, Orkestra)	Triple Helix coalition with a shared (place-based) leadership (CVCTI ^{***}) to anticipate and transform	Path extension Path renewal and path creation Policy path dependence and change
2020-on-going economic crisis caused by the COVID-19 pandemics. Awareness of the need to address societal challenges	Decrease in GDP Rise in unemployment Decrease in production Break in the global value chain (GVC)	Adaptation: <ul style="list-style-type: none"> - Employment protection (EU/NG) - Fiscal policy and flexibility in EU rules (EU) - Solid financial support for businesses (loans, subsidies) (EU, NG, GR) Adaptability (policy change and new policies, mix of horizontal & targeted policies, emphasis on strategic measures and on the demand side, RG) <ul style="list-style-type: none"> - Change in S3 through the introduction of green and digital transitions by the RG) - Industrial policy oriented towards transitions with a stronger demand orientation (RG) - Regulation on energy transition and climate change Adaptability: New framework policies at the EU and NG level focused on green and sustainable recovery: NextGenerationEU, European Green Deal, New Industrial Strategy	UE, NG, RG, Regional Agencies Cluster associations Public-private partnerships	Strong leading role of governments (entrepreneurial state) Collective agency through available mechanisms	Path renewal and path creation Policy path dependence and change

*** Basque Council of Science, Technology and Innovation.

Source: Based on Magro and Valdaliso (2019) and Magro et al. (2021)

Figure 3: Stages of industrial policy development & policy mixes



Source: Own elaboration

