



S4 + and the Sustainability Dimension for a New Territorial Perspective

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Abstract. The European Commission has made sustainable development a central element of its growth strategy for the next few years. From an all-encompassing perspective, the European Green Deal (EGD) represents the EU's contribution to the Sustainable Development Goals (SDGs), the “Smart Specialization Strategy” (S3), and the attempt of the EU at a position of global leadership in sustainable development. This paper states that an effective innovation-oriented policy, including a sustainable dimension, requires an adequate division of labour between the EC, national and regional/local governance levels, and the shift from S3 to S4 +, a smart specialization sustainable strategy. It also underlines how a territorial approach to policies is suitable for incorporating a five-helix innovation model and is well suited for implementing S4 +. Therefore, the Ecological Transition, illustrated in the EGD, requires a new governance design and management attitude. This contribution proposes a framework for implementing the new EGD strategy and the consequent implementation of the sustainability dimension. Numerous challenges focus on the sub-regional level highlighting the Community-Led Local Development (CLLD) as a tailored governance model that can include Sustainability and innovation in a complete democratic setting.

Keywords: S3 · S4 + · Quintuple Helix · Sustainability · Territorial Governance · CLLD

1 Introduction

The COVID-19 pandemic emergency has involved the entire planet and, in addition to having had severe repercussions for the health of humanity, has caused severe social and economic difficulties. The European Union (EU) has undertaken a wide range of policy initiatives and health measures to mitigate the economic and social crisis of COVID-19. Still, the pre-existing production capacity and the previous market logic are no longer a feasible task, and we are dealing with a new scenario based on a sustainable recovery. It becomes essential to discover and start new and innovative activities that can provide high-quality growth opportunities and deal with our time's environmental and social challenges. The main objective is to guide the EU toward a development path focused on ecological Sustainability the territorial and social cohesion. The EU looks at

a transition towards economic carbon neutrality, using digitalization, and fostering technological change in the context of globalization. In this context, the Smart Specialization Strategy [1] can be central to supporting innovative activities that help the territories discover new opportunities for more sustainable and inclusive economies. On the path towards a more inclusive and sustainable society, the European Union has made conscious and long-term choices. First, the UE has embraced the Sustainable Development Goals (SDGs), an urgent call for action by all countries, outlined in the 2030 Agenda. In a few words, a model of progress based on economic, social, and environmental Sustainability was adopted by the United Nations (UN) General Assembly in September 2015. The 2030 Agenda for Sustainable Development and its seventeen Sustainable Development Goals (SDGs) bind the 193 Member States to ensure sustainable and inclusive economic growth, social inclusion, and environmental protection, thus promoting peace, just, and inclusion through a broad global partnership. In addition, in December 2019, the European Commission presented the communication on the European Green Deal [2, 3]. The European Council indicated the new “Green Growth Strategy” in December 2020. It committed itself to the EU’s green transition, providing political guidelines on EU policies to achieve zero climate impact by 2050. Therefore, the European Transition for the next decades is to embrace the dimension of Sustainability with a holistic and omnipresent vision within future investment strategies and choices. Through a suitable governance approach, the work looks at innovation policies under the sustainability dimension and their potential effectiveness in European territories.

This contribution proposes a reference framework for achieving the European sustainability objectives. In the following, we outline the main elements of each section. The following paragraph presents the European Ecological Transition as a challenge and opportunity for the near future. The third paragraph highlights the relative evolution of innovation policies, which led to the transition from S3 to S4 + [4]. In a concrete effort to include the environment in the development strategy, the fourth paragraph connects the new S4 + to the Quintuple Helix innovation model [5], an excellent theoretical basis for implementing innovation with a systemic vision. The fifth paragraph explicitly references the territorial transition of governance necessary for implementing innovation policies with an idea of Sustainability. The sixth paragraph describes and proposes how community-based local development [6] is suitable for managing innovation in various European territories. Finally, the conclusions summarize the logic of the structure used in this work and propose reflections for further investigations on the subject.

2 The European Ecological Transition

The European Green Deal (EGD) approved 2020 is a set of policy initiatives by the European Commission to make the European Union (EU) climate neutral in 2050. The European Green Deal contemplates a series of different measures - including new laws and investments - designed for the next thirty years in the way of a sustainability view. The EGD started Europe into a climate-neutral, just, and prosperous society. Implementing these goals involves evolving from a linear to a circular economy, farm-to-consumer Sustainability, building a global food and agricultural system, a clean and resilient energy sector, and regulated social investment, including education, health, gender equality,

and rural education development [2, 3]. An innovation policy is necessary to implement the objectives of the EGD, which calls for a type of systemic innovation in which new solutions emerge from the combination of technologies, infrastructures, skills, and entrepreneurship, which involves citizens and local administrative capacity. In addition to new technological solutions, the European Ecological Transition requires significant changes following a new operational mindset. Besides pertinent upper system-level changes, a successful Ecological Transition requires a deep regional and local engagement. The European Green Deal statement framework indicates that the focus in research and innovation policy should be to achieve the necessary change, where innovative solutions can accelerate the shift towards Sustainability [4]. The object is to ensure a more sustainable development path.

Furthermore, the Green Deal underlines the importance of diversity within the EU. The Strategy's success will depend on recognizing local territories' diversity, places' cultural and social diversity, and the different characteristics present in urban and rural environments. Therefore, attention to territorial peculiarities can lead to a sustainable development path that respects these differences and develops the most relevant innovative potentials through innovation processes. In these aspects, the Smart Specialization Agenda provides an ideal platform for an EU journey towards implementing the Green Deal goals. Indeed, it already constitutes the combination of innovation-driven and entrepreneurship-driven activities linked to locally consolidated governance capacity on an urban and regional scale. In addition, in the new approach of European Cohesion Policy 2021–2027, a clear policy trajectory is required to improve Sustainability, entailing that the dimension of Sustainability is included within the essential S3 programming elements. The Ecological Transition marks a step toward transformative development, where research and innovation policies support the necessary innovative change in the direction of Sustainability. Therefore, the role that regional smart specialization strategies can play in this phase of evolution is of significant importance for repositioning Europe as a leader of a new growth model that follows the rules of environmental Sustainability. Through the Regional Innovation Strategy, Europe's diversities can take on value and turn into resources. Sub-national areas can identify and make the most of the industrial opportunities of the European Green Deal, engaging and co-creating with citizens. The European Green Deal can have very different regional implications, depending on the region's starting situation. Therefore, the challenges will be diverse within the European territory. At the local level, policymakers will have to deal with all the problems of alignment, stability, and coordination between various stakeholders, often contradictory or related to monopoly positions. The European Union needs a radically new political stance at the regional and local level compared to the previous traditional S3 policy, with policymakers facing problems of incentive alignment and horizontal and vertical coordination [4].

3 From S3 to S4 +

The Smart Specialization Strategy (S3) [1, 7] was conceived based on fundamental ideas such as minimizing the risk of dispersion of investments in research and innovation (such as training R&D expenditure) and the capacity to enhance existing knowledge

and innovation potential in a region. These paths included relaunching existing clusters in innovation and the “discovery” of new possibilities. The implementation of the Smart Specialization Strategy has initiated integrated actions contemplating a plan for a specific and place-sensitive economic change, focusing on the strengths of the reference territory and its competitive advantages [7]. The S3 has set itself the goal of focusing on all types of innovation, not just the technological one, with the involvement of a wide range of actors in developing the regional innovation strategy and defining priorities specific to the territories. The Strategy aims to promote an authentic chain of innovation and competitiveness, capable of transforming research and innovation, resulting in a competitive advantage for the production system and an effective increase in the well-being of citizens. The regional strategies formulation was an ex-ante conditionality for activating the interventions of the Structural and Investment Funds. In addition, it was the opportunity for the European regions to build a framework of coordinated actions to outline the specializations most suited to one’s potential for innovation and to design coherent, targeted, and accompanying selective paths. The initial logic of the Strategy stems from an aspatial concept of innovation [1], but it evolves to the regional and spatial aspects that influence innovation [8]. The Smart Specialization Strategy has adapted to the logic of a place-based approach [9], where the different levels of government share the implementation of the policy with particular attention to performance and results and the mobilization of local actors [10]. The S3 underlines how the innovation process is an open system in which different actors collaborate and interact to promote an open and inclusive governance system that supports the participation of traditional and new innovators. Smart specialization is a policy framework in the EU policy portfolio that combines top-down directionality with bottom-up activities involvement. According to Boschma [11], Smart Specialization has positive characteristics, such as a place-based and location-sensitive regional innovation policy strategy. Smart specialization has mobilized new forms and modalities of sub-national decision-making and coordination focused on collaborative engagement and policy formulation in public, private and civil society spheres. In the new programming period for 2021–2027, Smart Specialization Strategy should continue to play a significant role in regional development and cohesion inspired via an innovation paradigm that respects the dimension of Sustainability. The first generation of Smart Specialization has stimulated knowledge-based growth through better use of resources oriented to research and innovation. However, we are going through a phase of post-S3 change that considers new aspects of development and collective well-being essential. The new Smart Specialization Strategies 2021–2027 must incorporate the Ecological Transition. A reorientation and updating of the logic of Smart Specialization towards the objectives of the European Green Deal can provide a basis for a path towards sustainable development. In particular, making the most of the entrepreneurial and innovative spirit of the EU economies, interconnected to sustainable and inclusive growth, a structural shifting towards the S4 + [4]. The S4 + provides an ideal platform for achieving the Green Deal objectives. The transition from S3 to S4 + changes the logic behind regional development strategies in Europe. The programming elements of the S3 remain the same but, at the same time, added, at the EU level, an explicit and unambiguous focus on the required trajectory of locally driven innovation toward Sustainability and inclusiveness [4]. The entrepreneurial discovery process

(EDP) in the S3 is a core element, but with a lacking standard definition from the begin. It reflects learning process-oriented to a territory capable of setting the priorities on which the area of research and development of innovation should focus [12]. The EDP is a central element in regional endogenous growth. In other words, EDP combines creative methods of using the opportunity derived from possessing endogenous territorial assets [13–15]. Entrepreneurial discovery is an inclusive process in which the relevant stakeholders detect new and potential activities and notify the government. The government assesses this information and empowers those actors most capable of realizing the potential. This process mainly distinguishes Smart Specialisation from traditional industrial and innovation policies. In the broader context of the Smart Specialization Strategy, the entrepreneurial discovery process assumes different meanings. A well-specified summary appears to be that of Gianelle et al. [16], which define EDP as the result of an inclusive and evidence-based process driven by stakeholder engagement and attention to market dynamics, which drives investments. The scenario underneath S3 indicates that the right priorities for a given territory should engage territorial stakeholders, such as businesses, government, universities, and civil society, who possess the necessary knowledge to develop strategies suited to a given context [17]. However, after years of implementation is a challenging concept for most European regions and countries, probably due to a lack of territorial analysis and EDP contextualization. However, new elements can improve past results and missing targets. Today, this interaction contemplated in the Quadruple Helix Model related to Universities, Industry, Government, and civil society see the natural environment (fifth helix) as an essential element of the S4 +, a cornerstone for a development-oriented toward Sustainability [5, 18].

S4 + indicates bottom-up collaborative governance structures and multi-actor collaboration in a regional context to frame and inform the support structure for innovation and growth by seeking the distinctive elements of the territory. It, therefore, reflects a territorial governance approach, which supports regional specificities with a place-based vision. Through the EDP, the interested stakeholders identify the essential domains or those areas of research and development or innovation that characterize or can characterize a given geographical context. The goal of the smart specialization is for regions to identify opportunities to build competitive advantages in high-value-added activities [19]. All this presupposes that each area has a diversified economy and institutional structures that can determine the potential for future development, rejecting, in fact, universal policies applicable to each specific context [20, 21].

4 The S4+ and the Quintuple Helix Innovation Model

The concept of innovation has different meanings over time and is constantly evolving [22]. Considering innovation as a process that involves diverse cooperating actors, an ecosystem fits well an innovation system. The Helixes Models develop an approach to innovation considering an ecosystem where territorial actors play an essential role [18, 23, 24]. The Helixes refer to actors in relationships with each other favoring knowledge production in a given context. Identifying innovation as a process involving different actors, government, institutions, industry, civil society, and the natural environment requires acknowledging the factors influencing each helix or actor in innovation.

Innovation is a process that involves several phases [22]. It requires the cooperation of subsystems involved with varying intensity in the various stages of the overall activity [25–27]. The role of each subsystem becomes decisive in the innovation system, reflecting a synergistic process with non-linearity characteristics.

The basic model of the three-Helix [28] highlights the ability to generate innovation through the interactions between universities (higher education), industries (economy), and public authorities (government). The addition of the fourth helix represents civil society's bottom-up actions and opinions. It indicates how social networking capabilities increase the probability and impact of knowledge [23]. The nonlinear innovation model of the Quintuple Helix combines knowledge, know-how, and the natural-environment system into one interdisciplinary and trans-disciplinary framework. The Fifth Helix Model approach can enhance civil society participation and connect ecosystem value creators, i.e., users of innovation who can become innovative co-creators and do so in an Eco-sustainable way.

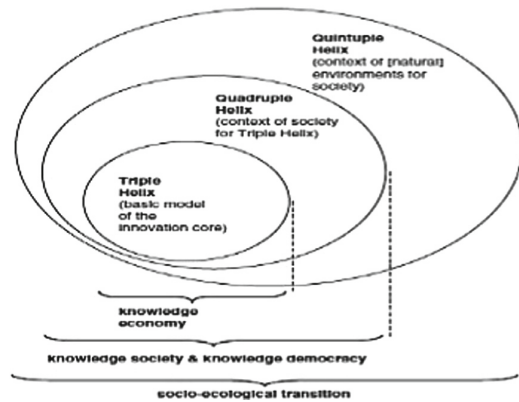


Fig. 1. Quintuple Helix Innovation Model [5]

The environmental helix represents the European Green Deal's crucial objectives concentrating on sustainable development for the future of European growth. The logic of the Quintuple Helix allows it to tackle existing environmental challenges and deal with the Ecological Transition. Adopt a Quintuple Helix Approach in the Smart Specialization Strategy means understanding the roles of innovation actors in a regional or sub-regional system in a sustainable way. An evolution of the policy logic from S3 to smart specialization strategies for sustainable and inclusive growth (S4 +) [4] implies a policy change where regions may contemplate setting policy priorities to drive innovation and the same time, response to societal challenges, including Sustainability. The Quintuple Helix Model can indicate a suitable model in theory and practice to understand the link between knowledge and innovation, forwarding sustainable development.

The Quintuple Helix is complete, with the environment becoming an essential element in the innovation and knowledge system. [26].



Fig. 2. Quintuple Helix Model [26]

5 The Transition to Territorial Governance.

The Green Deal involves a multilevel governance (MLG) framework and different governance levels between European, national, and regional/local policymaking. Therefore, the success of multilevel governance in achieving the Sustainable Development Goals will depend on how each governance level will contribute to the mission [4]. A solid governance configuration is a critical enabling condition for effectively implementing Sustainable Smart Specialization Strategies. An S4 + approach changes policy implementation structurally because innovation becomes systemic, focusing on synergies between innovation, Sustainability, infrastructure, and skills [8]. An intervention policy concerning a specific geographic context must consider all elements indicated. Therefore, implementing the Smart Specialization Strategy should refer to a territorial governance (TG) model that considers the peculiarities of a specific geographical area. The MLG examines policymaking across different levels of governance. Alongside the MLG, the territorial governance approach imposed itself. Implementing and forming policies based on local knowledge require territorial attention, and the TG focuses its reach at the sub-national level. In European policy, the concept of TG first emerged in spatial planning studies as a holistic instrument for backing spatial planning work [27, 28]. In the last years, the concept of TG has gained traction among EU and OECD representatives [29].

The TG is considered crucial both for implementing significant European policies, including the EU 2020 Strategy, the EU Territorial Agenda 2020, and EU Cohesion Policy [30, 31], and also for gathering the Sustainable Development Goals (SDGs) [32].

Territorial governance is an organizational model of collective territorial action, where emerging openness and transparency process, cooperation, and coordination, both horizontally and vertically [33]. Specific elements characterized the TG, such as the bottom-up approach, allocating power to the lowest levels of governance, and creating an open, transparent, and democratic political process. Furthermore, the TG allows the development of strategies and solutions for territorial challenges [29, 30, 34, 35]. The territorial dynamics can be managed with significant flexibility, making consistent the processes and tools and evolving the monitoring and assessing territorial impacts; so even delineating different territorial boundaries for dealing with changeable policy questions

or problems. Therefore, the spatial aspect becomes crucial to developing and managing specific strategies with a place-based approach. The main characteristics that identify and distinguish the TG concern managing territorial dynamics, monitoring and assessing territorial impacts, and delineating boundaries for dealing with different policy questions or problems [28]. Table 1 overviews five crucial dimensions of the TG concept specified in the academic literature [33–36] and adopted in the table by Moodie et al. [29].

Table 1. Critical dimensions of territorial governance (TG) [29]

Dimension	Key features
Coordinating actors and institutions	TG strengthens links between sub-national authorities and other public and private actors, with policymaking agencies devolved to the lowest level, vertically embedded in multilevel governance structures
Integrating policy sectors	TG creates horizontal synergies between public, private, and civil society actors, enabling the development of new-networked ecosystems that add to territorial cohesion
Mobilizing stakeholder engagement	TG approaches provide a voice to all relevant and interested actors, allowing them to shape the policymaking process and enhance regional autonomy and accountability in public administration
Adaptive to changing contexts	TG is reflexive and adaptive to changes in a territorial context, with actors able to review and revise territorial policies in light of new information and learning
Place-based/territorial specificities	TG is a bottom-up process driven by local knowledge creation that focuses on finding solutions to territorial challenges through focused visions and strategies

The S3 model accurately reflects and aligns with the concept of TG because it proactively involves the sub-national dimension in developing bottom-up policies guided by local knowledge and skills [29].

A relational approach allows for interpreting the most complex territorial relationships and identifies competitiveness in trust, sense of belonging, creativity, relationality, and local identity. Therefore, the concept of innovation in adherence to a territorial approach identifies the territory's ability to trigger innovative mechanisms and invest in resources linked to the territorial context through spatial relations. Material aspects such as infrastructures, the presence of large companies, and intangible aspects such as knowledge, creativity, entrepreneurship, and social capital are all elements of the development of sub-regional areas. They are generated by endogenous processes (development of local knowledge and creativity) and via exogenous operations (investments by multinationals and the public sector). In short, a combination of traditional elements of development and the local territorial capital [37].

Table 2. Smart Specialization Strategy and Territorial Governance (Authors' elaboration)

	Smart Specialization Strategy (S3)	Territorial Governance
The structural pattern of interaction	Bottom-up territorial governance (TG) approach: regional stakeholders working in collaboration with public authorities to frame policy direction	Network: polycentric
Functional scope	Narrow (domain-specific)	Narrow (task-specific)
Geographical scope	Sub-national level	A core focus on the sub-national level: congruent boundaries
Jurisdictions	Limited and non-intersecting	Limited and non-intersecting
Institutional stability	Fluid and flexible in time and space	Fluid and flexible in time and space

Territorial development policies (policies with a territorial development approach) must primarily help regions to build their territorial capital. All or part of territorial capital elements results from a specific context's history. It determines the productive vocation and the development path to build local development strategies. Several empirical studies [38–40] on the endowment of territorial capital show that it is not the presence of all the relevant elements in the development path but the presence of different complementary or synergistic components, and from one of them, balanced development. Thus, also, econometric analyses [41] indicate the presence of knowledge and a high social and relational capital as determining factors in the growth trajectory of European regions. Therefore, it is necessary to focus on governance initiatives directly involving local actors, with a place-based approach [9] to foster development. The local development paradigm assumes that each territory has a set of assets and values. Local actors should recognize and grasp them to exploit them as sources of local development [42]. The joint action of several actors from the public, private, and non-profit sectors creates relationships capable of strengthening the territory's identity and enhancing its strengths [43, 44].

Furthermore, the positions of the territorial actors and their communication flow within the governance network strongly influence the ability to adapt and learn [45, 46]. The Smart Specialization Strategy represents a multilevel challenge, and the local level is crucial for capturing places' distinctive and constantly evolving needs, facilitating concrete territorial challenges. In addition, the regional level is essential to ensure quality and coherence in the management and evaluation of the process and to coordinate a learning network around the locally activated projects. Finally, regional and local levels must share some actions, such as developing the connection of the local innovation ecosystem with the outside world. Acquiring relevant knowledge from local

stakeholders, usually incorporated and tacit [47], is essential to recognize the potential for innovation in a specific context and, consequently, obtain a practical implementation of the S4 +. Accomplish that acquisition is the result of a participatory governance attitude, which represents an opportunity to incorporate the perspectives and priorities of the local population [48].

6 Which Governance Apparatus is Suitable for the Sustainability Dimension of the Smart Specialization Strategy?

Institutional quality is an essential element for achieving development. In the tradition of Veblen and Commons, [49, 50] institutions are a particular type of social structure with the potential to change agents, including changes to their purposes or preferences. The definition is precise concerning an operational explanation such as the game's rules in a society. However, behind any theoretical aspects, institutions play an essential role in determining the potential of a territory to be developed. Empirical measures of institutions are difficult to determine, but different European regions which are lagging seem to have weaker institutional constructs than their more developed counterparts [51]. Poor institutions affect essential growth-promoting factors, such as the returns on European Cohesion policies competitiveness, weakened entrepreneurship, and the local capacity to innovate. Poor institutions – ineffective local governments, limits in voice and accountability, and corruption – have often directed infrastructure investment towards large projects with dubious economic and social returns. This has led to a rise of extensive projects that may have responded to short-term gains but, in the medium-term, have contributed little to improving the economic performance in lagging areas. If institutional quality cannot be improved, regions will not capture waves of economic possibilities and any innovation process. Even with its solid foundation, this kind of reasoning looks weak. We need, probably, a piece of better knowledge about why the capacity building of institutions does not work correctly in lagging areas, and we look at the strengthening of collaborative relationships according to a multilevel approach [52]. Local governance and development projects typically refer to complex phenomena involving different actors representing diverse interests and importance. The involvement of various stakeholders and the activation of their knowledge are generally considered aspects of “good governance” [36, 53, 54]. However, a recurrent problem is how to mobilize and include these actors and their knowledge in adequate strength for territorial development. Over the years, the European Commission has introduced several new policy instruments designed to enhance the role of the sub-national level in EU regional policy. Community-led local development (CLLD) is a specific tool for sub-regional use and mobilizing and involving local communities and organizations. The LEADER experience of community-based local development is the basic concept founded at the beginning of 1990. CLLD is a tool to strengthen synergies between local, public and private actors to respond to the territory's specific needs. The CLLD approach is community-driven because Local Action Groups implement it (LAGs) and represent the local public and private actors. The LAGs are local socio-economic interests deriving from the public and private sectors. A voluntary process defines the administrative spatial delimitation concerning the territories' needs. We do not have the typical administrative

delimitation of Municipality, City, Province, or Region but a voluntary aggregation of different municipalities with similar socio-economic characteristics. The LAGs develop and implement integrated and multi-sectoral local development strategies. The mission of the CLLD is to support local actors in rural areas in planning and designing development strategies capable of unlocking the unexpressed potential of these territories. The European Commission encourages a Community-Led Local Development approach (CLLD) [6] that focuses on integrated area strategies. CLLD reinforces the communities' strength, transforming local actors from passive beneficiaries into drivers of local development [55]. The CLLD is a method that conforms to policy implementations with a place-based and participatory vision. This approach allows for the integration of different EU funds based on the substantial involvement of local actors in both process phases: planning and delivering. The 2021–2027 Cohesion Policy framework, in addition, supports the development of regional growth strategies by urban, local, or other territorial authorities, which should now be in charge or at least involved in the selection of EU-funded projects. Indeed, the CLLD model has had excellent results in rural development across Europe. The application of CLLD in Europe enumerates about 3000 Local Action Groups, which highlights this policy instrument's capacity to address local development within a renewed support of integrated territorial initiatives of the EU policymaking [56]. However, the implementation of the CLLD initiative shows a different and articulated pattern in Europe. These different implementation approaches, of course, presuppose careful investigation and open up to in-depth research and comparison in search of the weaknesses and strengths of the CLLD policy tool. The following table 3 highlights the evolution from the Leader program to CLLD in the EU, the constant increase in the number of LAGs, and the growing amount of funding.

The CLLD local initiative, as indicated in Servillo [56], indicates the following connected dimensions:

- The spatial-institutional design occurring between LAG and functional territory;
- The LAG's design of a policy agenda;
- The community's cultural adherence with the territory;
- The societal process casts the community's role in the policy-agenda implementation.

This perspective of the CLLD framework allows for a deeper understanding of the local dynamics and their evaluation. It, therefore, appears to be a governance pattern suitable for implementing some aspects of the Quintuple Helix Model and leading to the search for the innovative capacities of specific territories. Furthermore, this approach allows for a longer-term vision of regions by directly involving those who live there. The elements that distinguish the CLLD tool overlap the logic underlying the Smart Specialization Strategies. The CLLD encourages local communities to develop "bottom-up" integrated approaches to respond to local challenges requiring structural changes, enhances the capacity to stimulate innovation, and promotes entrepreneurship by encouraging the discovery of potential in specific territories. The possibility of sharing and co-integrating the fragmented knowledge held by each interested party allows for reaching a shared vision in the design of policies. It allows for achieving the value added to the needs of the interested private and public stakeholders [47].

Table 3. Evolution from LEADER to CLLD in the EU Source: Miller [57] for the period 1991–2013; own elaboration for 2014–2020 data

Stage	Duration	Funds	Budget	Number of Local Action Groups (LAGs)
LEADER1	1991–1993	EAGGF, ESF, ERDF	€450 million	217
LEADER2	1994–1999	EAGGF, ESF, ERDF	€1.7 billion	821
LEADER +	2000–2006	EAGGF	€2.1 billion	893 in EU15 (+ 250 LEADER + type measures in 2004–06 in 6 Member States)
LEADER axis	2007–2013	EAFRD	€5.5 billion (6% EAFRD funding)	2,200 in EU27
CLLD	2014–2020	EAFRD,ERDF,ESF,EMFF	Min. 5% of EAFRD	3134 in EU27

Recent studies [58] analyze the cost-effective cooperation among CLLD agents in a game theory setting. The number of entities involved (citizens, local businesses, and authorities), the degree of independence in the decision-making process, and their access to information were all crucial to finding a high degree of cooperation and fairness achieving better results in the case study analyzed in the overmentioned work. Applying a decision support system clearly shows that CLLD's apparatus as an instrument of public policy support local economic and sustainable initiatives. The European top governance level towards policy tools such as CLLD triggers sustainable territorial development and local innovation processes.

Figure 3 summarizes the multilevel innovation governance implementation of the sustainability dimension required by the Green Deal strategy. The evidence shows how the Green Deal goes directly to the local, regional layer where the combination of s4 +, Quintuple Helix approach, and local community governance play a crucial role in a spatial development policy.

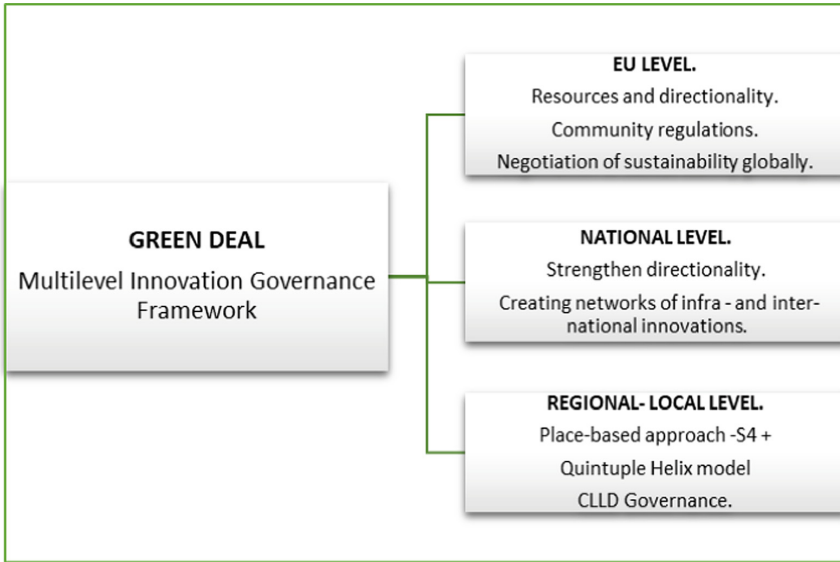


Fig. 3. Multilevel Innovation Governance Framework for the dimension of Sustainability (our elaboration)

7 Conclusion

The European Commission has made sustainable development and the digital agenda the core elements of its overall growth strategy for the following years. From an all-inclusive perspective, the European Green Deal represents the EU's contribution to the Sustainable Development Goals (SDGs) – and the new EU's “Smart Specialization Strategy” – Europe's attempt to develop at the world level a leading position in sustainable development. Players who were partially at the centre of the European integration process, such as regions, cities, and communities, will receive a significant boost in terms of activities and capacity to decide their destiny.

The underneath aspect of this paper is to offer new insights about reaching some balancing elements between the efficiency versus regional disparities conundrum considerably amplified in Europe. While, on the one hand, there is the need to reduce the technological gap with the US and China, enhancing the “champions” of innovation in Europe, on the other, economic theory still has no answer why growth differentials among regions did not decrease in these decades. A multi-governance strategy is therefore necessary, allowing a better understanding of the different territorial structures.

This paper claims that an effective innovation-driven policy requires a proper division of tasks between the EC, national, and regional/local governance levels within a particular transition period to develop a real territorial governance.

The innovation model of the Quintuple Helix appears suitable for Ecological Transition and conforms to the new challenges of the S4 +. Therefore, implementing new strategies for the territories also requires territorial governance with a place-based, democratic, and participatory approach. The Community-Led Local Development support,

already present in the implementation models of European policies, could be helpful in the changing path of significantly less developed regions. It aims to increase employment, skills, and enterprise and ensures local people are involved in developing projects.

Entrepreneurial discovery, a prerequisite of S3, can be facilitated by the same stakeholders they should be planning the territory, being themselves protagonists of a vision of their future. The dimension of Sustainability becomes an integral part of the path because it could naturally be included in the planning, as the territories' inhabitants are more sensitive to the well-being of the place where they live and the quality of life. Regional, National, and European policies must accompany this process by encouraging the ambitions of a green and sustainable economy with adequate resources. The paper aims to link together some concepts that, in our opinion, can strengthen the path of the Green Deal strategy. The work is a first starting point to deepen different ideas, identifying and analyzing in the continuation in the deep. The implementation of CLLD represents a motivating research topic. First, to find this approach's effectiveness, analyze its characteristics and usefulness from different perspectives. The democratic participation in the preparation of the territory certainly offers a wide range of reflections and research ideas stimulating. Identifying new qualitative and quantitative methods capable of supporting and analyzing a new territorial governance approach also lends itself to a significant research challenge.

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