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Opportunities and challenges in a collaborative governance for Smart Specialization Strategies – A systematic review of the literature

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Abstracts

Research and Innovation Strategies for Smart Specialization (S3) emphasize the need for an interactive and consensus-based decision-making process involving different stakeholders in their development. This paper offers a systematic review of the literature aimed at understanding whenever and to which extent the collaborative governance framework is considered in studies on S3. Collaborative governance refers to processes and structures engaging non-state stakeholders in public decision-making and management. We intend to identify in this framework the emerging opportunities and challenges towards the definition of facilitators for local stakeholders leading to an effective governance. From the articles selected, stakeholders are mainly recognized as responsible for the success of S3 development in its different steps and as actors included in an innovation system. New tools and structures need to be developed to address a set of critical aspects, especially in gaining active participation and overcoming old institutional frameworks. In addition, future studies need a more solid theoretical background and a rigorous case study development. Both the models of triple and quadruple helix are recalled, highlighting the necessity to further involve the demand side by ensuring citizens to actively participate in the design of the strategy.

JEL Classification: *G30; L10*

Keywords: *Smart specialization strategy; Collaborative governance; Triple helix; Quadruple helix.*

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1 Introduction

Research and Innovation Strategies for Smart Specialization (S3) with the objective of leading Europe towards knowledge-intensive and higher added value activities (European Commission, 2010a) attribute a leading role to the involvement of different stakeholders for the local economic, institutional and social system development (Foray, 2012).

In fact, the proposed S3 strategies by the European Commission have introduced a great emphasis on achieving an effective "collaborative governance" (Charron *et al.*, 2012). Collaborative governance refers to those processes and structures engaging non-state stakeholders to work together with the government in defining new policies or addressing public problems.

The approach required by these policies finds evidence in the literature where interactions by different actors become relevant in innovation processes, especially in the form of triple helix systems based on the relationships between government, industry and university (Etzkowitz *et al.*, 2007). However, the creation, dissemination and use of new ideas and knowledge resulting from interactions of different actors (Antonelli and Ferrao, 2000) is exploring an extension, with the inclusion of the civil society. The model is therefore evolving towards a quadruple helix system, including civil society, as a more effective way of generating intense experimentation and discoveries, enhancing at the same time innovativeness (Carayannis and Grigoroudis, 2016). This paper offers a systematic review of the literature to capture insights directly from studies related to Smart Specialisation Strategies (S3). Therefore, after selecting articles that dealt both with S3 and with a multi-stakeholder approach, a content analysis was undertaken. The analysis was addressed to understand the role recognized to stakeholders in the strategy development together with the opportunities, challenges and facilitators for an effective collaborative governance. The contribution, aware of the need to address the on-going topic, advances the state of the art by extracting and discussing the major outcomes and gaps providing a reference for policy makers and researchers. The paper is structured as follows. After describing the role of smart specialization strategies, the emphasized collaborative governance is considered referring to the triple and quadruple helixes. Then, research questions and methodology of the systematic review of the literature are illustrated. The two final paragraphs are devoted to discussion and conclusions.

2 Smart Specialization Strategy in the regional innovation eco-system

Research and Innovation Strategies for Smart Specialization (S3), as a regional policy framework driven by the concept of innovation growth, emerge to provide a suitable answer to the global financial and economic crisis (Foray, 2015). The policy was designed to find an explanation and strategy for the large R%D gap existing between Europe and key trading partners (Foray *et al.*, 2009), such as China and US. The recognized gap was mainly explained by the structural differences existing in the industrial structure of the countries (McCann and Ortega-Argilés, 2016). These differences were attributed to a diverse knowledge distribution across the European economy for high-tech and R&D intensive sectors, inefficient resource allocation and weak learning processes (Pontikakis *et al.*, 2009). The S3 appears as a key process addressed for structural change towards more knowledge-intensive and higher added value activities (European Commission, 2010a).

Precisely, for the current programming period (2014–2020), regional and national policy

makers are required to develop S3 before investing European Regional Development Fund (ERDF) resources in research and innovation policyR&I (European Commission, 2010b). The objective of developing S3 is to leverage public and private funds towards smart specialisation priorities, which should be identified through an entrepreneurial discovery processes (EDP). National or regional managing authorities, together with stakeholders such as research institutions, industry and social partners, are called to identify and produce information about new activities and develop roadmaps to realise their potential.

Different studies started to consider S3 trying to help regions develop smart strategies (Coffano and Foray, 2014), while others focused more on the lack of clarity in the process and in its implementation (Capello, 2016), especially addressing to regions in Central and Eastern Europe (Karo and Kattel, 2015). Indeed, in the following years, a focused effort is considered necessary to address the most important regional challenges, as increasing R&D intensity and strengthening cooperation networks; enhancing also the quality of human capital and facilitating its absorption; finding an optimal balance between traditional specialisations and a "smart diversification". In this context, the new smart specialisation strategy and the operational programmes seem suited to fulfil these needs even if further initiatives are recommended (Cifolilli, 2014).

Overall, the implementation of S3 seems to be highly challenging for regions faced with the adoption of new approaches (Iacobucci, 2014). Particularly, critical results emerge with reference to the implementation of bottom-up initiatives and integration of private and public stakeholders (Foray *et al.*, 2009). The involvement of stakeholder is a central argument that is emphasized by the S3 Guide (2012), which addresses governance as a sophisticated form of shared process management, between actors all striving towards a shared future outcome. The proposed S3 strategies have introduced a great emphasis on governance amongst different actors whose relationships are considered to make the difference for an effective governance process (Charron *et al.*, 2012). Indeed, the wide view of innovation automatically implies that stakeholders of different types and levels should participate in the design of innovation strategies (Foray, 2012).

3 Governance ensuring participation and ownership: from Triple to Quadruple Helix

When relating to governance as outlined by the S3 Guide (2012), we will refer to the literature based on public decision making and management involving both public and private actors, known as collaborative governance. Collaborative governance can be defined as the governing arrangement where one or more public agencies directly engage non-state stakeholders in a collective decision-making process that aims to make or implement public policy or manage public programs or assets (Agranoff and McGuire, 2003). Collaborative governance refers to those processes and structures engaging non-state stakeholders to work together with the government in addressing public problems and in the creation of new policies. In this approach, diverse arrays of stakeholders from the public, private, and non-profit sectors are convened for one or more public purposes, including policymaking, policy implementation, or coordinating public service delivery tasks (Emerson *et al.*, 2012). The benefits of collaborative processes include greater responsiveness to complex situations and more deliberation than traditional governance processes (Leach, 2006). Collaborative governance may produce more

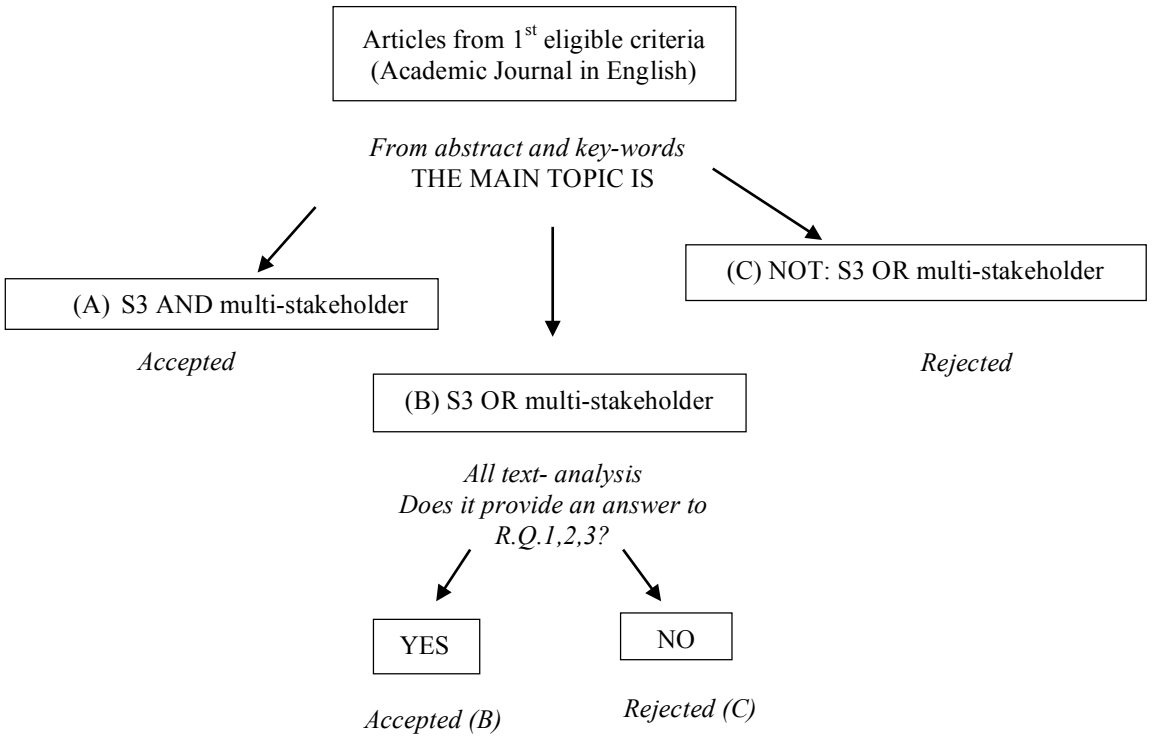
effective, efficient, and flexible policies (Sousa and Klyza, 2007) with greater public acceptability. Proponents of collaborative governance argue that the complexity and uncertainty - that are attached to great societal challenges - are best addressed through engaging those most directly interested and affected by them, including individuals with relevant expertise (Emerson and Nabatchi, 2015). In this governance setting, diverse stakeholders are engaged in public policy making and management. The aim is to encourage inclusion and participation in the policy process along with connecting stakeholders' various expertise, resources, and support (Emerson and Nabatchi, 2015).

The S3 strategies have introduced a great emphasis on governance amongst different actors, especially in the EDP (Charron *et al.*, 2012). The EDP is an interactive process in which market forces and private sector discover and produce information about new activities to be developed, while the government evaluates the outcomes and empowers the most capable actors (Landabaso, 2014). The multi-stakeholder approach becomes relevant in innovation processes since cooperation dynamics, various knowledge networks and mechanisms lead to creation, dissemination and use of new ideas (Antonelli and Ferrao, 2000).

The requirement of involving stakeholders in major policies is conceived as one of the most crucial implications for innovation policy (Martin, 2010). In fact, the approach presented by S3 finds evidence in the literature where interaction by different stakeholders become relevant in innovation processes, especially in the form of triple helix systems (Etzkowitz *et al.*, 2007). This model is a strong environment of parallel relationships between (national or regional) authorities, the wider business community (industry) and academia (including other research-focused institutions). The approach places more emphasis on the role of each one of these categories of actors in the innovation process. (Etzkowitz and Leydesdorff, 1995) The systemic nature of the triple helix interactions reflects, to a large extent, the interactions as manifestations of social systems, characterised by action (Parsons and Smelser, 1956) and communication (Shannon, 1948).

However, to guarantee a truly place based entrepreneurial process of discovery, it is imperative that new demand side perspectives, as consumer and innovation users, are represented with intermediaries offering knowledge based and market facing prospective. The approach of quadruple helix was developed by maintaining the interaction of the spheres of the third helix as academia, industry and government, while formalising the role of civil society (Yawson, 2009). Therefore, extending the range of actors towards a forth category identified as innovation users (Arnkil *et al.*, 2010). This means going beyond a triple helix approach towards a quadruple one as underlined already by the S3 guide (2012). According to this model, citizens would not only be involved in the actual development work, they would also have the power to propose new types of innovations, which connect users to stakeholders across industry, academia, or government (Arnkil *et al.*, 2010). By applying a quadruple helix approach, regional policymakers are more likely to enable a place-based entrepreneurial process of discovery, which would generate intensive experimentation and discoveries. Even if a quadruple helix approach is suitable for developing S3, it requires a great effort from which becomes evident the need to define measures that can keep the momentum generated in the original initiatives and demonstrate the value of their exercise (Carayannis and Grigoroudis, 2016).

Figure 1: *Selection of articles for the systematic review*



Fonte: Authors' elaboration.

4 Research Questions and Methodology

In the context of a collaborative governance for Smart Specialization Strategies (S3), a systematic review of the literature was undertaken to address to following research questions: R.Q.1: What role is recognized to stakeholders in the S3? R.Q.2: Which are the main opportunities and challenges of setting a collaborative governance in S3? R.Q.3: Which facilitators are identified to overcome its critical aspects while exploiting its potentialities? The intention of this review is also to capture the theoretical models recalled by the studies and the methodologies used when undertaking research studies on S3. To provide a suitable answer to the research questions, a protocol of work was formulated to specify the methods to select suitable articles (Kitchenham, 2004). A key-word search strategy was applied in all-text using as keywords "Smart Specialization" OR "Smart Specialisation" AND (governance OR helix OR stakeholder). Three databases were used to retrieve articles, which are Business Source Premier, Econlit, Education Research Complete. Using the mentioned key strategy 90 articles were found (March 2018), accepting only academic journals in English (1st eligible criteria). Then a further assessment was made to select only those papers dealing both with S3 strategy and involvement of different stakeholders in accordance to the flow chart here presented (Figure 1).

From the application of the 2nd eligible criteria, 36 articles were found as complying with the objectives of the review. The remaining articles were excluded since not considering as central topic S3 or not addressing in anyway the objectives of the research in relation to the

topic of collaborative governance (C).

5 Discussion

The systematic review of the literature has allowed to identify insights on the main opportunities and challenges emerging in a collaborative governance when developing S3. The review has also highlighted some potential facilitators to overcome the critical aspects, while exploiting the potentialities of such a multi-stakeholder prospective. In relation to the methodology used in the 36 selected articles, 14 of these were theoretical papers, while 17 included a case study. Among the case studies, 9 were based on desk research providing a descriptive analysis, while 8 revealed to be more structured, based on interviews and questionnaires. In addition, 2 articles included econometric modelling and 3 a multi-case study prospective. Theoretical frameworks were proposed by the selected studies, as relational resource approach (Magro *et al.*, 2014), social network analysis (Vittoria and Lavadera, 2014) and Analytical Hierarchical Process (AHP) (Šipilova *et al.*, 2017).

On the other hand, the triple helix system was recalled in 7 articles when considering the relationships between industry-government and academia, as in the case of Šipilova *et al.* (2017) and Camagni and Capello (2013). Morgan (2013) proposed a three-tier system divided in governmental, intermediate and operational level, while Fabbri (2016) suggests an institutionalization of the triple helix system.

The quadruple helix was explicitly considered in 5 studies, others even if not recalling a quadruple helix, included in the network of relationships the civil society as Casaramona *et al.* (2015), McCann and Ortega-Argilés (2016), Kleibrink *et al.* (2016), confirming the need to consider in the policy development also the demand side Karo and Kattel (2015), Šipilova *et al.* (2017). Further articles made reference to both the triple and quadruple helix system (n.5). In addition, Carayannis and Rakhmatullin (2014) presented in their analysis the natural environment of the society where relationships take place as a fifth helix. This last approach stresses the socio-ecological perspective of the natural environment of society by considering the interactions between society and nature.

5.1 The role of stakeholders

The role of stakeholder in the articles as reported in the Table 1 was found to be mainly that of actors responsible for the development of the overall strategy in its different steps, starting from its design (Karo and Kattel, 2015), preparation of data and analysis (Marlow and Richardson, 2016), consultation (Kroll *et al.*, 2016), evaluation (Aragon *et al.*, 2014), monitoring (Kleibrink *et al.*, 2016) and lastly in the implementation (Capello, 2016).

Stakeholders are recognized as key actors especially in the process of EDP (Polverari, 2017; Fabbri, 2016) in its decentralized approach (Foray, 2016). Other studies underlined more their role as part of an innovation system as in the case of Magro *et al.* (2014) and as contributors for implementing innovation processes (Rudolf and Yusupova, 2015). In the same line, other studies include them in different innovation models and ecosystems (Camagni and Capello, 2013; Reimeris, 2016) or as part of emerging micro-systems of innovation (Foray, 2016). In other papers, stakeholders are presented as actors involved in processes of interactive learning (Camagni and Capello, 2013), capacity building (Estensoro and Larrea, 2016) and as knowledge providers (Todeva and Ketikidis, 2017). Others emphasized more their role in the regional

growth and competitiveness (Konstantynova and Lehmann, 2017), especially for a sustainable development (Šipilova *et al.*, 2017; Rinkinen *et al.*, 2016) towards a social and economic transformation (Mieszkowski and Kardas, 2015).

Table 1: *Role recognized to stakeholders in the S3*

Responsible for the comprehensive S3 development
Actors of innovation models
Responsible for the regional growth and development

Fonte: Authors' elaboration

5.2 The opportunities

The opportunities identified in a collaborative governance, as reported in opposition to the challenges in Table 2 relate particularly to the possibility of exploiting knowledge sharing potentialities, especially as an exchange of tacit knowledge through informal social interactions, coming from different knowledge basis starting from general to applied ones (Nunes and Lopes, 2015).

The same relates by using different kinds of knowledge to define long term priorities, synergistic investments and collective actions (Clar and Sautter, 2014), also forcing the public sector and all other actors to understand in open reflection what they are good at (Polverari, 2017). There is a large source of knowledge contribution when implementing innovation processes (Rudolf and Yusupova, 2015), and this knowledge-based development is also driven by the population for which a higher involvement is required (Šipilova *et al.*, 2017).

Other articles focused more on the possibility of taking advantage of occasions of interactive learning in the productive system (Muscio *et al.*, 2015) being a dynamic process that can lead to potential policy improvements through the exchange of ideas and perspectives (Aragon *et al.*, 2014), resulting from the proximity of stakeholders (Virkkala *et al.*, 2017). Overall, the triple and quadruple helix approach are even encouraged by the EDP by giving rise to a more inclusive governance that breaks the silos between research, industry and policies (Peroulakis, 2017) and also limits the innate wisdom of government due the strong learning process of the whole system (Foray, 2016).

Further, selected smart specialization strategy can help overcome the limited degree of cooperation among regional stakeholders, leading to a strategic cooperation (Mieszkowski and Kardas, 2015). Lastly, an effective collaborative governance results to be determinant for the participation in international networks (Boden, 2017; Wostner, 2017).

5.3 The challenges

One of the major concerns emerging in developing a collaborative governance seems to be the persistence of old routines and mechanisms (Karo and Kattel, 2015) which give rise to difficulties in working on a new concept of strategy based on learning, negotiation and collaboration (Estensoro and Larrea, 2016). In particular, for Eastern Europe the adoption of new governance practices meets hard institutional obstacles due to the traditional planning culture and centralist systems, which are also affected by the general inertia as low participation

complying with existing rules and priorities (Reimeris, 2016). The problem is that of overcoming the resistance of local partners and permissive approaches (Marlow and Richardson, 2016) still sceptical on stakeholder involvements (Capello, 2016). This is the case, for example of SMEs that might ignore the role of universities as potential innovation partners, due to weak collaborative culture (Healy, 2016).

Another major issue it that of keeping the momentum and an active participation of the actor throughout all the process (Aragon *et al.*, 2014), together with the presence of too many actors around the table, identified as a bottleneck (Polverari, 2017). The process is described also as being time consuming in terms of time and effort needed to set up structures and process that allow stakeholder to interact (Wostner, 2017). An emerging risk is that of monopoly coming from dominating actors in the political and economic landscape (McCann and Ortega-Argilés 2016) due to egocentric views (Virkkala *et al.*, 2017) of specific interest groups as powerful lobbies or major regional stakeholders (Mieszkowski and Kardas, 2015). A further challenge that needs to be addressed is that of building trust and long-term relationships (Wostner, 2017), especially in the case of SMEs (Nordberg, 2015). However, the same topic is viewed also as an opportunity led by the strategy itself encouraging trust building and long term mutual commitment (Kleibrink *et al.*, 2016) when using specific tools and instruments to forest and support trust (Boden, 2017).

Table 2: *Opportunities and challenges in setting a collaborative governance for S3*

Opportunities	Challenges
Knowledge sharing	Old institutional routines
Interactive learning	Passive participation
International cooperation	Dominance of selected interests
Trust building	Trust and long-term commitment
	Resistance towards collaborative culture
	Diversity of interests
	Time consuming
	Information asymmetries
	Lack of professional intermediaries
	Lack of unified methodologies and structures

Fonte: Authors' elaboration

5.4 Identifying facilitators and general suggestions for an effective governance

From the papers selected, as outlined in Table 3, different facilitators for an effective governance were identified. Most studies highlighted the urgent need to design specific structures and instruments for promoting a successful cooperation among different stakeholders. Mieszkowski and Kardas (2015) suggests developing specific programs and instruments to involve stakeholders in an appropriate governance structure, and address quickly to emerging weaknesses. The same applies to Estensoro and Larrea (2016) who refer to alternative work methods and spaces designed to keep and facilitate dialogue processes also to handle the emerging complexities. In this regard, new policy practices need to be introduced exploiting a territorial development

model for different learning processes Capello (2016). More in detail, Boden (2017) explains the usage and effects of a tool called REMth as an example to test in other regions. The mentioned tool box is used to support cooperation and trust building, engaging stakeholders with preparatory actions making them aware of the S3 and of new governance structures.

Another example, is given by Del Vecchio *et al.* (2017) who suggest promoting Living Labs in S3 for enhancing knowledge sharing in a quadruple helix system, even if new methods and structures need still to be defined. Informal mechanism for involving stakeholders as personal meeting and phone calls shaped on individual relationships are considered as a further facilitator (Magro *et al.*, 2014; Vittoria and Lavadera, 2014).

These "soft" mechanisms being less institutionalized can benefit from the ability of creating unique synergies, ensuring constant communication and openness to raise understanding of S3 (Reimeris, 2016). Among the facilitators supporting a collaborative governance, the government has a key role in fostering cooperation among stakeholders, encouraging the involvement of entrepreneur and universities (Carayannis and Rakhmatullin, 2014). A crucial role is covered also by intermediate organizations promoting informal networks based on a voluntary participation among stakeholder to boost cooperation (Nordberg, 2015). These actors need to address more large cooperation projects that are demand dependent (Kroll *et al.*, 2016) enhancing the role of civil society and social organizations (Boden, 2017). Intermediate organization act as boundary spanners (Virkkala *et al.*, 2017) and connector of universities and companies, as the case of the technology centre KETEK in Finland, suggesting the importance of creating intermediate organizations supporting specifically a quadruple helix system (Nordberg, 2015). The same applies to the case of advising hubs presented by Marlow and Richardson (2016). Instrumental are the insights captured by the case study of Casaramona *et al.* (2015), suggesting a multidisciplinary approach, creating the right social and cultural conditions to support the development of the innovation eco-system. This approach can lead towards more knowledge sharing practices and can be enriched by setting up groups of specialists in technology transfer to define a common methodology. Further articles underline that participation must be part of a strategic vision (Fabbri, 2016) in which the ownership of strategies and credibility of S3 are safeguarded, meeting the expectations of all stakeholders (Peroulakis, 2017) fostering long- term cooperation (Morgan, 2013). More attention needs to be devoted also to smaller entrepreneurial actors (McCann and Ortega-Argilés, 2016), requiring support from the micro-innovation system (Foray, 2016). Further, from the selected studies it becomes evident the need to develop more rigorous case study development on S3 (Marlow and Richardson, 2016). In this sense, more solid theoretical frameworks should be considered, especially refereeing to the current literature on network and entrepreneurship (Morgan, 2017), as the connectivity model (Fabbri, 2016). Overall, more research is needed to support policy makers in the engagement design, with a focus on the practice of monitoring (Kleibrink *et al.*, 2016) together with sharing the best practices focusing on participants strengths (Clar and Sautter, 2014) while understanding the right questions to address (Carayannis and Rakhmatullin, 2014).

6 Concluding remarks

The paper through a systematic review of the literature leaves indications for policy makers and researchers dealing with the on-going S3 policies and addressing issues related to its multi-stakeholder approach.

It does so by focusing on the collaborative governance model, which is emphasized by the

Table 3: *Facilitators identified to overcome critical aspects while exploiting potentialities in S3's collaborative governance*

Facilitators
Cooperation tools and structures
Intermediary actors
Mixing formal and informal interactions
Theoretical frameworks and rigorous research
Best practice diffusion

Source: Authors' elaboration

policy's development (S3, 2012).

The paper identifies opportunities and challenges emerging from the participation of different actors and describes a set of potential facilitators for exploiting opportunities, while overcoming the most critical aspects of such approach. Nevertheless, the present contribution must counter limits starting from the protocol of research used to retrieve articles. Indeed, the selection of databases may have lowered the number of relevant articles dealing with a collaborative governance in S3. The same applies to the selection of the keywords. Moreover, we didn't use any parameter to select journals to include in the review. A guide reference to rank the articles could have guaranteed a higher-level of quality of the contributions, even if lowering the number of the outcomes. Further, the systematic review of the literature is based on a short timeframe of reference starting from the recent launch of the S3 policies, which are still being implemented and adjusted. Therefore, further contribution addressing the topic may soon be published.

Nevertheless, the intention of the systematic review was that of raising discussion on the topic, while providing some valuable insights for developing an effective governance for both policy makers and researchers involved in S3.

The review highlights the role of policy-makers in supporting the development of structures and tools where collaboration between different actors can take place. They are also asked to foster policies promoting the demand side, even employing intermediary actors that can help making the society aware of the impacts of S3 and of its logics. The participation of innovation users can contribute to an effective collaborative governance by stimulating innovation aligned with their needs. Therefore, their participation doesn't have to be limited in designing the policy but should collect and interpret their suggestions to foster directly innovation. This can take place by linking them effectively to academia and business actors. Intermediary actors become determinant not only for citizens, but also for establishing stronger relationships between business and academia, making industries understand and appreciate the benefits of applied research for their performance. This latter concept is strongly related to Small Medium Enterprise. These firms need to be supported in changing their current mindset towards a more collaborative approach based on trustful relationships with academia and other business actors. In addition, policy makers are responsible in ensuring that the S3 strategy will continue to pursue an active participation even in the following steps of the strategy, especially in its monitoring phase. In this way, policy makers can demonstrate that participation in S3 is not symbolic but has concrete and practical implications. Therefore, it is necessary that actors are called to participate in monitoring the results and in the revision of the strategy. On the

other side, researchers are called to support policy makers in different directions, designing and testing tools and structures for an effective collaborative governance. Further, researchers should provide concrete indications on how to monitor the development of the strategy selecting appropriate indicators.

Moreover, specific and homogeneous indicators need to be built for measuring the effectiveness of a collaborative governance in the Region. With these latter measures it can be possible to provide suggestions also applicable at national and international level. In this sense, it would be of interest to understand how an effective governance inside a Region is then translated in greater opportunities for participating in international networks. Additionally, the results from the review underline that more rigorous case studies need to be developed, going beyond the descriptive analysis of a desk research. Future case studies should be enriched by provided also quantitative analysis balanced with qualitative approaches. Then, the review outlines how both policy makers and research institutions should take into account the growing role of the natural environment as part of the networks of relationship in triple and quadruple systems. Specifically, they are called to address a more sustainable development in which actors must feel responsible of socio-economic conditions of the context.

Lastly, being S3 a place- based policy localized in a specific territory that has a unique identity and path-dependency (Solly, 2016) both the potentialities and critical aspects identified from the literature need to be considered in their specific context. In other words, it would be instrumental to understand how much the place influences the extent of the opportunities and challenges leading towards an effective collaborative governance.

Table 4: *Role recognized to stakeholders in the S3*

Article (A/B) Methodology	Stakeholders (b)	Role of the stakeholders (c)	Emerging factors of (d)	Facilitators and suggestions (e)	Level of analysis (d)
(Aragon *et al.*, 2014) Case study Desk research	Government, Cluster association, firms and research team	Responsible in process of evaluation	*Opportunity* - Development of dynamic leaning process *Callenge*: - Keeping active participation - creation and management of clusters	Design and implementation of a framework for cooperation and policy learning	Hegan – Basque County
(Boden, 2017) Theoretical Paper	Regions Authority business and universities	Part of governance systems	*Opportunity*: - Trust building, - Support helix cooperation *Challenge* - Guarantee joint devel. by all actors - Time to - create a culture of collaboration - Enhance both formal and informal collaboration	- Support the momentum - Promote proactiveness of actors - Enhance role of civil society - Include new tools and further test the existing ones	Greek Region of Eastern Macedonia and Thrace
(Camagni and Capello, 2013) A Theoretical Paper	Triple Helix Actors	Part of collective learning processes	*Opportunity*: - Exploit local synergies -Integration of different knowledge bases *Challenge*: - Reduce uncertainty and information asymmetries	- Ensure transparency and control on local strategies -Introduce tripartite cooperation	European level analysis per NUTS2
(Capello, 2016) A Theoretical Paper	SME, MNE large firms, government, local administrations	Involvement tin the overall design of S3	*Challenges*: -Multinational Enterprise (MNE) with no intention of getting involved in regional strategies - Lack of application oriented strategies - Loss of *Governance challenges*: - Overcome traditional planning - Lack of business orientations of public administration	- Introduce new tools and policy practices - Exploit a practice based innovation mode for different learning processes	

Fonte: Authors' elaboration

*(*continue*) Role recognized to stakeholders in the S3*

Article (A/B) Methodology	Stakeholders (b)	Role of the stakeholders (c)	Emerging factors of (d)	Facilitators and suggestions (e)	Level of analysis (d)
(Carayannis and Rakhmatullin, 2014) A Theoretical Paper	Triple and Quadruple helix actors	Researcher and policy makers evaluating triple helix impact. Government encouraging participation of entrepreneurs and universities.	*Challenges*: - turn start up into enduring companies - Crucial questions need to be answered in relation to S3 *Opportunities*: -production of global champions	- Set specific questoins for improving of multi level governance -Design mechanism for an effective involvment	Nordic Countries
(Casaramona *et al.*, 2015) Case study (interviews, direct observations, questionnaires	Policy makers innovation supporters producers, civil society and natural environment	Part of variable ecosystem in a triple and quadruple helix approach	*Challenges*: - Heterogeneity of actors *Opportunity*: - Mutual learning -International coordination	- Strengthen networks research industries -Apply marketing strategies and multi-disciplinarity approach -Support development of innovation eco-systems and knowledge sharing culture - Set up group of specialists in technology transfer - Define common methods	ETC (European Tunisian Cooperation) Mediterranean Partner Countries and Tunisia
(Clar and Sautter, 2014) Case study (desk research)	Public administration, civil society, research, organisations, and industry	Part of a cluster system viewed in a multi actor perspective	*Opportunity* - Knowledge sharing for long terms - synergistic investments - Exploit collective actions.	- Spread best practice focused on participants' strengths in a "Strategic Learning Cycle"	MicroTEC Sudwest within the Germany cluster "*Spitzen*"
(Del Vecchio *et al.*, 2017) A Theoretical Paper	Quadruple helix actors ecosystem	Actors of the innovation	*Opportunity*: - Promote Living Labs - Exploit the role of universities and research centers	- Adopt a global vision in international networks - Deepen methods and techniques for active involvment of end users	Italian Region

Fonte: Authors' elaboration

*(*continue*) Role recognized to stakeholders in the S3*

Article (A/B) Methodology	Stakeholders (b)	Role of the stakeholders (c)	Emerging factors of (d)	Facilitators and suggestions (e)	Level of analysis (d)
(Estensoro and Larrea, 2016) Multi-Case study (desk research)	Government and researchers and sub-region actors	Actors of a multi-level governance with an approach for learning and capacity building	*Challenges*: - Adjust new concept of strategy based on learning, negotiation and collaboration *Opportunity*: - Exploit potentialities of a long term dialogue	- Develop alternative work methods and spaces - Integration of social researchers	Basque Government 3 sub-regional cases: GIPUZKOA Goierri, Bilbao City
(Fabbri, 2016) Case study (desk research)	Quadruple helix actors	Involved in Entrepreneurship Discovery and strategic planning	*Opportunity*: - Promotion of stronger relationship - Exploit windows of opportunities	-Combine wide participation with strategic vision - Exploitation web ties - Set a methodological rationale	Tuscany (Italy)
(Foray, 2016) Theoretical Paper with descri-ptive case	Public and private sector, industrial associations, large companies, universities, public research organizations, Innovation Public agency	Part of emerging micro system of innovation	*Opportunity*: - Integration of know-ledge - Limit innate wisdom of government *Challenge*: - Consider differences in needs per activity - costs - Limit government omniscient planning	- Transform existing structures - Enhance support for micro system of innovation	Northen Portugal (Footwear Industry)
(Golejewska and D., 2016) Case Study (Desk Research)	Firms, research units, social organisations administrations, Consortia	Selection of Smart Specialisations Coordinators as market makers	*Opportunity*: - Overcome the limited degree of cooperation among regional stakeholders	- Spread best practice example of Region	Świętokrzyskie (Example Region for great progress in S3

Fonte: Authors' elaboration

*(*continue*) Role recognized to stakeholders in the S3*

Article (A/B) Methodology	Stakeholders (b)	Role of the stakeholders (c)	Emerging factors of (d)	Facilitators and suggestions (e)	Level of analysis (d)
(Healy, 2016) Case Study (Desk Research, (interviews)	Universities, research centres, large and SME)	Universities as key agents of regional innovation	*Opportunity*: - Cross national cooperation for mutual learning *Challenge*: - Understand role of Universities as innovation partners Weak collaborative culture - System incentives rewarding basic research and not applied one	- Raise awareness on university role - Universities bridging organization as requirements to access national findings	North East Romania
(Karo and Kattel, 2015) Theoretical Paper	Private-public sector	Responsible for designing S3	*Challenges*: - Persistence of old routines	- Enhance triple helix with experimental pilots -Consider demand polices	Baltic States (BS) Slovenia (S) Visegrad Countries
(Kleibrink *et al.*, 2016) Survey	Policy makers and stakeholders as community of citizens and social and economic actors	Involvment in the monitoring system	*Opportunity*: - Trust building - Long-term mutual commitment *Challenges*: - Lack of real ownership in monitoring - Promoting clear roles for stakeholders	- More research on how policy makers can embed engagement - Promote daily practice of monitoring	Policy makers of 68 European Regions
(Konstantynova and Lehmann, 2017) Theoretical Paper	Companies (Software ICT) and Universities	Drivers of regional growth and competitiveness	*Challenge*: - Overcome institutional factors of cluster activities	Bild a framework to explore the bundle	Germany, Austria, Ukraine, Serbia

Fonte: Authors' elaboration

*(*continue*) Role recognized to stakeholders in the S3*

Article (A/B) Methodology	Stakeholders (b)	Role of the stakeholders (c)	Emerging factors of (d)	Facilitators and suggestions (e)	Level of analysis (d)
(Kroll *et al.*, 2016) Case study (desk research, interviews)	Policy makers, consortium consultants, representatives industry, science, civil society politics and administration, unions managers decision makers, ministries	Multi-actors for strategies definition	*Opportunity*: - Possibility of introducing an advanced methodological development of S3 *Challenge*: - Deal with perception of not effecting the final outcome - Little possibility of real participation	- Larger share funding should be linked to large scale cooperation projects (demand depending) - Enhance relevance and efficiency of S3	German Regions: Lower Saxony, North Rihine Westphalia (NRW) and Saxony
(Kroll, 2015) Empirical Analysis (survey and interviews)	Research Infrastructures, private sector	Actors in the consultation process for policy development	*Opportunity*: - Occasion to exploit opportunities for regional improvment *Challenge*: - Overcome local challenges	-Introduce new elements of governance - Involve external expects and working groups	Southern, Eastern, Northen, Central Europe
(Magro *et al.*, 2014) Theoretical Paper	Representatives government, provincial councils, public agencies, networks for STI, firms and business association	Actors of innovation system	*Challenges*: - management of complexity - Presence of costs of coordination	-Mix formal and uninformal mechanisms of involvment	Basque Country
(Marlow and Richardson, 2016) Theoretical Paper	Local Enterprise Partnerships (LEPs), Advisory hub universities and Local Authorities (LA) government	Development of S3 - Preparation of data analysis. Advisory hub as a point of coordination	*Opportunity*: - Support for local partners in embedding S3 more fully - Exploit structural methodological approaches in S3 development. *Challenge*: - Resistance local partners, localism and permissive approaches.	More rigorous academic appraisal and analysis of case studies - Further interactions are required (e.g. quadruple helix living laboratories for social innovation)	England, and regional cases (Cornwall, Liverpool City Region, Greater Manchester, North East and Tees Valley Lep Isles of Scilly

Fonte: Authors' elaboration

*(*continue*) Role recognized to stakeholders in the S3*

Article (A/B) Methodology	Stakeholders (b)	Role of the stakeholders (c)	Emerging factors of (d)	Facilitators and suggestions (e)	Level of analysis (d)
(McCann and Ortega-Argilés, 2016) Theoretical Paper	Private sector, education sector and civil society	Involvement in entrepreneurial activities	*Opportunity*: - Learning opportunity *Challenge*: - Monopoly actors dominating the political and economic landscape	- Focus on smaller entrepreneurial actors - Promote Transparency of the processes	
(Mieszkowski and Kardas, 2015) Case Study (Desk Research)	Entrepreneurs, researchers, users, governmental agencies, agents from reaserch, environment, health policy experts	Part if a changing system of involvment linked to economic and social transformation	*Opportunity*: - Develop a strategic collaboration - Learn from entrepreneurs more familiar with the discovery processes *Challenge*: - Dominance of specific interest groups or major regional stakeholders	- Develop programmes and instruments to involve stakeholders and address weaknesses - Consider the role of governmental agencies as facilitators	Poland and specifically to: Podkarpackie Great Poland Śląskie
(Morgan, 2013) Multi-Case Study (Desk Research)	Three tier systems: governmental, intermediate, operational tier	Part of an inclusive governance	*Opportunity*: - Deal with problem of institutional complexity with new spaces of entrepreneurship discovery	- Focus on theoretical perspectives of other fields, as network and entrepreneurship literature	Wales and Basque Country
(Muscio *et al.*, 2015) Data Analysis (Econometric Modeling)	Business. public agencies, higher education, reaserch organizations, actors from social sector	Actors facing regional innovation paradox	*Opportunity*: - Interactive learning *Challenge*: - Management of multi-level funds - Lack of professional intermediaries	- Improve quality of of governance	Eastern European Member at NUTS2 level

Fonte: Authors' elaboration

*(*continue*) Role recognized to stakeholders in the S3*

Article (A/B) Methodology	Stakeholders (b)	Role of the stakeholders (c)	Emerging factors of (d)	Facilitators and suggestions (e)	Level of analysis (d)
(Nordberg, 2015) Case Study (interviews, content analysis)	Actors of triple helix, technology centre KETEK (intermediate organization), public organizations, regional actors.	Actors of interactive innovation (collective endeavour)	*Opportunity*: - Support innovation development - Favour the quadruple helix *Challenge*: - Build trust and long-term relationships	- Create quadruple helix intermediate organizations (Living Labs) - Compare the development of quadruple helix in peripheral regions to metropolitan areas	Kokkola Jakobstad Region (Finland)
(Nunes and Lopes, 2015) Quantitative analysis (Econometric modeling)	Stakeholder from market, instituional and personnel channels. processes	Part of different innovation models in collective learning knowledge	*Opportunity*: - Informal interactions for social exchange of tacit term	- Governance mechanism and private innovaton strategies for long agreements	Portugal regions
(Peroulakis, 2017) Theoretical Paper	Triple helix towards a quadruple actors	Actors called to find synergies and public authorities called as facilitators of collaboration.	*Opportunity*: - EDP for effective quadruple helix	- Ensure ownership triple/ strategies - Find ways to facilitate cooperation via thematic platforms.	of the
(Polverari, 2017) Theoretical Paper	Local authorities, firms, organizations, representing firms, universities, public research, trade unions	Involved in the preparation of S3 especially Entrepreneur Discovery	*Opportunity*: -Open reflection of existing competences - Bridge actors from different communities *Challenges*: - Too many actors around the table - Time consuming process	- Constant process of engagement, testing, and refining assumptions and choices	

Fonte: Authors' elaboration

*(*continue*) Role recognized to stakeholders in the S3*

Article (A/B) Methodology	Stakeholders (b)	Role of the stakeholders (c)	Emerging factors of (d)	Facilitators and suggestions (e)	Level of analysis (d)
(Reimeris, 2016) Case Study (Desk Research)	Representatives science, business, public, government authorities	Actors of different innovation ecosystems	*Opportunity*: - Exploit S3 coordination groups *Challenges*: - Engage in new governance practices - Involve all planned representatives - Deal with passive participation - Deal with diversity of activities - Understanding public authorities new role	- Ensure constant communication for changes in strategy - Mediation between different stakeholders - Raise understanding of S3	Lithuania
(Rinkinen *et al.*, 2016) Qualitative content analysis	Social enterprises, users, workers, Regional Innovation Platform	Active players for an economically, environmentally and socially sustainable development	*Opportunity*: - Learning from variety *Challenge*: - Inclusion of all types of entrepreneurs	Build cooperation structures to bring together private, public and third sector organisation	Finnish regions
(Rudolf and Yusupova, 2015) Case Study (Desk Research)	International coalitions operating in organisation External Coalition (residents, non-profit associations, authorities, universities, businesses institutions)	Contributors of innovation process	*Opportunity*: - Added value from intelectual resources. *Challenges* - Balancing solutions with territorial nature	- Focus on instruments and events to foster cooperative links	Lodzie Voivodeship and the Novosibirk Oblast (Poland).
(Šipilova *et al.*, 2017) Case Study (qualitative and quantitative analysis)	Triple helix actors	Actors of sustainable development	*Challenge*: - Lack of unified methodological approaches	- Greater involvement from civil society	Latvia

Fonte: Authors' elaboration

*(*continue*) Role recognized to stakeholders in the S3*

Article (A/B) Methodology	Stakeholders (b)	Role of the stakeholders (c)	Emerging factors of (d)	Facilitators and suggestions (e)	Level of analysis (d)
(Todeva and Ketikidis, 2017) Theoretical Paper	Public authorities, Universities, businesses enterprises (Focus SME) innovation actors, institutions associations.	Knowledge providers and innovation leaders. Proactive role of public authorities.	*Opportunity* - Cluster association for a collaborative technology *Challenge*: Firms promoting specific groups, minimizing individual needs, "cherry picking".	- Creation production value chain intelligence - Institutionalize TH - Build TH consensus space constellations (EDIP model) towards GVC. - Strengthen innovation infrastructure with ICT	
(Virkkala *et al.*, 2017) Theoretical Paper	Triple helix actors and intra and cross helix relationships.	Entrepreneurial discovery process to interactive learning -Exploit the role of boundary spanners	*Opportunity*: - Proximity may lead *Challenge*: - Overcome gaps in network - Lack of common vision and participation - Presence of varied interests - Possibility of egocentric views	Usage connectivity model	Ostrobothnia
(Vittoria and Lavadera, 2014) Case Study (empirical analysis)	Knowledge Network Structure (KN) of bio-chnology actors Public base and research organizations	Representative of the interactive character of innovation	*Challange* - Overcome innovation paradox - Anchoring regional nodes in network - Encourage involvement of private firms	-Develop multi-effective governance as starting point of networks - Mix formal and informal means of involvment - Focus on local and more inclusive actors	Campania Southern Italy

Fonte: Authors' elaboration

*(*continue*) Role recognized to stakeholders in the S3*

Article (A/B) Methodology	Stakeholders (b)	Role of the stakeholders (c)	Emerging factors of (d)	Facilitators and suggestions (e)	Level of analysis (d)
(Wostner, 2017) Case Study (Desk Research)	Businesses, knowledge institutions, government, NGOs	Government as facilitators in innovation system	*Opportunity*: -Exploit international cooperation *Challenge*: - Build trust - Time consuming processes - Manage structural transformation	- Build a long term cooperation may lead to trust	Slovenia S4

Fonte: Authors' elaboration

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Opportunità e sfide in una governance collaborativa per le Strategie Smart Specialization. Una rassegna della letteratura

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Sommario

Le strategie di ricerca e innovazione per la *smart specialization* (S3) pongono l'accento sull'importanza di un processo decisionale interativo e basato sul consenso, che coinvolga tutti gli stakeholder nella loro definizione e e nel loro sviluppo. Il presente contributo fornisce una rassegna completa della letteratura con l'obiettivo di comprendere quando e in quale misura il modello di *governance* collaborativa sia preso in considerazione negli studi su S3. La governance collaborativa si riferisce a quei processi e strutture che coinvolgono stakeholders non governativi nei processi decisionali pubblici e nella gestione. L'obiettivo è identificare all'interno del modello, le opportunità e le sfide emergenti nella definizione di mediatori per gli stakeholder locali che conduca ad una governance efficace. Dagli articoli selezionati, emerge che gli stakeholders sono principalmente ritenuti responsabili del successo nello sviluppo S3 nei suoi differenti passaggi e riconosciuti attori all'interno di un sistema di innovazione. I nuovi strumenti e le nuove strutture devono essere sviluppate per identificare un serie di aspetti critici, in particolare per incrementare la partecipazione attiva e superare i modelli istituzionali piu datati. Inoltre, gli studi futuri hanno bisogno di un più solido background teorico e dello sviluppo di casi studi più rigorosi. Sia il modello di tripla che di quadrupla ellisse vengono ripresi, evidenziando la necessità di un ulteriore coinvolgimento del lato della domanda che garantisca ai cittadini di partecipare attivamente alla definizione delle strategie.

Classificazione JEL: *G30,L10*

Parole Chiave: *strategia smart specialization, governance collaborativa, tripla ellisse, quadrupla ellisse..*