

Abstract

During the 1990s the ever widening productivity and growth gap experienced between the EU and the US, prompted various stakeholders in Europe to start investigating for the reasons for this phenomenon and what could be done to alleviate it. An array of arguments were raised for the existence of this gap including among others differences on labour issues, human capital and mobility, market segmentation, managerial practices and so forth. However the Research and Development (R&D) gap was found to be one of the main reasons, having a substantial economic impact, and has since become the focus point of the Smart Specialisation concept, which seeks to shorten and alleviate it by focusing on the competitive advantage and the synergies between the various stakeholders in the European regions.

The concept has evolved since, to a basic ingredient of the "Europe 2020" which is the EU's growth strategy for the coming decade. It has become a political instrument and forms part of the regional development agendas across the EU.

While the results of the RIS3¹ policy have been mixed so far, as it will be demonstrated in the dissertation, nevertheless the experience is evaluated as positive in general. While it's too early to reach a final verdict, corrective measures can be taken to better adapt the policy to the present and future needs of the European regions.

¹*In the dissertation at hand the use of the term of Smart Specialisation Strategies (S3) is an equivalent to the term of "Regional research and Innovation strategy for Smart Specialisation (RIS3)" and both terms are used interchangeably.*

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According to Article 5 of the Regulation (EU) No 1301/2013 of the European Parliament and of the Council of 17 December 2013 on the European Regional Development Fund and on specific provisions concerning the Investment for growth and jobs goal and repealing Regulation (EC) No 1080/2006....

....

The ERDF shall support the following investment priorities set out in the Partnership Agreement:

(1)strengthening research, technological development and innovation by:

(a)enhancing research and innovation (R&I) infrastructure and capacities to develop R&I excellence, and promoting centres of competence, in particular those of European interest;

*(b)promoting business investment in R&I, developing links and synergies between enterprises, research and development centres and the higher education sector, in particular promoting investment in product and service development, technology transfer, social innovation, eco-innovation, public service applications, demand stimulation, networking, **clusters and open innovation through smart specialisation**, and supporting technological and applied research, pilot lines, early product validation actions, advanced manufacturing capabilities and first production, in particular in key enabling technologies and diffusion of general purpose technologies;*

1 Introduction

Smart specialisation is an EU policy with a place-based approach that aims to exploit advantages of proximity to promote economic growth and competitiveness. According to the European Commission [European Commission (2012)] the Smart Specialization *strategies* "...are integrated, place-based economic transformation agendas that do five important things:

- *They focus policy support and investments on key national/regional priorities, challenges and needs for knowledge-based development;*
- *They build on each country's/region's strengths, competitive advantages and potential for excellence;*
- *They support technological as well as practice-based innovation and aim to stimulate private sector investment;*
- *They get stakeholders fully involved and encourage innovation and experimentation;*
- *They are evidence-based and include sound monitoring and evaluation systems."*

However the relevant experts such as Foray [Selected EU papers (2009), and European Commission (2014)] maintain that the concept should not be a top-down approach, adhering to some sort of state policy on regional development. It is suggested that an entrepreneurial process of discovery should be used, where entrepreneurs will discover and unearth the possibilities and the economic opportunities located in a specific area. It is precisely at this point that public policy can play a supporting/guiding role towards entrepreneurs by providing and dispensing appropriate information about technological advancements, assisting in exploiting available commercial opportunities, monitoring of product and process safety standards, promoting sales in domestic and export markets, and pinpointing possible external sources of finance and distribution agencies.

As the historical anecdotal references demonstrate, presented in other parts of the dissertation, the role of the state is not always apparent. This should not be translated that the state is redundant or useless. On the contrary this role can revolve around the following axes:

- provider of incentives to encourage entrepreneurs, research institutes and Universities to locate the most promising smart specializations of an area;
- supporter of R&D and innovation especially the ones with the highest future impact;
- improving the relationship between the needs for specialized R& D and relevant training providers;
- promoter of networking and relationships between the relevant stakeholders;

According to the European Commission there is a RIS3 ex-ante conditionality. This clause requires that EU Member States and regions must have smart specialisation strategy in place that has the following characteristics:

- is based on a SWOT or similar analysis to locate and concentrate resources on a limited set of research and innovation priorities;
- outlines measures to stimulate private research, technology and development (RTD) investment;
- contains a monitoring and review system;
- sees that a Member State has adopted a framework outlining available budgetary resources for research and innovation; and
- sees that a Member State has adopted a multi-annual plan for budgeting and prioritisation of investments linked to EU priorities (European Strategy Forum on Research Infrastructures – ESFRI).

Despite the existence of the guides and the assistance both online and offline as Kroll notes (Kroll, 2015), currently there is no generally accepted definition of what smart specialisation is and its implications regarding policy making.

It is true that many misunderstandings have occurred regarding the application of the policy. First the initial emphasis has been more on the second part (Specialisation) with the "Smart" part being overlooked: cross-sectoral use is more likely to be supported. As Foray argues (Foray, 2009) the application of smart specialisation in thematic areas that make the most of a region's current knowledge base is the appropriate response. Second when everything is said and done, the tools provided, explained elsewhere in the text, give a methodology to pick the most promising projects/sectors to be financed; a fact which is more pronounced in importance in the austerity times we all live in: this because each country has to choose wisely among the options available due to limited funds available.

Another criticism addressed towards the concept, is that it is focused almost exclusively to technology. In reality the concept places the *adaptation* of technology in high- or low-tech sectors at the centre of its argumentation.

And while RIS3 will not replace the EU Cohesion Policy, nevertheless it should work in tandem with all other tools and ways available in the framework of this Policy. After all, any change in this policy in a specific area or region will be the object of bargaining and negotiations between local stakeholders, something which is to be expected in a democratic state.

RIS3 does not favour established sectors or ideas over emerging ones or vice versa. Rather it employs a logical way of picking the most promising one or more, through a methodological procedure, therefore increasing the odds of success.

Finally, the issue of implementation is something that hinders the development of the concept. Regarding the issue of practical application of the RIS3 concept, a more thorough examination will take place later in the dissertation. At this moment it should suffice to say that RIS3 application will bring in the foreground any weaknesses and/or difficulties in regional governance and strategic policy making. These issues which may occur, augmented with the natural tendency of

resistance to change, while it provides an immediate picture of regional capacity, nevertheless may hinder the successful application of the RIS3 concept.

1.1 Scope of the dissertation

The dissertation starts with a brief presentation of the Smart Specialisation concept. Then it proceeds with its historical perspective and then the methodological and theoretical framework of the concept is explained.

From that point RIS3 is presented within the framework of other EU policies, culminating with its description in action in various areas and regions across Europe.

Since the RIS3 policy is a novel item in the EU polity, this latter part takes into account the early experiences of stakeholders in various regions across Europe (including Greece) and provides the first input concerning results and impact of its application.

A special mention is made for cross border smart specialisation with the example of Greece and Bulgaria. Then the dissertation proceeds with a discussion of entrepreneurship and RIS3 and culminates with the conclusions of the analysis presented until that point and possible future steps of the policy.

2 History and origin of the Smart Specialisation

While Smart Specialisation is a novel concept, its logic is not something that has been encountered for the first time; several examples can be found in economic history. Take for example (Foray, 2015) the case of a company founded in Morez, France back in 1796, which produced nails. Then, the owner, Pierre-Hyacinthe Caseaux, discovered that the same technique used to produce nails could be used to produce spectacles.

This led to other nail producers doing the same, creating a vocational training centre in the process, thus forming a nucleus of spectacles' production, making the area a world centre. In this case the presence of state was non-existent and no policy changes were necessary.

Or in opposition the case of the city of Lyon where, the silk industry was in decline back in the 1960s. This led some visionary local businessmen to explore the possibility of moving from silk to technical fabrics and then to integrate those items, coming from textile and chemistry respectively. This led to structural and policy changes and to a strong competitive advantage, enjoyed by the local companies.

So transformation of an existing idea or method to another one which is close yet entirely different is one step. Policy changes such as modernization and diversification may help, so that market and co-ordination failures happen less.

But production is not the only area where Smart Specialization may occur. An unused airport in Wales, UK, was bought in the year 2000 as a potential hub for business jets. When this endeavour failed, the owner remodelled it as the first testing ground for drones in the UK. This was then combined with the expertise and the input by relevant local education establishments on this subject and subsequently production facilities which focused on drones were involved, thus creating what can be called "a drone cluster".

Coming closer to our present time, it may seem odd to some of today's readers but the world was different in many aspects in the 1990s: the cold war had ended with the West (and the USA in particular and its allies) as the winner, Russia and the former Soviet republics were facing some very difficult economic and social situations, and a civil war in the former Yugoslavia had erupted; and this refers only to Europe (which had only 12 nations as Member States), not to mention the Middle East with its continuing problems and the Gulf Wars or Asia and the financial and social upheavals that they were experiencing.

In addition to "what was", there were also many scientific advances that we take today for granted, that "were not": The World Wide Web was more of a scientific instrument than the all-encompassing medium that is today, mobile phones were the domain of secretive organisations, and PCs and their software were just taking off. Finally, China was not the world player that is today and the Maastricht Treaty had just been signed.

But even in that era with all those differences from our current one, there was an issue that was and still is on the minds of the EU decision and policy makers.

As McCann and Argilés note (McCann-Argilés, 2011) the Smart Specialisation concept, close to the meaning that we attribute to it today, started appearing in noticeable size around 1995 when the productivity gap between Europe and the US became evident and was gaining momentum.

A number of reasons for this gap were proposed, centred on the differences between the US and the EU, on labour market and mobility, on management practices, on venture capitals and investments, on industrial structuring, and in the slow translation and transfer of R&D into production and market launch.

However the dominant underlying theme was, and still is, the ever increasing adoption and/or market adaptation and use of ICT (Information and Communication Technologies) and its contribution to the ever widening transatlantic gap.

One obviously cannot claim that more technology is the answer. As Van Ark accurately suggests (Van Ark et al, 2008) "...European productivity slowdown is attributable to the slower emergence of the knowledge economy in Europe compared to the United States."

One of the reasons cited for this phenomenon is that, despite the fact that the EU economy is slightly larger than that of the US, the European markets are more fragmented, with fragmentations ranging from different laws and traditions to diverse language and production standards. While in markets like energy or telecommunications, integration has proceeded more or less successfully thus reducing fragmentation, nevertheless in R&D the situation has remained (fragmented that is) with many similar initiatives and with low market penetration, especially worldwide.

These phenomena were expected to be countered and reversed with the creation of the European Research Area (ERA), established as a mechanism for the dissemination of knowledge and as a facilitator of research and innovation throughout Europe. In order to underpin the ERA logic and the policy priorities it pointed to, the Smart Specialization concept was developed as one of the leading ideas of the "Knowledge for Growth" (Selected Papers, p.21), an expert group (with K4G being its abbreviation) which was a think-tank group advising to the European Commissioner for Research at that time, Mr. Janez Potocnik.

This group, established in 2005 by Mr. Potocnik, consisted of prominent economists and was tasked with providing him with high-level advice on how knowledge can contribute to sustainable growth and prosperity and to foster policies in support of the Lisbon Strategy² goals.

² *The original Lisbon Strategy was launched in 2000 as a response to the challenges of globalisation and ageing. The European Council defined the objective of the strategy for the EU "to become the most dynamic and competitive knowledge-based economy in the world by 2010 capable of sustainable economic growth with more and better jobs and greater social cohesion and respect for the*

In fact the effort was to locate:

- how can knowledge promote sustainable growth and prosperity;
- how can an optimum mix of policies be created that will foster the creation, dissemination and use of knowledge;
- how can the various stakeholders play a role in stimulating a knowledge society;
- how can the dialogue among these actors be enhanced.

The ERA concept sought to make R&D results available across Europe. This concept moved the emphasis from R&D as practised mainly by the MNCs (multinational companies), to institutional and government entities relating to science, and finally towards technological specialisation based on the adoption, dissemination and adaptation of General Purpose Technologies (GPTs), a term which mainly refers to ICTs, and their applications and use across a wide range of sectors and industries.

Furthermore the "Knowledge for Growth" group recommended the support of structural change and the location of sectors and/or industries which had high Research and Innovation³ potential, adapting to local and regional circumstances. Networking and collaboration with other relevant stakeholders from the public and private sector should be in order.

At this point this recommendation had to be translated into policy. Smart Specialisation/RIS3 is a key part of the EU Cohesion Policy supporting thematic concentration and reinforcing strategic programming and performance orientation. RIS3 has a central role in the contribution of cohesion policy to the Europe 2020 goals.

environment", http://ec.europa.eu/europe2020/pdf/lisbon_strategy_evaluation_en.pdf, accessed on September 2016

³*Adapted from <http://www.nordregio.se/en/Metameny/Nordregio-News/2012/Smart-Specialisation/Context/>, accessed on September 2016.*

This initiative succeeded in making the idea of European Research Area a more stable concept and thus promoting innovation across the EU.

Knowledge and its applications are considered to be a major part of the arsenal of available policies in the EU area, to counter the ever widening gap with the US. As it became apparent very soon a host of issues had to be dealt with: policy issues, global challenges, financial constraints, and a low level of R&D budget dedicated, all of which are connected with the RIS3 policy.

3 Methodology and Theoretical framework of Smart Specialisation

An important distinction must be made at this point: the logic of Smart Specialisation is not top-down, government intervention approach; rather it emphasises a process of discovery and learning from the entrepreneurs, who are the entities understood as being those who will locate the right types of knowledge-related specializations and the government policies should be more targeted like SME incentives which are expected to bring the shift from academic science to commercial use. For this reason the concept of “domain” is used where entrepreneurs look at their sector, where knowledge spillovers either within or from outside the sector may occur and this could lead to the discovery of new business ideas and/or models. This process depends upon the size of the sector, referring to the existence of a critical mass, and the connectivity with other sectors.

This process of discovery and learning from the entrepreneurs is what is referred to in the relevant literature, as the “Entrepreneurial Discovery Process”. This Entrepreneurial Discovery process⁴ is a process which has the following characteristics:

- It is inclusive, interactive, and bottom-up, where relevant stakeholders from different parts of the society (policy, business, academia, etc.) are locating new activities or interact with old ones, in order to identify emerging opportunities, while policy makers are expected to facilitate the whole network;
- Integrates the existing knowledge, which resides in various sectors and parts of the society, which shows signs of fragmentation and therefore offers the minimum impact. The issue of connectedness mentioned

⁴<http://s3platform.jrc.ec.europa.eu/entrepreneurial-discovery-edp>, accessed on September 2016

previously, occurs between citizens, institutions, companies and academia is activated at this stage through the formation of collaborative, schemes, networks and partnerships. More on this “quadruple helix” concept as it is known in the literature will be further explained;

- Opening of new avenues of opportunities both from a technological and from a market point of view that offer the possibility of a rapid growth.

It is natural that this process, with many moving parts, has the potential to fail or to side-track at many stages: the entrepreneur(s) may have a limited viewpoint, therefore may miss opportunities and/or data or may simply fail to make the necessary connections among them. Or that the size of either the market or the number of qualified personnel may not be enough to provide a critical mass for successful results. However policy makers could partly alleviate this by promoting measures that support greater engagement from the entrepreneurs.

The aim of going from R to D or from invention to application development is what it is all about.

According to Foray (Foray, 2013, p. 20) Smart Specialisation may occur without any sort of planning or help from outside forces: The combination of a forward thinking entrepreneur, the pre-existence of practises, ideas or concepts and their combination⁵ can work in order to produce something new, something that did not exist before.

This process affects more than one industry; with more companies participating in the Smart Specialisation concept, they induce the public sector to offer amendments in societal structure, in the legislative policy and in the institutional framework.

⁵Is what James Altucher refers as “Idea sex”.

More on this concept: <http://www.jamesaltucher.com/2012/04/how-to-have-great-ideas/>, accessed on September 2016

4 Smart Specialisation in the context of the European Union policies

According to McCann & Argilés (McCann & Argilés, 2016), even if the concept of Smart Specialisation has only recently started being implemented in the EU, nevertheless some initial remarks can be made concerning its place within the framework of EU policies.

The first major challenge of the application of modern regional innovation policies across the EU is to apply them in regions with very limited innovation-related assets be it in the private or public sector or in the education and research establishments or the society in general.

Therefore the tools that are available for designing and implementing Smart Specialisation across regions in Europe should be adapted to the needs of the target area and should not follow the one-size-fits all mentality. This means that the innovation policy orientation and the policy mix ought to differ in different contexts. Also this brings to the surface the issue of monitoring these policies and their outcome, with a view towards the choice of the correct indicators that should be used for ex ante policy design, policy experimentation and better ex post evaluation. As Veugeleurs argues (Veugeleurs, 2015) the tendency to have homogeneity in policies will produce wrong policy priorities in certain regions which are weaker than others: she cites the example of the case of weaker economies which are aiming to catch up with more advanced parts of Europe. In this case the main priorities should relate to the absorption and adaptation of existing technologies rather than at initiatives aimed at fostering features such as creativity.

A first indicator of success (or of failure depending on the evaluator's viewpoint!), is the fact that the notion of Smart Specialisation must be present in the design of regional and national Operational Programmes. According to surveys conducted, within the framework of the Smart Specialisation Online Platform, in

60% of Operational Programmes a detailed SWOT analysis of a region's innovation assets and capabilities took place and approximately 50% of the Operational Programmes also incorporated an explanation of the methodologies employed in the policy-prioritization processes. Unfortunately only 30–40% of Operational programmes include detailed and specific descriptions of how to achieve resource concentration, what are the best policy mix and tools to use, how the entrepreneurial discovery process is planned to work, and in particular how it relates to include Small and Medium enterprises (SMEs⁶) in this process, and finally how the monitoring and evaluation activities will take place.

In summary, while steps towards implementing Smart Specialisation have taken place, the distance to achieving the results envisaged is still long.

McCann & Argilés (McCann & Argilés, 2016) have made a quite thorough review of the various reports as compiled by different researchers (i.e. Kroll, 2015; Kroll, H. et al. 2014, etc.) and according to them the initial conclusions from the application of RIS3 across Europe are the following:

- RIS3 is a dynamic process which should continually evolve and adapt to the reality faced in the region in question;
- It affects many aspects in the economy and in policy making, not just around technology and/or innovation, by being the catalyst for wider improvements concerning institutions, policy making both within and beyond the scope of technological issues;
- Different results obtained across European regions according to the needs and the level of development: in economically strong regions with more reliable institutional and governance systems, RIS3 often leads to a refining and sharpening of existing practices, while in regions in southern Europe in

⁶ "The category of micro, small and medium-sized enterprises (SMEs) is made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million." Extract of Article 2 of the Annex to Recommendation 2003/361/EC

particular, RIS3 activities appear to have led to real progress. However, in the economically weaker regions with less solid local and/or national governance arrangements, RIS3 has often proved to be very difficult to implement and/or measure;

- Regions and areas which are lacking behind have to rise to the challenge including among others upgrading the quality of governance and enhancing institutional capabilities;
- Increase of international exposure, co-operation and networking should be fostered.

4.1 Europe 2020 strategy

Europe 2020 strategy⁷ as proposed by the European Commission is the European Union's ten-year jobs and growth strategy. It was launched in 2010 and aims to create the conditions for smart, sustainable and inclusive growth.

Five major targets have been agreed for the EU to achieve by the end of 2020 namely employment; research and development; climate/energy; education; social inclusion and poverty reduction.

Within the framework of this strategy, and for the sake of the dissertation at hand, the interest lies on Smart growth which is translated to efforts towards improving the EU's performance on:

- education (encouraging people to learn, study and update their skills);
- research/innovation (creating new products/services that generate growth and jobs and help address social challenges);
- digital society (using information and communication technologies)

The flagship initiatives launched, which pertain to Smart Growth are the following:

⁷http://ec.europa.eu/europe2020/index_en.htm, accessed on September 2016

- Digital agenda for Europe
- Innovation Union
- Youth on the move

From the above mentioned initiatives, the focus in this dissertation is on the "Innovation Union". As it is mentioned in the relevant site⁸: *"Innovation Union is the European Union strategy to create an innovation-friendly environment that makes it easier for great ideas to be turned into products and services that will bring our economy growth and jobs."*

This initiative aims at re-focusing R&D and innovation policy on the challenges facing our society, such as climate change, energy and resource efficiency, health and demographic change. "Innovation Union" focuses on two levels: EU and National Level.

On the EU level the Commission is responsible:

- to complete the European Research Area;
- to improve framework conditions for business to innovate;
- to launch 'European Innovation Partnerships' between the EU and national levels and to promote knowledge partnerships and strengthen links between education, business, research and innovation.

On the National level, which is the main domain of individual Member States, they (the Member States) have to:⁹

- To reform national (and regional) R&D and innovation systems to foster excellence and smart specialisation, reinforce cooperation between universities, research and business, implement joint programming and enhance cross-border co-operation in areas with EU value added and adjust

⁸http://ec.europa.eu/research/innovation-union/index_en.cf, accessed on September 2016m

⁹European Commission Brussels, 3.3.2010 COM (2010) 2020 final Communication from the Commission EUROPE 2020 A strategy for smart, sustainable and inclusive growth

national funding procedures accordingly, to ensure the diffusion of technology across the EU territory;

- To ensure a sufficient supply of science, maths and engineering graduates and to focus school curricula on creativity, innovation, and entrepreneurship;
- To prioritise knowledge expenditure, including by using tax incentives and other financial instruments to promote greater private R&D investments.

At this point it is necessary to briefly present the tools offered by the EU to foster Smart Specialisation across Europe as they are presented and offered in the relevant online platform: <http://s3platform.jrc.ec.europa.eu/>.

The RIS3 online Platform offers a lot of tools and advice on how countries and regions can design and implement their strategies by offering assistance in:

- capacity-building and upgrading of institutional quality and capabilities;
- offering guidance material and good practice examples;
- organizing information sessions for policy-makers and participating in conferences; providing
- training to policy-makers; facilitating peer-reviews; supporting access to relevant data; and participating in high quality research projects to inform strategy formation and policy making.

A key objective of the RIS3 Platform is the development of co-operation among EU countries and shifting the focus from general to targeted analyses linked to the region's assets and features. For this purpose detailed data and analytical tools are provided for self-analysis as well as peer-review processes between regions from different countries. In addition an energy and green economy agenda as well as an urban initiative is soon to be developed.

5 Smart Specialisation in action

As previously mentioned the role of the Government and of policy makers is an important part of the equation of a successful Smart Specialisation policy.

Again the Government¹⁰ should not be viewed as an oppressive or a top down enforcer of policies, supreme selector of national or regional “champions” and supporting them. Rather it should come as a facilitator for the:

- involvement of entrepreneurs, research and educational institutes as well as any other organisation that will assist in discovering the regions’ respective specialisations by providing the any incentives required;
- support of R&D and Innovation;
- identification of any weak links in the chain and their subsequent strengthening;
- knowledge and technology transfer on a national and EU level.

But how do nations and regions proceed in formulating a Smart specialisation Strategy? There are certain steps that need to be taken. These practical steps are the following¹¹:

- Analysing the innovation potential
- Setting out the RIS3 process and governance
- Developing a shared vision
- Identifying the priorities
- Defining an action plan with a coherent policy mix
- Monitoring and evaluating

This strategy will cater for regional scientific excellence and include the adoption and diffusion of knowledge and innovation. An assessment and monitoring

¹⁰ The terms “State”, “Government”, “Local And Regional Authorities” are used interchangeably throughout the text and they all refer to the public administration of each country.

¹¹<http://s3platform.jrc.ec.europa.eu/ris3-guide>

method should be included and should be, if possible, peer-reviewed. The Commission will assess the fulfilment of the conditionality in relation to the negotiation of the Partnership Agreement and Operational Programmes. There is guidance available and an online platform with guides, training, and support available.

Such is the importance of Smart Specialisation in the current programming period of 2014-2020 that the Commission has made such strategies a pre-condition (the conditionality clause mentioned previously) for ERDF funding. Thus EU Members States and regions must have RIS3 strategies in place before their Operational Programmes supporting these investments are approved.

From the brief description presented above it is evident that the design, implementation and monitoring of the Smart Specialisation strategy is not an easy task. A lot of things can go wrong or divert from the original idea and many hurdles need to be overridden which, given the dynamic character of the whole process, makes it even more difficult to fulfil. What could be those hurdles and in which areas they might lie? Below is a list, which while non-exhaustive is an indicative one:

- The first hurdle is to prioritise in which sectors to apply RIS3. The Entrepreneurial discovery process is a tool to be used for this task;
- The second hurdle is to determine if the available policies to pursue the strategy are enough. If not, what needs to be upgraded in the legislation?
- The third hurdle is to establish the mechanisms to measure, assess, apply and derive knowledge from RIS3 application. Without these, nobody knows for sure if the policy is successful or not;
- The fourth hurdle is to align the policies on a regional, national and EU level. This means that contradictions in policies should be nullified, otherwise they pose a hindrance to successful implementation;

- The fifth hurdle is to choose the territories to apply it or to co-operate with. These territories could be outside the region or even the country. The latter refers to cross border co-operation, which is further developed in other parts of the dissertation;
- The sixth hurdle is to convince all parties and stakeholders involved to participate, engage and commit to the process and its results. It would not be an understatement to say that this could be the hardest part. Resistance to change coupled with personal interests and local agendas may very well rob RIS3 of any chance of success.

More details about the actual application of the policy will be later analysed, in other parts of the dissertation, where actual country and/or regional examples will be described.

5.1 Clusters and Smart Specialisation strategies

Cluster theory and Smart Specialisation theory without being the same, nevertheless share many characteristics and deserves a more analytical mentioning in the dissertation at hand.

A cluster can be defined as “a geographically proximate group of interconnected companies suppliers, service providers and associated institutions in a particular field linked by externalities of various types” (Porter, 2003).

The term which is of importance at this definition is “proximity”¹² which is the main advantage of the Cluster theory as presented by Porter.

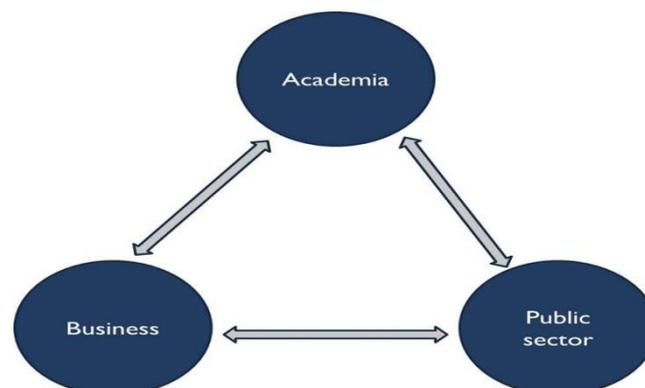
According to this theoretical framework, proximity in clusters offers the following advantages:

¹²European Commission (2013) “The role of clusters in smart specialisation strategies”, p.14

- scale and agglomeration which promote productivity since contractors and subcontractors are near to each other raising the degree of specialization and connectivity among companies;
- improved personal relations between the people since their places of work are so close, their social lives are bound to interact, a fact which could create better working bonds;
- creation and exchange of knowledge locally and subsequently easier access to it.

One easily notes that those arguments refer to physical proximity. What immediately comes to mind is the fact that with modern ICT available the geographical notion becomes more or less obsolete, which is one more link between Cluster theory and Smart Specialisation theory as will be evidenced further below.

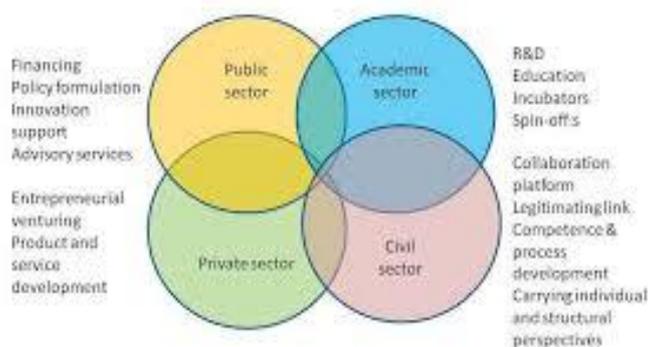
Clusters are very attractive because of another reason as well: The triple helix model, which is visually depicted below¹³, shows the relationship that exists between the business/private sector, Academia (universities and research centres) and the Public sector.



¹³ Source of the graph: <http://blog.bearing-consulting.com/2012/03/22/beyond-triple-helix-towards-quad-helix/>

This model originated¹⁴ in the 1990s by Etzkowitz and Leydesdorff, building on the work by Lowe and Sábato and Mackenzi, claiming the shift from a dualistic relationship between industry-government, a prominent characteristic of Industrial Society to a growing triadic relationship between university-industry-government in the Knowledge Society, which we currently live.

This model has evolved to the 'Quadruple Helix' model as depicted below¹⁵. As Carayannis and Campbell note (Carayannis and Campbell, 2009) this model emphasises the importance of including the perspective of public/civic society which bears the influence of media and culture. The outcome is an emerging fractal knowledge and innovation ecosystem, better adapted for the knowledge economy and society than the previous one.



What is the connection between clusters and RIS3? They share two critical elements: 1) a focus on productivity and innovation as key drivers of competitiveness; and 2) an accent on fostering regional embeddedness with a view to capitalise on the advantages of proximity.

However there are also some differences: RIS3 promotes spillover effects between different knowledge domains; clusters on the other hand concern mostly

¹⁴http://triplehelix.stanford.edu/3helix_concept, accessed in September 2016

¹⁵Source of the graph: Malin Lindberg, Monica Lindgren, *Quadruple Helix reports 2010:4 The role of NGOs in supporting women's entrepreneurship A study of a Quadruple Helix project in the Baltic sea region*

industries which have a degree of relationship and common characteristics in infrastructure and resources required. In the end, RIS3 may transform a regional knowledge domain into something new while in the framework of a cluster may just improve the performance of the companies that belong to it.

6 Smart Specialisation in regions across Europe: Selected examples

McCann and Argilés (McCann-Argilés, 2014) rightly argue that the whole issue of Smart Specialisation as it is designed and applied in regions and/or countries around Europe has some differences. These differences reside mainly in the local context, meaning the specific local circumstances and characteristics encountered.

From the analysis provided by those two authors and from the literature review in general, accessed for the sake of this dissertation, it becomes obvious that there is no single successful approach to smart specialisation, applicable to all regions across Europe. Regional administrations have to implement this policy within the framework, the possibilities and the limitations that they are dealing in their context.

Designing RIS3 and implementing it, as the experience in regions across Europe demonstrates is not easy. It is expected what Kroll describes (Kroll, 2015) that regional stakeholders have to strike a balance between RIS3 concepts and regional diversity; is what several other researchers referred to as "place sensitivity" or "specialised diversification", "regional branching" and so forth. What they all referred to is that while policies and ideas are one thing, their adaptation should take into account regional conditionality's, relevant stakeholders, their wishes and institutional specificities.

European regions while not being aware of RIS3 or of its possibilities or limitations nevertheless had developed over the years various systems, methodologies and practises of policy incorporating. These would be used once again. As Foray (Foray et al. 2012) explains, it was a combinational effort on several distinct fronts: create new paths, transform and adapt existing ones while providing the necessary institutional framework.

This logic soon led to regional approaches differing according to the local context. (Camaghi et al, 2014)

From reviewing the literature one cannot help noticing the speed with which RIS3 was designed and subsequently is implemented or at least that is the aim of regional stakeholders: from the reference in 2009 from the Knowledge for Growth Expert Group as mentioned in other parts of this document, to becoming an established policy and a target for Europe 2020. Such was the drive that all parties, concerned with the allocation of European structural investment funds, had to submit a RIS3 strategy or lose their access to those funds. Therefore the force of change was so strong that Foray (Foray, 2015) suggests that it was the most seminal change to Cohesion Policy since that policy field's 1989 reform. Or as McCann and Argiles (McCann Argilés, 2014) mention the introduction of the RIS3 policy means that the primary logic of Cohesion Policy design is shifting away from absorption and towards objectives, a development which represents a major change in the policy arena. Or, in other words the focus is now on policies and their accountability measured by the degree of implementation according to objectives, goals and strategies.

The transition from an academic concept to a regional policy was not always easy since there were few provisions in the way of helping regional policy-makers to make sense of local political and institutional complexity and dynamism to the extent needed for solid policy-making. It was this mix of policies and conflicting interests that led in a number of cases to a confusion regarding RIS3, its potential and its limitations.

Kroll (Kroll, 2015) sets the tone by saying "*...that diversity in implementation (of RIS3) is strongly determined by differences in general institutions and, more importantly, regionally specific modes of governance.*" The weight placed on the shoulders of policy makers, especially in less experienced regions can be heavy.

So RIS3 had different results for different regions according to their experience and capacity.

For very inexperienced regions the clash between the old culture and the novel methodology proposed was substantial and a high degree of resistance to change was experienced. Even when regional policies were actually changed, the degree of actual implementation remains to be seen. Especially for areas of Central and mainly of Eastern Europe as Muscio describes (Muscio et al, 2015) a regional innovation paradox was and is experienced where "*The regional innovation paradox*) is the greater need of lagging regions to invest in innovation and their relatively lower capacity to absorb funding compared to more advanced regions." This is verified econometrically and it is also proved that the potential of RIS3 to promote "innovation-driven growth" faces increased challenges from inadequate government capacities. This is not experienced only on central government but also on the local/regional level. In order to overcome this obstacle, capacity building activities will be required. These activities should also include actions to foster collaboration and networking between SMEs and between SMEs and public administration.

For regions with medium experience, RIS3 with its bottom up approach revived dormant actors, especially in science and technology fields and with the pressure of funding led to improvement especially in governance. This was more evident in the regions of Southern Europe.

For regions with robust governance systems and strong capacities, the gains were not substantial. Obviously they implemented the RIS3 policy, although there were also regions that had little success. What these regions gained was less fragmentation and improved co-ordination among those in the triple (or quadruple) helix mentioned previously. This was more evident in many Central and Northern European Regions.

On a positive note, and this may have been the reasoning behind the need for speedy implementation, the whole Smart Specialisation process led to the building of more robust government and institutional foundations and to improved capacity building. As for an after-action result any policy in the future should take into consideration local limitations and taking a regionally adaptive approach.

This is coupled by Foray (Foray, 2016)¹⁶ where he mentions that horizontal policies (such as RIS3) failed in such cases, where the knowledge gap was not reduced and even when that occurred, this did not result in economic growth. For innovation to be successful it requires specific capabilities and resources. He presents the term of “Microsystems of innovations” stemming from connections between entrepreneurs, suppliers, research, lead users to open and explore new opportunities. These opportunities complement existing structures with the aim of transforming them. This process is not finite, but rather it is open-ended.

This is obviously an expensive process, with local and regional governments being unable to cover such an endeavour by themselves with their resources (money, personnel). This is the reason why RIS3 is forcing them to make some tough choices: assist in the transformation of existing sectors or creating new ones?

The response so far was to let the government decide and set the incentives for the private sector to implement it. This has not been successful in many cases and for various reasons:

- Government/public administration is supposed to have the correct answer as to the sectors to be promoted for specialisation. This is simply not true because RIS3 specialisations are not given ex ante. For this reason the entrepreneurial discovery process does not have prearranged results. A clarification is in order at this point for this concept: “entrepreneurial” is

¹⁶ <https://www.youtube.com/watch?v=I4tTnKdt52s>, *Smart specialisation strategies in the EU and their policy impact - Lecture by Prof. Dominique Foray, Video of the joint lecture organised by the European Commission's department for Regional Policy (EC DG REGIO) and the European Regional Science Association (ERSA).accessed on September 2016*

used in the broadest term of including the whole triple (or quadruple) helix: companies, universities and research institutes, final users, online and offline communities; “discovery” addresses opening and exploring new domain of opportunities, mainly through the integration and combination of various kinds of knowledge. Innovation comes afterwards;

- Choices for specialisation are made at sectoral level where the method of specialisation should be the focus. For example if biotechnology and agriculture are going to be working together, then the focus is on biotechnology in certain companies in this sector and not in the whole sector. Therefore the prioritisation is not on a sector as a whole but on the new activity aiming at transforming the sector or its part which is connected with this activity;
- Choices about specialisation can vary over time and changes from one sector to another can and should come;
- Criteria for choices can vary: potential impact, speedy development, feasibility, proximity to market, significance for the regional economy, policies involved and so forth;
- RIS3 has an element of guessing embedded. After some time (5-6 years) a strategy is deemed a success or failure and if the former happens it is no longer a novelty but an accepted situation;
- Sadly in many cases relevant stakeholders proclaim the initiation of RIS3 but very few things happen afterwards.

One should note that RIS3 does not have to be something flashy or create an extraordinary scientific breakthrough. Sometimes even innovation complementarities may hold the key to local or regional development and growth.

McCann and Argilés (McCann-Argilés, 2014) have some interesting conclusions from the application of RIS3 strategy from regions across Europe, namely from the United Kingdom (UK), the Low Countries and Spain. These examples

constitute a nice mix of ideas, practical applications, pragmatism and taking into account local circumstances.

From the application of RIS3 in other parts of Europe some initial remarks have emerged although much more elaboration is necessary and they should be considered preliminary.

6.1 RIS3 in the UK

In the UK, government institutional capabilities are considered to be strong. The UK is considered a largely centralised state, which means that most of the funding for the activities of regional/local governments is derived from the national government. This may hinder the design and application of any RIS3 policy. However, following the economic crisis after 2008, the degree of public investment undertaken by local/regional governments in highly centralised states fell sharply. In addition to this, investments associated with economic affairs or regional development executed outside the national government in the UK is one of the lowest in the OECD.

Also the fact that Regional Development Agencies (RDA) were dropped in 2010, and were replaced with the Local Enterprise Partnerships (LEPs) was not conducive to applying for any new policy. These partnerships were more informal and bottom-up oriented, with the capacity of the latter to design and implement a Smart Specialisation strategy to be of a varying degree. This regional disparity did not go unnoticed by the public administration which led to an effort to link public sector, private sector and civil society, which reminds us something loosely based on the quadruple helix model. This effort should help LEPs to better to engage with the Smart Specialisation agenda in order to access ERDF funds, which as mentioned before, is an ex ante conditionality for the new Programming period of 2014-2020.

The Smart Specialisation strategy prompted the country to promote initiatives that were to act as a catalyst for further reforms and to accommodate the regional qualities of the country.

So, as Marlow and Richardson (Marlow and Richardson, 2015) argued in February 2015, Smart Specialisation is currently at an important crossroad. Even if the five recommendations mentioned above are implemented, nothing is guaranteed. Consistency of action combined with an evolutionary process of learning and capacity building could definitely help. But in light of the recent developments in the UK (the Bruit Referendum of the 23rd of June 2016, with 52% voting to leave) will definitely affect not only RIS3 but all policies emanating from EU.

Marlow and Richardson (Marlow and Richardson, 2016) offer some insight into the recent UK experience of RIS3. As it seems, more is needed to be done to make this policy work. In fact they offer some particularly useful insights for the matter, namely:

- Continuing investment in newer and more capable techniques taking into account regional realities;
- Capacity building of LEPs (Local enterprise partnerships) is a very important ingredient if it is desired the policy to be successful;
- Smart specialisation requires collaboration between various stakeholders which may not be situated in the same area or even in the same country. Closer collaboration and/or networking may be required;
- Deriving from the previous point, RIS3 is bound to be connected to more parts of the EUROPE 2020 agenda. Therefore its scope should be broadened to include more than the European Structural and Investments funds¹⁷;

¹⁷With a budget of €454 billion for 2014-20, the European structural and investment funds (ESIFs) are the European Union's main investment policy tool. They are the European Regional Development Fund (ERDF), the European Social Fund (ESF), the Cohesion Fund (CF) the European Agricultural Fund for Rural Development (EAFRD) and the European Maritime & Fisheries Fund (EMFF), http://ec.europa.eu/contracts_grants/funds_en.htm, accessed on September 2016.

- The implementation of a RIS3 strategy is not static but a dynamic procedure. In fact it is a "...*process of continual learning, capacity building, and review of performance and impact*" with the ongoing assistance of regional, national institutions without forgetting the role of EU agencies such as the JRC18, and the S3 platform.

Other areas in Europe have reported similar results depending on the economic and social conditions of each region. It is for this reason that one should take into account the actual experience of local beneficiaries which are either currently or have a vast experience of implementing a host of projects to upgrade their success rate not only of RIS3 but of any project.

6.2 RIS3 in the Netherlands and Belgium

Netherlands vis-à-vis the UK is characterised by inter-regional equality. The country is a centralised state with a high government quality and strong institutions. Most of the funding for the activities of local/regional governments comes in the extreme majority by fiscal transfers from the national government. But local public administration has enough powers because the share of public direct investment undertaken high by OECD standards and also has slightly increased, following the world financial crisis of 2008. Also the freedom in economic decisions by the local governments is higher than in the UK. The government has two initiatives "Top Sector" and the "Quality in Diversity". The former aims to improve the connection among large companies, universities and business associated in key sectors while the latter is a strategic agenda which is a long-term scenario for higher education, research and science. These approaches are for the most part space-blind in logic, sectoral in concept and top-down in

¹⁸The Joint Research Centre (JRC) is the European Commission's science and knowledge service which employs scientists to carry out research in order to provide independent scientific advice and support to EU policy, <https://ec.europa.eu/jrc/en>, accessed on September 2016

governance construction. This sectoral approach as well the top down approach does not follow so much the RIS3 policy. However Smart Specialisation as in the case of the UK has acted as a catalyst for fostering local participation of relevant stakeholders such as local government and local SMEs not only in developed regions but across the country.

In Belgium, the country boasts a high degree of inter-regional equality. As in the UK and in the Netherlands, the national government supports local economic activities but also because Belgium has a federal system, it should provide for a suitable environment for policy autonomy that can assist in RIS3 implementation.

A special mention should be made for Flanders where the local agenda has been well received and implemented and the participation of various sectors, the role of Universities and research centres coupled with the federal system, offers a combination which is more congruent with Smart Specialisation that in the case of UK and the Netherlands.

6.3 RIS3 in Spain

The case of Spain is another interesting example with the country having some common characteristics with the UK and the Netherlands but also on the other hand having some unique ones of its own.

There is inter-regional variation in tertiary educated human capital which is very large as is the variation in R&D investment intensity but on the other hand low levels of inter-regional inequality in terms of productivity performance are experienced. Spain is nowadays a highly decentralised country with "Autonomous Communities", a system which allows for a high degree of local or regional policy design and implementation. RIS3 agenda provides a framework for the upgrade of the Spanish labour force. Also the support targeted towards SMEs should be promoted more to exploit the potential of each region. As Miren Estensoro & Miren Larrea (Estensoro & Larrea, 2016) analyse specifically for the

Basque country the non-homogeneity of regions, the power issues between local stakeholders for the implementation of bottom up approaches, change in governance and the increased needs for capacity building are some of the issues facing RIS3 strategy.

6.4 RIS3 in Portugal

Cooke (Cooke, 2016) provides an interesting viewpoint concerning the condition of RIS3 in Portugal. He mentions that the economic and social conditions were different in the southern (Algarve), in the central (Centro) and in the northern (Norte) parts. Portugal, a country strongly hit by the economic crisis (although the southern part was more severely affected than the central and the northern one) tried to quickly adopt the RIS3 policy, in order to receive funding; the conditionality clause mentioned earlier was put in operation here as well.

The southern part was especially hit because of about 200,000 unsold residential properties on the market in 2008 while the other two areas had pursued policies and made investments on innovation before the crisis, which helped them a lot to offset the effects of the crisis. Despite the country's low degree of regionalisation, the central government sought to consult with regional stakeholders which projects to fund and support, since regions were recognised as key instruments for the implementation of RIS3 policies. This put into question the extent of power of the central government and, with some optimism, it was seen that good intermediation, networking and learning among agencies and ministries would produce effective results.

So, how did each region react?

For the South the main goal was to find 'related variety' in tourism, where ICT and any other innovation could enhance tourism attractions.

For the Center it meant making different production and technology clusters to better communicate together.

For the North it meant, akin to the Center's methodology, to locate the links between existing innovation candidates with relations with each other using matrix methods, aiming to build a strong regional innovation ecosystem.

What are some of the lessons learned? First, diversification of economic activity is superior to specialization. Second, the various stakeholders in central and/or local government have to cooperate with each other and there are cases where they will push for a certain policy despite regional aspirations or desires. Third, preparing for the future or as the French scientist Louis Pasteur said¹⁹ "Fortune favours the prepared mind". This was especially apparent in the central and northern regions of the country where previous investments in science, technology and innovation paid off by having a ready-made ecosystem of relevant infrastructure and stakeholders that promised opportunities for commercialization through possible 'entrepreneurial discovery'. So while for those areas it was easier to leap frog to a RIS3 strategy, for the south and its image of "sunny tourism" proved more difficult which could be overcome by promoting variety and interregional collaboration.

6.5 RIS3 in Greece

In Greece there is one national and thirteen regional strategies of research and innovation for Smart Specialisation.²⁰

Within the framework of these strategies, the country and its regions sought to present the activities that have or could develop competitive advantages and to focus their efforts and resources to achieve developmental results. After investigation, the eight sectors were found to be, good candidates, where research and innovation could positively contribute to the formation of

¹⁹<http://www.brainyquote.com/quotes/quotes/l/louispaste159478.html>, accessed on September 2016.

²⁰<https://www.espa.gr/el/pages/staticRIS3.aspx>, accessed on September 2016

national/regional competitive advantage while taking into account critical mass and the level of research potential available. These sectors are:

- Agro-alimentation;
- Health-Medicines;
- ICT;
- Energy;
- Environment and sustainable development;
- Transport;
- Materials –Construction;
- Tourism-Culture-Creative industries.

The General Secretariat for Research and Technology has created a platform for each of these sectors.

RIS3 is constructed on the basis of three strategic choices and four priority axes as the following table clearly demonstrates:

Strategic RIS3 choices	Investment in the creation and dissemination of New Knowledge	Investment in Research and Innovation	Development of innovative mentality, institutions and connections of RTDI with society
Intervention axes	Categories of intervention		
1. Capacity Building	1a. RTDI Capacity Building in specialization fields	2a. Incubation of business players	3a. Support of mechanisms and institutional framework
2. Promote RTDI²¹ activities	1b. Supporting RTDI activities and areas of excellence	2b. Support of internal research and innovation in businesses	3b. Support of the demand for innovation in the public administration
3. Support	1c. Support of	2c. Infrastructure	3c. Mechanisms

²¹ *Research, Technology Development, Innovation*

Strategic RIS3 choices	Investment in the creation and dissemination of New Knowledge	Investment in Research and Innovation	Development of innovative mentality, institutions and connections of RTDI with society
Structures	networking infrastructure	and support mechanisms of innovative entrepreneurship	for the support of Entrepreneurial discovery and Documentation
4. Extroversion and networking	1d. Networking and co-operation in RTDI	2d. Business extroversion	3d. Development of innovative culture

For the design and the implementation of the RIS3 policy two main bodies exist, namely the Smart Specialization Strategy Council, comprised of representatives of the ministers as well as a representative of the Union of Regions, and the Regional Councils in the 13 Regions of the country assisted by the Regional councils of Research and innovation.

With the National Strategy for Smart Specialisation for the period of 2014-2020 approved very recently (Government Gazette 1862-27/08/2015) there is not much data and results concerning the success (or not!) of the Strategy. But because of the existence of the ex-ante conditionality for the ERDF funding, the relevant RIS3 strategies of the 13 regions of Greece had already been prepared. Therefore, because of the already approved RIS3 strategies some initial results, on a regional scale, have been published.

Komninos (Komninos et al, 2014) provides some first insights, especially concerning the options that RIS3 strategies offer to overcome the current fiscal and development crisis. He mentions the interplay between central and regional government on who should manage innovation. In addition a complete reshuffle of the Greek knowledge and innovation system is a radical yet logical proposition in order to arrive to support technologies and marketable innovations in the specialisation fields taking into account the high concentration of research in the universities and the underperformance of research in the private sector.

However this complete reshuffling and restructuring mentioned, requires a greater financial support from the central government, attraction of relevant FDI in RTDI activities, openness of academic research and greater involvement of the private sector again in RTDI activities. All these actions do not exist in a vacuum; rather they work in unison to become drivers of specialisation which should lead to competitiveness and growth.

6.5.1 Proposals for the application of RIS3 in the Region of Central Macedonia

In a report to the European Commission (Komninos, 2015), specifically for the ICT related actions, the principal recommendation about the regional and national RIS3 was about turning towards cloud computing and the creation of repositories for ICT solutions which will be used by the local and central government, private sector and ordinary citizens by utilizing a system of vouchers for customisation, training, data and content creation.

As mentioned before there is a National RIS3 Strategy for the country as well as for each specific region. Since the approval of the national and regional strategies is only very recent no reliable data has been derived from its application (or not!) and therefore there is no reliable data concerning problems and/or measures or countermeasures that can be taken towards their alleviation.

According to the relative document for RIS3 concerning the region of Central Macedonia (March 2015) the strategic vision for 2025 is to *"...make the region an Innovation node for the wider region of South East Europe through maintaining and strengthening its important Human Capital with adequate skills in the issues of research and technological development, deepening cooperation in the area of Knowledge with Entrepreneurship and with the development of an innovative environment aiming at exiting from the crisis and to the creation of new jobs, based on innovation, competitiveness and extroversion."*

Also in this document the four regional specialization sectors (“the champions”) are mentioned:

- agro-food;
- construction materials;
- textile & clothing;
- tourism.

These sectors have been found to heavily influence the Gross Added Value of the Region, to participate in the employment structure, to maintain critical mass and to exhibit intrinsic dynamics and extroversion

Also four technological sectors have been identified, with a particularly crucial role in the establishment of the advantages of the economy of the Region towards innovation, competitiveness and extroversion. The technological sectors act as catalysts for absorbing innovation, identified as “Horizontal Support Sectors” and are the following:

- Information and Communication Technologies (ICT)
- Energy technologies
- Environmental technologies
- Transport and logistics technologies

At this point it should be mentioned once again the holistic nature of the RIS3 strategy. One can obviously detect from the champion and the horizontal sectors mentioned, that the interaction, support and effect they have among them is crucial for the success not only of RIS3 but of any strategy as well. This is also obvious from the triple and quadruple helix model where this interaction is promoted on another level, namely among the public and private sector, academia and the public/civic society.

In order to achieve in making the RIS3 strategy workable certain flagship actions have been identified with the basic criterion being the degree of representation in achieving the RIS 3 specific strategies.

These flagship actions are the following:

- Cluster Creation and Development; indicative actions include technology transfer, provision of consulting services, use of common infrastructure, spin-offs and the networking;
- Mobility of researchers to businesses aiming to improve current products and services and create new ones;
- Infrastructure and pilot units for the provision of technological services which includes funding of feasibility studies for the creation of infrastructure and of research infrastructure in particular;
- New entrepreneurship (support of the creation of new businesses) by providing finance for business investments, business plans, education training and formation.

It does not go unnoticed that the component parts of the triple or quadruple helix concept mentioned before must also act in a co-ordinated manner in these flagship actions. However, the reality is that the connection between those components is little and on an ad-hoc basis, thus leading to minimum commercial applications.

From the author's experience In the case of the Region of Central Macedonia some remarks for the improved implementation of projects (including RIS3 related ones) are the following:

- Personnel on behalf of the beneficiaries has to have the necessary specialisation, to submit, monitor, implement and follow any project including those pertaining to RIS3 and the activities referred before. This means that the capacity of the beneficiaries' personnel should be maintained and updated on a constant basis. This personnel should have

continuity, which means that they should remain after the project is finished or to pass their experience to other members of the organisation. This is especially apparent when there is a governmental change and personnel is transferred or moved from positions even in the middle of projects.

- The assistance of Managing Authorities is indispensable in understanding the peculiarities of each programme. Seminars should be attended whenever possible. Also personnel from the Managing Authorities of Operational Programmes can offer valuable insight on improved project implementation.
- Change of office sometimes, but not always, played a significant role in how and when a project will be implemented and finished. This is especially apparent in projects where there is a substantial level of political power involved. When this power changes focus it may bring any project to a sudden stop.
- Poor planning equals poorer implementation. Planning starts from the stage of proposal writing where all parameters must be taken into account. Planning in this case involves a lot of risk management and evaluation of alternative courses. A good advice could be to start with the final end in sight and move backwards.
- The formation of a relevant legislative and political structure should come before the project starts its implementation. This aspect alone can make-or-break any project and should not be treated lightly.
- Finally the will of the local community and its stakeholders, their involvement and participation should be taken into account in the planning of a project.

6.6 RIS 3 in Bulgaria

The Innovation strategy for Smart Specialization of the Republic of Bulgaria for the programming period of 2014-2020 was approved with the Council of

Ministers' Decision No857/03.11.2015. In this document²² the main socioeconomic challenges of the country are identified as being the following: low labour productivity; low share of high-tech production; demographic crisis – aging of population; providing high quality and healthy life. On a parallel note, the private sector is faced with the following challenges: exports include mainly low-tech products; internationalisation is low; FDI in technology transfer is limited; and finally industrial production is extremely energy intensive and energy inefficient.

Based on this analysis, the following technology thematic areas have been defined where concentration should be focused.

- Mechatronics and clean technologies²³;
- Information and Communication Technology;
- Biotechnology²⁴;
- Nanotechnology²⁵;
- Creative industries, including cultural ones²⁶;
- Pharmacy;
- Food industry²⁷;

According to the European Commission (European Commission, 2015) the following areas have been found to be problematic, which prevent them from successfully implementing RIS3:

²²<https://www.mi.government.bg/en/themes/innovation-strategy-for-smart-specialization-of-the-republic-of-bulgaria-2014-2020-is3-1470-287.html>, accessed on September 2016

²³ *Mechatronics refers to mechanics, electronics, software, management systems while clean technologies refers to electric vehicles, fuel cells, hydrogen society*

²⁴ *Refers to food, cosmetics, paper, packaging*

²⁵ *Refers to medicine, electronics, new products, textiles and clothing, cosmetics*

²⁶ *Refers to Production of movies and TV shows, and broadcasting radio and television programs, sound recording and music publishing*

²⁷ *Refers to ecologically clean products*

- strengthening of the relationship between the participants in the R&D&I system;
- reforming research activities in higher education institutes;
- Introduction of talent acquisition and retention measures;

7 RIS3 and FDI

According to Dunning (Estrin and Uvalic, 2013) FDI is initiated by what he refers to as OLI advantages, namely a mix of ownership (O), location (L) and internalization (I) advantages that a company may possess. In this model (Denisia 2010) the Ownership advantages refer to:

- a) Monopoly advantages in the form of privileged access to markets through ownership of natural limited resources, patents, trademarks;
- b) Technology, knowledge broadly defined so as to contain all forms of innovation activities
- c) Economies of large size such as economies of learning, economies of scale and scope, greater access to financial capital;

while the location advantages refer to:

- a) The economic benefits which consist of quantitative and qualitative factors of production, costs of transport, telecommunications, market size etc.
- b) Political advantages: common and specific government policies that affect FDI flows
- c) Social advantages: includes distance between the home and host countries, cultural diversity, attitude towards strangers etc.

Finally Internalization refers to the advantages that a company enjoys when undertaking production on its own rather than producing through a partnership arrangement such as licensing or a joint venture.²⁸

Could RIS3 be a catalyst for a rise in FDIs in Greece or in the Region of Central Macedonia? In order to examine this, an example can be used to demonstrate the validity of the connection between RIS3 and FDI and its potential.

²⁸https://en.wikipedia.org/wiki/Eclectic_paradigm

As mentioned before, two of the four champion sectors of the Region are agro-food and tourism. Their connections are numerous and on various levels, thus any activity on the former could have a direct positive effect on the latter and vice versa. So an agricultural product and its production which is endemic to the Region can be promoted via a tourist package, taking into account the cultural and natural heritage of the region or of the area in question. Examples could be olive oil, honey, and wine and alcoholic drinks' production.

A cluster could be developed between wineries, hotels, tourist agencies, growers and bee keepers for a variety of tourist packages aiming to various types of target groups' i.e. young people, pensioners, nature lovers, cooking aficionados and gastronomists. This could be also linked with events like a Marathon or with visits to Archaeological sites, which also exist close to the geographical areas in question. An entrepreneurial discovery process could uncover the real market potential of each one of these proposals, thus involving competent SMEs in each sector.

The State and/or Local government should offer the legislative and policy framework for this cluster to operate.

Various start ups could be formed within this cluster, especially if there was assistance in financing, in writing proposals for financial instruments and or institutions, business and marketing plans, in the use of ICT tools and of Social Media and so forth.

Immediately one can see that the OLI advantages are apparent in this example, which can attract Foreign Direct Investment: the connection of this particular agricultural/touristic product can be offered only in this area and while the business model is not innovative nevertheless it can be viable, sustainable and profitable.

Elaborating further on the concept of the described cluster, it must be explained that this is by no means limited only to SMEs; the other parts of the quadruple

helix should also participate such as the academia (Universities, institutes, trade schools) in activities such as training and formation and the civil sector (local associations, chambers, cultural groups, NGOs) in the activities of networking, promotion through their members, mentoring and coaching.

Further to the above, this cluster or its components can also work and collaborate with other SMEs in Region, in the neighbouring cross border areas or beyond.

Last but not least competitiveness of the sectors in question as well as of the Region should be directly affected in a positive way.

It should be clarified that the example of the connection between FDI and RIS3 described is not limited only to these sectors. One cannot escape from noticing that the success of such an endeavour is based on a multitude of factors. However is not something that has not been done before or will not be done in the future; the knowledge, the tools and the concepts are available but it requires the combined effort from a variety of stakeholders of the Region to be successful.

The dynamism of the market and the fluctuations and the current conditions of the business, social and economic environment is definitely a hindering factor. As a final note with the effort of many stakeholders the risk of failure could be lessened but not eliminated since risk is an inherent part of entrepreneurship.

8 Cross Border Smart Specialisation

Expanding the notion of Smart Specialisation, it concerns a place-based strategy, meaning it can encompass neighbouring regions, even when they are not part of the same country: this can refer to cross border specialisation. Dettori (Dettori Barbara et al) has indicated that there are correlation and spillover effects between neighbouring regions. This works both ways, to varying degrees. In addition to that, it may imply both a negative and a positive connotation.

However focusing on a positive outcome, as evidence has shown and the European Commission admits²⁹ administrative boundaries may not coincide with the boundaries of economic regions defined by the intensity of actual economic linkages and spillover. This fact is in favour of cross border co-operation.

This is more evident in geographically smaller regions where economic development may involve actors from both sides of the border. However any cross border effort for co-operation on the level of SMEs collaborating with each other, will face the issue of different administrative and legislative frameworks. In addition to this obstacle, one should notice that RIS3 policies are usually designed on a regional or national level and not on a cross border level. This prevents any financial or institutional support to the other side of the border.

There are some examples of successful cross border cooperation in the literature. Walerud and Viachka (Walerud and Viachka, 2012) mention the Top Technology region (Germany, Netherlands, Belgium): it is a cross-border cluster scheme covering and co-funded by the five regions of the cross-border region.

In total, more than eighty such networks were identified in Europe in 2012. All but twelve of these were devoted to a particular sector. One such example was CLUSTERPLAST, a network that wanted to address the future challenges for the

²⁹ *European Commission, The role of clusters in smart specialisation strategies,*

European polymer converting industry. This cluster had 15 partners including local authorities, business entities, cluster organisations and research centres, from 6 European countries. Since the application of RIS3 requires collaboration and networking, it is likely that in the future more cross border collaboration will emerge. In addition complementarity, which is a Smart Specialisation pillar, is not something which is necessarily confined within the national borders; the whole of EU can be a fertile ground for expansion and collaboration.

8.1 The case of Greece and Bulgaria

An interesting proposal was developed within the framework of the project with the title "Plan of Smart Regional Specialization for the promotion of competitiveness, research and innovation", with the acronym "Smart Specialization". The Project³⁰ was funded by the European Territorial Co-operation Programme "Greece - Bulgaria 2007-2013", and, among its numerous deliverables, it has compiled a feasibility study for an Interregional Entrepreneurship Zone (IEZ). IEZ could be an additional facilitator of RIS3, encompassing all the regions from both countries of the cross border eligible area of the Programme: Region of East Macedonia and Thrace (REMTH), and Region of Central Macedonia (RCM) from Greece, and South Central Region (Yuzhen Tsentralen) South West Region (Yugozapaden) from Bulgaria. Such a proposal could enhance cross border mobility, cross border co-operation, both of which should promote extroversion of SMEs. In the feasibility study presented, a lean organization approach is proposed; the legal form of the IEZ is proposed to be a non-profit legal entity with partners/shareholders being the partners of the funded Project and to operate as a virtual cooperation platform with representation offices in all the four regions of the cross border area. Financing is dependent upon the contribution of the partners and may or may not require

³⁰ For more information www.smartspecial.eu, accessed on September 2016

further funding. However the socioeconomic impact of the Interregional Entrepreneurship Zone concept in the cross border area is important enough to warrant further elaboration from the competent authorities and stakeholders of both countries.

9 RIS3 and Entrepreneurship

Entrepreneurship enjoys a pivotal role in the RIS3 policy: The entrepreneurial discovery process, as the name implies is impossible without the private sector; in addition the private sector is part of both the triple and the quadruple helix model.

Furthermore because of the bottom-up approach required in designing and implementing the strategy, entrepreneurs are or at least should be a substantial part of the policy.

McCann and Argilés (McCann-Argilés, 2014) refer that the new face of Cohesion Policy is towards policy accountability vis-à-vis simply absorbing funds. This has led policy makers to provide measures for “... *fostering local entrepreneurship and innovation and second, the need for such policies to be built on strategies which are realistic and appropriate to the regional context.*”

It is a characteristic of most EU support programs that they support projects which can be divided into “hard” and “soft” investments: the former refers mainly to infrastructure projects like road construction, buildings’ renovations, sewage and so forth while the latter refers to education, studies, capacity building, organising cultural events and so forth.

It is also characteristic that the more advanced an economy is, the less needs it has for “hard” investments.

Take for example the case of the Cooperation Programme Interreg³¹ V-A - Belgium-France 2014-2020 (France-Wallonie-Vlaanderen) with a total budget of more than 280 million Euros. The Programme focuses on four thematic priorities:

- Improving and supporting cross-border cooperation in research and innovation;

³¹http://ec.europa.eu/regional_policy/en/atlas/programmes/, accessed on September 2016

- Increasing the cross-border competitiveness of SMEs;
- Protecting and improving the environment via integrated management of cross-border resources;
- Promoting social inclusion and combating poverty.

And then we have the example of the Cooperation Programme Interreg V-A³² Greece-Bulgaria 2014-2020 with a total budget of about 130 million with four priorities:

- Priority axis 1: A Competitive and Innovative Cross-Border Area;
- Priority axis 2: A Sustainable and Climate adaptable Cross-Border area;
- Priority axis 3: A Better interconnected Cross-Border Area;
- Priority axis 4: A Socially Inclusive Cross-Border Area.

Priority axis 3³³ of the latter Programme is about infrastructure projects and has a total budget of about 40 million Euros. The difference in the design and application logic between the two Programmes is obvious.

For this reason it has been suggested that in the future, as the economies improve, the emphasis should shift from support for “hard” investments to support for “soft” investments. This shift should, among others, promote more SME and innovation support measures, something which is closely related to RIS3.

As evidenced previously, one of the reasons of the productivity gap between the EU and the US is the degree of innovation, and its application and introduction into the market. The latter is translated to an immediate link between entrepreneurship and regional growth. Since RIS3 has as its internal components both the ideas of entrepreneurship and innovation, it is only logical that any action supporting these will benefit the policy and vice versa.

³²*Ibid*

³³ *Obtained from the Operational Programme as found in www.greece-bulgaria.eu, accessed on September 2016*

Another characteristic which should be underlined once again is the “Regional” part of the policy. The top-down policies of the past, which are now perceived as forceful and unsuccessful, are gradually being supplemented (or even replaced in some cases) with a bottom up approach. Institutionally speaking, the Region is something between the national and the local community approach. So the Region as a political tool is expected to play a greater role in the future, depending on its capacity for entrepreneurship and innovation. For this reason any regional policies aiming at supporting local entrepreneurship and innovation must necessarily take into account these differences by adapting their policies accordingly.

Also the entrepreneurial attitude towards the RIS3 policy, or any policy for that matter, is a necessary ingredient for success. This requires a tailored approach to the design and implementation of RIS3, taking into account a number of parameters and realising that change in culture is inevitable, which is what the Smart Specialisation agenda is designed to help facilitate.

In economics is not the first time that entrepreneurship and innovation are connected.

Although it is beyond the scope of this dissertation, two economists, both Austrian-born, namely Joseph Shumbeter and Peter Drucker spoke of this link.

The former identified innovation as the critical dimension of economic change. He argued that economic change revolves around innovation, entrepreneurial activities, and market power.³⁴

The latter wrote a seminal book on “Innovation and Entrepreneurship” in 1985. In this book he elaborates on a great extent concerning the link between entrepreneurship and innovation. As he mentions “...*Innovation is the specific*

³⁴https://en.wikipedia.org/wiki/Joseph_Schumpeter#Innovation

instrument of entrepreneurship. It is the act that endows resources with a new capacity to create wealth."

As he freely admits there is no theory of innovation. However the pursuit of innovation is the bedrock of entrepreneurship. So much that in fact he maintains that "*Entrepreneurs will have to learn to practice systematic innovation...*". And further on he defines systematic innovation as "*...consists in the purposeful and organized search for changes, and in the systematic analysis of the opportunities such changes might offer for economic or social innovation*".

He goes further on to mention the seven sources of innovation (the unexpected, the incongruity, innovation based on process need, changes in industry structure or market structure, demographics, changes in perception, mood and meaning, new knowledge) and the one which is more known as the "bright idea".

He also mentions the principles of innovation namely that innovation:

- begins with the analysis of the opportunities;
- is both conceptual and perceptual;
- requires simplicity and focus;
- starts small;
- aims to become a leader;
- has mass appeal by being closer to the average person;
- is focused;
- refers to the present.

Such is the in-depth analysis of the link between innovation and entrepreneurship, as the book presents in detail, a fact which may provide a clue for the productivity gap between EU and the US previously mentioned!

10 Conclusions

Capello & Kroll (Capello & Kroll, 2016), discuss some of the changes the limits and possible future steps of the RIS3 and reach some interesting conclusions.

A first change identified is the way innovation policies are conceived, which is no longer associated only with R&D expenditure with “entrepreneurial discovery” working in other sectors as well. This process, which is a bottom-up approach, away from the previous centralised planning, obliges the regions concerned to identify potential and real development priorities, which are realistic for the context concerned.

How about the limits? The less-developed regions found it difficult to identify and to work on their local specialisations, because of the lack of connectedness, entrepreneurial spirit, size in terms of market potential, industrial diversity, quality of local governance and a critical mass of capabilities to develop collective learning processes.

Historical specializations were not always the answer, especially when it came to combine them with technological advances. SMEs, especially in less developed regions, could not or would not engage in the RIS3 policy. In addition, in those regions policy prioritization was not functioning properly, where in many cases simply transposed the national priority sectors as the local choices, without taking into account local stakeholders and their capabilities or lack thereof.

As a result, the RIS3 policy has not produced a common political rationale for a socio-economically and territorially diverse set of regions and/or nations (as is the case in EU) which are not on the same development level on a variety of aspects, be it technological, entrepreneurial, or even mentality-wise.

This brings us to an underlying theme in all policies which are emanating from the EU downwards, namely policy and governance which were centred on the following:

- Political power and actual implementation were not matched in powers and/or capabilities;
- The rhetoric for bottom up, participative approaches did not always match reality;
- Some regions were simply not capable to design and/or implement RIS3;
- The participation of SMEs in the Entrepreneurial discovery process was low in some regions. This meant that this essential process of the policy did not bring the results required, especially in regions where the local government did not have a past of working closely with the private sector.

What could be the future of the RIS3 policy, especially within the ambitious Europe 2020 goal, and the emerging doubts about its success (Hoepker, 2013)?

From the analysis in this and the pervious chapters, it is becoming apparent that RIS3 enjoyed different levels of success depending upon a variety of reasons, but mainly according to the level of economic, political and social conditions of each region. In addition the conditionality obliged all regions to pursue this strategy. Probably the European Commission thought that the less developed areas would be obliged to "drag" themselves towards development. In any case there is a strong possibility that in the future, application of RIS3 will become optional instead of compulsory. While it may seem initially as a failure, one should not be so hasty to jump into conclusions, since the experience is overly judged as positive. Also it has awakened forces of development which would lie dormant if it were not of this concept. Therefore the next stage of voluntary participation may yield more positive results than the current one.

From another viewpoint the pinpointing of sectors or industries on which to focus efforts, funds and apply the relevant tools, which in reality means a renewal of industries, loses sight of the territorial (=the place) aspect of the policy. The territorial aspect in this sense is not confined only to the geography of an area. It has a broader view (or one would suggest a more holistic view) of intangible

assets such as culture, entrepreneurial spirit, government structures, creativity and the accumulation of knowledge.

The future of RIS3 will require collaboration from various forces in the society, from the central to the local government and in-between, the private sector, the knowledge-producing entities and the civic groups and the management of the tensions among them (Foray 2016). In this way local characteristics should be more respected and taken into account, especially in less-developed regions where an innovation ecosystem is lacking. Or, as it is described in other parts of this dissertation and Capello & Kroll (Capello & Kroll, 2016) suggest, the formation in the future of cross border RIS3 policies and/or the formation of Europe-wide domain-specific networks could be an answer, thus establishing a new technological division of labour between different countries in Europe.

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