
COHESION POLICY IN THE EU: MAPPING MAIN FEATURES OF
INTERREG

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Abstract

This research has the cohesion policy as the main theoretical support and aims at mapping the Interreg programmes. Particularly, it aims at finding similarities amongst EU countries concerning Interreg and checking for potential overlapping amidst the programmes that make up for Interreg. In spite of existing a vast research covering the topic of cohesion policy, not much effort has been directed towards the analysis and systematization of the Interreg programmes. Therefore, this research intends to contribute to the existing literature by adopting a new approach towards the cohesion policy topic.

In order to contextualize the subject, the definition of cohesion policy is provided by an extensive literature review. In addition, the three dimensions that consensually constitute the cohesion policy are theoretically and conceptually addressed. Finally, the topic shifts towards the Interreg programmes. This policy instrument is analyzed both within a historical perspective, focusing on its evolution over the years, and under a conceptual perspective, in which the objectives of this type of programmes are explained and the reasons for its existence are presented.

In terms of the methodology employed in the dissertation, in addition to the qualitative description of Interreg programmes, a quantitative technique is also employed. In the qualitative approach, a deep categorization of the policy instrument is presented, based on fundamental dimensions such as priority axes, objectives and indicators. Then, the quantitative approach corresponds to a TwoStep Cluster Analysis based on data obtained from the database KEEPeu.

The findings of our research suggest that some transnational and cross-border Interreg programmes cover the same geographic region and share the same objectives, which imply the occurrence of overlapping. In addition, the cluster analysis also showed that, regardless of the programming period, the countries and thematics involved with the largest number of projects seem to repeat.

JEL codes: O2, C38

Keywords: Cohesion policy, Interreg, European Territorial Cooperation, Cluster analysis.

Resumo

Este trabalho escolhe a política de coesão como referência teórica e tem como objetivo principal mapear os programas Interreg, identificando a existência de semelhanças entre os estados membros da União Europeia em relação à participação nos Interreg e analisando se existe sobreposição entre estes programas. Apesar de existirem diversos trabalhos acerca da política de coesão, há uma carência de estudos destinados a analisar e sistematizar os programas Interreg. Assim, esta dissertação pretende contribuir para a literatura existente através do uso de uma nova abordagem ao tópico da política de coesão.

De forma a contextualizar o tema de investigação, a política de coesão é tratada através de uma revisão de literatura exaustiva. É feito o enquadramento teórico e conceptual das três dimensões da política de coesão, focando-se posteriormente o instrumento político Interreg. Este é analisado quer sob uma perspectiva histórica, expondo, assim, como evoluiu ao longo dos anos, quer conceptual, apresentando-se os objetivos estratégicos desse programa e as razões para sua existência.

Em relação à metodologia utilizada, esta dissertação faz uso da descrição qualitativa dos programas Interreg e também de métodos quantitativos como a análise de *clusters*. No âmbito qualitativo, os instrumentos políticos do programa são categorizados com base nos seus eixos prioritários, objetivos e indicadores. Posteriormente, é utilizado o método quantitativo *TwoStep Cluster Analysis*, o qual efetua a análise de agrupamento sobre a base de dados construída a partir de informações recolhidas na plataforma Keep.eu.

Os resultados de nosso estudo sugerem que alguns programas transnacionais e transfronteiriços cobrem a mesma região geográfica e compartilham os mesmos objetivos, o que indica que poderá existir sobreposição. Além disso, a análise de *clusters* também demonstrou que, independentemente do período programático em análise, os países e as temáticas envolvidas com o maior número de projetos tendem a repetir-se.

Códigos-JEL: O2, C38

Palavras-chave: Política de coesão, Interreg, Cooperação Territorial Europeia, análise de *clusters*

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Chapter 1. Introduction

Since the foundation of the European Union (EU), one of its most important pillars has been the development of regional and urban development policies, the so-called Cohesion Policy. Through cohesion policy, the EU aims at spreading the benefits of integration among its members and promoting a balanced development in geographic terms (Gang, 2012). According to Fratesi and Wishlade (2017), the Directorate-General for Regional Policy was conceived 50 years ago, in 1968, and the foundations for how the policy is carried out nowadays have been laid in 1988, with the revision of the Structural Funds, which, in its turn, followed the Single European Act from 1986. Referring to Cohesion Policy, the same authors state that its relevance is easily observable by the share of the EU budget allocated to it, about one-third, for the programming period 2014-20. Additionally, the authors state that this policy is idiosyncratically unique in terms of governance since it involves a multilevel-governance structure that commits national, regional and local communities towards the same objective, in what can be labeled as “shared management” alongside the European Commission (Fratesi & Wishlade, 2017).

In accordance, Farole, Rodríguez-Pose and Storper (2011) argue that, following the previously mentioned reform of the Structural Funds, the EU has established the principle of cohesion as one of the key points on its agenda, especially in a context marked by dynamic changes in the political, demographic and economic realities within the EU. Regarding the interest on developing a solid cohesion policy, Fratesi and Wishlade (2017) emphasize that, since its creation, the EU has been concerned with the hypothesis that deeper economic integration may create a scenario where some regions are clearly benefited from it and others are increasingly left poorer behind. For Farole et al. (2011), the level of economic activity is unevenly distributed throughout the world and also among the Member States of the EU. These differences result on conspicuous gaps in wealth, in population density, in business cycles and economic growth, as well as in the composition of their economies. Therefore, the EU has structured its cohesion policy mainly in the form of funds intended for lagging regions which aim at pushing for economic convergence.

Therefore, cohesion policy appears as the instrument capable of reducing the gap between different regions and members and, more specifically, attenuating the disparities between developed and developing areas. Thus, it represents an important instrument of financial solidarity and implies a more integrated economy (Dumciuvienė, Stundziene and Startiene, 2015). Still, according to Dumciuvienė et al. (2015, p. 507), the Treaty of Lisbon,

which forms the constitutional basis of the EU, confirms the objective of promoting “economic, social and territorial cohesion and solidarity of the Member States”. Hence, the European cohesion policy extrapolates the scope of simply being a funds distribution mechanism and, instead, pushes for increasing efficiency in the less developed regions, higher life standards, sustainable development, economic growth and reducing opportunities disparities amidst its members.

As commented by Barca (2009), the objective assigned by the EU Treaty to cohesion policy, through the Cohesion Fund and Structural Funds, is to advocate for a harmonious development among its members. Cohesion, therefore, corresponds to a mix of efficiency, growth and economic goals combined with equity and social ones. Thus, cohesion policy is the means through which the EU aims at reducing the economic development disparities and the backwardness of the least developed regions.

Within the European cohesion policy framework, for the programming period 2014-2020, European Territorial Cooperation (ETC), better known as Interreg, is one of the two established goals for cohesion policy – together with investments for Growth and Job (European Commission, 2015). Back in 1990, the Interreg initiative was conceived with a budget of just EUR 1 billion and focused exclusively on cooperation at the cross-border form. As the initiative evolved, besides having its commitment budget multiplied by ten in little less than thirty years, in current prices, it also had its scope extended to cover also transnational and interregional cooperation. As stated by the European Commission (2015), the ETC’s underlying objective is to build up a coordinated economic, social and territorial development of the EU, and the initiative lays down the framework for the development of cooperative operations and policy exchanges between different governance-level actors – national, regional and local – from the Member States.

This dissertation, thus, aims at (i) mapping the ETC programmes and associated projects, also known as Interreg programmes; (ii), having the cohesion policy as the main theoretical support, find similarities amongst EU countries and/or regions concerning the Interreg programme; and (iii) check for potential overlapping among the programmes that make up for Interreg. Our main research questions are the following: how does the Interreg programme fit within the cohesion policy structure? Are there any similarities amongst EU regions in respect with Interreg programme? Is there an overlapping phenomena among Interreg programmes?

In fact, after all these years since the establishment of the Interreg programmes, the

evaluation of this initiative is still particularly useful, especially for the political decision-makers. In spite of existing a vast research covering the topic of cohesion policy, not much effort has been directed towards the analysis and systematization of the Interreg programmes. Therefore, it is understood that this project will complement the existing literature and provide a useful framework that can be used in future studies and support policy decision making.

In order to fulfill our goals, both quantitative and qualitative methods will be employed. First, an extensive categorization of the policy instrument will be implemented, based on fundamental dimensions such as priority axes, objectives and indicators. As an exploratory research, the qualitative method will be used to map the programmes in their most relevant dimensions, analyzing their evolution and providing a theoretical basis for an attempt to understand the underlying reasons for the existence of these programmes. In order to accomplish that, secondary data, in the form of books, papers and official documents and publications, will be extensively analyzed and interpreted. Then, a cluster analysis based on data obtained from the database KEEPeu will be developed in order to classify geographic areas, such as countries and/or regions, and programmes according to their similarities concerning the Interreg.

This dissertation is organized as follows: Chapter 2 consists in a literature review and addresses the definition of cohesion policy, its dimensions and a description of what the Interreg initiative is. Chapter 3 explains the methodology used in the dissertation, as well as the data used for the quantitative analysis. Chapter 4 presents the quantitative analysis and discusses the results. Finally, Chapter 5 ends with the conclusion, main limitations and future research paths.

Chapter 2. Cohesion policy: main insights from the literature

In this chapter, a definition of cohesion policy is introduced, as well as a historical panorama of the concept. Therefore, on the first topic we address cohesion policy and provide a historical context of when it was created and later evolved, so it becomes possible to discuss how it changed since its establishment. Then, on the following topic, we conceptually define each one of cohesion policy's goals, economic, social and territorial cohesion, and relate them to the thematic priorities of the current programming period, in order to make the conceptual definitions more palpable.

2.1 Cohesion policy: a historical perspective

Cohesion policy, as previously, yet briefly, described can be labeled as a policy of solidarity, in the sense that it is a vehicle of aid within the European Union (Gang, 2012). Through this policy, the EU aims at spreading the benefits of integration as widely as possible among its members and promoting a balanced development in geographic terms. As mentioned by Gang (2012), if regional disparities already represent a major concern for governments of well-developed countries, when it comes to the political and economic integration process of a group, this topic deserves even more attention. Addressing specifically the European cohesion policy, Carballo-cruz (2015) states that its importance varies significantly along the different stages of the process of European construction. For the author, that importance is deeply related to the priorities set on the European political agenda. Because of that, the overriding political interests influence the priorities, matter and scope of regional policy, as well as its framework and plan of action. In accordance, Manzella & Mendez (2009) defend that the historical evolution of the European cohesion policy is marked by recurrent turning points.

As described by Gang (2012), since the early stage of European integration, the founding members placed a lot of emphasis on trying to mitigate regional inequality. For instance, in the preamble of the Treaty of Rome, which dates to 1957 and established the European Economic Community (EEC), it is mentioned the need “to strengthen the unity of their economies and to ensure their harmonious development by reducing the differences existing among the various regions and the backwardness of the less-favored regions”. Also, the Article 2 specifies that the newly formed organization aims at promoting a ‘harmonious development of economic activities and a “continuous and balanced expansion”’. Furthermore, Gang (2012) adds that two funds were created to ensure these objectives, the European

Social Fund (ESF) and the European Agricultural Guidance and Guarantee Fund (EAGGF).

However, Manzella and Mendez (2009) disagree with Gang (2012) and argue that cohesion policy appears to be the great absentee at the official documents that formed the EEC, which later became the European Union. According to the authors, despite recognizing the existence of a “regional issue” in the Treaty of Rome, the attention to cohesion policy was minimal. Even though the preamble and Article 2 advocate for objectives focused on reducing regional disparities, Manzella and Mendez (2009) defend that in the main body of the text, the regional issue is not addressed directly, but by a series of provisions relating to some particular sectoral policies, like transport and agriculture. Also, the authors reinforce their argument by stating that the only financial instrument conceived to directly endorse a cohesive regional development was the European Investment Bank, which, among many other tasks, would also grant loans for projects that had the capability of developing less developed regions.

For Baldwin and Wyplosz (2009), the existence of disadvantaged regions in Europe has always been a major concern of the international organizations formed in the continent. However, during the 1950s, 1960s and 1970s the task of aiding less-developed regions was firmly placed in the hands of national governments. As argued by the authors, in line with Manzella and Mendez (2009), the EEC indeed had some programs focused on promoting economic growth in rural regions, but the level of EU funding was insignificant. Spending on these programmes accounted for only 3% of the budget on the 70s and 11% a decade later. The situation changed when poorer members joined the organization. In 1973, when Ireland entered, the European Regional Development Fund (ERDF) was conceived with the objective to redistribute funds towards the poorest region – but its budget was still negligible. Nonetheless, in the 1980s, when the Community admitted three new members which were relatively poorer than the founding ones, Greece, Spain and Portugal, the organization’s spending priorities had to be realigned. Since these countries did not benefit from the same agricultural incentives as the others, if these nations were to benefit economically from joining the EU, the way funds were channeled would have to be reshaped (Baldwin & Wyplosz, 2009). Throughout the Iberian enlargement meetings, as the authors continue, the Community promised to significantly increase the budget allocated to spending on poor regions. The official rationale for this upsurge was that deepening economic integration, formally established by the 1986 Single European Act, would favour Europe’s industrial core and counter-balance the burden of the single market for less-developed regions.

As commented by Carballo-cruz (2015) similarly to what Baldwin and Wyplosz (2012) stated, the inclusion of new countries fetched increased regional disparities and, therefore, subsidizing became a key means of balancing wealth around the EU. According to the same author, the sanction of the Single European Act gave an important boost to the European regional policy, once that, together with the prospects of a single market in the continent, it pushed for deep reforms on the Structural Funds, in terms of scope and operation. As stated by Manzella and Mendez (2009), the year of 1988 marked a new era for cohesion policy. Under the leadership of Jacques Delors, the new president of the Commission, the importance ascribed to this set of policy was very bold and straightforward: transform the European cohesion policy from a fundamentally intragovernmental budgetary transfer to that of a legitimate regional development instrument, aimed at providing effective solutions to the problems faced by the poorer members. The most important reforms on this period, according to Carballo-Cruz (2015), Gang (2012) and Manzella and Mendes (2009), were the: i) increase funding due to the so-called Delors I package, which doubled the structural funds endowment from 1988 to 1993 (during this programming period, it accounted for ECU 65 billions); ii) the integration of the ERDF with the other financial instruments, ESF and EAGGF; iii) the establishment of four main principles to underpin policy implementation: concentration, programming, partnership and additionality; iv) multi-level governance, which emphasizes a shared and interlinked nature of decision-making among the Community and the national and subnational actors, as oppose to the previous model forged by state-centric decisions regarding policy-making.

As Manzella and Mendes (2009) asserted, the 1988 reform is considered the watershed of the EU's cohesion policy and, according to Carballo-Cruz (2015), with this reform, the European regional policy became a true cohesion policy of the economic, social and territorial spheres within the EEC, which aimed at counterbalancing the hex of an European single market for regions lagged behind on economic and social development matters. Regional policy's main goals, thus, turned out to be the retrieval of poorer regions, recovering industrial areas in decline, giving incentives for a more diversified production in the first sector and the revitalization of tainted urban areas. Baldwin and Wyplosz (2012) added that, for the first time, it was established the permanent focus on generating new jobs. Starting with this reform, cohesion policy is organized in multiannual programs. Initially, it lasted for five years (1989-1993), then it was added one more year (1994-1999) and, more recently, its duration changed for seven years (2000-2006, 2007-2013 and 2014-2020).

While the 1988 reform can be considered a defining moment for the European cohesion policy, the next two set of reforms, in 1993 and 1999, according to Manzella and Mendes (2009), focused more on fine-tuning the newly established governing principles, particularly aiming at improving policy effectiveness. The authors also highlight that these reforms must be analyzed within the conjuncture they occurred, a period notable by deepening economic integration, Treaty reform and two new enlargements in the EU.

The Treaty of the European Union was approved in 1992 in Maastricht and entered into force in 1993. This event marked a new age in European integration, once it provides the establishment of the Economic and Monetary Union (EMU) and reinforces the priority devoted to social and economic cohesion by setting it up as core EU objective, on parity with EMU and the internal market (Manzella & Mendes, 2009). In this context, cohesion policy's framework was reformed once again, even though its main objective remained the same as in the preceding period: to buffer the adverse impacts of the single market on cohesion. Under this circumstance, the Cohesion Fund, a new financing instrument, was launched to co-finance infrastructure and environmental projects in countries with a Gross National Product *per capita* (GNPpc) lying below 90% of the ECC's average – Ireland, Greece, Portugal and Spain, and, therefore, help these Member States fulfill the EMU convergence criteria. For that, the Delors II package was approved and reinforced the cohesion's policy endowment up to ECU 177 billions for the 1994-1999 programming period, doubling the resources allocated for the policy. Also, the Financial Instrument for Fisheries Guidance (FIFG) was conceived to support the restructuring of the fisheries sector. Still on the late nineties, the subsidiary principles was introduced. Based on it, national authorities were granted the responsibility for choosing and executing the projects to be financed (Manzella & Mendes, 2009; Baldwin & Wyplosz, 2012; Carballo-Cruz, 2015)

In order to prepare for the 2000-2006 programming period, a new reform took place in 1999. At that time, enlargement negotiations towards Eastern European countries were undergoing and the economic climate was not very smooth, once that the unemployment levels were continuously rising. As reported by European Commission (2015), the reforms on this period received the label “making a success of enlargement” and had two key themes: efficiency, in the sense of simplification of design and procedures, and preparation for enlargement. In this context, in 1997 the Commission presented a document called “Agenda 2000: for a stronger and wider Union” and paved the way for the ascension of ten new Members, which increased the EU population by 20%, but the GDP by only 5%. In the

beginning of 1999, at the European Council of Berlin, an agreement was reached over the new reform of the Structural Funds and a modification on the Cohesion Fund. The budget for the 2000-2006 programming period was slightly increased, reaching €213 billion, €39.6 billion of which was destined for by post accession support. Also, in line of the Agenda 2000 document, four main goals underpinned the reforms: i) increase the concentration of support – reduction in the number of priority objectives and of Community Initiatives from thirteen to four (INTERREG, LEADER, URBAN and EQUAL), with a cut on the budgetary allocation for them to 5.3% of the total amount; ii) simplification of the procedural and decentralization due to changes in the programming and cooperation principles; iii) simplification of programming and implementation, enhancing the cost/effectiveness relation; iv) improvement of mechanisms of control by refining supervision and monitoring instruments (Manzella & Mendes, 2009; Gang, 2012; Carballo-Cruz, 2015).

As stated by Manzella and Mendes (2009), the reform for the 2007-2013 programming period was a moment of strategic turn. The reforms were succeeded by very controversial times, as mentioned by Carballo-Cruz (2015), marked by the debate between many opposing aspirations, such as: i) members of the former EU-15 kept receiving assistance from cohesion funds; ii) new members enjoyed a substantial share of cohesion policy funds, and; iii) net contributors saw a drop in their contribution to cohesion policy backing. For the 2007-13 period, the overall amount of resources available for cohesion policy was set at €347 billion, which accounted for 35.7% of the EU budget. According to Manzella and Mendes (2009), the regulatory package approved represented the most radical modification in the policy since 1988. The operational programmes were designed on top of the EU strategic objectives compiled on the Community Strategic Guidelines (CSG) and in a National Strategic Reference Framework (NSRF), the latter formulated exclusively by the member states. Also, as settled on the commitments agreed by member states in the Councils of Lisbon and Gothenburg, cohesion policy's objectives should shift towards the perfection of Europe's competitiveness. The goals for this period were, then: i) Convergence; ii) Regional competitiveness and employment and; iii) European territorial cooperation. 82% of the budget was allocated to the first objective, which aimed at aiding regions with a GDP *per capita* below 75% of Europe's average, and the remaining 18% was distributed among the other two.

For the 2014-2020 programming period, the European Commission planned noteworthy changes in the design, structure and implementation of cohesion policy. As presented by European Commission (2015), these changes occurred in seven aspects: i) emphasis on

the urgencies of the Europe 2020 Strategy; ii) compensating performance; iii) supporting integrated programming; iv) focus on results; v) gearing towards investment; vi) solidification of territorial cohesion; and, vii) simplification of execution procedures. According to European Commission (2014), the Europe 2020 strategy established five main objectives for the programming period, which address topics like raising employment levels, increasing the budget allocated to R&D, promote a more environmental friendly economy, push for a more educated society and reduce poverty and social exclusion.

In order to achieve these goals, as presented by European Commission (2014), seven initiatives were proposed, which were split in three different themes: three of them belong to the smart growth objective, two correspond to sustainable growth and the last two are part of the inclusive growth objective. In addition, European Commission (2014) comments that for the 2014-2020 period eleven thematic objectives were formulated. They are all related to the cohesion policy goals and to the specific objectives of the programming period they belong to.

Still according to European Commission (2014), cohesion policy funds for the 2014-2020 programming period will be used entirely with two key objectives: investment in the promotion of economic growth and job creation and on promoting European territorial cooperation. The budget for cohesion policy funding 2014-2020 is of € 351.8 billion and, as explained by European Commission (2014), investment from the ERDF will channeled to all 11 thematic objectives. However, objectives that relate to development of R&D, communication technologies and boost of competitiveness are the main priorities. The ESF primarily channels funds for objectives that deal with social matters and, finally, the Cohesion Fund supports the objectives connected to better practices for public administration, improvement of the transportation system and progress towards a more “green” economy.

2.2 Cohesion policy: main concepts

As commented by Barca (2009), cohesion policy was conceived in order to give the European Union a tool so that European citizens do not cast doubt on the common will of the Union to uphold their standards of living. As the author continues, cohesion policy pushes for a more harmonious development amidst the member states. As Barca (2009) conceptualizes, both the equity and efficiency dimensions are included in the general objectives of cohesion policy – equal opportunities for all regions to develop their full potential (efficiency) and for all citizens to live a life worth living wherever they are born (equity).

Still according to Barca (2009), the condition of “fitting together” inherent in the concept of “cohesion” is explicitly addressed by the Treaty through three dimensions. As stated by the Treaty on the Functioning of the European Union, by European Union (2012, p. 81) on the Article IV, “In order to promote its overall harmonious development, the Union shall develop and pursue its actions leading to the strengthening of its economic, social and territorial cohesion”. Therefore, “harmonious development and the reduction of disparities must therefore be pursued through an action, and by creating a condition, where: economic relations are dense and fluid; social relations are open and participatory; and territorial effects are taken into account and monitored” (Barca, 2009, p. 3). The conceptual dissociation of economic from social cohesion is a complicated theoretical exercise. As defended by Barca (2009), harmonious development is about both efficiency, which is described as the output achieved from the exploitation of the full potential of available resources, and equity, a term the author uses to refer to social inclusion. However, when the **economic** dimension of **cohesion** policy is particularly specified, scholars and political agents essentially associate it with the notion of economic convergence. For Rakauskienė and Kozlovskij (2014), the concept can also be narrowed down to employment opportunities, living standards or even redistribution of the GDP. According to these authors, when it comes to the economic aspect of cohesion, this can be explained through three different lenses: economic, financial and technology/innovation.

Essentially, according to Rakauskienė and Kozlovskij (2014), when measuring economic cohesion in the EU, scholars and the official reports rely on macroeconomic indicators such as GDP per capita and unemployment levels to analyze how it has been developing and to identify the ideal targets. Still about these indicators, a critique made towards the EU’s cohesion policy is the lack of indexes used to evaluate the inequality levels between regions is the GDP per capita. Regarding financial cohesion, the authors explain that the main indicators used for analysis are inflation, government debt, exchange rate and interest rate. Finally, the technology and innovative aspect is evaluated by looking at the budget allocated for investments in science and innovation, labour productivity, human capital investment and common investment.

On their turn, Farole et al. (2011) argue that economic cohesion is the part of cohesion policy that focuses on minimizing conspicuous gaps on wealth across the member states and lessening the obstacles to the process of deepening and completion of the European Monetary Union. Thus, the target is pushing for cross-national convergence, which means

that countries initially from the peripheral parts of Europe and lagging in terms of economic development catch-up with the richest members. Also, according to the European Economic and Social Committee (2017, p.1), and in line with Farole et al. (2011), the highest priority of economic cohesion is “putting the European economy on the track of sustained convergence, growth and employment, and bringing prosperity back to the European people and companies”.

As supported by the 7th Report on economic, social and territorial cohesion, by the European Commission (2017, p. 31), cohesion policy, with its economic strand, targets at dipping economic discrepancies across EU regions. To achieve that, in the past few years the EU has invested and co-financed projects in the areas of “innovation, education and digital and transport networks, so helping to create a single market that boosts growth, productivity and specialization in areas of comparative advantage in all regions”. Addressing the same idea, Novy et al. (2012) state that economic cohesion gathered importance within the EU because of the fear that the lack of proper accompanying policies, regional divergences would not be able to be eliminated solely by market mechanisms.

When it comes to **social cohesion**, Barca (2009) writes that, in Europe, the attention given to social issues has significantly increased in the past two decades. The major concern is that a scenario set by high and increasing levels of inequality, as well as the growing concern with globalization, may put in danger economic integration. In parallel, social issues in the EU level are getting more and more important due to the fact that national welfare systems are tied to EU budgetary norms and also because of the expectation that surrounds the EU in which citizens should have equal rights, the so-called federal motivation, as the author defines.

As reported by Novy et al. (2012), social cohesion arose as a key concern across Europe because of its acknowledgement as an important pillar for deepening economic integration. Novy et al. (2012), comment that Jacques Delors, former President of the European Commission described social cohesion when it first appeared in the European cohesion policy, with the Single European Act from 1986, by stating that wealthier members should demonstrate solidarity to the less developed peers to create a more homogenous environment essential for building cohesion. Also, Novy et al. (2012) argue that the concept of social cohesion stood out in the policy rhetoric only when social cohesion turned out to be a tenacious matter. For the authors, the non-economic aspects of social cohesion obtain its importance mainly because of their economic functionality and under the competitiveness

agenda.

With the Report of High-Level Task Force on Social Cohesion, the Council of Europe (2008) states that social cohesion is a mechanism used by policy makers to achieve social goals in Europe. Social cohesion, therefore, focuses on the well-being of the citizens and believes that harmonious and reliable social connections are a necessity for economic and social evolution, as well as pacific co-existence. Because of that, a major concern for social cohesion is the degree to which the citizens feel as a member of society and, in return, are loyal and committed to a set of beliefs and social goals that are commonly shared. As the Report follows, in 2000, with the Lisbon Strategy, the importance of social cohesion as the basis for a competitive economy in terms of knowledge and employment was highlighted.

About the interpretations of social cohesion, the Council of Europe (2008) understands that this term can relate to a vast number of definitions. For instance, some interpretations are that social cohesion: i) is generated by stable social connections and acceptance by citizens of the same group of their shared responsibilities; ii) demands all members to be able to enjoy the advantages that derive from economic life; iii) requires the distribution of means in society; and iv) necessitates recognition and tolerance of people with different background and cultural values.

However, the Report states that maybe the most influential definition of social cohesion is the one that describes it as a mechanism that underlines shared ideals and commitment towards a unified community. From this prism, social cohesion relies on the bonds and connectedness among the members of a society, which closely relates to the notion of social solidarity – when individuals unite around the same cause and are prepared to act in favor of the collective good.

Another interpretation for social cohesion links it with the belief of participation – especially in economic life – and emphasizes the significance of economic inclusion and the role that, besides individuals, the market play. As commented by the Council of Europe (2008), the ultimate goal of the policy is to ensure that everyone has the right to take part in the economic life, especially when it comes to access to employment. Therefore, all the actions that marginalize individuals from the labour market represent a risk to social cohesion.

Assuming a different approach, some scholars view social cohesion from a perspective in which the society is forged by continuous conflict and, because of that, these authors rather emphasizing the concentration of power, especially in terms of economic interests, and how markets will poorly distribute resources among the society. As the Council of

Europe (2008) states, the policy projects that derive from this perspective assume that social cohesion requires that means are redistributed to those in need and the creation of institutions that will challenge the *status quo* and promote both the distribution of resources and the mediation between shares of the society that differ in terms of interests and ambitions.

A further approach contemplates the thematic of diversity. According to the Council of Europe (2008), researchers and scholars that interpret social cohesion this way place emphasis on cultural factors and assume the context of multi-cultural societies on their analysis. For them, social cohesion is seen as a policy that demands tolerance and respect for different cultures. Here, both identity and recognition play a central role, in the sense that people expect to see their own beliefs and cultural values valorized, especially if they do not belong to the dominant majority. Under this approach, social cohesion is jeopardized when diversity is not sustained and recognized.

As shown by the 7th Report on economic, social and territorial cohesion, by the European Commission (2017), the main indicators used by the EU to analyze the effectiveness of social cohesion are the employment and income levels, the internal migration rate, economic inclusion and some other life quality indicators, such as access to health, social welfare and education. In addition, it is important to state that they are, in most of the cases, interdependent. For instance, the EU understands that significant differences in unemployment and income levels may stimulate Europeans to move to other regions in search for better life opportunities and to escape poverty.

In order to explain the rationale for territorial cohesion, Barca (2009) attests that there are two reasons for a place to require external intervention. First, a country, for example, can be viciously trapped in a circle of social exclusion and inefficiency entangled by ineffective economic institutions or even institutions that, advocating for the elite's interest, intentionally fail to tackle the real problems, therefore precluding the country from overcoming the poverty threshold. Also, the author points out that social exclusion shows hereditary traces, in the sense that this condition is prone to be perpetuated. Thus, the intervention desired to deal with these issues should be done by integrated packages of public services and goods intended to push for structural changes, leaving as consequence improvements in terms of well-being, productivity and innovation. However, the mentioned bundle of public goods and services used for these reforms should be tailored according to the local reality and preferences, besides fitting for the linkage with other places. For this reason, territorial cohesion is particularly relevant.

As defined by the Council of European Municipalities and Regions (CEMR) (2009), **territorial cohesion** underlines the importance of the notion of territory in sustainable development and in cohesion policy. The major challenge of this dimension is to trigger the potential development of each region and undertake any shortcomings and weaknesses. For that to happen, a multi-level governance is needed, with regional and local authorities assuming the central role due to their proximity with the citizens and know-how on the area's necessities. Therefore, the CEMR (2009) advocates that territorial cohesion calls for a bottom-up approach and that all actors and sector must cooperate.

Still about the definition of territorial cohesion, the CEMR (2009) describes that the territorial aspect of cohesion policy aims at guaranteeing a harmonious and polycentric development. Also, the Council explains that territorial cohesion brings geographical and spatial planning components to economic and social cohesion. In practice, then, since socioeconomic inequalities are tackled within the territorial context where they are situated, territorial cohesion essentially integrates economic and social cohesion, alongside their respective policies, within a specific territory in all the regions that constitute the European Union.

As commented by Medeiros (2016), even though the concept of territorial cohesion was only formalized as a cohesion policy main objective, alongside the socioeconomic dimensions, with the Lisbon Treaty, from 2009, it has always been somehow present in the specific objectives of the EU, especially the ones that focused on bringing progress to lagging regions. Medeiros (2016) classifies as “curious” that it took two decades since the beginning of the multiannual programming periods for the EU to include the territorial dimension of cohesion. However, as he continues, it does not mean that this dimension was neglected by the political agenda. Since 1983, with the inclusion of “spatial planning” on the release of the European Regional/Spatial Planning Charter, territorial cohesion has been figuring somehow on the policies implemented by the EU. Nonetheless, through an empirical analysis, such as looking at the Cohesion Reports published by the European Commission, Medeiros (2016) was able to attest that the usage of the term “territorial cohesion” has been significantly increasing over time.

About the meaning of territorial cohesion for the European cohesion policy, Medeiros (2016) states that the role played by this dimension: i) makes it easier to identify the location where the policy is implemented; ii) defines the spatial level for the policy; iii) compromises regional and local institutions. Also, by assuming an econometric approach, the author mentions that the territorial dimension highlights some important aspects regarding

territorial disparities, such as unequal access to markets, to know-how, to innovation and the lack of availability of certain services.

As explained previously, it is very difficult to dissociate the three cohesion policy goals from each other. Since they are in most aspects interdependent, there will hardly be one project or program that addresses solely one of them. However, on a theoretical attempt to match the cohesion policy goals with the main priorities for the current programming period, 2014-2020, a possibility that emerges to provide some analytical background is examining how the priorities are funded. By analyzing the objectives of each fund and combining this information with what the priorities aim at achieving, one may attempt to link the goals with the priorities they relate to.

As explained by European Commission (2014a), there are three main funds responsible for delivering cohesion policy. The European Regional Development Fund's (ERDF) purpose is to reinforce economic and social cohesion through investments on growth-enhancing sector, which allows the creation of new jobs and the increase on competitiveness levels. The European Social Fund (ESF) is focused on social cohesion. For that, it channels funds to projects which focus on improving the employment situation and generating better education opportunities. Also, it intends to assist disadvantaged people under social exclusion and/or below the poverty line. Finally, the Cohesion Fund (CF) aims at proliferating sustainable development and green growth. Also, it targets at improving the connectivity in relatively poor Member States, the ones with a GDP below 90% of the EU average. On the following table, the thematic objectives for the programming period 2014-20 are listed on the vertical, as presented by the European Commission (2014a, p. 5) and on the horizontal line are highlighted the three cohesion policy goals addressed on this topic. In parenthesis it is labeled which fund is the main financier of each objective.

Table 1: Thematic objectives and matching cohesion policy goals

Objectives / Goals	Economic	Social	Territorial
Strengthening research, technological development and innovation (ERDF)	X		
Enhancing access to, and use and quality of, information and communication technologies (ERDF)	X		X
Enhancing the competitiveness of SMEs (ERDF)	X		

Supporting the shift towards a low carbon economy (ERDF)			X
Promoting climate change adaptation, risk prevention and management (CF)			X
Preserving and protecting the environment and promoting resource efficiency (CF)			X
Promoting sustainable transport and improving network infrastructures (CF)	X		X
Promoting sustainable and quality employment and supporting labour mobility (ESF)		X	X
Promoting social inclusion, combating poverty and any discrimination (ESF)		X	
Investing in education, training and lifelong learning (ESF)		X	
Improving the efficiency of public administration (ESF)	X		X

Source: Own elaboration based on European Commission (2017) and European Commission (2014a)

2.3 Interreg

As defined by Interreg Europe (2018), the Interreg initiative aims at supporting regional and local governments from the EU to deliver better policy. For that, Interreg promotes an environment prone to the sharing of solutions and opportunities, which intends to ensure that governmental efforts, in terms of investment and innovation, lead to a sustainable and integrated impact for citizens and the region. As commented by European Commission (2015), the creation of Interreg places it as a community initiative programme (CIP), with the intent to build solid connections between neighbouring countries among the member states. Also, European Commission (2015, p. 29) states that Interreg targets the “stitching together of border areas, which was part of the perspective of the single market in 1993”, and it is “intended to reduce the obstacle to relations and exchanges that the border represents”.

In accordance, European Union (2011) adds that Interreg, being since 1990 part of cohesion policy, assumes a place-based approach and its importance derives from its problem solving nature, which tackles issues that transcend national boundaries and demands a common approach. Additionally, Interreg is defined as the key mechanism for helping regions

through the share of knowledge across Europe. Regarding the key features of Interreg, Interact (2015) labels the programme as EU's most important mechanism to promote cooperation across national borders. Furthermore, the same author, when addressing Interreg's strategic objectives, states that it aims at redressing regional imbalances across the member states, which represents the cohesion objective of ERDF.

Also, Interact (2015) situates the conception of Interreg within the context of the deepening process of European integration. For the author, this progressive process, which entailed the creation of a Single Market and Monetary Union, exposed the social and economic discrepancies across the member states, especially in the border regions. As the author continues, even though the Single Market provided a vast number of opportunities for growth and development, the regions did not equally benefit from the benefits of free movement of people, goods and capital. In order to address these challenges, therefore, a structured initiative to deal with cross-border cooperation was needed. As added by Interact (2015, p.1), "through coordinated actions and joint decision making, authorities and people from border regions could work jointly on developing their cross-border areas as centers of commerce and services, transitioning their peripheral locations into attractive Europe-internal locations". The objective, therefore, is to bring to cross-bordering areas regions opportunities for them to become hubs and bridges between the member states.

In the end of the 80s, the European Commission decided to address territorial cohesion through long-term and consistent strategies. For that, in 1989 the European Commission allocated EUR 21 million in the form of financial support to fourteen cross-border projects, which aimed at addressing the structural causes for lagging development in border regions (European Union, 2011). These regions, as explained by European Commission (2015), are peripheral areas whose economy depends on them being at the border. The implementation of a single market could, therefore, impact negatively these areas, and this programme intended to mitigate the possible undesirable effects. As stated by the author, this initiative can be seen as a trial for the Interreg programme, and its success propelled the implementation of the latter.

In 1990, the European Commission created the Interreg I Community Initiative, comprising 31 programmes implemented at internal EU borders with a community contribution on €1.082 billion and over 2,500 projects could be carried out. Interreg I lasted from 1990 to 1993 and, as commented by Interact (2015), its actions intended to hasten the integration of the border regions into the single market, lessening the seclusion of border regions

and to advocate for joint efforts towards spatial development matters. Furthermore, Interreg I provided the border regions' authorities the necessary resources and incentives to promote cooperation projects that push bordering regions to work together towards the same goals, tackling common territorial challenges and, therefore, bringing Europe together, also through the sharing of good practices. In addition, Interact (2015) states that Interreg I served as the main instrument to push forward a multi-level governance structure, as it did not demand funds to be allocated strictly to nation-states, but also to regions covered by one of its programmes. For European Commission (2015), one of the merits of Interreg I is that, even though it covered only a limited area, it successfully incorporated a vast range of bordering areas when it comes to their populations, development and activities. About its legacy, Interact (2010) considers Interreg I a success. As reported, in 15 of the 31 programmes the original amount channeled had to be enlarged. Moreover, cooperation was quite dynamic in the areas of tourism, environment and infrastructure.

After the resolution of Interreg I, which enabled the programme to be tested at European level, Interreg II ran from 1994 to 1999 to continue the initiative. As contextualized by European Union (2011), in the programme's second edition, the Treaty on European Union (1992) was signed, three new members joined the Union, Austria, Finland and Sweden, and cooperation was extended besides the limited geographical focus, as in cross-border cooperation, to include also transnational cooperation. According to Interact (2015), Interreg II was initially made up by two strands. Interreg IIA basically arose as the natural substitute of Interreg I and focused on cross-border cooperation, whereas Interreg IIB was a continuation of the former Community Initiative REGEN (1989-1993) and took over the funds allocated to cross-border energy networks, mainly between Greece and Italy and Spain and Portugal. In 1997, a third strand was introduced. Interreg IIC, as mentioned by Interact (2010, p. 7) was added to comprise "seven general transnational cooperation programmes, two cooperation programmes in the field of flood prevention⁶ and four programmes for drought prevention (Portugal, Spain, Italy and Greece)". According to Interact (2015), the Community contributed to Interreg II with around €2.69 billion and these funds helped more than 10,000 cooperation projects to become reality in the programming period. The following table summarizes the three strands of Interreg, which began with Interreg II.

Table 2: The Interreg Strands

Strands	Spatial emphasis	Integration	Stakeholder level
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A. Cross-border	Proximity	Contiguity	Local, regional
B. Transnational	Cohesion	Planning as the overarching theme (transport, environment, etc.)	Regional, supranational, national
C. Interregional	Network	Interactions	Regional, supranational, local

Source: European Commission (2015)

Following Interreg II, the third edition of Interreg continued from 2000 to 2006 with a budget of €5.1 billion (European Commission, 2015). As reported by Interact (2010), Interreg III was developed in the context of the eastern enlargement of the EU and the resultant increase in the number of Interreg IIIA programmes to 62. Conforming Interact (2015), Interreg III was composed by five operational elements. Strand A was directed to cross-border cooperation and strand B, as a continuation of Interreg IIC, was on transnational cooperation, focusing on developing of a truly integrated territorial approach for the European regional policy. Strand C was on interregional cooperation, with the objective of bringing development to EU regions lagging behind by the interregional cooperation, exchange of information and sharing of know-how. Then, two new programmes were added. The European Spatial Planning Observatory Network (ESPON) was conceived in order to provide analysis of regional development trends within the EU and of spatial planning networked research significant to the EU. Finally, the INTERREG Animation, Cooperation and Transfer (Interact) programme was launched with the mission of providing technical assistance to all the stakeholders implementing the Interreg projects.

For the 2007-2013 programming period, Interreg changed its name. As explained by Interact (2015, p. 5), “in 2007–2013 cooperation was recognized as a cornerstone of EU cohesion policy, and INTERREG was made into a separate structural fund objective – European Territorial Cooperation (ETC) – alongside the ‘convergence’ and ‘competitiveness’ objectives”. The ETC initiative was granted €7.8 billion by the Community, making Interreg IV a remarkable mechanism in financial terms to induce cooperation (Interact, 2010). After acquiring the status of becoming one of the three goals of cohesion policy, ETC programmes were seen on the same level as the conventional regional and national development programmes and obtained more visibility, an improved legal basis structure, besides higher expectations for accomplishments. In this programming period, Interreg IV/ETC was enlarged and supported 75 cooperation programmes, including cross and external borders (Strand A), 13 transnational projects (Strand B) and four EU-wide programmes: ESPON,

Interreg IVC, Interact and the new arrival Urbact, focused on transnational exchanges on urban development (Strand C). Additionally, ETC on this period was guided by the “Community Strategic Guidelines for Cohesion’ and directed towards achieving thematic priorities such as innovation, environment, accessibility and sustainable urban development” (Interact, 2015, p. 5).

Table 3: Evolution of the Interreg Programmes

Interreg	Phase	Number of Programmes	Funding amount (million EUR in real terms)	Number of EU Member States
0	1988-1989	14 projects	0,021	
I	1990-1993	31	1,082	12
II	1994-1999	59	3,500	15
III	2000-2006	79	5,100	25 (after 2004)
IV	2007-2013	92	7,800	27
V	2014-2020	100	10,100	28

Source: European Commission (2015)

The fifth edition of the programme started to operate in 2014, to last until 2020, as part of the European Union’s Europe 2020 strategy. For this programming period, Interreg was identified as goal two of EU cohesion policy, besides investment for Growth and Job, and received a Community contribution of €10.1 billion (Interact, 2015). According to European Commission (2015), Interreg V focuses on promoting smart and sustainable growth, as well as a more inclusive society. As described by European Commission (2018), over 100 cooperation programmes are supported by Interreg V. Out of these, 60 projects are of cross-border nature, corresponding to Interreg VA; 15 transnational – Interreg VB; and 4 Interreg VC programmes, which includes the cooperation projects Interreg Europe, Interact, Urbact and ESPON. The table below illustrates the evolution of the Interreg programmes, as well as its phases and funding.

Chapter 3. Methodology

In this section, the methodology used in the dissertation is explained. Therefore, in addition to the qualitative description of Interreg programmes, we will employ a quantitative technique. We will use a cluster analysis in order to map the Interreg programmes and to understand how they fit within the cohesion policy structure.

3.1 Cluster Analysis

As explained by Hair, Black, Babin, and Anderson (2014, p. 415), when a researcher makes use of a cluster analysis, the objective is to group “individuals or objects into clusters so that objects in the same cluster are more similar to one another than they are to objects in other clusters”. Therefore, the goal is to maximize the similarity of objects included in the same cluster and, at the same time, maximize the heterogeneity amongst the clusters. In accordance, Hair et al. (2014) attest that cluster analysis consists of a multivariate technique in which the intent is to bring together objects based on common traces they possess.

As described by Hair et al. (2014), the classical methods of clustering use hierarchical algorithms, in which the clusters are formed successively on top of clusters previously established, or partitioning algorithms, where the clusters are determined at the same time by forming different partitions and then classifying them in regards with a certain criteria. However, in the case of this research, the method employed is the TwoStep Cluster Analysis, by using the software SPSS – version 25. In SPSS, the clustering method can be performed using either Hierarchical Cluster, K-Means Cluster or TwoStep. The first two are classical methods of analysis, whereas TwoStep was specially designed for SPSS, as mentioned by Şchiopu (2010). As commented by the same author, the SPSS TwoStep Cluster Analysis was conceived to handle large data and, additionally, this method allows the researcher to use both continuous and categorical variables on the analysis in a very straightforward way. For these reasons, TwoStep Cluster by SPSS is more appropriate for this research. As explained by Şchiopu (2010), TwoStep Cluster Analysis is an algorithm written to handle large datasets in two steps. The first one is the “pre-cluster” phase, when all the data is scanned individually and the method decides, one by one, if the current record should be included in the previously created cluster or if it should begin a new one, based on the distance criterion – which can be the Euclidean or the log-likelihood distance; in this research, SPSS automatically employed the log-likelihood distance, since the Euclidean distance is only valid for the cases where all the variables are continuous. Then, the “cluster” step takes the sub-clusters resulted

from the pre-cluster step as an input and merges them according to the desired number of clusters. In this dissertation, cluster analysis will be used to analyze Interreg and identify similarities among its projects and potential overlapping among its programmes, based on a set of characteristics selected by the researcher. The dataset used will be gathered from Keep.eu, the official source of aggregated data on EU’s cross-border, transnational and interregional cooperation programmes, which offers useful information on the Interreg initiative from the year 2000 until the current programming period. Also, the database allows the user to filter for NUTS, thematic objectives and types of programmes. The variables extracted, such as thematic, geographic area and duration of the projects, will be labelled in order to be turned into quantitative variables. Additionally, we also consider the budget allocated to each project and the total amount received by each country or region. In order to standardize all the quantitative variables of the dataset, and give them equal weight and importance, the variables Budget, EU Funding and Duration were normalized. The data, then, was normalized according to the Minimum – Maximum method, which employs the following formula, as stated by OECD (2008):

$$y = \frac{x - \min(x)}{\max(x) - \min(x)} \quad (3.1)$$

With cluster analysis, the researcher intends to identify the similar characteristics found among the countries that receive EU funds through Interreg programmes.

3.2 Database description

In order to define data to be used in the cluster analysis, the database found at Keep.eu was exploited. As above mentioned, Keep.eu is the official source of data regarding European cooperation programmes – cross-border, transnational and international – among member states and between these and neighbouring countries (Keep.eu, 2019). For this work, the data was searched under the criteria “projects” and the only filters applied were on the “types of programmes”, where the options “Interreg Cross-border”, “Interreg Transnational”, “Interreg Networking” and “Interreg-IPA Cross-border” were checked.

When downloaded, however, the data obtained from Keep.eu did not come ready for this analysis. The information on the countries involved in the projects, the lead and the other partners, came in two separate tables and in a not quite organized way. For instance, each partner corresponded to a new entry (line) on two different tables, and, therefore, some adjustments had to be made to have the info put together. Also, some effort was directed

towards the categorization of qualitative data. As it will be explained with more details further on, the variables for the countries, thematic and programmes had to be labelled on a binary form. For that, each thematic, country and programme became a new column, and the number one was added for a country if the project had that particular country involved, and zero when it did not – same logic applies for the thematic and programmes.

With this, the data available, downloaded on February 10th of 2019, presents 19.360 projects comprising the three programming periods, 2000-2006, 2007-2013 and 2014-2020, accounted for in the database. On the table below the number of projects and programmes on each programming period are presented:

Table 4: Projects and programmes per programming period

Programming Period	Number of programmes	Number of projects
2000-2006	82	7670
2007-2013	78	9162
2014-2020	49	2528

Source: authors computation based on Keep.eu.

Keep.eu presents few variables related with our research. For this dissertation, the ones used were: the *programme* in which each project is included, the *countries* involved, considering both the lead partner and the other partners, the *total budget*, the *EU funding*, the *thematic* of each project and, finally, the *duration* of projects. In order to do a more efficient analysis, each programming period was evaluated individually. Still about the variables used, it is important to highlight that not all the projects presented values for all the variables. To avoid that this situation invalidate the analysis, these projects were removed from the database.

Still about the variables analyzed in this research, as the name suggests, *Budget* and *EU funding* correspond, respectively, to the total amount spent on it and how much of the budget will be funded by the EU. The *duration*, on its behalf, corresponds to the difference between the starting date and the end date.

Table 5: Quality of data on each programming period

	Number and % of projects with no information for the variable on each programming period		
Variable	2000-2006	2007-2013	2014-2020
Budget	668 (8.7%)	298 (3.2%)	0
EU funding	2012 (26.2%)	320 (3.5%)	0
Thematic	7 (0%)	1 (0%)	0
Duration	3335 (43.4%)	0	0

Legend: In parentheses, the percentage over the total number of projects.

Source: authors computation based on Keep.eu.

Table 6: Projects with complete information on each programming period

	Number and % of projects with complete information on each programming period		
	2000-2006	2007-2013	2014-2020
Number (%) of projects	3676 (48%)	8219 (89.7%)	2528 (100%)

Legend: In parentheses, the percentage of projects this amount represents over the total number of projects initially displayed.

Source: authors computation based on Keep.eu

The variable *thematics* is related to the thematic objectives of the programming period in which each project is included and each one may be associated with up to three thematics, as presented in the dataset. However, the thematic choices may vary from one programming period to another, depending on the priority axes defined by the EU. Therefore, in order to allow this variable to be matched across periods, it was necessary to categorize it in common and comparable thematic areas, as did by Interact (2016). For this research, based on the framework presented by Interact (2016), the classification has been made by grouping together the 42 possible thematic choices into the following eight groups: 1) Employment, social inclusion, education and institutional capacity; 2) Health; 3) Innovation and competitiveness; 4) Transport and mobility; 5) Environment and energy efficiency; 6) Sustainable urban and rural development; 7) Agriculture, fisheries and forestry (AFF) and coastal management; and 8) Tourism and culture.

Table 7: Thematic groups

Thematic	Label	Thematic	Label
Education and training	1	Climate change and biodiversity	5
Social inclusion and equal opportunities	1	Water management	5
Community integration and common identity	1	Renewable energy	5
Governance, partnership	1	Sustainable management of natural resources	5
Clustering and economic cooperation	1	Soil and air quality	5
Institutional cooperation and cooperation networks	1	Waste and pollution	5
Labour market and employment	1	Managing natural and man-made threats, risk management	5
Demographic change and immigration	1	Waterways, lakes and rivers	5
Safety	1	Traditional energy	5
Health and social services	2	Energy efficiency	5
Cooperation between emergency services	2	Construction and renovation	6
Innovation capacity and awareness-raising	3	Evaluation systems and results	6
Green technologies	3	Regional planning and development	6
Scientific cooperation	3	Urban development	6
SME and entrepreneurship	3	Infrastructure	6
New products and services	3	Rural and peripheral development	6
ICT and digital society	3	Coastal management and maritime issues	7
Knowledge and technology transfer	3	Agriculture and fisheries and forestry	7
Transport and mobility	4	Tourism	8
Multimodal transport	4	Cultural heritage and arts	8
Logistics and freight transport	4		
Improving transport connections	4		

Source: authors computation based on Keep.eu and the labelling of thematics proposed by Interact (2016).

With this labelling system, instead of characterizing the thematics related to each

project by their names, these were classified according to the group they were included. The table below shows the number of projects related to each thematic group in each programming period. On the graph below, between parentheses it is displayed the percentage of the number for projects for the correspondent programming period. Since each project can be matched with up to three thematics, the sum of the percentages will exceed 100%. Also, on the graph it is possible to observe how this percentage changed over the programming periods.

Table 8: Relevance of the thematics over the programming periods

Thematics	1	2	3	4	5	6	7	8
2000-2006	4366 (57%)	442 (6%)	3300 (43%)	521 (7%)	1913 (25%)	1670 (22%)	752 (10%)	3126 (41%)
2007-2013	4083 (44%)	755 (8%)	2871 (31%)	606 (7%)	2329 (25%)	2010 (22%)	898 (10%)	2521 (27%)
2014-2020	869 (34%)	280 (11%)	667 (26%)	174 (7%)	706 (28%)	448 (18%)	240 (9%)	557 (22%)

Source: authors computation based on Keep.eu and the labelling of thematics proposed by Interact (2016).

As can be seen from the table above, on the first programming period, thematics 1, 3 and 8 were the most relevant, and this situation prevailed for thematics 1 and 3 on the two following programming periods. However, between the years 2007 and 2013, thematic 8 was the third more relevant and, on the current programming period, 2014-2020, thematic 5 appears on the second place.

Each project, besides being matched with thematic groups, having its budget and funding condition presented, as well as its duration, also involves at least two countries as part of an Interreg programme. These countries are presented on the table below, with the number of projects per programming period next to them. As commented by Interreg Europe (2018), besides the 28 member states of the EU, plus Norway and Switzerland, the so-called Third Countries can also take part in an Interreg Europe Project, which explains the involvement of 46 different countries in total, as shown below:

Table 9: Interreg projects per country by programming period

	2000-2006		2007-2013		2014-2020	
Countries	Projects	% of total	Projects	% of total	Projects	% of total
Albania	0	0,0%	49	0,5%	101	4,0%
Austria	249	3,2%	807	8,8%	394	15,6%
Belarus	3	0,0%	26	0,3%	0	0,0%
Belgium	151	2,0%	498	5,4%	268	10,6%
Bosnia and Herzegovina	0	0,0%	40	0,4%	61	2,4%
Bulgaria	0	0,0%	534	5,8%	319	12,6%
Croatia	13	0,2%	175	1,9%	245	9,7%
Cyprus	3	0,0%	93	1,0%	74	2,9%
Czech Republic	1376	17,9%	727	7,9%	321	12,7%
Denmark	99	1,3%	309	3,4%	115	4,5%
Estonia	46	0,6%	245	2,7%	135	5,3%
Finland	632	8,2%	410	4,5%	215	8,5%
Former Yugoslav Republic Of Macedonia	0	0,0%	55	0,6%	21	0,8%
France	626	8,2%	1543	16,8%	415	16,4%
French Guiana	3	0,0%	24	0,3%	0	0,0%
Germany	848	11,1%	1338	14,6%	722	28,6%
Greece	163	2,1%	538	5,9%	263	10,4%
Guadeloupe	11	0,1%	30	0,3%	2	0,1%
Hungary	253	3,3%	1077	11,8%	287	11,4%
Iceland	4	0,1%	28	0,3%	33	1,3%
Ireland	82	1,1%	192	2,1%	179	7,1%
Italy	954	12,4%	1448	15,8%	510	20,2%
Latvia	53	0,7%	322	3,5%	205	8,1%
Liechtenstein	1	0,0%	7	0,1%	5	0,2%
Lithuania	65	0,8%	355	3,9%	185	7,3%
Luxembourg	18	0,2%	63	0,7%	13	0,5%
Malta	5	0,1%	83	0,9%	13	0,5%
Martinique	1	0,0%	17	0,2%	2	0,1%
Montenegro	0	0,0%	34	0,4%	38	1,5%

Netherlands	256	3,3%	477	5,2%	365	14,4%
Norway	300	3,9%	363	4,0%	83	3,3%
Poland	225	2,9%	829	9,0%	265	10,5%
Portugal	98	1,3%	566	6,2%	103	4,1%
Romania	0	0,0%	566	6,2%	332	13,1%
Russia	20	0,3%	0	0,0%	2	0,1%
Saint Martin	0	0,0%	4	0,0%	0	0,0%
Serbia	24	0,3%	207	2,3%	138	5,5%
Slovakia	64	0,8%	462	5,0%	231	9,1%
Slovenia	43	0,6%	557	6,1%	324	12,8%
Spain	425	5,5%	1120	12,2%	210	8,3%
Sweden	392	5,1%	866	9,5%	206	8,1%
Switzerland	218	2,8%	558	6,1%	60	2,4%
Turkey	0	0,0%	26	0,3%	0	0,0%
Ukraine	2	0,0%	23	0,3%	8	0,3%
United Kingdom	255	3,3%	742	8,1%	380	15,0%

Source: authors computation based on Keep.eu

As presented on the table above, Czech Republic, Italy and Germany stand out as the countries with the most projects being developed in the first programming period. Between the years 2007 and 2013, however, that order changed, in the sense that France stood out as the country with the most projects, followed by Germany and Italy. On the current programming period, Germany once again is very prominent, now on the first place, with Italy and France in second and third, respectively.

Chapter 4. Mapping main features of Interreg using cluster analysis

In this section, we use cluster analysis to reach two main objectives. First, to identify potential similarities among the projects that receive EU funds through Interreg programmes. Then, focusing on the current programming period, 2014-2020, the analysis is run to identify if there is overlapping of programmes with respect to their objectives and geography (countries involved).

As described in the previous chapter, data clustering allows to group classes of objects with similar characteristics. In this research, the method chosen was the TwoStep Cluster Analysis due to its ability to analyze very large data files and its capability to work well with both categorical and continuous variables. For this analysis, the number of clusters is particularly important. To address this matter, SPSS provides an indicator of cluster quality whenever a cluster analysis is run. As explained by IBM Knowledge Center (2018), the so-called “Model Summary View” shows a Silhouette measure of cluster cohesion and separation which attests if the clustering is considered poor, fair or acceptable, or good. These results are based on a research done by Kaufman and Rousseeuw (1990) on the interpretation of clusters. As commented by these authors, this measure averages the record’s distance to its cluster (A) and the record’s distance to the closest cluster it does not belong to (B), as shown below:

$$\frac{(B-A)}{\max(A,B)} \quad (4.1)$$

By interpreting these results, SPSS attests a grade from -1 to 1, in which around 0,2 is considered acceptable and above 0,5 is good. In order to define the optimal number of clusters for this research, some tests were run to check for clustering quality. On the table below, the results for the first set of analysis, which aims at identifying similarities among the projects.

Table 10: Cluster quality

Number of clusters	2000-2006		2007-2013		2014-2020	
	Grade	Cluster quality	Grade	Cluster quality	Grade	Cluster quality
5	-0,6	Poor	-0,7	Poor	-0,6	Poor
10	-0,5	Poor	-0,5	Poor	-0,4	Poor
15	0	Poor	-0,1	Poor	0,2	Fair
20	0,2	Fair	0,3	Fair	0,2	Fair
25	0,2	Fair	0,2	Fair	0,3	Fair
30	-0,1	Poor	0	Poor	0,2	Fair

Source: authors' own computation.

As observed on the table above, 20 clusters had the outcome with a fair result and, therefore, was the chosen one for the three programming periods analyzed on topic 4.1. The number of clusters for the second set of analysis is explained on the respective subtopic, 4.2.

4.1 Finding similarities among projects

In this section we use TwoStep Cluster Analysis to search for similarities among the projects developed through the Interreg programmes. The three programming periods were analyzed, and the variables used were Countries, Thematics, Budget, EU Funding and Duration.

4.1.1 Programming Period 2000-2006

The first programming period analyzed comprises the projects developed between the 2000 and 2006. As previously presented, a prominent trait of this programming period is the fact that 52% of the projects included in this programming period lack information for at least one of the variables analyzed. For this reason, the cluster analysis for this period considered only the projects with complete information – which correspond to 3676 projects, in a total of 7670.

Table 11: Centroids and Cluster Distributions

Centroids

Cluster	Duration normalized		EU Funding normalized		Budget normalized		Cluster Distribution	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	Number of projects	% of Total
1	0,03555	0,022328	0,01208	0,01386	0,022699	0,025325	203	5,50%
2	0,026564	0,017104	0,008136	0,011693	0,015032	0,021193	294	8,00%
3	0,070076	0,018436	0,018279	0,015276	0,045712	0,039229	165	4,50%
4	0,045147	0,016008	0,094036	0,036538	0,176106	0,072571	99	2,70%
5	0,124425	0,115764	0,129824	0,124507	0,312046	0,167838	64	1,70%
6	0,060633	0,020276	0,016949	0,010616	0,040984	0,025406	193	5,30%
7	0,074565	0,023866	0,019879	0,01315	0,050243	0,032544	120	3,30%
8	0,063773	0,029427	0,014634	0,014308	0,036012	0,035415	140	3,80%
9	0,029676	0,019385	0,007781	0,009886	0,015197	0,019503	75	2,00%
10	0,070006	0,020323	0,023218	0,022067	0,051946	0,049075	144	3,90%
11	0,078109	0,0268	0,015579	0,014695	0,038507	0,040504	174	4,70%
12	0,053509	0,030201	0,010792	0,013475	0,026345	0,034293	367	10,00%
13	0,082466	0,02905	0,011498	0,010576	0,031674	0,033735	162	4,40%
14	0,072657	0,025227	0,016827	0,013079	0,041467	0,031773	169	4,60%
15	0,063477	0,021504	0,018269	0,014133	0,043337	0,031783	157	4,30%
16	0,067617	0,024576	0,008339	0,008152	0,01984	0,021356	123	3,30%
17	0,053875	0,022583	0,00696	0,007909	0,013687	0,016271	248	6,70%
18	0,022884	0,013814	0,007259	0,008921	0,013349	0,016394	313	8,50%
19	0,018845	0,011595	0,004293	0,007703	0,007915	0,01378	250	6,80%
20	0,020687	0,013024	0,004783	0,007512	0,008677	0,013473	216	5,90%
Combined	0,051077	0,035103	0,015911	0,029624	0,03557	0,059343	3676	100%

Source: authors' own computation.

SPSS, after running for TwoStep Cluster analysis, provides some very useful information on the clusters. On the previous table, the centroids are presented. As displayed, cluster 5 has the projects that received, on average, the largest amount of EU funding – that is also the case for the budget of its projects. This cluster, as it is presented later, includes only Luxembourg, which is quite unexpected, and the thematic 4. On the other hand, cluster 19 combines the projects that received the smallest amount of funding on average. On this cluster, Czech Republic and the thematic 1 and 8 are included.

In order to combine the countries and thematic 1 into the clusters, it was pre-defined that each country should have at least 15% of the projects it is involved with in a given cluster

to be included into it. For the thematics, the minimum percentage was established as 6%¹. Below, the 20 clusters are shown.

Table 12: Clusters programming period 2000-2006

Cluster	Countries	Thematics
1	Czech Republic	4, 5, 8
2	Czech Republic, French Guiana and Guadeloupe	1, 2, 3, 5, 7, 8
3	Portugal, Slovenia, Sweden, Denmark, Latvia, Russia, Norway, Hungary, Luxembourg and Iceland	3, 4, 6, 7
4	Slovakia	2
5	Luxembourg	4
6	Italy	3, 4
7	Italy, Switzerland, Cyprus, Slovenia, Sweden, Latvia, Estonia, Netherlands and Belgium	5
8	Germany, Malta, Latvia, Lithuania, Estonia and Slovakia	4, 5
9	Poland	-
10	Spain	3, 7
11	United Kingdom	3, 4, 5, 7
12	Germany	1, 2, 3, 6, 8
13	Switzerland, Ireland, Lithuania, Estonia, Netherlands, Belgium and Luxembourg	1, 2, 3
14	France	3
15	Austria and Greece	3, 4, 5
16	Malta, Ireland, Finland, Norway, French Guiana and Iceland	8
17	Finland	1, 2, 3, 4, 5, 6
18	Czech Republic	8
19	Czech Republic	1, 8
20	Czech Republic	1

Legend: the dash symbolize the lack of significance in the clustering.

¹ In order to analyze the statistical significance of these thresholds, a Friedman Test was run. For that, the number of countries on each cluster assuming a 15% threshold was compared with a 10% and 20% threshold and the 6% for the thematics was compared with 5% and 7% thresholds. For both cases, the Friedman Test result rejected the null hypothesis, attesting for statistically significant differences between the mean values of the related comparison scenarios.

Source: authors' own computation.

When analyzing the clusters obtained for this programming period, the absence of clusters combining groups of neighbouring countries is something that stands out. In fact, as observed, the analysis puts on the same group countries which are located significantly far from each other. That, considering the nature of Interreg programmes is not something one would foresee. Furthermore, the existence of multiple clusters with only one country included, and four clusters with only Czech Republic highlights the additional peculiarities of this output. An explanation for these bewildering results may reside on the fact that 52% of the projects of this programming period had to be excluded from the analysis due to the lack of available data.

4.1.2 Programming Period 2007-2013

The second programming period analyzed comprises the projects developed between 2007 and 2013. As explained previously, from the raw data downloaded from the database, 10,3% of the projects had to be excluded from the analysis for not presenting information for all the variables evaluated – leaving a total of 8219 projects. On the table below it is possible to observe the distribution of projects among the 20 clusters of this programming period.

As displayed on the following table, cluster 7 concentrated the projects with the longest duration on average. However, it also holds the largest standard deviation. This cluster includes the country Guadeloupe and the thematic 4. On the other hand, cluster 18 – Hungary and all the thematics - combined the projects that took the least time to be completed. As far as EU funding, cluster 7 also places on top, but, again, with a very considerable standard deviation. The smallest value, on average, for EU funding is found on cluster 11, which also presents a quite low standard deviation. Cluster 11 is made up of Sweden, Finland, Norway, Iceland and Estonia.

Table 13: Centroids and Cluster Distribution

Centroids								
Cluster	Duration normalized		EU Funding normalized		Budget normalized		Cluster Distribution	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	Number of projects	% of Total
1	0,05957	0,01752	0,06349	0,02335	0,05137	0,01893	129	1,60%
2	0,05558	0,01239	0,03522	0,03135	0,0315	0,0267	448	5,50%
3	0,0528	0,01011	0,06166	0,02599	0,04661	0,01904	119	1,40%
4	0,0604	0,01046	0,04544	0,0232	0,03787	0,01951	338	4,10%
5	0,05241	0,01491	0,03037	0,02392	0,02643	0,02176	685	8,30%
6	0,08718	0,03071	0,08167	0,05227	0,10828	0,06891	202	2,50%
7	0,08768	0,11362	0,18286	0,13672	0,18221	0,12957	144	1,80%
8	0,07385	0,0258	0,03663	0,02925	0,04139	0,03488	285	3,50%
9	0,04201	0,02016	0,01968	0,02108	0,01585	0,01664	377	4,60%
10	0,04515	0,02899	0,0153	0,02735	0,02133	0,03869	207	2,50%
11	0,04639	0,02202	0,01481	0,01524	0,01957	0,0199	616	7,50%
12	0,04413	0,01957	0,0344	0,03424	0,02926	0,03132	409	5,00%
13	0,05771	0,02666	0,01728	0,02203	0,01821	0,02045	655	8,00%
14	0,06206	0,02393	0,01981	0,01702	0,02533	0,02224	588	7,20%
15	0,07766	0,02824	0,02734	0,02418	0,03695	0,03412	233	2,80%
16	0,02913	0,01267	0,01514	0,01794	0,01179	0,01415	525	6,40%
17	0,0364	0,01881	0,01712	0,01769	0,01466	0,01665	442	5,40%
18	0,03124	0,01716	0,01336	0,01729	0,01036	0,01343	757	9,20%
19	0,0568	0,01433	0,01796	0,01699	0,01898	0,01748	455	5,50%
20	0,04551	0,01883	0,02013	0,02636	0,01551	0,02021	605	7,40%
Combined	0,05099	0,02864	0,02796	0,03891	0,02743	0,03963	8219	100,00%

Source: authors' own computation.

After presenting the centroids, we move to the interpretation of the results of the TwoStep Cluster Analysis of this programming period, 2007-2013. As explained on the previous topic, each country should have at least 15% of their total number of projects in a particular cluster to be included in that cluster. For the thematics, the minimum was established at 6%².

² Again, a Friedman Test was run to analyze the statistical significance of these thresholds. As it happened on the previous programming period, the number of countries with the 15% threshold was compared with a 10% and 20% threshold and the 6% for the thematics was compared with 5% and 7% thresholds. For both cases, the Friedman Test result rejected the null hypothesis, attesting for statistically significant differences between

Table 14: Clusters programming period 2007-2013

Cluster	Countries	Thematics
1	Slovenia, Slovakia and Ukraine	-
2	Italy, Switzerland, Austria, Liechtenstein, Malta and Slovenia	4, 5, 6, 7
3	Greece, Slovenia, Serbia, Ukraine, Croatia, Albania, Bosnia and Herzegovina, Bulgaria, Former Yugoslav Republic of Macedonia, Romania and Montenegro	-
4	Italy, Greece, Malta, Cyprus, Spain, Ireland, United Kingdom, Portugal, Slovenia, Netherlands and Romania	3, 4, 6
5	France, Spain, Ireland and Portugal	1, 2, 3, 5, 6, 7
6	Ireland, United Kingdom, Denmark, Netherlands, Belgium and Luxembourg	4
7	Guadeloupe	4
8	United Kingdom	7
9	Austria and Slovakia	-
10	Netherlands	-
11	Sweden, Finland, Norway, Iceland and Estonia	1, 2, 3, 5, 7, 8
12	Sweden, Finland, Denmark, Poland, Latvia, Lithuania, Estonia and Belarus	1, 4, 7
13	Germany and Denmark	1, 2, 3, 4, 5, 6, 7, 8
14	France and Switzerland	1, 2, 4, 5, 6, 7, 8
15	Belgium	-
16	Bulgaria and Romania	1, 2, 3, 6, 8
17	Greece, Cyprus, Guadeloupe, Martinique, Luxembourg, Serbia, Croatia, Albania, Former Yugoslav Republic of Macedonia and Turkey	2, 7, 8
18	Hungary	1, 2, 3, 5, 6, 7, 8
19	Italy, Switzerland, Austria and Slovenia	1, 2, 8
20	Poland and Czech Republic	1, 6, 8

Legend: the dashes symbolize the lack of significance in the clustering.

Source: authors' own computation.

the mean values of the related comparison scenarios.

The existence of clusters combining neighbouring countries is very prominent on this programming period as well. Cluster 3 is a solid example of it, since it combines South-eastern European countries and Ukraine, from Eastern Europe, which borders Romania. By looking at the centroids table, it is possible to note that projects from this cluster received on average the 4th largest amount from EU funding, which implies its importance for the programming period. Cluster 2 also matches neighbouring countries, in this case from Central Europe, plus Malta. The projects here were matched with the thematics Transport and mobility, Environment and energy efficiency, Sustainable urban and rural development and Agriculture, fisheries and forestry.

Ireland, Spain, Portugal and France, all bounded by the Atlantic Ocean, were put together on cluster 5 and these projects were paired with all the thematic groups, but the ones related with mobility and tourism. Cluster 6 combined Ireland, the UK, the Netherlands, Belgium, Denmark and Luxembourg and the thematic Sustainable urban and rural development. The UK, interestingly, was put alone on cluster 8 with the thematic Agriculture, fisheries and forestry. The Netherlands was placed alone on cluster 10 and Belgium on 15. Hungary was put alone on cluster 18 and what strikes is the fact that all the thematics were listed in this cluster.

All the thematics also appeared on cluster 13, where Germany and Denmark are included. On the programming period 2014-2020, all the thematics were linked with projects related to these two countries as well, but on that case with Switzerland also included in the cluster. France and Switzerland, on cluster 14, were also merged with a large number of thematics, excluding only the group number three. Bulgaria and Romania, bordering countries from Southeast Europe, form cluster 16. Five different thematics were linked to this cluster, which is also expressive.

Clusters 11 and 12 combine northern countries. Cluster 11 put together the Nordic countries plus Estonia on a group of projects related, with significance, with all the thematics, but Transport and mobility. Cluster 12 combined Sweden, Finland, Denmark, Poland, Latvia, Lithuania, Estonia and Belarus, with the thematics Employment, social inclusion, education and institutional capacity, Transport and mobility and Agriculture, fisheries and forestry and coastal management.

The central European countries Switzerland, Austria and Slovenia were matched with Italy on cluster 19. On cluster 20, the bordering countries Poland and Czech Republic were

combined and the thematic Employment, social inclusion, education and institutional capacity, Sustainable urban and rural development and Tourism and culture stood out.

4.1.3 Programming period 2014-2020

The last programming period analyzed through the TwoStep Cluster Analysis is the current one, which started in 2014 and ends in 2020. Because of that, it is important to mention that not the totality of projects developed will be included in the database gathered from Keep.eu since more calls for projects may be open in some Interreg programmes. However, the 2528 available for analysis provide a solid representation of the programming period. On the table below, it is possible to observe the projects distribution among the 20 clusters.

Table 15: Centroids and Cluster Distribution

Centroids								
Cluster	Duration normalized		EU Funding normalized		Budget normalized		Cluster Distribution	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	Number of projects	% of Total
1	0,22519	0,09939	0,02703	0,02082	0,02702	0,02082	161	6,40%
2	0,58807	0,08843	0,04168	0,01073	0,04269	0,01082	180	7,10%
3	0,32985	0,07719	0,02591	0,01224	0,02697	0,01246	155	6,10%
4	0,32681	0,02923	0,05594	0,01291	0,05593	0,01291	74	2,90%
5	0,2317	0,09325	0,03731	0,05276	0,0373	0,05276	157	6,20%
6	0,22991	0,07426	0,02495	0,01379	0,02494	0,01379	126	5,00%
7	0,37654	0,06334	0,05692	0,01161	0,05858	0,0122	83	3,30%
8	0,24242	0,11582	0,02672	0,02205	0,02671	0,02205	93	3,70%
9	0,375	0,13036	0,0393	0,03226	0,05174	0,04102	187	7,40%
10	0,33631	0,12136	0,02602	0,02924	0,02636	0,03012	209	8,30%
11	0,32581	0,07943	0,04348	0,026	0,04558	0,02775	129	5,10%
12	0,35735	0,06289	0,05403	0,01298	0,05726	0,01339	49	1,90%
13	0,45558	0,08815	0,08995	0,03939	0,13379	0,05363	149	5,90%
14	0,32065	0,20745	0,02922	0,02767	0,03323	0,02992	186	7,40%
15	0,39272	0,12972	0,05277	0,03754	0,09177	0,06698	189	7,50%
16	0,38324	0,07241	0,05812	0,01843	0,06572	0,02112	47	1,90%
17	0,49962	0,23926	0,30219	0,26118	0,26457	0,23558	23	0,90%
18	0,22955	0,13534	0,02544	0,02007	0,02639	0,02165	79	3,10%
19	0,231	0,07083	0,01377	0,01077	0,01382	0,01078	126	5,00%
20	0,33321	0,10209	0,03804	0,02921	0,04278	0,03288	126	5,00%
Combined	0,339	0,14822	0,04125	0,04762	0,04843	0,05369	2528	100,00%

Source: authors' own computation.

SPSS, after running for TwoStep Cluster analysis, provides very useful information on the clusters. On the previous table, the centroids are presented. As displayed, the cluster 2 concentrated the projects with the longest median duration, whereas cluster 1 the shortest ones – both with a relatively low standard deviation. Also, projects included on cluster 17 received, on average, by far the most funding from the EU, but the relatively high standard deviation predicates that the values are noticeably disperse relative to its mean. However, curiously, this cluster was not significant for any country or thematic, as can be seen on table 20. On the other hand, cluster 19 concentrates the projects with, on average, the smallest values for EU funding. This cluster combines the Baltic states and the thematics 2 and 3.

After presenting an overview of the clusters, now we move to the interpretation of the outputs of the TwoStep Cluster Analysis³ in Table 16.

The first cluster has as its most notorious trait the location of the countries combined, since that four of them are Balkan countries, plus Cyprus, which is relatively close to them. By looking at the thematics linked with the projects from cluster 1, it is possible to attest that these projects were, in their majority, related with social matters and institutional capacity, environment and energy efficiency and tourism and agriculture. This aspect of combining neighbouring countries, or at least ones which are close to each other, is easily perceivable when looking at Table 12. Considering Interreg's programmes nature, that was expected to occur.

Clusters 4 and 6 also combine mainly countries from Southeast Europe, including most of the Balkan ones. On cluster 4, none of the thematics groups was matched with significance relevance, but for cluster 6 the projects were identified as being relevant on the topics Sustainable urban and rural development, Agriculture, fisheries and forestry and Tourism and culture – being the former very representative for that region, then.

³ Same way as before, the number of countries for a 15% threshold was compared with 10 and 20%, while the amount of thematics on each cluster by assuming a 6% threshold was compared with a 5 and 7% minimum. For both cases, the Friedman Test result rejected the null hypothesis, attesting for statistically significant differences between the mean values of the related comparison scenarios.

Table 16: Clusters Programming Period 2014-2020

Cluster	Countries	Thematics
1	Greece, Cyprus, Albania, Bulgaria and Former Yugoslav Republic of Macedonia	1,5,8
2	Italy, Greece, Malta, Cyprus, Spain, Ireland, United Kingdom, Portugal, Sweden, Finland, Denmark, Poland, Latvia, Lithuania, Norway, Hungary, Guadeloupe, Martinique, Luxembourg, Ukraine and Romania	1, 2, 7, 8
3	Italy, Austria and Slovenia	2,5,7
4	Austria, Slovenia, Slovakia, Hungary, Serbia, Croatia, Bosnia and Herzegovina, Bulgaria, Romania and Montenegro	-
5	Bulgaria and Romania	1,3,4,8
6	Serbia, Croatia, Albania, Bosnia and Herzegovina and Montenegro	6,7,8
7	Slovenia, Poland, Czech Republic, Hungary and Croatia	-
8	Slovakia and Hungary	-
9	Germany, Switzerland and Denmark	1,2,3,4,5,6,7,8
10	Czech Republic and Slovakia	1,2,3,4,5,6,7,8
11	Italy and France	4
12	Switzerland and Liechtenstein	-
13	France, United Kingdom, Denmark, Norway, Netherlands and Belgium	4,6,8
14	Ireland, United Kingdom, Sweden, Finland, Russia, Norway and Iceland	1,2,5,6,7,8
15	Germany, Netherlands and Belgium	1,2,3,4,5,6,8
16	Spain, Ireland, Portugal and Martinique	-
17	-	-
18	Poland and Lithuania	-
19	Latvia, Lithuania and Estonia	2,3
20	Sweden, Finland, Latvia and Estonia	1,2,6

Legend: the dashes symbolize the lack of significance in the clustering.

Source: authors' own computation.

Cluster 3 combined the neighbouring countries Italy, Austria and Slovenia and

showed the importance of the areas of Health, Environment and energy efficiency and Agriculture, fisheries and forestry for that bordering region. Cluster 7 comprised some Central European countries, such as Slovenia, Poland, Czech Republic, Hungary and Croatia. Czech Republic and Slovakia, the former merged countries, were put in their own cluster, number 10, and the fact that all the available thematics were listed in this cluster is a matter of relevance. This only happened again on clusters that had Germany in it, like in cluster 9, alongside Switzerland and Denmark, and cluster 15, with the Netherlands and Belgium.

The Baltic states were listed in their own cluster, 19, and had as the most relevant project thematics Health and Innovation and Competitiveness. Cluster 20 combined two Baltic states with two Nordic ones and identified, besides Health again, Employment, social inclusion, education and institutional capacity and Sustainable urban and rural development the themes with the most importance.

Cluster 13 combined core countries from Western and Northern Europe - France, United Kingdom, Denmark, Norway, Netherlands and Belgium. Transport and mobility, Sustainable urban and rural development and Tourism and culture were the thematics with the most significance. This geographical approximation can be seen again on cluster 14, but now with Russia included and a significantly different set of countries.

There is no cluster combining the Southern Europe countries. However, cluster 16 combined Portugal and Spain with Ireland and Martinique. Southern European countries also appeared together in cluster 2. Yet, this cluster did not stick to any geographical criteria, being more of a diverse mixture of European countries.

4.1.4 Results overview: comparison between programming periods

In this section, we aim to sum up the results of this first set of analysis and provide some useful insights in line with the objectives of this work. About the table below, the entries that mention recurrence refer to the number of clusters the variables are included – the amount is displayed in parentheses. Also, the entries “most and least projects” are related with the totality of projects of the respective programming period.

The set of tables found on the Annexes 1, 2 and 3 provides additional comparative information of the cluster analysis of the three programming periods. As before, the periods are displayed chronologically.

Table 17: TwoStep Cluster Analysis results overview

	2000-2006	2007-2013	2014-2020
Most recurring thematics	1) Thematics 3 (10) 2) Thematics 4 (8) 3) Thematics 5 (7)	1) Thematics 1 (9) 2) Thematics 2, 6, 7, 8 (8) 3) Thematics 3, 5 (6)	1) Thematics 8 (9) 2) Thematics 1, 2 (8) 3) Thematics 6: (7)
Least recurring thematic	Thematics 6 (3)	Thematics 4 (5)	Thematics 3 (5)
Most recurring countries	1) Czech Republic (5) 2) Luxembourg, Latvia and Estonia (3)	1) Slovenia (5) 2) Italy, Switzerland, Aus- tria, Greece, Ireland, Denmark, Netherlands and United Kingdom (3)	1) Hungary (4) 2) Bulgaria, Italy, United Kingdom, Ireland, Swe- den, Denmark, Poland, Latvia, Lithuania, Nor- way, Italy, Slovenia and Croatia (3)
Most projects: Country	Czech Republic	France	Germany
Most projects: Thematics	Thematics 1: 57% Thematics 8: 36% Thematics 6: 28%	Thematics 1: 44% Thematics 3: 31% Thematics 8: 27%	Thematics 1: 34% Thematics 5: 28% Thematics 3: 26%
Least projects: Thematics	Thematics 2: 6%	Thematics 4: 7%	Thematics 4: 7%
Mean value of funding	629.736,45 €	828.379,06 €	1.361.800,57 €
Median value of funding	287.433,00 €	482.110,56 €	1.076.129,52 €
Average duration (days)	728,5	684,4	1015,9

Source: authors' own computation.

When looking for similarities between the programming periods, some aspects draw instant attention. First, 16 countries are listed on the top 10 countries with “the most projects” for the three programming periods. Out of these 16, five of them appear on all three “top 10s”, Germany, Italy, France, the United Kingdom and Czech Republic, and four are listed twice: Spain, Sweden, Austria and the Netherlands. The other 7 countries that appear once on the lists are Finland, Hungary, Poland, Norway, Slovenia, Romania and Bulgaria. Also, a repetition in terms of relevance is seen on the thematics field as well. By looking at the top three thematics on each programming period, it is possible to attest that thematic 1

(Employment, social inclusion, education and institutional capacity) stood out as the one related with the largest number of projects. Even though thematic 1 was the only one which appeared on the top 3 for all three programming periods, thematic 8 (Tourism and culture) also acquired significant relevance, once that it was only 1% short from making in the top 3 on the 2014-2020 programming period. Thematic 3 (Innovation and competitiveness), which appeared twice, is also worth mentioning.

Something noteworthy is that for both cases, countries and thematics, the large number of projects involved with does not entail appearing in the “most recurring” list. That suggests that, in spite of their relevance, these variables may have been concentrated in a smaller number of clusters.

By looking at table 17, it is possible to observe how the EU funds channeled to Interreg projects changed over the years. Both the average and the median value significantly increased in a cross-period comparison. The mean value of the 2014-2020 programming period corresponds to around 212% the number accounted for the first period under analysis. This upsurge is even higher when the median value is used as reference, since the value for the current programming period is almost four times higher than it was in 2000-2006. However, the funding variable, when looked at the average value, apparently is not related with the number of projects each country is involved with. In other words, at least by looking at the top 10 countries of each programming period, the relevance each country has does not correspond to higher amounts of funding. In fact, the ratio of funding of the top 3 countries compared to the total amount for the top 10 corresponds to 25% for the 2000-2006 period, and then to 31% for the other two periods. Notwithstanding, if instead of Czech Republic, the amount received by France is added with Germany's and Italy's (which together were the top 3 countries in the other two periods), this ratio goes up to 29% - in line with the other periods.

About the combination of countries and thematics, some conclusions can also be taken from these tables. Besides the 2000-2006 period, most of the countries listed on the top 10 were matched with at least five different thematics. On the 2007-2013 period, five of the 10 countries were matched with all thematics, but this did not occur in 2000-2006, when this happened with only one, and 2014-2020, when two were combined with thematics 1 to 8. Another possible observation is that the top 3 thematics shown on table 21 did not necessarily reflect on how the top 10 countries were matched in the three periods. The thematics that matched the most with the top 10 countries in all three periods were 4 (Transport and

mobility) and 5 (Environment and energy efficiency), with 7.6 countries on average, and 3 (Innovation and competitiveness), with 7.3 on average. Thematic 1 (Employment, social inclusion, education and institutional capacity), which stood out both by being very recurrent and related to a very large number of projects, was only the 5th in this analysis.

Regarding the combination among countries, by looking at the Annexes 1, 2 and 3, most of the countries were matched together regardless of the programming period, which is expected due to how Interreg is structured. However, some cases stick out. France for instance, was not matched with any countries on the first period, and, on the following two, none of the countries that France was combined with repeated, even though the thematics from the 2014-2020 period also appeared on 2007-2013. Germany was matched with Denmark on the last two programming periods, but none of the countries combined in these ones appeared on the clusters of the 2000-2006 period. For the UK, all of the countries but Slovenia, which it was matched with in 2007-2013 appeared again on the current programming period. With Italy, most of the countries from 2007-2013 repeated on 2014-2020 – France is the most notable absence. But, when the first period is compared with these two, the list of countries matched with is completely different. It is important to reiterate, however, that the database used for the cluster analysis of the 2000-2006 period had to be cut in half due to the lack of data for the projects. Czech Republic, the last country to appear on all three tables, saw Poland repeating on the last two periods⁴.

4.2 Finding overlapping of programmes

The TwoStep Cluster Analysis was now employed with an additional variable, the programmes in which the projects are included. With this, the aim is to evaluate potential overlapping of the programmes in terms of objectives, identified through the thematics, and countries involved. As presented on chapter 3, the variable Programmes was created in a binary form, so that this variable could be used on the analysis. Also, the quantitative variables EU Funding, Budget and Duration were encompassed. This analysis is focused on the current programming period, 2014-2020 since the database does not present complete information for the previous periods.⁵

⁴ Czech Republic and Poland joined the European Union in the enlargement of 2004, together with other Central and Eastern European countries.

⁵ Due to some methodological changes, many of the projects from the periods 2000-2006 and 2007-2013 were matched with a generic name of programme – for example, what appears most of the times is if a project involves the countries Portugal and Spain, for the variable Programme Keep.eu presents “Portugal-Spain 2000-2006”.

In addition, it is important to state that the database used for this analysis is not the same as the one used on the subtopic 4.1.3, when the programming period 2014-2020 was also analyzed. Now, only the projects belonging to programmes from Interreg V-A, cross-border cooperation, and Interreg VB, transnational cooperation, were included.

About the number of clusters, as on the previous TwoStep Cluster Analysis, some tests were run in order to check for clustering quality. The table below attests that 10 clusters is the optimal number.

Table 18: Cluster quality

Number of Clusters	Grade	Cluster Quality
2	-0,7	Poor
4	-0,6	Poor
6	-0,2	Poor
8	0,1	Fair
10	0,3	Fair
12	0,2	Fair
14	0	Poor

Source: authors' own computation.

As previously explained, for this analysis only the projects from the programming period 2014-2020 that belonged to Interreg V-A or Interreg VB were included on the database, which left a total of 2,332 projects. Below, the distribution of the projects among the 10 clusters.

On the following table, the centroids are also presented. As can be seen, cluster 10 concentrated the projects with, on average, the largest Budget and EU Funding, whereas cluster 5 kept the projects with the smallest value for these two variables on average. Cluster 10 combined the countries France, the UK, Denmark, Norway, the Netherlands, Belgium and Luxembourg, alongside three thematics and six programmes. Cluster 5 matched Sweden, Finland and the Baltic countries, with four thematics and three programmes. When it comes to duration, cluster 3 aggregated the projects with the largest value, and a small standard deviation, whereas cluster 6 grouped the, on average, shortest projects.

Table 19: Centroids and Cluster Distribution

Centroids

Cluster	Budget normalized		EU Funding normalized		Duration normalized		Cluster Distribution	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	Number of projects	% of Total
1	0,05785	0,05262	0,04068	0,03269	0,38501	0,11717	376	16,10%
2	0,04779	0,10045	0,05371	0,12777	0,26908	0,15915	125	5,40%
3	0,04178	0,00826	0,04078	0,00829	0,59172	0,08393	184	7,90%
4	0,02978	0,03463	0,02823	0,03185	0,30001	0,12544	304	13,00%
5	0,02351	0,02402	0,02218	0,02171	0,27966	0,09537	219	9,40%
6	0,03461	0,04437	0,03462	0,04437	0,22753	0,1009	270	11,60%
7	0,0444	0,02608	0,04417	0,02581	0,32701	0,08365	306	13,10%
8	0,04709	0,02288	0,04746	0,03148	0,32948	0,07544	163	7,00%
9	0,03432	0,03118	0,02833	0,02709	0,24353	0,16447	139	6,00%
10	0,12003	0,06145	0,07707	0,04087	0,42289	0,10791	246	10,50%
Combined	0,04911	0,05199	0,04136	0,0452	0,33997	0,14574	2332	100,00%

Source: authors' own computation.

After the analysis of the centroids, we move to the interpretation of the outputs of the TwoStep Cluster Analysis of projects that belong to the current programming period, 2014-2020. Here, for a country to be included in a cluster, it must have at least 20% of their total number of projects in that cluster. For the thematics and for the programmes, this threshold was set at 10% and 80% respectively⁶.

By looking at Table 20, the results obtained from the TwoStep Cluster Analysis suggest that Interreg programmes are overlapping in some cases, in the sense that transnational and cross-border programmes cover the same geographic area and share common objectives. This is evidenced on three clusters:

- Cluster 6: Interreg VB Balkan-Mediterranean matched with both V-A Greece – Cyprus and V-A Greece – Bulgaria;
- Cluster 8: match between VB Alpine Space and V-A ALCOTRA;
- Cluster 10: VB North Sea seems to be overlapping with V-A Euregio Maas-Rhein and V-

⁶ As on the section 4.1, a Friedman Test was conducted to analyze the statistical significance of these thresholds. The number of clusters on each cluster assuming a 20% threshold was compared with a 10% and 20% one. Also, the same test was run for the thematics threshold, which was compared with 9% and 11% and the programmes', which was compared with a 70% and 90% threshold. For the three cases, the p-value did not reject the null hypothesis, and, therefore, the test did not attest for statistically significant differences between the mean values of the related comparison scenarios.

A Belgium – The Netherlands, besides VB North West Europe overlapping with V-A Euregio Maas-Rhein, V-A Two Seas and V-A Belgium – The Netherlands.

Table 20: Clusters' composition

Cluster	Countries	Thematics	Programmes
1	Germany, Switzerland, Denmark, Czech Republic and the Netherlands	1, 2, 3, 4, 5, 6, 7 and 8	· Interreg V-A France - Germany - Switzerland · Interreg V-A Germany - Denmark · Interreg V-A Germany - The Netherlands · Interreg V-A Germany / Bavaria - Czech Republic · Interreg VB Baltic Sea · Interreg VB South West Europe
2	Poland and Lithuania	-	· Interreg V-A Lithuania-Poland · Interreg V-A Poland - Denmark - Germany - Lithuania - Sweden (South Baltic) · Interreg V-A Poland - Germany / Saxony · Interreg V-A Poland - Slovakia
3	Italy, Greece, Malta, Spain, Portugal, Finland, Poland, Guadeloupe, Martinique and Romania	1 and 8	-
4	Austria, Czech Republic, Slovakia and Hungary	1, 2, 3, 4, 5, 6, 7 and 8	· Interreg V-A Austria - Czech Republic · Interreg V-A Austria - Hungary · Interreg V-A Italy - Austria · Interreg V-A Slovakia - Czech Republic · Interreg V-A Slovakia - Hungary
5	Finland, Latvia, Sweden Lithuania and Estonia	1,2,3 and 6	· Interreg V-A Estonia - Latvia · Interreg V-A Finland - Estonia - Latvia - Sweden (Central Baltic) · Interreg V-A Latvia - Lithuania
6	Greece, Cyprus, Albania, Bulgaria, Former Yugoslav Republic of Macedonia and Romania	1, 3, 4, 5, 7 and 8	· Interreg V-A Greece - Bulgaria · Interreg V-A Greece - Cyprus · Interreg V-A Romania - Bulgaria · Interreg VB Balkan - Mediterranean

7	Italy, Austria, Slovenia, Poland, Czech Republic, Slovakia, Hungary, Serbia, Ukraine, Croatia, Albania, Bosnia and Herzegovina, Romania and Montenegro	1,2,3,4,5,6 and 7	·Interreg V-A Italy - Slovenia ·Interreg V-A Slovenia - Austria ·Interreg V-A Slovenia - Croatia
8	Italy, France, Switzerland and Liechtenstein	-	·Interreg V-A France - Italy (ALCOTRA) ·Interreg V-A Italy-France (Maritime) ·Interreg VB Alpine Space
9	Spain, Ireland, United Kingdom, Portugal, Sweden, Finland, Russia, Normay and Iceland	-	·Interreg VB Atlantic Area ·Interreg VB Northern Periphery and Arctic
10	France, United Kingdom, Denmark, Norway, Netherlands, Belgium and Luxembourg	1,4 and 8	- Interreg V-A Belgium - Germany - The Netherlands Euregio Meuse - Rhin / Euregio Maas-Rijn / Euregio Maas-Rhein ·Interreg V-A Belgium - The Netherlands ·Interreg V-A France - Belgium - The Netherlands - United Kingdom (Two Seas) ·Interreg V-A France - United Kingdom (Manche - Channel) ·Interreg VB North Sea ·Interreg VB North West Europe

Source: authors' own computation.

The potential overlapping of Interreg programmes, as can be seen by the evidences, occurs mostly around sea basins. Since these programmes are planned according to a trans-national or cross-border design instead of a sea area approach, some inefficiencies in the programmes may arise. The matter of both efficiency and effectiveness on public spending is addressed by Mandl, Dierx and Ilzkovitz (2008). According to the authors, improved levels on both aspects allows achieving better results at lower levels of spending, which entails a better value for money. Therefore, to avoid wasting scarce resources, some Interreg programmes might need to undergo significant changes in their architecture so that overlapping is prevented. In order to summarize the key findings of this dissertation, present the conclusions drawn from this research and provide recommendations for future analysis, now we move on to the conclusions.

Chapter 5. Conclusions

Cohesion Policy is the European Union's main investment policy. Since the foundation of the EU, the development of regional and urban development policies has played a central role in pushing for a more harmonious development amongst the member states, being a valuable instrument of financial solidarity and a tool for a more integrated economy. With this research, our intent was to map the Interreg programmes, one of cohesion policy's instruments, and analyze how countries, projects and programmes relate in respect with the structure of this policy.

For that, we began by presenting the main contributions from the existing literature to define cohesion policy and its goals, economic, social and territorial cohesion. In this qualitative analysis, the perspectives of different authors were brought to analyze how the policy evolved over the years and to present the rationale for its existence. The literature showed that the increasing importance of the policy within the European Union is linked with the necessity to ensure a more harmonious development, by leveling the various regions that constitute the EU and reducing the backwardness of the poorest member states, in a scenario marked by deeper economic interdependence. Then, Interreg was specifically addressed. Same as we did with cohesion policy, Interreg was scrutinized by an extensive qualitative analysis. By combining the insights of different authors, Interreg was presented as an important mechanism to promote cooperation across national borders, to redress regional imbalances and to ensure that governments deliver better policy. Also, the analysis covered how Interreg evolved over the years, from only 31 programmes in the 1990-1993 period, to 100 in the current programming period, 2014-2020.

As for the methodology employed on this research, in addition to the qualitative description of the cohesion policy and Interreg programmes, we have used cluster analysis to find similarities among projects that received EU funds through Interreg and check for potential overlapping between programmes. The database was constructed based on data gathered from Keep.eu, which allows to filter for projects developed on each programming period. The variables used were both quantitative, such as budget, EU funding and duration, and qualitative, such as thematic and geographic area. To handle a dataset with a large number of entries and made up of both continuous and categorical variables, the method used was the SPSS TwoStep Cluster Analysis.

We then split the cluster analysis into two parts with two distinct objectives. First, to find similarities among projects, we analyzed individually the three programming periods

which have available data on Keep.eu: 2000-2006, 2007-2013 and 2014-2020. The results show that the countries with the most projects involved with tend to repeat, regardless of the programming period, were Germany, Italy, France, the UK and Czech Republic. These countries stood out by appearing in the “top 10” countries with the most projects in the three periods. Additionally, a repetition in terms of relevance is also observed with thematic groups. The thematic group 1 (Employment, social inclusion, education and institutional capacity) stuck out by appearing on the “top 3” ranking of thematic groups with the most projects involved with in the three periods. Thematic groups 8 (Tourism and culture) and 3 (Innovation and competitiveness) were also quite relevant. However, a conclusion that could be made by comparing these results with the clusters presented is that even though these countries and thematic groups were relevant for a vast number of projects, they were concentrated in a small number of clusters. Still about the combination between countries and thematic groups, when looking at the top 10 countries with the most projects, the thematic groups they were matched with did not necessarily repeat across programming periods. Also, on the 2007-2013 period, five of the top 10 countries were combined with all the thematic groups, but this is not seen on the other two periods. Another interesting observation is that the thematic groups involved with the largest number of projects were not necessarily the thematic groups matching the most with the top 10 countries in any of the periods. Finally, regarding the combinations between countries, as expected due to the nature of Interreg, most of the matchings repeated across programming period. However, the case of France stood out since this country did not repeat any countries in the clusters it was put in for the three periods.

Second, we employed the TwoStep Cluster Analysis to search for potential overlapping between programmes – in terms of their objectives and countries involved. For this, we added the variable “programmes” into the analysis. However, we had to focus only on the current programming period, 2014-2020 since the other two lack information related to which programme the projects belong to. As for the results, the clusters combined by SPSS suggest that some transnational and cross-border Interreg programmes may be overlapping. That is the case for programmes that cover the areas: Balkan and Mediterranean, the Alps, North Sea and North West Europe.

The overlapping of programmes may indicate inefficiencies in the architecture of the Interreg. As shown by our results, this situation occurs specially around sea areas, where, instead of developing programmes with a “sea area” approach, and thus diminishing the odds of overlapping, transnational and cross-border programmes end up covering the same

region. Also, the results from the first part of quantitative analysis show that, regardless of the programming period, the countries and thematics involved with the largest number of projects seem to repeat. However, further analysis is needed to find out if this also indicates an inefficiency of the Interreg programme.

As for the limitations of this research, the poor quality of the data for the 2000-2006 programming period is an important one. In addition, the lack of information for the programmes developed in the 2000-2006 and in the 2007-2013 periods precluded the cluster analysis for overlapping during these periods. Notwithstanding, even though the current programming period, 2014-2020, is very well documented, the fact that it is ongoing may also be a limitation. Finally, the absence of a broad academic literature that addresses the objectives of this research hampered the validation of our results, since we were not able to counterpose our findings with multiple perspectives.

The importance that cohesion policy and the Interreg acquired within the European Union's structure makes these topics very appealing for future research. A suggestion is employing the method of Social Network Analysis to understand how the countries combine with each other under this approach and check if it differs from the cluster analysis results. Also, when looking for overlapping among the Interreg programmes, it would be interesting to see researchers including the NUTs variable to obtain a more precise result. Additionally, it seems relevant to study more in depth how do the Interreg programmes impact the quality of life of the Europeans.

References

- Baldwin, R., & Wyplosz, C. (2009). *The Economics of Europe Integration*. (T. Hill, Ed.) (3rd ed.). Berkshire: McGraw-Hill Education (UK).
- Barca, F. (2009). *An Agenda for a Reformed Cohesion policy: A place-based approach to meeting European Union challenges and expectations*. Brussels. Retrieved November 11, 2018 from http://ec.europa.eu/regional_policy/archive/policy/future/pdf/2009_11_4_thoughts_tomorrow.pdf
- Carballo-Cruz, F. (2015). COHESION POLICY IN THE EUROPEAN UNION : A BRIEF CRITICAL REVIEW. *Revista Brasileira de Gestão e Desenvolvimento Regional*, 11(4), 101–121.
- Council of Europe. (2008). Report of High-Level Task Force on Social Cohesion. Strasbourg. Retrieved October 20, 2018 from [http://www.coe.int/t/dg3/socialpolicies/source/TFSC\(2007\)31E.doc](http://www.coe.int/t/dg3/socialpolicies/source/TFSC(2007)31E.doc).
- Council of European Municipalities and Regions. (2009). CEMR Response To the consultation on the “Green Paper on Territorial Cohesion Turning territorial diversity into strength.” Brussels. Retrieved October 20, 2018 from http://www.ccre.org/img/uploads/piecesjointe/filename/CEMR_response_territorial_cohesion_EN.pdf
- Dumciuvienė, D., Stundziene, A., & Startiene, G. (2015). Relationship between structural funds and economic indicators of the European union. *Engineering Economics*, 26(5), 507–516. <https://doi.org/10.5755/j01.ee.26.5.8831>
- European Commission. (2014a). An introduction to EU Cohesion Policy 2014-2020. Brussels: European Commission - Regional Policy. Retrieved October 5, 2018 from http://ec.europa.eu/regional_policy/sources/docgener/informat/basic/basic_2014_en.pdf
- European Commission. (2014b). The EU’s main investment policy - Regional Policy - European Commission. Retrieved October 29, 2018, from http://ec.europa.eu/regional_policy/en/policy/what/investment-policy/
- European Commission. (2015). Interreg: European Territorial Co-operation - Regional Policy - European Commission. Retrieved October 25, 2018, from http://ec.europa.eu/regional_policy/en/policy/cooperation/european-territorial/
- European Commission. (2017). *Seventh report on economic, social and territorial cohesion*. Brussels. Retrieved October 25, 2018 from

- http://ec.europa.eu/regional_policy/en/information/cohesion-report/
- European Economic and Social Committee. (2017). ECO Priorities for 2018 and beyond. Brussels. Retrieved October 28, 2018 from <https://www.eesc.europa.eu/en/sections-other-bodies/sections-commission/economic-and-monetary-union-and-economic-and-social-cohesion-eco>
- European Union. (2012). Consolidated Version Of The Treaty On The Functioning Of The European Union. *Official Journal of the European Union*, 344. Retrieved October 2, 2018 from <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:12012E/TXT&from=EN>
- Farole, T., Rodríguez-Pose, A., & Storper, M. (2011). Cohesion policy in the European Union: Growth, geography, institutions. *Journal of Common Market Studies*, 49(5), 1089–1111. <https://doi.org/10.1111/j.1468-5965.2010.02161.x>
- Fratesi, U., & Wishlade, F. G. (2017). The impact of European Cohesion Policy in different contexts. *Regional Studies*, 51(6), 817–821. <https://doi.org/10.1080/00343404.2017.1326673>
- Gang, L. (2012). The Origin of EU Regional Policy In a Theoretical Perspective. *Institute of European Studies*, 6(5), 23. Retrieved October 2, 2018 from http://ies.cass.cn/webpic/web/ies2/en/UploadFiles_8765/201212/2012121015050321.pdf
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate Data Analysis* (Seventh). Essex: Pearson Education Limited.
- IBM Knowledge Center. (2018). Model Summary View. Retrieved May 5, 2019, from https://www.ibm.com/support/knowledgecenter/pt-br/SSLVMB_25.0.0/statistics_mainhelp_ddita/clementine/entities/clusterviewer_modelsummary_panel.html
- Interact. (2016). *Analysis of the Thematic Objectives of the Interreg Programmes 2014-2020 in the Mediterranean*. Madrid. Retrieved November 15, 2018 from www.interact-eu.net/download/file/fid/1157
- Interreg Europe. (2018). What is Interreg Europe? Retrieved December 12, 2018, from <https://www.interregeurope.eu/about-us/what-is-interreg-europe/>
- Kaufman, L., & Rousseeuw, P. (1990). *Finding Groups in Data: An Introduction to Cluster Analysis*. (John Wiley & Sons Inc, Ed.) (1st ed.). John Wiley & Sons Inc.
- Keep.eu. (2019). Interreg, Interreg IPA CBC and ENI CBC. Retrieved February 10, 2019,

- from <https://www.keep.eu/>
- Manzella, G. P., & Mendez, C. (2009). *The turning points of EU Cohesion policy*. Retrieved December 8, 2018 from http://ec.europa.eu/regional_policy/archive/policy/future/pdf/8_manzella_final-formatted.pdf
- Mandl, U., Dierx, A., Ilkovitz, F. (2008). The Effectiveness and Efficiency of Public Spending. *Economic Papers: Directorate-Generale for Economical and Financial Affairs*, 301, 1-36. Retrieved July 05, 2019 from http://ec.europa.eu/economy_finance/publications/pages/publication11902_en.pdf
- Medeiros, E. (2016). Is there a rise of the territorial dimension in the EU Cohesion Policy? *Finisterra*, 51(103), 89–112. <https://doi.org/10.18055/Finis7940>
- Novy, A., Swiatek, D. C., & Moulaert, F. (2012). Social Cohesion: A Conceptual and Political Elucidation. *Urban Studies*, 49(9), 1873–1889. <https://doi.org/10.1177/0042098012444878>
- OECD. (2008). *Handbook on Constructing Composite Indicators*. Retrieved February 6, 2019 from <https://www.oecd.org/sdd/42495745.pdf>
- Rakauskienė, O. G., & Kozlovskij, V. (2014). Overview of EU Economic Cohesion Process Performance for New Member States. *Procedia - Social and Behavioral Sciences*, 110, 284–292. <https://doi.org/10.1016/j.sbspro.2013.12.872>
- Șchiopu, D. (2010). Applying TwoStep Cluster Analysis for Identifying Bank Customers ' Profile. *UniversităȚii Petrol – Gaz Din Ploiești*, LXII(3), 66–75. Retrieved April 10, 2019 from <http://www.upg-bulletin-se.ro/archive/2010-3/7.Schiopu.pdf>

Annexes

Annex 1: Cluster analysis results comparison: Programming Period 2000-2006

Programming Period 2000-2006				
Top 10 countries	Thematics matched	Thematics >1	Countries matched	Average funding
Czech Republic	1, 2 ,3, 4, 5, 6, 7, 8	1, 5, 8	<u>Once</u> : French Guiana and Guadeloupe	639.402,67 €
Italy	3,4, 5	-	<u>Once</u> : Switzerland, Cyprus, Slovenia, Sweden, Latvia, Estonia, Netherlands and Belgium	1.019.784,41 €
Germany	1,2,3,4,5,6,8	-	<u>Once</u> : Malta, Latvia, Lithuania, Estonia and Slovakia	649.171,34 €
Finland	1, 2, 3, 4, 5, 6	-	-	320.132,41 €
France	3	-	-	993.115,34 €
Spain	3, 7	-	-	1.094.813,65 €
Sweden	3, 4, 5, 6, 7	-	<u>Twice</u> : Slovenia <u>Once</u> : Portugal, Slovenia, Denmark, Latvia, Russia, Norway, Hungary, Luxembourg, Iceland, Italy, Switzerland, Cyprus, Latvia, Estonia, Netherlands and Belgium	981.226,95 €
Norway	3, 4, 6, 7, 8	-	<u>Twice</u> : Iceland <u>Once</u> : Portugal, Slovenia, Denmark, Latvia, Russia, Hungary, Luxembourg, Malta, Ireland, Finland and French Guiana	1.081.893,92 €

Netherlands	1, 2, 3, 5	-	<u>Twice</u> : Switzerland, Estonia and Belgium <u>Once</u> : Italy, Cyprus, Slovenia, Sweden, Latvia, Lithuania, Luxembourg and Ire- land	1.399.050,87 €
United Kingdom	3, 4, 5, 7	-	-	1.041.727,84 €

Source: authors' own computation.

Notes: Column “top 10 countries” shows the ten countries which were involved with “the most projects” in the programming period. “Thematics matched” presents all the thematics combined with that country. “Thematics >1” shows only the thematics matched more than once with that country. “Countries matched” shows the number of times the countries were combined in the same cluster. “Average funding” corresponds to the mean value of EU funding of the projects involving that country.

Annex 2: Cluster analysis results comparison: Programming Period 2007-2013

Programming Period 2007-2013				
Top 10 countries	Thematics matched	Thematics >1	Countries matched	Average funding
France	1, 2, 3, 4, 5, 6, 7, 8	1, 2, 5, 6, 7	<u>Once</u> : Spain, Ireland, Portugal and Switzerland	1.060.069,91 €
Germany	1, 2, 3, 4, 5, 6, 7, 8	-	<u>Once</u> : Denmark	1.183.287,83 €
Italy	1, 2, 3, 4, 5, 6, 7, 8	4, 6	<u>Twice</u> : Switzerland, Austria, Slovenia and Malta <u>Once</u> : Greece, Cyprus, Spain, Ireland, United Kingdom, Portugal, Slovenia, Netherlands, Romania and Liechtenstein	1.145.672,28 €
Spain	1, 2, 3, 4, 5, 6, 7	3, 6	<u>Twice</u> : Portugal and Ireland <u>Once</u> : Greece, Malta, Cyprus, United Kingdom, Slovenia, Netherlands and Romania	1.094.851,47 €
Hungary	1, 2, 3, 5, 6, 7, 8	-	-	802.921,73 €
Sweden	1, 2, 3, 4, 5, 7, 8	1, 7	<u>Twice</u> : Finland and Estonia <u>Once</u> : Denmark, Norway, Poland, Latvia, Lithuania and Belarus	823.250,46 €
Poland	1, 4, 6, 7, 8	1	<u>Once</u> : Sweden, Finland, Denmark, Latvia, Lithuania, Estonia, Belarus and Czech Republic	1.316.279,82 €

Austria	1, 2, 4, 5, 6, 7, 8	-	<u>Twice:</u> Italy, Switzerland and Slovenia <u>Once:</u> Liechtenstein and Malta	1.010.316,20 €
United Kingdom	1, 2, 3, 4, 5, 6, 7	3, 6	<u>Twice:</u> Ireland and Netherlands <u>Once:</u> Italy, Greece, Malta, Cyprus, Spain, Portugal, Slovenia, Romania, Denmark, Belgium and Luxembourg	1.623.914,57 €
Czech Republic	1, 6, 8	-	Poland	812.484,92 €

Source: authors' own computation.

Notes: Column “top 10 countries” shows the ten countries which were involved with “the most projects” in the programming period. “Thematics matched” presents all the thematics combined with that country. “Thematics >1” shows only the thematics matched more than once with that country. “Countries matched” shows the number of times the countries were combined in the same cluster. “Average funding” corresponds to the mean value of EU funding of the projects involving that country.

Annex 3: Cluster analysis results comparison: Programming Period 2014-2020

Programming Period 2014-2020				
Top 10 countries	Thematics matched	Thematics >1	Countries matched	Average funding
Germany	1, 2, 3, 4, 5, 6, 7, 8	1, 2, 3, 4, 5, 6, 8	<u>Once</u> : Switzerland, Denmark, Netherlands and Belgium	1.559.508,60 €
Italy	1, 2, 4, 5, 7, 8	2, 7	<u>Once</u> : France, Greece, Malta, Cyprus, Spain, Ireland, United Kingdom, Portugal, Sweden, Finland, Denmark, Poland, Latvia, Lithuania, Norway, Hungary, Guadeloupe, Martinique, Luxembourg, Ukraine, Romania, Austria and Slovenia	1.420.493,89 €
France	4, 6, 8	4	<u>Once</u> : Italy, United Kingdom, Denmark, Norway, Netherlands and Belgium	1.948.870,86 €
Austria	2, 5, 7	-	<u>Twice</u> : Slovenia <u>Once</u> : Italy, Slovakia, Hungary, Serbia, Croatia, Bosnia and Herzegovina, Bulgaria, Romania and Montenegro	1.409.000,05 €

United Kingdom	1, 2, 4, 5, 6, 7, 8	1, 2, 6, 7, 8	<u>Three times:</u> Norway <u>Twice:</u> Denmark, Ireland, Sweden and Finland <u>Once:</u> Italy, Greece, Malta, Cyprus, Spain, Portugal, Poland, Latvia, Lithuania, Hungary, Guadeloupe, Martinique, Luxembourg, Ukraine, Romania, France, Netherlands, Belgium, Russia and Iceland	2.004.062,65 €
Netherlands	1, 2, 3, 4, 5, 6, 8	4, 6, 8	<u>Twice:</u> Belgium <u>Once:</u> France, United Kingdom, Denmark, Norway and Germany	2.126.126,16 €
Romania	1, 2, 3, 4, 7, 8	1, 8	<u>Twice:</u> Bulgaria and Hungary <u>Once:</u> Italy, Greece, Malta, Cyprus, Spain, Ireland, United Kingdom, Portugal, Sweden, Finland, Denmark, Poland, Latvia, Lithuania, Norway, Guadeloupe, Martinique, Luxembourg, Ukraine, Austria, Slovenia, Slovakia, Serbia, Croatia, Bosnia and Herzegovina,	1.367.319,91 €

			Romania and Montenegro	
Slovenia	2, 5, 7	-	<u>Twice</u> : Austria, Croatia and Hungary <u>Once</u> : Italy, Slovakia, Serbia, Bosnia and Herzegovina, Bulgaria, Romania, Montenegro, Poland and Czech Republic	1.489.317,47 €
Czech Republic	1, 2, 3, 4, 5, 6, 7, 8	-	<u>Once</u> : Slovakia, Slovenia, Poland, Hungary and Croatia	1.167.229,56 €
Bulgaria	1, 3, 4, 5, 8	1, 8	<u>Twice</u> : Romania <u>Once</u> : Greece, Cyprus, Albania, Former Yugoslav Republic of Macedonia, Austria, Slovenia, Slovakia, Hungary, Serbia, Croatia, Bosnia and Herzegovina and Montenegro	1.348.469,97 €

Source: authors' own computation.

Notes: Column "top 10 countries" shows the ten countries which were involved with "the most projects" in the programming period. "Thematics matched" presents all the thematics combined with that country. "Thematics >1" shows only the thematics matched more than once with that country. "Countries matched" shows the number of times the countries were combined in the same cluster. "Average funding" corresponds to the mean value of EU funding of the projects involving that country.