



Second ESPON 2013 Scientific Report
December 2013

Science in support of European Territorial Development and Cohesion



ESPON 2013 Programme

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This publication is based on papers and the discussion of the ESPON Scientific Conference held on 12-13 September 2013. The papers were prepared by authors from transnational project groups carrying out applied research projects and targeted analyses for ESPON as well as authors from the professional and academic organisations AESOP, ECTP-CEU, ERSA, EUGEO and RSA.

The present publication was processed by the ESPON Coordination Unit and edited by Frank Holstein, Sabine Zillmer and Kai Böhme from Spatial Foresight. The single papers have been reviewed by Gordon Dabinett, Cliff Hague, Jacek Zaucha and Sabine Zillmer. Gordon Dabinett and Cliff Hague did the language editing of the papers.

Information on the ESPON Programme and projects, the complete reports and list of partners involved can be found at www.espon.eu

The ESPON website always presents the latest developments in the ESPON Programme and findings from ESPON projects. It offers the opportunity to consult in detail ESPON publications, tools, project reports and indicators available in the ESPON database.

ISBN 978-2-919777-53-2

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The ESPON Programme is managed by the Ministry of Sustainable Development and Infrastructure, Department for Spatial Planning and Development, Grand Duchy of Luxembourg.

Printed in Luxembourg, February 2014

Printed on paper produced environmentally friendly

Layout and graphic design by Imprimerie Centrale

In the same series of ESPON publications:
First ESPON 2013 Scientific Report:
“Scientific Dialogue on Cities, Rural Areas and Rising Energy Prices”, December 2010

Disclaimer:

The content of this report is based on the results of applied research projects by transnational teams of research taking part in the ESPON 2013 Programme. As such, the maps and texts do not necessarily reflect the opinion of the ESPON Monitoring Committee.

The ESPON 2013 Programme, the European Observation Network for Territorial Development and Cohesion, supports policy development with evidence and analyses on territorial dynamics within Europe. ESPON's main activity is to deliver new European facts and understanding for policy makers via applied research projects, targeted analyses and analytical tools.

One of the objectives of the ESPON Programme is to support the European wide research community in the field of European territorial science and to involve a wide European network of scientists and practitioners in the field of territorial research and its related fields. A large involvement is indispensable to get high qualified research capacity in ESPON projects and at the same time to increase interest and competences in research on European territorial structures, trends, perspectives and impacts of EU sector policy.

The ESPON Programme has hitherto promoted the scientific component of the programme through scientific conferences and workshops, cooperation with European organisations in the fields of regional science, geography and spatial planning, as well as with a dedicated series of ESPON reports ("blue series") mainly targeting the scientific community. The ESPON 2006 Programme published two Scientific Reports and the first ESPON 2013 Scientific Report was published in 2010.

This second ESPON 2013 Scientific Report presents papers from both ESPON projects and authors from several European professional and academic organisations. The report is the result of the ESPON Scientific Conference "Science in support of European Territorial Development and Cohesion" held on the 12th and 13th of September 2013 in Luxembourg. This ESPON Scientific Conference targeted territorial research and analysis and continued the building of a European scientific research community that can provide evidence capable of supporting a stronger territorial dimension in policy considerations. In this context, the conference was part of a scientific dialogue to support a stronger territorial dimension in policy considerations. This is reflected in the aim of the conference, which was on the one hand to provide a good overview and scientific dialogue of the progress made in the scientific field during the current programming period. On the other hand, on-going ESPON projects as well as researchers outside the ESPON network had the opportunity to exchange their views of new and innovative research.

This Scientific Report contains 34 scientific papers, prepared by researchers involved in ESPON projects and authors from the European professional and academic organisations AESOP, ECTP-CEU, ERSA, EUGEO and RSA. The papers were presented and discussed during the conference workshop sessions, after which they have been reviewed by Prof. Gordon Dabinett, Prof. Emer. Cliff Hague, Assoc. Prof. Jacek Zaucha and Dr Sabine Zillmer. All authors have used the remarks made by the reviewers to strengthen their papers. The results can be found in Chapters 2 to 4.

Chapter 1 gives an introduction to the policy framework ESPON is dealing with and provides an overview and structure of all papers included. In addition, a number of overarching points emerged which are discussed giving some ideas for the future.

A third ESPON 2013 Scientific Report is planned for end 2014 taking stock of the progress ESPON projects made in the scientific field of territorial development and cohesion.

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1 Introduction

The European territory and its development are affected by global, national and regional trends as well as various policies. The economic crisis which started towards the end of last decade affected European territorial development heavily. However, not all countries and regions were affected equally hard. It was tackled in different ways by national policies including numerous austerity measures in several countries. In this environment the European Commission launched the Europe 2020 Strategy which aims not only at overcoming the economic crisis, but also seeks to address structural shortcomings of the European economy by creating good conditions for smart, sustainable and inclusive growth. The corresponding objectives and growth priorities refer to various sector policies, which in some cases have considerable effects on European territorial development.

At the same time the territorial priorities of EU member states have been updated in the Territorial Agenda 2020 formulated by the Ministers responsible for spatial development. Objectives and priorities of these strategic documents influence the current formulation of future programmes financed under the European Structural and Investments Funds. Against this background of a changing policy environment also the scientific community dealing with applied sciences of territorial development is more than ever asked to provide evidence support to European territorial development and cohesion and to provide substantial analytical input to decision makers at different territorial levels.

With this policy framework in mind, in September 2013, ESPON invited about 100 researchers from all over Europe to Luxembourg to discuss scientific concepts, methodologies, indicators, typologies, tools and models in support of European territorial development and cohesion. The conference sought to provide a good overview of the progress made in the scientific field during the current programming period. In addition, the conference intended to stimulate a debate on how ESPON projects, researchers outside the ESPON network, as well as policy makers can make use of new and innovative research approaches, methodologies and results.

The conference was organised in cooperation with five European professional and scientific organisations, namely the Association of European Schools of Planning (AESOP), the European Council of Spatial Planners (ECTP-CEU), the European Regional Science Association (ERSA), the Association of Geographical Societies in Europe (EUGEO) and the Regional Studies Association (RSA). Collaboration among these organisations in the framework of the conference furthermore accentuated the multi- and inter-disciplinary nature of research when addressing territorial development analysis in its overall complexity. Finally, it showed the variety of possible approaches to analysing territorial development and to communicating results of applied research.

I. STRUCTURE OF THE REPORT

This report presents the various papers presented at the conference. The papers are grouped along three themes (1) understanding territorial realities, (2) measuring territorial outcomes, and (3) science-policy translation revisited. The conference and the papers touch upon a critical aspect of the work carried out by ESPON as well as other intermediaries between policy making and sciences: How to bridge the gap between information needed or desired by policy making and sound and rigorous scientific work? In addition to the familiar dimensions of this gap, such as language and timing, there are also various more nuanced dimensions of possibilities and challenges for scientific support to territorial policies in Europe, which were at the heart of the conference and are discussed in this report in further detail.

Understanding territorial realities

When resources become scarcer and expectations towards public investments continuously rise, policy makers need support in making their policies more effective and efficient. Tailoring policies to the specific needs and potentials of a given area might be an answer. At the same time, a mere local or regional focus may not be sufficient to meet all expectations. For many policies it is necessary to understand the broader picture and opportunities and challenges across regions and possibly across Europe and beyond. Thus, the demand for territorial evidence addressing various geographical levels has been growing recently.

The papers in chapter 2.1 present some of the latest findings on how regional disparities and territorial cohesion can be understood and measured in order to support policy making, not at least when it comes to implementing the Europe 2020 Strategy while taking into account the territorial diversity of Europe. In addition to a series of rather broad approaches on territorial structures, the papers in chapter 2.2 focus on relations between regions and spatial integration. Some papers discuss relational aspects of territorial capital (e.g. networking, functional regions) and the interplay between business and territorial development. Apart from cross-thematic analyses dealing with functional integration of territories or territorial governance, some papers tackle more thematically focused relational approaches. This includes, for example, the understanding of population dynamics and mobility, which is of increasing importance in areas highly affected by the economic crisis and/or facing considerable aging processes. One of the aspects discussed in this respect is the role of female mobility in rural development and the emerging challenges deriving from increasing gender imbalances in some rural areas in Europe.

Measuring territorial outcomes

Evidence support to policy making is highly dependent on understanding what to measure and at what level. Territorial evidence can only support policy making when it increases the proper understanding of the developments at stake. In a perfect world, it would be possible to have comparable data on a wide range of different topics and various geographical scales, from local to European. In such a perfect world, it would furthermore be easy to link policy inputs and territorial results. Unfortunately, territorial scientists are faced with numerous challenges when providing evidence to policy making. These start with the limitations of data availability with European coverage and extend to the ability to measure the effectiveness of policy making. The evaluation regime advocated by the European Commission is based on evidenced understanding what was intended to change, why and how this change has occurred and what needs to be done differently to achieve more beneficial outcomes. Usually, this can only be measured by indicators representing a proxy of the desired change rather than an indicator that perfectly represents the intended change. An additional complication is that policy often sets multiple and sometimes contradictory or unclear objectives and the relationships between outcomes in terms of meeting the objectives of sector policies, and the outcomes in terms of territorial impacts are highly complex. Evidence often needs to be obtained from varying perspectives and multi-scalar and different types of analyses. Given these restrictions, the choices of which indicators to select, what geographical level to focus, and how to combine different indicators by means of which method becomes crucial.

In chapter 3.1, three papers deal with the question on how to use large sets of indicators to measure specific aspects, e.g. innovation dynamics or different types of territorial capital. Another set of papers in chapter 3.2 takes this debate one step further by approaching the building of typologies of European regions. This includes typologies on land use, urban sprawl and even spatial typologies for European seas. Both discussions of indicators and typologies are challenged by the need to interlink information available at different geographical scales and use the most appropriate methodological approaches. The papers in chapter 3.3 present various examples where information available at different geographical levels has been used to generate policy relevant information e.g. on risk of poverty or the forecasting of regional growth. Finally, chapter 3.4 focuses on different types of data, which support research at different geographical levels by means of innovative data processing and analysis. These papers also include illustrations of various ways to match data requirement and data availabilities including first tests on how new data sources, e.g. deriving from the use of social media, can be employed for generating relevant information for territorial policy making.

Science-policy interaction revisited

One of the tasks of the ESPON Programme is to screen policy demands and translate these into applied research projects. Later on the results of these applied research projects are used to support policy processes at events and through publications targeting various groupings of policy makers. In addition, ESPON increasingly involves stakeholders in targeted analysis studies and other techniques trying to bridge, and foster a more direct dialogue, between scientists and policy makers. The approaches of ESPON focus thereby on “translating” research results, rather than aiming at the co-production of knowledge by researchers and policy makers. The latter would require different kinds of communication approaches.

The papers of chapter 4.1 present some of the latest discussions on methods supporting policy decisions and implementation processes. Among others, this refers to illustrations of possible territorial implications of the implementation of the Europe 2020 Strategy. Chapter 4.2 addresses approaches to support participatory processes. This includes concrete examples from two ESPON projects on their work with the involvement of policy stakeholders. Last but not least, the issues of communication techniques are addressed in chapter 4.3. They become increasingly important for translating research evidence into policy measures in the most effective way. This discussion, among others, challenges the priority given to European maps as the main communication tool of territorial evidence, and provides first insights into educational tools developed within the framework of the ESPON Programme.

II. SYNTHESIS

Throughout the various papers a number of overarching discussion points emerge, which were also discussed during the conference. The following paragraphs summarise the main points of discussion and results. Some of them address more general issues and concerns of applied territorial research while others raise ideas for future perspectives for the ESPON Programme.

Seeking a balance between description, explanation and prescription

The main focus of ESPON projects is to analyse territorial development dynamics in order to generate information of use for policy makers. However, ESPON results often remain in a rather descriptive mode for which two reasons are identified. Firstly, there is a rich body of evidence describing how regions are doing, as that is what statistical analysis can show. Mapped typologies are one of the tools frequently used to give a simplified presentation of complex trends. Nevertheless, the typologies often remain descriptive and can hide information important for policy making. Analytical evidence on why a region or city is doing as it does is often lacking. To attract more interest from the policy community, ESPON projects need to find ways to go beyond describing the situation; more discussion is needed on the reasons why things are developing as they are; and better understanding and explanation of development dynamics. To “shift the gaze” towards the “why” of developments in Europe’s regions and cities, it may be occasionally necessary to reduce the statistical focus on European-wide data sets and maps, and to enhance the combination of different methods and tools. The same holds when territorial relations are better understood and explained rather than described or if questions such as “how to change” and “how to make better use of regional specifics” are fully analysed.

This leads to the second reason, namely the development of recommendations. The discussions point out that to a large degree project results tend either (a) to present only the evidence and leave it up to the reader to draw conclusions on what needs to be done in policy terms, or (b) to make firm suggestions on how policy makers should act based on the presented evidence and in doing so risk a rather technocratic and often unrealistic approach to policy making. Keeping the balance of presenting not only the status quo but also analysing the dynamics of developments and drawing options for policy making from that (rather than clear cut recommendations) is one of the major challenges highlighted by many authors and also during the conference discussions by others.

Territorial knowledge broker

The mission of the ESPON Programme is to support policy development based on evidence and analyses of European territorial dynamics. This implies that ESPON needs to bring science and policy making together. A main question is: How can the ESPON Programme play a clear role as knowledge and information broker between science and policy? What does it take to go beyond the dissemination of research findings and analyses? For applied territorial research to be valuable for policy makers not only knowledge and understanding of regional or local needs is crucial, but this must be aligned with the broader policy agenda, whether at European, national, regional or local level. This involves various challenges for scientists struggling with policy formulations and demands, and also for policy makers struggling with scientific information that might not provide them with direct answers, and might not be delivered in time for the policy processes.

Bridges are needed to overcome the conflicts between the complex world and simplicity. This is a translational challenge. Innovation – so crucial in the knowledge economy – is needed here too:

ESPON has to find innovative ways of presenting and interpreting its results. Different means and methods should be sought to strengthen the communication and understanding between scientists, practitioners and policy makers in order to deal better with the real policy demand. One possible way forward may be to embed policy makers as stakeholders in research projects and analysis in order to enhance their co-ownership of ESPON results. This would have to go beyond the present approach of targeted analysis, for which stakeholders formulate their demand and have regular meetings with the project team to discuss intermediate results. Among others, this could help to incorporate better awareness of territorial development practices and dilemmas within ESPON projects.

ESPON is increasingly building up a strong and broad European knowledge base comprising ESPON research results and information on other research. The latter is taken on board through ESPON projects, but also received through various communication channels, such as the web, different events and scientific conferences. Given this permanently growing information and knowledge base, the intermediate function of a knowledge broker might become an interesting option for ESPON in the future. While not all information needed by regional or national policy makers can be provided in a European context, ESPON can provide important insights into territorial tendencies and for benchmarking particular territories for policy making. Policy makers increasingly ask for robust knowledge and evidence to link general socio-economic trends better with regional territorial objectives and possible development paths. This may become even more important in case the regional level has more responsibilities. ESPON may be most useful in supporting strategic territorial development and visioning processes. One of the key challenges for ESPON is to bring forward its research evidence to all types of decision makers, i.e. not only those responsible for territorial development but also to those in charge of territorially relevant sector policies. Territorial cohesion may provide a suitable policy framework for that.

Representations and meanings of territory

As European territorial research relies largely on data provided by Eurostat and other official statistical offices, it often focuses on NUTS2 and a bit less on NUTS3 data sets. Throughout the papers the limitations of exclusively using these data sets was emphasised and evidenced, as well as the desire and potentials to use more innovative approaches. The need to base territorial research on functional rather than administrative regions is obvious. This implies the need for data at lower levels than NUTS3, as well as the combination and variation of scales to adjust the geographical level of analysis to territorial development dynamics. Corresponding analyses may even explicitly focus on linking the different dimensions – territory, place, scale and networks – of socio-spatial analysis. This kind of territorial variation and disaggregation will be beneficial for the quality of policy decisions.

In addition, official and comparable European data at regional level is often a few years old. The economic crisis has underlined the need for more up-to-date data. In times when socio-economic development can change quickly and vary between places, policy advice based on data that is 4 to 5 years old is not helpful and risks undermining the credibility of those providing it. To solve this issue various research teams have started experimenting with other data sources, which includes among others collecting data directly from national and regional sources or using data sets from social media information to capture territorial tendencies. In addition, micro-level longitudinal data, e.g. at neighbourhood level, may provide important insights into territorial dynamics.

Innovative and more daring approaches to finding information at the appropriate geographical level certainly need room for exploring, testing, and also failures. Furthermore, innovative approaches will not always be able to cover all of Europe and may require forms of presentation other than the standard ESPON map.

Validity and relevance of ESPON evidence

Above all ESPON work has to be scientifically sound and strict. Only applied research of high quality is of added value and will be recognised as basis for policy makers when serving policy-making and developing new and innovative approaches. Among other things, this requires sound methodologies and accurate documentation of the work carried out. Quality assessment of ESPON work is strongly linked to correctly understanding and interpreting maps, but this entails several stumbling

blocks such as an objectivity trap of fuzzy understandings. ESPON values the research quality of its numerous research teams. There is, however, also a need for projects to break new ground to enable them to develop and thoroughly test their innovative work and ideas.

The challenge of communicating the results to the policy world starts once the scientific work is done and considered as solid and of high quality.

The quality of spatial research may be principally confirmed by publications in leading international regional science research journals. Even though this may be something to strive for, quality for ESPON is first of all a result of the up-take and use of results by policy makers.

This report is a scientific report. As such it mainly targets scientists and the authors use a rather scientific language. However, it aims to discuss a large variety of different ways in which science can better support policy makers in their daily work for territorial development and cohesion across Europe. This, and the fact that the papers are short and focussed, makes the report also of interest for policy makers and practitioners.

2 Understanding territorial realities

2.1 Regional disparities and territorial cohesion

2.1.1 Investigating regional diversity and integrative patterns in ESPON collaboration networks

*Sylvie Occelli, Elena Poggio and Alessandro Sciullo**

I. INTRODUCTION: REGIONS ON THE MOVE

Insofar as Europe 2020 calls for a smart engagement of all governmental bodies, then regions have to enhance their knowledge capabilities in order to partake fully in the implementation of the European strategy. Broadly speaking, capabilities are here understood as the accomplishments a regional system *would achieve* if it committed the available (material and non material) resources to actions taken, taking into account existing constraints. This represents a longstanding idea in the regional literature (Morgan 1997, Pryor 2007) which acknowledges that these capabilities depend on the intrinsic systemic nature of a region, and more specifically on the pattern of interactions among many different parts, whereby the region as a whole is not simply the sum of its parts. Indeed, the fact that a regional policy exhibits systemic features and that these can play a role in enhancing these capabilities, is a topic which nowadays is attracting an increasing interest (OECD 2011; Inguaggiato & Occelli 2012).

This viewpoint also raises new challenges on methodological grounds, whereby the dramatic progress in ICT offers unprecedented opportunities to tackle the problems (Schroeder 2012). In fact, it provides analytical tools and strategies for blending different types of data, and for crossing disciplinary boundaries in many new ways. This paper aims to provide a contribution in this respect by developing a hybrid approach using different data sources and methods which can bestow regional knowledge capabilities. In the following, section 2 outlines a conceptual framework against which the hybrid approach is situated. Then, section 3 describes the implemented approach. The main results of its application for the regions which participated in the 2007-2013 ESPON Programme are discussed in section 4. Lastly, in section 5 the paper's main insights and suggestions for some directions on future research are summarised.

II. A CONCEPTUAL FRAMEWORK FOR INVESTIGATING REGIONAL KNOWLEDGE CAPACITIES

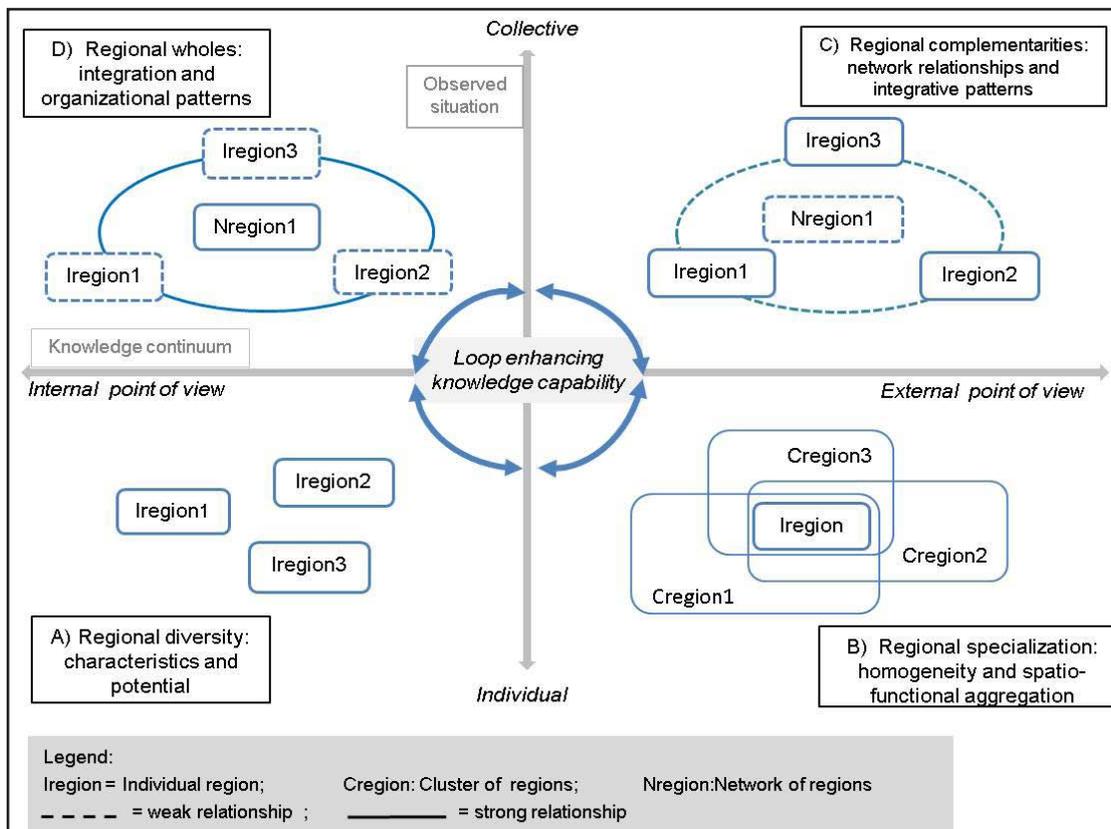
The notion of system knowledge capabilities acknowledges that social systems are able to reproduce both their material and non material (functional and communicative) constitutive parts (Poli 2010). An associated property is self-reflexivity, in particular the property of system reflectivity, meaning the ability of learning about oneself, one's own activities and their functioning, (Leydesdorff 2005).

In the spirit of the ESPON efforts to enhance stakeholders' understanding of their territories (ESPON, 2010), the discussion identifies two main dimensions which help to apply the above concepts to the empirical analysis of regional systems, (see Figure 2.1). The first refers to the so-called knowledge continuum a region can access, by adopting an internal or external perspective of its situation. The second acknowledges the individual or collective nature of the observed regional situation.

Through the arrangement of these dimensions, as shown in Figure 2.1, one can identify four possible windows of observation, A-D. When looking at them, it can be seen that A focuses on the individual regional asset, as a distinct and separated system. By comparing different regional profiles, B aims to assess regional specialization and similarities (e.g. regional clusters) while C investigates the relationships among the regions' systems and the resulting integrative patterns; and in D, attention is paid at exploring the level of regional awareness when being part of larger systems.

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Figure 2.1 A scheme of a reflective regional system



For a successful reflective regional system, moving across the different observation windows (see central loop in Figure 2.1) would reinforce the system knowledge capability, while raising the awareness about the regional situation.

III. THE IMPLEMENTATION APPROACH

The approach discussed in this paper belongs to the observation window C in Figure 2.1, and in dealing with regional assets, it adopts a collective stance and an external point of view. Unlike conventional studies about regional complementarities, which aim to understand the structural features of these, this paper probes the integrative patterns which might result from the collaborative relationships among regions. Its main goal, in fact, is to increase awareness about the potential of those complementarities.

It is a hybrid approach based on two components.

A) The collaboration network established by regional participation in the 2007-13 ESPON programme. This was built from the data-base obtained using a web-survey of the sixty-seven ESPON projects carried out by IRES in spring 2013. An application of social network analysis, implemented by adopting the UCINET software package, was undertaken. This process allowed the identification of 1) the most important regions, according to the main indicators of the network centrality; and 2) the complementary basin a region would enjoy thanks to its participation in the collaboration network, which consists of the directly connected regions belonging to the region's ego-network.

B) The individual regional profiles. Building upon the spatial indicator literature (Bertuglia, Clarke & Wilson, eds. 1994) and the latest studies by the European Commission (2011, 2012), a set of indicators was selected accounting for the (macro) economic profile (employed population,

productivity, GDP per capita) and human capital characteristics (tertiary education, life-long Learning, human resources in science and technology, HRST, people aged 18-24, not in employment, education or training, NEET). For both the profiles a synthetic index was calculated. To account for regional innovativeness, the type of innovation group as defined in the European study of regional innovation was also considered.

These components are used in a complementary way to investigate the integrative patterns likely to be exposed, among the ESPON regions, which also depend on the collaboration network and the observed distribution of the resource endowments, as represented by the selected indicators.

The application of the hybrid approach makes it possible:

- a) to improve the description of the regional network, by better qualifying the nodes, according to the selected indicators of the resource endowments;
- b) to explore the potential resources a region may access to as a result of its participation to the collaboration network as represented by the complementary basin.

IV. AN INVESTIGATION OF REGIONAL INTEGRATIVE PATTERNS

The 67 ESPON projects involved 124 regions, from 30 countries (about 285 million inhabitants, approximately more than half of the population in the EU27). The 324 individual participants were from public and private organizations. The countries most represented in terms of number of projects were Spain, Germany, United Kingdom and Italy (see Map 2.1). On average a region was involved in 4 projects, with a maximum of 26 for Cataluña.

A comparison of the distribution of the profile indicators across the group of ESPON regions with that for other regional aggregates, reveals that the former is relatively more heterogeneous, and it concentrates on a relatively larger share of innovation prone areas (cf. Table 2.1). This means that the ESPON program brought together some quite diverse regions, and it suggests that it might well have been an opportunity to support territorial cohesion processes.

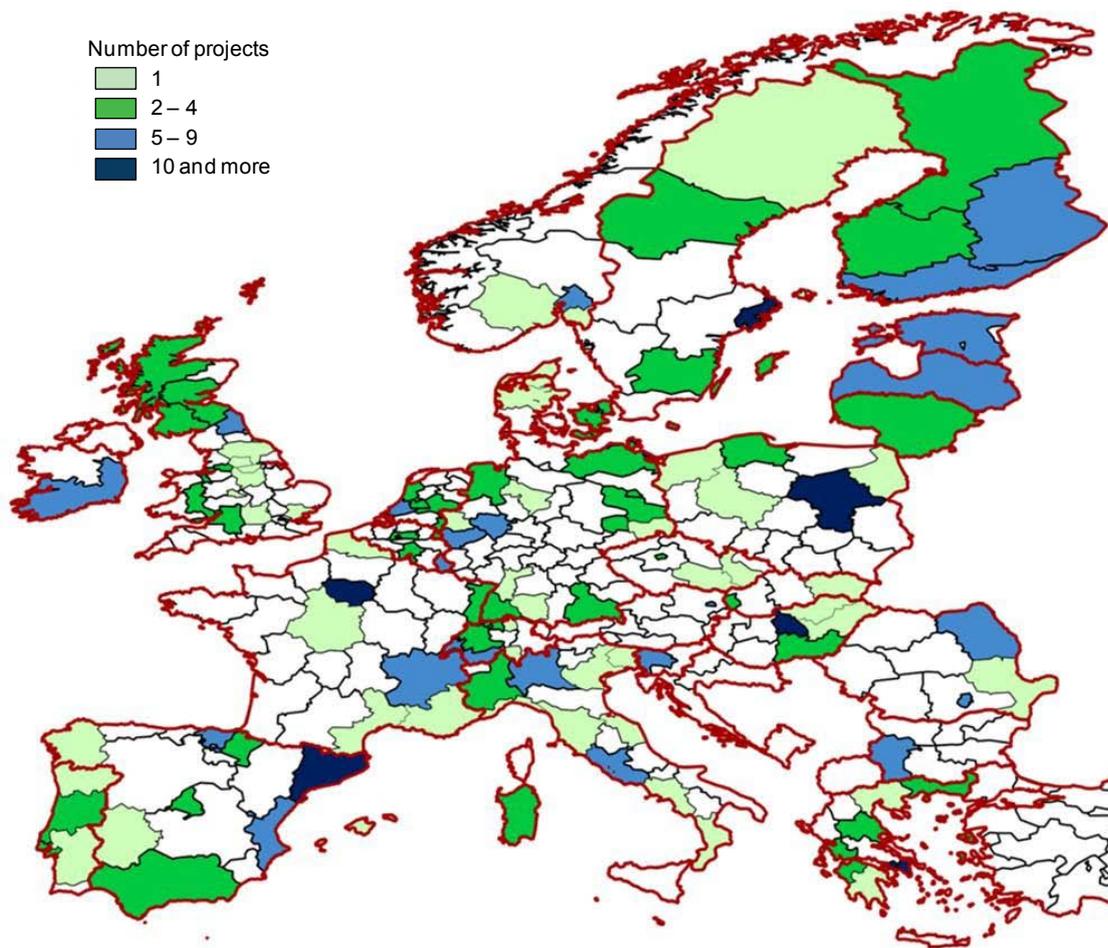
Table 2.1 Coefficient of variation of the economic and human capital indices

Aggregates	No. of regions	Economic index	Human Capital Index
All Regions	283	0,298	0,352
EU27	268	0,287	0,345
ESPON	124	0,314	0,363
All Regions (no ESPON)	159	0,281	0,326
EU27 (no ESPON)	152	0,270	0,317

Source: EUROSTAT

Some results can be derived from the joint consideration of Figure 2.2 and Table 2.2. The former shows the ESPON regional network along with the territories according to the value of the macro-economic index and the type of innovation group. The latter offers an overview of the main centrality measures used in determining the relevance of network nodes.

Map 2.1 Regional participation to the ESPON program (2007-2013)



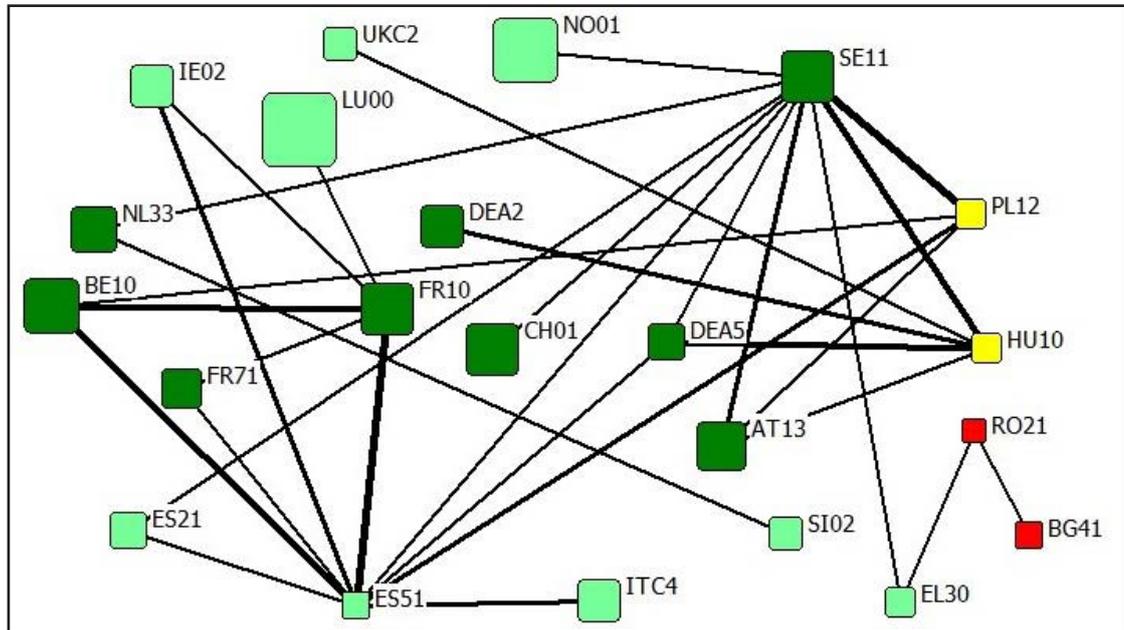
Source: developed by IRES upon data available at http://www.espon.eu/main/Menu_Projects/

The inspection of the degree centrality reveals that the most important regions are: Cataluña (ES51, Spain), Stockholm (SE11, Sweden), Köln (DEA2, Germany), Mazowieckie (PL12 Poland) and Ile de France (FR10, France). It is also to be noted that this result is not reflected in higher values of the macro-economic index (size of the nodes), nor by belonging to the most innovative clusters.

Cataluña, has the largest complementary basin, consisting of 82 regions which carried out at least one project with the Spanish region. The area also positions itself on the top for all the centrality indices. The index value accounting for the *throughness* of the regional position within the overall network (the so-called betweenness index) is particularly outstanding compared with that of the other regions.

Finally, a comparison between the regions and their complementary basin when looking at the selected socioeconomic indicators disclose a) certain critical social issues (employment and youth situation) do affect regions and their complementary area in a similar way; b) when considering both the human and economic resources which might be used in regional collaborations, the average values of these indicators for the basins are greater than those for the regions (see Figure 2.3).

Figure 2.2 The network of ESPON regional collaborations

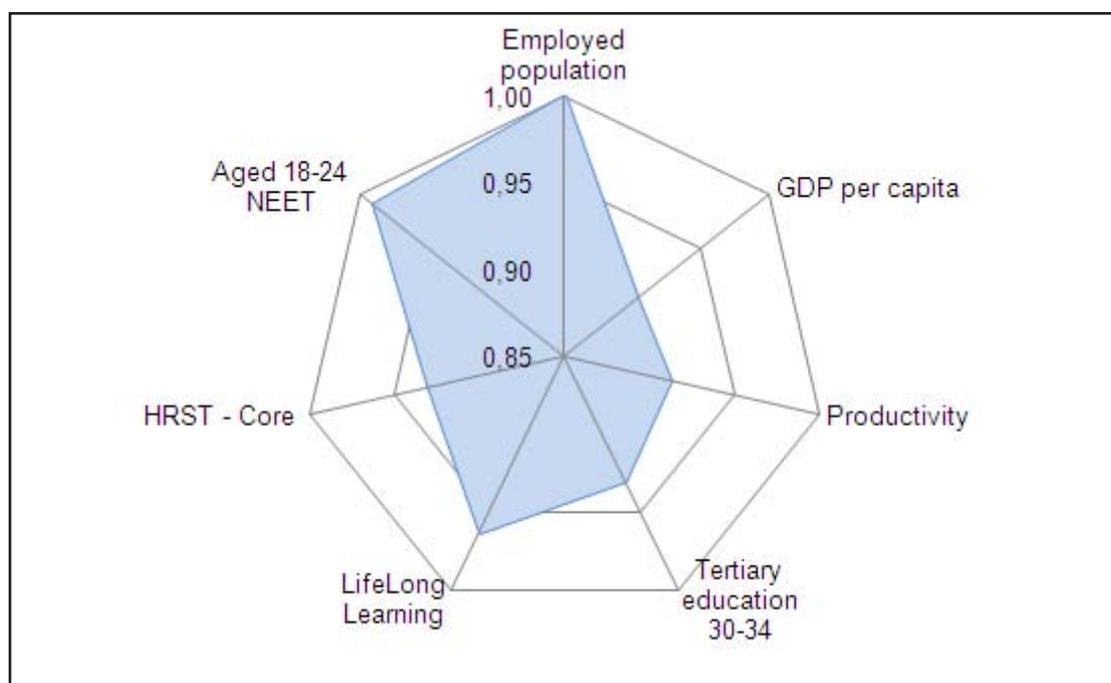


Source: EUROSTAT and network data processed by IRES upon information available at http://www.espon.eu/main/Menu_Projects/

Note: Only connections with a tie value of >3 are shown. The node size is proportional to a normalized synthetic index combining: GDP per capita, employment and productivity. The color of the node represents the type of innovation group as defined in the European study of regional innovation: dark green= leader, light green= follower, yellow= moderate, red=modest).

Table 2.2 Main centrality indices for the 10 top regions in the network

Degree centrality		Betweenness		Closeness	
region	value	region	value	region	value
ES51	65,9	ES51	16,2	ES51	74,5
SE11	52,0	SE11	7,2	SE11	67,2
PL12	43,1	FR10	5,0	DEA2	63,4
DEA2	42,3	NO01	4,0	PL12	63,4
FR10	39,0	DEA2	3,7	HU10	61,5
ES21	38,2	BE10	3,4	FR10	61,2
HU10	38,2	ES21	3,1	ES21	60,9
BE10	37,4	PL12	3,0	SI02	60,6
NO01	35,8	EL30	2,4	NO01	60,3
SI02	35,8	EE00	2,4	BE10	60,0

Figure 2.3 Region-complementary basin indices in ESPON programme for selected indicators

Note: The index value for an indicator is the ratio between the indicator average value for all regions and that for their complementary basin.

V. CONCLUDING REMARKS

The contribution of this study can be grasped from three perspectives.

First, on a conceptual ground, we tried to emphasize the importance of acknowledging a system view of regional collaborations. This enlarges conventional scrutiny of regional systems, thus strengthening learning processes and regional capabilities (Inguaggiato & Occelli 2012; Occelli 2013).

Second, from a methodological point of view, an approach which jointly uses structural and relational regional data was tested. This attempt increased awareness about the potential of territorial complementarities, thus reinforcing regional knowledge capability.

Third, on operational matters, the proposed approach can be applied to other European cooperation programmes (provided that the data-bases are made available). It can also be expanded by considering other descriptive indicators of the Europe 2020 strategy.

A topic which deserves further insights from future research concerns the investigation of the regional complementary basins, needed in order to support the development of more adequate regional partnerships in relation to expected regional achievements.

Finally, a more general point is the opportunity to better exploit the utilization of relational information derived from institutional projects for practically oriented policy tasks, such as accounting, monitoring and evaluation. This type of effort may help to meet the ESIF requirements for developing more system oriented policy actions.

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2.1.2 A composite index to measure the achievement of the 'Europe 2020 Strategy' by regions and member states: how far are territories to emerge from the crisis?

Rubén C. Lois, X. Carlos Macía and Valerià Paül*

I. INTRODUCTION

The Europe 2020 Strategy (EU2020S) was published in March 2010 as a Communication from the European Commission, being finally adopted by the European Council in June 2010. The EU2020S, first and foremost, seeks *growth* and considers that this prime objective must be achieved through three priorities or dimensions: growth should be smart, sustainable and inclusive. The previous EU strategic document for the decade 2000-2010 was the so-called Lisbon Strategy. The need for a new strategic direction was mainly motivated by the crisis in the global circumstances since 2008 which “has wiped out years of economic and social progress and has exposed structural weaknesses in Europe’s economy”, according to the EU2020S.

The ESPON-SIESTA Project, developed between 2011 and 2013 and led by the University of Santiago de Compostela, aimed to provide evidence on the territorial dimension of the EU2020S, especially focusing on the regional scale (NUTS2 and, when possible, NUTS3). In order to assess the overall fulfilment of the EU2020S an aggregate index has been developed by the ESPON-SIESTA project team. This paper discusses the results that have been obtained, concluding that the EU2020S is far from being achieved in several regions and member states to date, especially in Southern and Mediterranean Europe.

II. METHODOLOGY

The aggregate index measured how far away member states and regions were from the eight EU2020S headline targets set by the European Commission (EC2010):

- 75 % of the 20-64 year-old population to be employed.
- 3 % of the EU’s Gross Domestic Product to be invested in R&D.
- The three targets known as “20/20/20”: a 20 % reduction (and even 30 % if possible) in greenhouse gas emissions in relation to 1990 levels, 20 % of renewable energy sources and a 20 % increase in energy efficiency.
- To reduce early school leavers to below 10 %.
- At least 40 % of the 30-40 year-old population completing third level education.
- At least 20 million fewer people in or at risk of poverty and social exclusion.

The analysis has been mainly done at NUTS 2 level, and a region scores 100 if it has reached all eight headline targets, whereas a region scores 0 if it is positioned far away from all eight headline targets. The aggregate index is represented on a map for 2009-2010 and takes into account that there are three headline targets which are only available at member state level (the “20/20/20”), and a fourth target that is available at different scales depending on the country (people at risk of poverty or social exclusion). Datasets were available from Eurostat and in general refer to 2010, although some exceptional cases refer to 2009.

Each of the eight indicators was scored from 0 to 100, so when a region scored the maximum for a headline (100) it did not overpass this top threshold. The amalgamation of all the indicators was divided by 8, resulting in an index basis of 100. In this sense, the composite index was obtained by taking the equally weighted average of the eight official headline indicators. It was decided to weight each of the eight headlines equally given that no political priority has been conceded to one of them or a selection.

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The EU2020S covers a wide range of topics, which means that whilst the regions scoring more highly are typically almost accomplishing across the eight targets, all the regions in intermediate positions are in very different situations, which vary from case to case and imply different reasons for their position in the ranking. Two regions having the same scoring might do so for very different reasons. Be this as it may, the EU2020S is plural in its very nature and the objective of the aggregate index is to reflect its general fulfilment at regional scale in order to improve the understanding of European territorial development and cohesion.

III. MAIN RESULTS

Map 2.2 shows that all Scandinavian regions, plus southern Germany, several French regions and southern England (basically, North London, and Hampshire) take the top positions in the achievement of the regional EU2020S aggregate index for 2009-2010, while Sweden registers five regions with an index of above 90 % (Table 2.3).

Table 2.3 Ten regions with the highest and lowest EU2020S aggregate index, 2009-2010

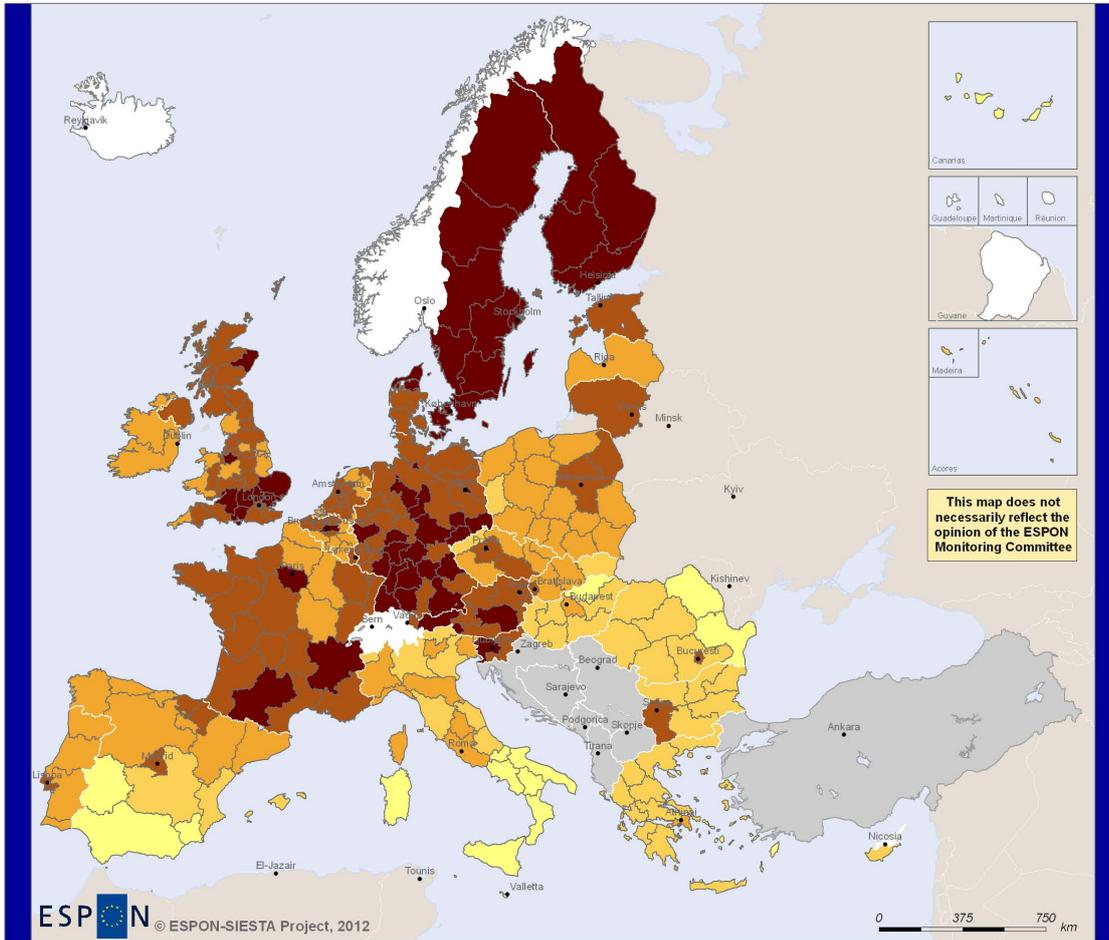
Region		EU2020S Aggregate Index	Region		EU2020S Aggregate Index
SE	Östra Mellansverige	93.35	HU	Eszak-Magyarország	46.71
SE	Sydsverige	93.35	IT	Sardegna	44.87
SE	Västssverige	93.35	IT	Basilicata	43.22
SE	Stockholm	93.21	ES	Melilla	39.35
SE	Övre Norrland	92.58	IT	Puglia	38.11
FI	Etelä-Suomi	90.74	IT	Calabria	37.54
FI	Länsi-Suomi	89.99	IT	Campania	34.00
DE	Oberbayern	89.59	ES	Ceuta	34.00
DE	Dresden	89.59	MT	Malta	33.81
FI	Pohjois-Suomi	88.16	IT	Sicilia	32.68

Source: SIESTA calculation

It is possible to identify two corridors in this pattern: Midi-Pyrénées to southern Germany and Denmark to Finland. Some capital regions, Ile de France, Greater London, Berlin, Brussels, Copenhagen and Ljubljana also score particularly highly and are included in the group of regions scoring above 80 %. The corridor between Austria and London is less clear, because there are regions scoring relatively poorly in relation to their neighbouring geographical units (i.e. Wallonie in Belgium and Picardie or Nord-Pas-de-Calais in France).

In contrast, regions occupying the bottom positions are eastern Romania, Eszak-Magyarország (Hungary), southern Italy and southern Spain, and the outermost Spanish regions. Some of these regions lag behind with scores of less than 40 % (Table 2.3). In countries dominated by low figures, such as Spain or Romania, there are dramatic imbalances between regions, with higher rankings evident in some areas (Madrid, the Basque Country and Navarra in Spain, Bucuresti-Ilfov in Romania). In general, Eastern Europe tends to score worse than Western Europe, although, in general, the eastern capital regions score better and have already attained average EU values: Mazowieckie-Warsaw in Poland, Közép-Magyarország-Budapest in Hungary, Yugozapaden-Sofia in Bulgaria, Bucuresti-Ilfov in Romania.

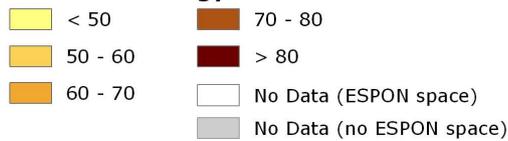
Map 2.2 EU2020S aggregate index, 2009-2010



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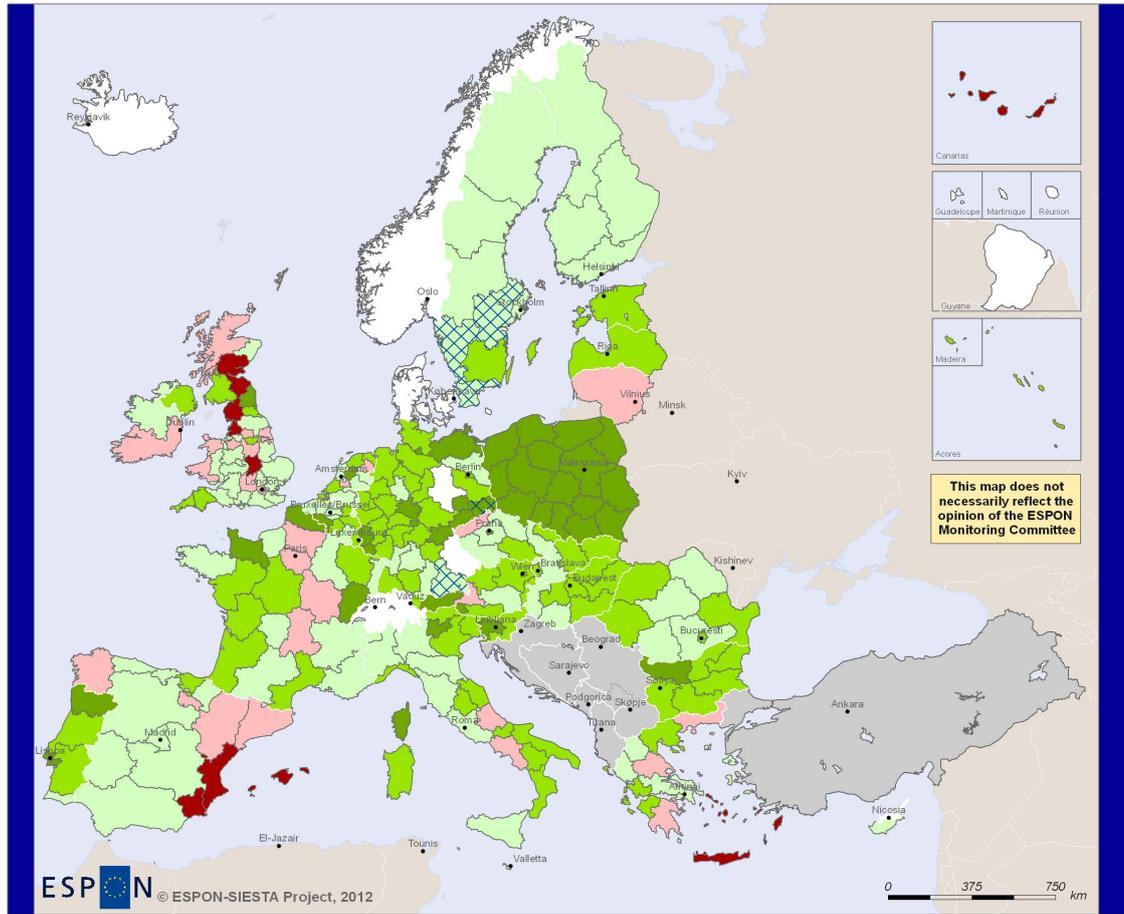
Regional level: NUTS 2
Source: Own elaboration based on EUROSTAT data
Origin of data: EUROSTAT, 2012
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EU 2020 Strategy Index - 2010



Map 2.3 seeks to show how to understand the regional change experienced in the last few years using available data at NUTS2 level for 2005-2010. This shows the change based only on the four headline targets with available datasets (on employment, GERD, drop-out rates and the tertiary educated population), and excludes the three on environment, energy and poverty. Although the pattern is not so evident, the important issue to highlight is that Portugal, and the eastern most notably Poland, perform better, while the Scandinavian and southern European regions remain stable. It must be highlighted that the former are top and means that progress is statistically difficult to attain, while the latter score poorly (Map 2.2). It is worthwhile mentioning that there are five regions that score 100 % in 2010, meaning that the four considered targets have already been reached in Västsverige, Sydsverige and Östra Mellansverige in Sweden, and in Dresden and Oberbayern in Germany.

Map 2.3 Regional change in the EU2020S aggregate index, 2005-2010



ESPON © ESPON-SIESTA Project, 2012

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Regional level: NUTS 2
Source: Own elaboration based on EUROSTAT data
Origin of data: EUROSTAT, 2012
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Change 2005-2010 - EU2020S index (4 headline targets with available regionalised datasets)

- < -5
- 0 - 5
- Regions achieving the 4 targets in 2010
- 5 - 0
- 5 - 10
- No Data (ESPON space)
- > 10
- No Data (no ESPON space)

The regions whose positions fall are mainly in Greece, eastern Spain (plus Galicia and the Spanish outermost regions), France, Lithuania and the British Isles. The causes associated with this upgrading are diverse; for instance, in eastern Scotland, Lancashire, Leicestershire, Rutland and Northamptonshire (UK) the four targets were reached or almost reached in 2005, but in 2010 their performances were further from the target (that is, worsening). This might be for several reasons, for example investment in R&D in eastern Scotland and Lancashire has dramatically decreased, whereas in Leicestershire, Rutland and Northamptonshire school drop-out rates and tertiary educated population rates have worsened. In Illes Balears, Comunitat Valenciana and Murcia (Spain), a drop in employment is clearly the underlying cause for worsening conditions, but also worrying is an increase of the early-leaver rates. Employment together with the fall of tertiary educated people are the same key reasons for the worsening performance in the Greek regions such as Kriti. Ceuta and Melilla (Spain), which were the worst scoring regions in 2010, account for the four variables (19 and 24 %, respectively) and have also suffered a severe decrease in the young tertiary educated population. While the UK regions in the EU2020S targets were almost accomplished in each region in 2010, the increase only changes the overall positive situation a little in respect to the EU2020S on a regional scale (Map 2.2).

IV. CONCLUSIONS

To summarise, the aggregate index shows how the performance against EU2020S targets as a whole has an uneven geography. It seems clear that achieving the smart, sustainable and inclusive growth envisaged through the EU2020S is far from being achieved measured on this basis. The current gap in achieving targets in a very large number of regions means that the EU2020S' implementation is not feasible by 2020, even when acknowledging that not all the regions can or should reach all the EU2020S set targets.

The question that remains is how policies, especially the cohesion policy, will be able to face the consequent challenges. Moreover, the spirit of the EU2020S also needs to go beyond the EU institutions and reach every single one of the regions in Europe.

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2.1.3 Regional disparities in Europe: Are they robust to the use of different measures and indicators?¹

José Villaverde* and Adolfo Maza#

I. INTRODUCTION

The reduction of regional disparities in development in the EU has been a prominent goal in the European Commission's agenda since at least mid-1970s, to the point that currently "economic and social cohesion is one of the main operational priorities of the EU" (Monfort, 2008: p. 3). In order to address it, the EU has implemented what we know as "cohesion policy". Although the stated goal of this policy is self-evident, there are at least two issues that have captured the attention of academics and policy-makers: the first one relates to how to measure disparities; the second refers to the practical meaning of the word *development*.

Bearing this in mind, this paper attempts to contribute to the empirical literature on regional disparities in the EU. It tries to shed some light on these two crucial issues through a sensitivity analysis that compares the results obtained with different inequality measures and different indicators of development. Our sample consists of 264 NUTS2 regions of the EU27 during the period 1995-2007.

II. MEASURES OF REGIONAL DISPARITIES

As indicated by Villaverde & Maza (2011: 3); the term "disparity is a multifaceted concept encompassing dimensions such as convergence, inequality, polarisation and concentration". Of these four dimensions, that of inequality, probably offers the broadest perspective. Yet, inequality is far from an easy concept to capture; on the contrary, it can be said that "inequality is like an elephant: You can't define it but you know it when you see it" (Fields 2001: 14). The problem with this is that a large number of measures of inequality circulate in the literature and that, in certain situations, they may offer different views on its extent and evolution.

To cope with this problem, and considering that none of these measures is universally accepted as being superior to the others, the usual practice is to consider together a representative set of inequality measures (Villaverde & Maza 2011). Thus, if all of them point to the same direction we can have some confidence in the robustness of the conclusions. Following this pragmatic approach, we have opted here to apply five of the most commonly used summary inequality measures: the coefficient of variation (CV), the Gini index (G), two versions of the Theil index (T(0) and T(1)), and the Atkinson index (A). The first four are positive measures of inequality, while the fifth is a normative one.

III. INDICATORS OF DEVELOPMENT. SINGLE OR COMPOSITE INDICATORS?

The term *development* is as widely used in the literature as it is in ordinary conversation. Typically, it is used in an exclusively economic sense and per capita gross domestic product (GDP) is its common proxy. However, as a very broad concept embracing more than economic aspects, the term 'development' is difficult to pin down and, consequently, difficult to capture in just one indicator.

In an effort to create a working definition, researchers, policy-makers, and international institutions have offered various proposals addressing how to measure country/regional development. One of the most interesting is that of the United Nations Development Programme (UNDP) with its yearly publication of the Human Development Report, in which the Human Development Index (HDI), inspired by Sen's development theory, is included (UNDP 1990). More recently, there has been

¹ This is a short and revised version of a report prepared for SIEPS.

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the work of the Commission on the Measurement of Economic Performance and Social Progress (CMEPSP) created by the President of the French Republic (Stiglitz et al. 2009).

Typically, national or, as is the focus of this paper, regional development, is measured by GDP per capita, mainly for the handy usability of this indicator. Per capita GDP is the most frequently used indicator as, directly or indirectly, it is considered to reflect a region's production capacity, income, and/or economic development level.² Although per capita income is a key component in measuring economic development, the premise of the HDI and the CMEPSP reports, as well as that of many other critics of the *de facto* position of this variable as the primary (or sole) indicator of development,³ is that there are other dimensions that are closely linked to quality of life and the opportunities available to individuals that should also be taken into consideration. Among these, it is thought that non-income dimensions such as health, education, personal activities, political voice and governance, social connections, environmental conditions, and personal and economic (in) security should also be considered.

Acknowledging the soundness of these ideas, but also considering the difficulty of their implementation, here we adopt a very simple yet rigorous approach, implying the use of two different sets of indicators. The first one is made up of some highly significant single indicators, while the second consists of various composite indicators. Both approaches have pros and cons, and there is no generally accepted rule for determining which is best.

Although we are well aware of the criticism directed at per capita GDP as an indicator of development, we opted to use it as our benchmark in accordance with long standing tradition. Taking into consideration data availability and in addition to per capita GDP, we decided to employ five alternative single indicators: productivity (PR), compensation per employee (wages, W), disposable income (DI), and the (inverse of) unemployment (1/UR).

Because, according to opinions such as those mentioned above, the use of single indicators other than per capita GDP does not add much to the use of this variable alone as a proxy for development, we have also constructed some composite indicators. In particular, we opted initially for computing a very simple yet consistent set of composite indices echoing the HDI (Table 2.4).

A composite indicator like any of the previous ones can be criticised on at least two counts: the *ad hoc* weights chosen for its computation, and the small number of variables used. Although for practical reasons we do not fully address these issues, we partially deal with them by computing a new composite indicator (Nardo et al. 2005) by means of applying a principal components analysis to seven variables (we consider not only the five previously mentioned but also household expenditure and the employment rate). In this way, the number of variables is increased and the weightings are endogenously determined.

² See, for example, Khan (1991) and Mankiw et al. (1992) and, more recently, the Communication from the Commission to the Council and the European Parliament on the issue of "GDP and beyond. Measuring progress in a changing world (European Commission, 2009: p.2), which specifically states that "GDP has also come to be regarded as a proxy indicator for overall societal development and progress in general".

³ See, for instance, Davidson's book "*You can't eat GNP. Economics as if ecology mattered*" (Davidson, 2000), or the conference "Beyond GDP" organized by the European Commission, European Parliament, Club de Rome, OECD and WWF and held in Brussels on 19&20 November 2007.

Table 2.4 Weights for composite indicators echoing HDI

	GDP	PR	W	DI	1/UR
I11	33.3	33.3			33.3
I12	25.0	25.0			50.0
I13	30.0	30.0			40.0
I14	35.0	35.0			30.0
I15	40.0	40.0			20.0
I21		33.3	33.3		33.3
I22		25.0	25.0		50.0
I23		30.0	30.0		40.0
I24		35.0	35.0		30.0
I25		40.0	40.0		20.0
I31		33.3		33.3	33.3
I32		25.0		25.0	50.0
I33		30.0		30.0	40.0
I34		35.0		35.0	30.0
I35		40.0		40.0	20.0

IV. REGIONAL DISPARITIES IN THE EU

With the aforementioned precautions in mind, we apply the inequality measures mentioned in Section 2 to the (single and composite) indicators referred to in Section 3. After normalising our results relative to those of the first year (1995 = 100), Figure 2.4 offers a clear idea of how regional development disparities have evolved over time for each of the single and composite indicators we computed. Three main conclusions can be drawn.

- The foremost conclusion is that it does not matter much which indicator (single or composite) and inequality measure is being considered, since the evolution of regional disparities nearly always follows the same time pattern. There are, however, two main differences between single and composite indicators: a) the time patterns of single indices tend to be more linear (less variable) than those of composite indicators, and b) the period between 2000 and 2004 tends to systematically show higher values with composite (excluding these computed using factor analysis) than single indicators.
- The second conclusion is that, depending on the indicator considered, the decline in regional disparities varies substantially. This decline is much larger when wages and/or disposable income are involved in the computation.
- The third conclusion is that the observed decrease in the level of inequality shows large discrepancies depending on the measure considered; the degree of variability is the lowest with the Gini coefficient and the coefficient of variation.

The main conclusion is strengthened when we compute the Pearson correlation coefficient between all our (single and composite) indicators. The results indicate that per capita GDP and productivity are the indicators that best correlate with the others. In particular, per capita GDP correlations are quite strong (always >70 % and in most cases >80 %) with all composite indicators. In contrast, the unemployment rate tends to correlate much more poorly with the other indicators.

V. CONCLUSIONS AND POLICY REMARKS

Two main conclusions have been derived from this work:

First, that all inequality measures convey, by and large, the same information about the time pattern of EU regional disparities: a significant reduction.

Second, that regional changes in development, whatever the indicator and the inequality measure employed, are closely related to variations in per capita GDP.

Does this mean that in the evaluation of EU regional disparities in development levels we should pay attention to just per capita GDP and forget about other indicators? Our answer is: IT DEPENDS

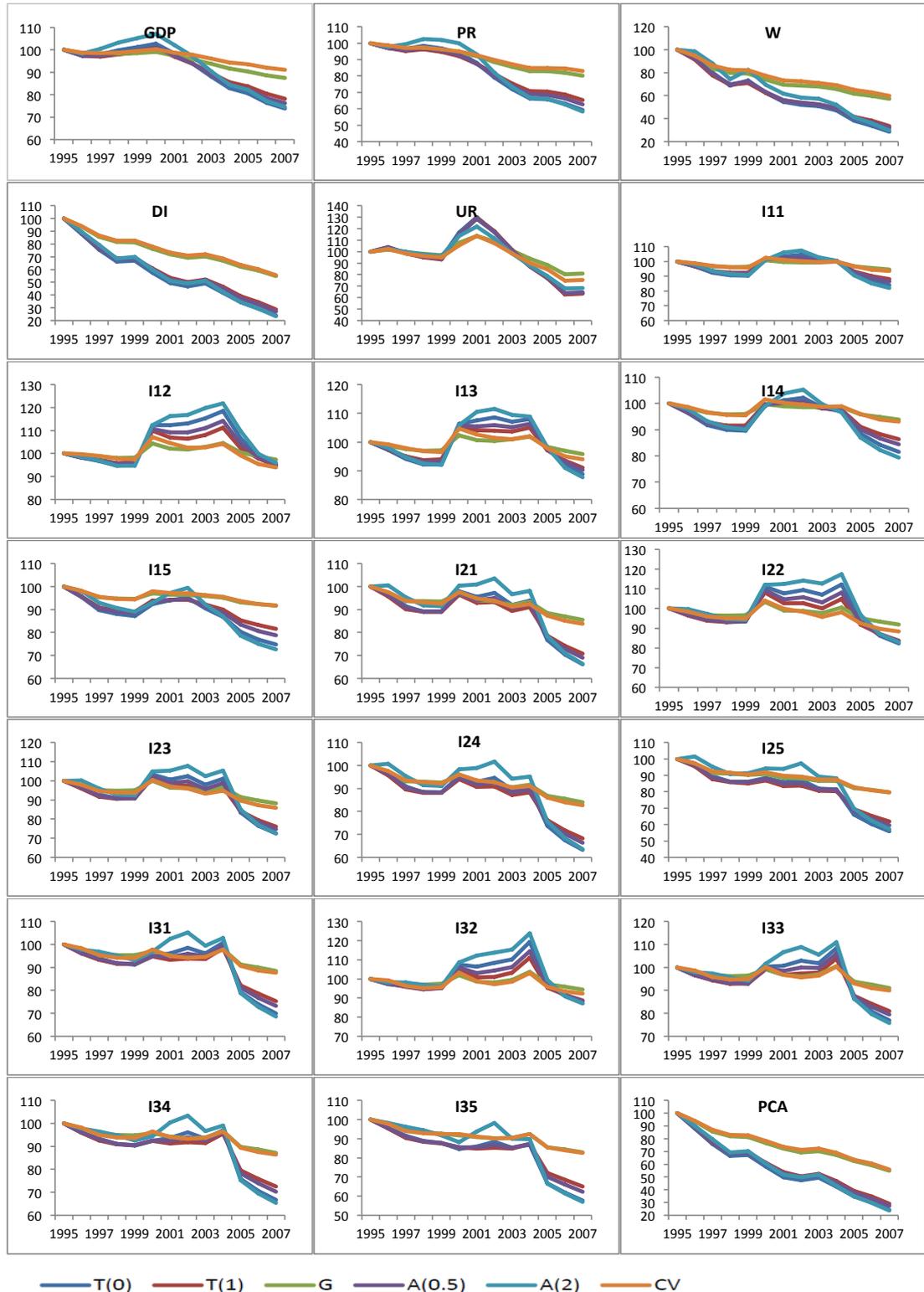
- If we were able to agree about the real content of the term development and its dimensions and if we had reliable, consistent and far-reaching time series observations for the underlying variables behind the agreed dimensions, the answer would clearly be NO.
- However, acknowledging the difficulty of achieving this agreement, we propose a very simple “rule of thumb”: keep it simple. In other words, it appears to us that:
 - Per capita GDP is the best single indicator of the degree of development in the EU27 regions, as it is the most widely available and reliable of all indicators. As such, it should continue to be the benchmark indicator when it comes to assigning the future ESIF. Therefore, increasing efforts should be made by EUROSTAT to improve, as much as possible, the way this variable is estimated.
 - If, as mentioned before, it is considered that development is a multifaceted concept that, to be properly measured, requires a composite indicator, then we believe that this should be constructed using as few single indicators as possible. In fact, the greater the number of single indicators used in the construction of a composite indicator, the more assumptions regarding the data imputation will be required, and the resulting composite indicator will be more difficult to interpret and less reliable.

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Figure 2.4 Evolution of disparities



2.1.4 Sigma-convergence as a measure of territorial cohesion

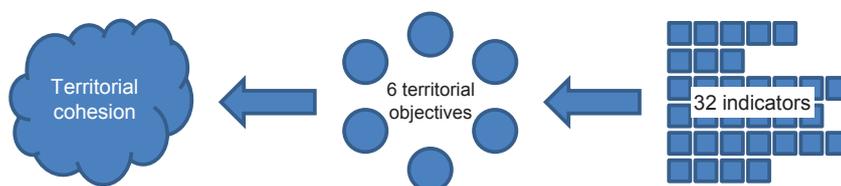
Hy Dao*, Pauline Plagnat and Vanessa Rousseaux#

I. THE QUEST FOR TERRITORIAL COHESION INDICATORS

Measuring progresses toward cohesion by means of indicators has been a concern for European policy since the First Cohesion Report in 1996. After more than a decade of ESPON research on territorial cohesion indicators - projects “1.1.1 Polycentric Development” (2006), “3.1 Integrated Tools for European Spatial” (2006), “4.1.3 Feasibility study on monitoring territorial development” (2006) - it must be acknowledged that an agreement on a synthetic measure could not be reached. Even tentative theoretical approaches (Farrugia and Gallina 2008, Medeiros 2012) or robust statistical methods (Grasland and Hamez 2005) did not provide a final answer on the subject. This is due to the subjective and contested nature of territorial cohesion.

On the basis of the past attempts to define indicators of territorial cohesion, the ESPON project INTERCO - Indicators of territorial cohesion (Dao et al. 2012) embarked in 2010 on an innovative approach combining an analytical and participatory method for the selection and prioritisation of indicators usable by policy makers. From more than 600 potential indicators identified in the first phase of the project, INTERCO finalised 32 top indicators organised in 6 territorial objectives, namely: 1) Strong local economies ensuring global competitiveness; 2) Innovative territories; 3) Fair access to services, markets and jobs; 4) Inclusion and quality of life; 5) Attractive regions of high ecological values and strong territorial capital; and 6) Integrated polycentric territorial development.

Figure 2.5 Territorial cohesion: the concept approached by territorial objectives and indicators



The aim of developing the territorial objectives is to synthesise different understandings of the concept, as drawn from policy documents and from the interaction with stakeholders (through workshops and presentations). They give different and non-exclusive views on territorial cohesion. Their interest lies in the fact that they are not fixed and may be subject to rapid changes according to new policy developments.

To support this, indicators can help to measure states and trends for a given territorial objective, but they can also provide contextual information for other territorial objectives (e.g. GDP per capita measures economy and maybe also can be used as context information for social inclusion). They are in principle more stable through time than territorial objectives, and possibly are likely to be maintained by regular work of statistical offices and administrations.

The combined analytical and participatory method used during the INTERCO project shaped a framework of final indicators that were selected and prioritised according to the thematic interests of the stakeholders, but also to satisfy a number of pre-defined criteria: they should be able to indicate a clear direction of change, which must be interpretable (e.g. more is better – or worse); they should be sensitive to policy change and be able to measure the outcome or impact of a policy measure; finally, they should be available for time series, (i.e. the data should be updated regularly, preferably annually) and at sub-national level, preferably at NUTS3.

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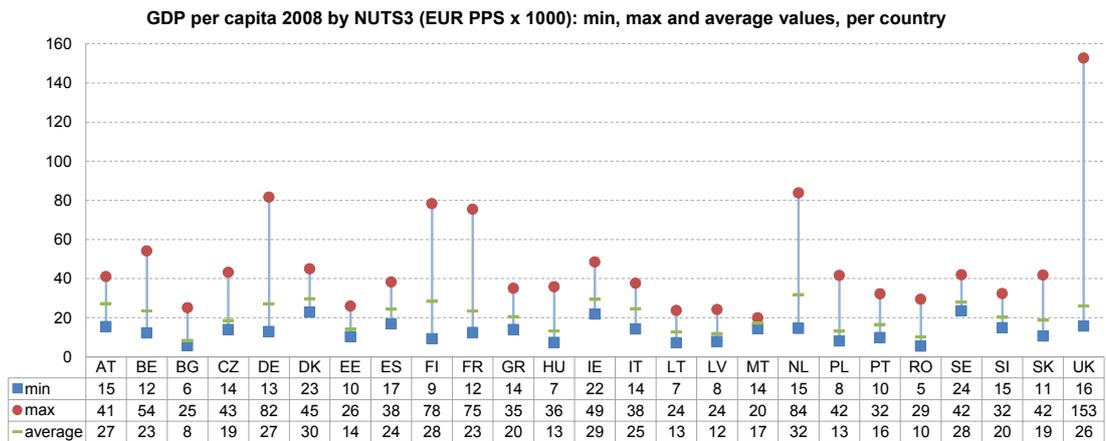
The objective of this paper is not to discuss the selected indicators, nor the selection process, which were both agreed upon by the stakeholders, but rather the ways these indicators can be analysed for further interpretation in terms of territorial cohesion.

II. DISPLAYING THE INDICATORS

To this end, INTERCO decided to go beyond the classical presentations of an indicator. For instance, values for a given year can be displayed on a map (e.g. a choropleth map of GDP per capita in 2008 by NUTS3). Such thematic maps can be read in terms of spatial differences (e.g. east-west / north-south or intra-national variability), concentrations, discontinuities, etc. As a complement to static maps, webmapping applications can offer more interactive and analytical tools to explore the indicators (see e.g. Hypertatlas http://www.espon.eu/main/Menu_ToolsandMaps/ESPONHyperAtlas/, Interactive Atlas of European Regions <http://aire.ums-riate.fr/>), but those applications may sometimes appear complex to the users, who therefore cannot exploit their full potential. Auto-correlation measures (e.g. Moran's I, Geary's C) can also help approaching the notion of spatial concentration in a mathematical way, but they are not easy to interpret for non-specialists.

Graphs are another classical way to display synthetic information such as aggregated values (e.g. NUTS3 values summarised by country). Figure 2.6 shows summary statistics of GDP per capita per country, and also allows for comparisons between countries.

Figure 2.6 Graph representation of an indicator



However, some policy-relevant information is still missing in the above examples: for instance, a political interpretation of the indicators would require information on the progress of territories towards desired levels. GDP growth could indeed be calculated, but it would not by itself show how far territories are from policy targets, nor differences between territories. These differences, addressed by EU Regional Policy, are the object of our proposal for a measure of convergence, as a complement to the classical presentation of states and trends.

III. CONVERGENCE AND ITS MEANING FOR TERRITORIAL COHESION

In the broad sense, convergence means to come together toward a common point. In the framework of European Regional Policy, convergence has been the most funded of the three objectives in recent years, with 81,5 % of the budget for the programming period 2007-2013, whereas “regional competitiveness and employment” and “European territorial cooperation” were respectively funded with 16 % and 2,5 % of a total amount of EUR 347 billion. Convergence here clearly relates to territorial cohesion, as the aim of this financial allocation is to reduce regional disparities by helping poorer regions (i.e. those whose GDP per capita is less than 75 % of EU average) to catch up with the richer ones. Despite some significant changes in the future Regional Policy (2014-2020), European action will continue to focus on catching-up processes while increasing its support to the other

main dimensions of cohesion - i.e. competitiveness, concentration, connection and cooperation. The two latter dimensions can be easily linked to the notion of convergence by looking at how the differences in accessibility and levels of cooperation evolve through time. Conversely, with regards to concentration and competitiveness, convergence may seem contradictory. This may be overcome by assessing how concentration indices (such as the polycentricity index selected by the INTERCO project) differ between territories and through time, or by evaluating convergence within groups of territories sharing the same (structural) characteristics, hence acknowledging that territories may have different levels of achievements due to their specificities and potentials.

IV. MEASURING CONVERGENCE

As developed in economics literature, the measure of convergence is considered in two ways: the reduction of income disparities across economies – the sigma(σ)-convergence – and the catching-up process by which poorer economies grow faster than richer ones – the beta(β)-convergence. As Sala-i-Martin (1996) puts it, there is beta-convergence “if we find a negative relation between the growth rate of income per capita and the initial level of income. In other words, we say that there is β -convergence if poor economies tend to grow faster than wealthy ones. This concept of convergence is often confused with an alternative definition of convergence, where that the dispersion of real per capita income across groups of economies tends to fall over time. This is what we call σ -convergence.” The two notions are linked: it has been shown that beta-convergence is a necessary but insufficient condition for sigma-convergence. Following the goal of EU Regional policy, INTERCO chose to focus on sigma-convergence, which is what we aim for – i.e. the reduction of disparities – rather than on beta-convergence, which refers the catching-up process.

The idea for approaching sigma-convergence is simple: to assess the differences between territories, and their evolution through time. Several measures of convergence exist, which were clearly analysed in relation to European Regional Policy in the referential article by Monfort (2008). Among the metrics studied by Monfort, we choose the coefficient of variation for its ease of computation, communication and interpretation. The coefficient of variation (C_v) is defined as the ratio of the standard deviation to the mean :

$$C_v = \frac{\sigma}{\mu}$$

Whereas standard deviation (σ) expresses the dispersion of values in absolute terms, the coefficient of variation (C_v) depicts the dispersion in relative terms, i.e. in proportion to the mean of the observed values. The problem with standard deviation is that it is sensitive to the scale on which variables are measured: if all values are multiplied by a constant c , the standard deviation will increase by a factor of c as well. This is not the case for the coefficient of variation: it is dimensionless and it enables the comparison of variables with different units (e.g. GDP per capita and unemployment rate) or means (e.g. mean GDP per capita at different dates).

Two important requirements must be followed when calculating the coefficient of variation:

- variables must be ratio scales, i.e. variables with absolute zeros, ensuring true proportional relations between values. For instance, 20 % of unemployment rate is indeed twice as much as 10 %, and 0 % would really mean no unemployment (this property would also apply to GDP per capita, but not to a variable such as temperature in $^{\circ}\text{C}$: 30° is two times 15° in terms of heat, 0° is not an absolute zero);
- mean values must not be too close to zero, otherwise the coefficient of variation becomes too sensitive to small differences in the mean values.

These two conditions can be fulfilled by the 32 INTERCO indicators.

V. SIGMA-CONVERGENCE APPLIED TO INTERCO INDICATORS

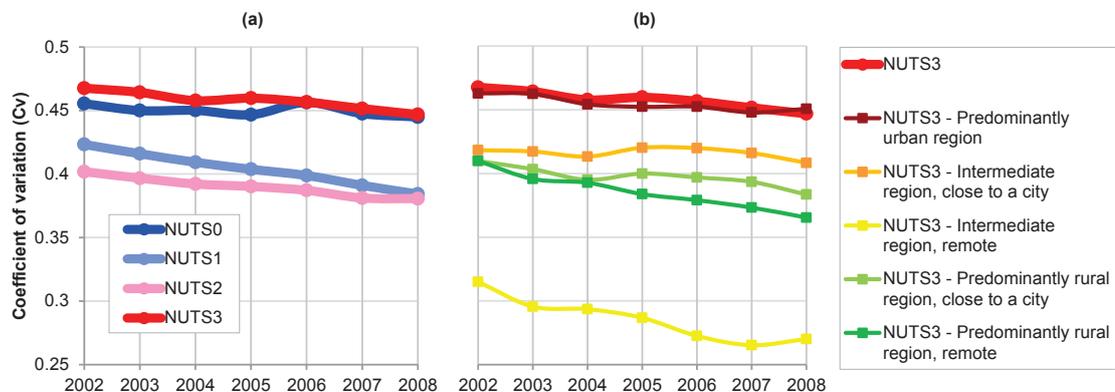
In the INTERCO project, for a given variable, the coefficient of variation was computed for each year, over time periods with the most available data, for all NUTS levels and for various groups of territories

(Europe 27, by country, by type of regions). It is important to note that data for the exactly same territories over the years must be available in order to allow for sound comparisons.

The resulting times-series of coefficients of variation were plotted on graphs for a visual trend analysis. Linear regressions were also performed on the time-series in order to quantify the fitness (R^2) and the slope of the trend of the coefficient of variation over time.

Figure 2.7 displays the evolution of the coefficient of variation of GDP per capita for various NUTS levels and types of NUTS3 regions (study area: EU27+4). In Figure 2.7(a), a clear sigma-convergence - reduction of disparities - can be visually observed at all NUTS levels: the more negative the slope, the faster the convergence.

Figure 2.7 Coefficient of variation of GDP per capita in PPS, 2002-2008: by NUTS level (a) and by type of NUTS3 regions (b)



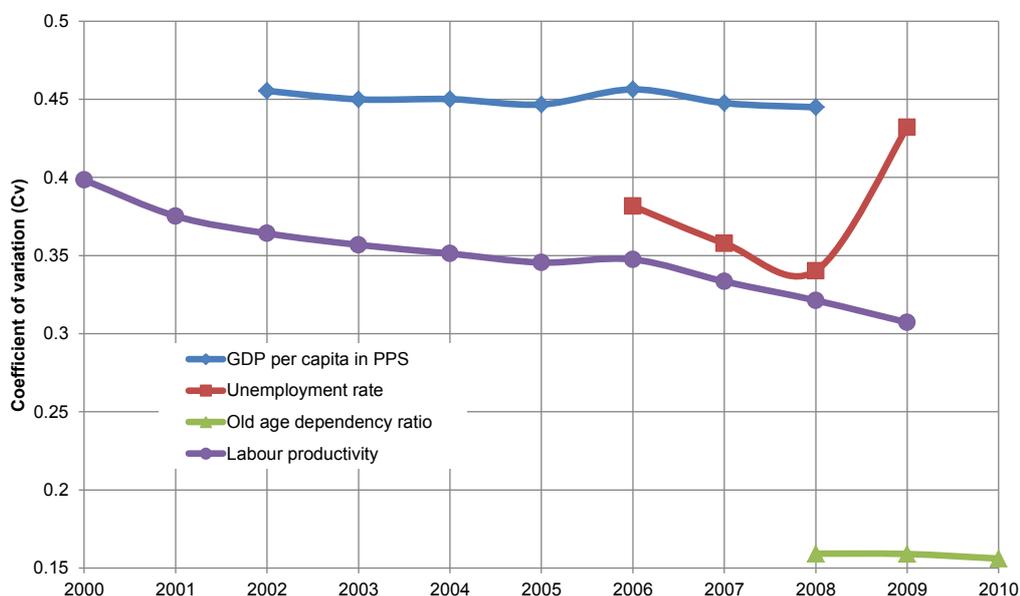
Note: At NUTS1 level: slope = -0.0063 , $R^2 = 0.997$; at NUTS3 level: slope = -0.0032 , $R^2 = 0.933$. Reduction in disparities is faster and clearer for NUTS1 than for NUTS3 (steeper negative slope, higher R^2).

An example of the flexible application of the proposed sigma-convergence analysis is shown in Figure 2.7(b), which displays the trends of disparities between NUTS3 units by type of regions. Urban regions (dark red line) clearly influence the general trend of all NUTS3 units considered together (thick red line). NUTS3 territories classified as “remote rural” (dark green line) and “remote intermediate” (yellow line) have the lowest disparities and the fastest tendency to converge.

Another analysis by country (not featured in the above graph) reveals additional trends. For instance, the national average GDP per capita has increased markedly in the 10 eastern countries since their accession to the European Union (2004 and 2007). However, disparities between NUTS3 have increased a lot within some of these countries, such as Bulgaria and Romania. In contrast, during the same period, Latvia shows a reduction of disparities between its NUTS3 territories.

Because the coefficient of variation is dimensionless, it is also possible to compare several thematic variables, as shown in Figure 2.8 with the four indicators selected by the INTERCO process under the territorial objective “strong local economies ensuring global competitiveness”.

Figure 2.8 Coefficient of variation for the four indicators under the territorial objective “strong local economies ensuring global competitiveness” by NUTSO, 2000-2010



Note 1: The effect of the economic crisis can be clearly seen with the sudden rise in unemployment disparities between countries in 2009. There was a large increase in unemployment in countries such as Spain, Iceland, Ireland, Latvia, Estonia, Lithuania.

Note 2: The graph also shows important data gaps. Data are available for all four selected variables only in 2008.

VI. CONCLUSION AND PERSPECTIVES

A way to further exploit existing indicators

The application of sigma-convergence to well-known variables (e.g. GDP per capita) is a way to further exploit the potential of already existing indicators, by facilitating their interpretation in terms of territorial cohesion. For instance, our analysis of GDP per capita showed that convergence is occurring differently depending on the spatial levels and the groupings of regions considered. Sigma-convergence goes beyond classical displays/metrics (states, trends, indexed values) and complements more complex spatial measures such as spatial concentration indices (e.g. Moran's I, Geary's C). It adds a territorial dimension to sectoral indicators, simply by performing a comparison of territories.

Moreover, sigma-convergence can be generalised as it can be applied to many thematic variables, provided that appropriate spatial scales/entities and time periods are considered. In this respect, the use of typologies is a key factor for the sound comparison of territories, which should be comparable in terms of their characteristics, potentials, functions, etc.

Data issues and policy relevance

To further take advantage of the sigma-convergence approach, there is a crucial need to complete and update time-series data. Several data are only available for a few (if not single) points in time. Some regional (NUTS3) statistics need to be updated for recent years in order to cover to the effects of the Eurozone crisis. Even more local (LAU) data would also be necessary for analysis of specific entities (functional urban areas, mountains, islands, etc.).

Focussing on a limited number of indicators as selected by stakeholders limits the effort of data updating, while ensuring the political relevance of the indicators. An alternative and more policy-oriented way of calculating disparities would be to replace mean values by policy targets (European or national/regional ones) and to compute distances to these targets.

Sigma-convergence alone is not sufficient for evaluating the successes/failures of Regional Policy. It provides a synthetic measure that must be used to complement fine grained analyses, in order to fully understand the processes at stake and individual trajectories of territories. Sigma-convergence must be seen as a tool for exploring data. In the end, as for their selection, the interpretation of indicators in terms of territorial cohesion is in the hands of stakeholders pursuing specific and sometimes contradictory goals.

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2.2 Relations between regional and spatial integration

2.2.1 Effective planning and scientific Data

Jan Vogelij*

I. INTRODUCTION

This paper about effective planning and scientific data focuses on enhancing the effectiveness of ESPON. From the perspective of a discipline of planning practitioners, this paper seeks to address how the planning discipline can contribute better to the development of Europe? Why is the discipline's distinct ability to integrate sectors and levels as practiced in local and regional strategic planning not more broadly applied?

A weakness of our discipline is that planning research fosters on a different focus from planning practice. Practice, especially strategic planning, is a decision-making process aiming at negotiating agreement or even creating consensus. Its challenge is to integrate the different political and sector views of a specific territorial society into a common vision for future development. The achievements of strategic planning practice seem underestimated.

Place-based planning practice seeks unique and distinct solutions, whereas planning science analyses problems for achieving generalized conclusions and categorizations. Both are needed, but how to better integrate both orientations?

With regard to ESPON, more specific issues are: How to better integrate scientific concepts and local and regional policy concepts? How to bring together the scale of analysis and the scale of policy interventions? How to address the importance of the local level in multi-level governance? How to bring top-down and bottom-up policy ideas together?

Although planners tend to concentrate on the content, the interaction of participants representing different interests is a decisive factor for success. Therefore when searching for improving the effectiveness of planning, the context and process management aspects must be taken into account as well,

This article considers a theoretic background (2), viewing strategic planning as a decision-making process. By taking account of society's complexity and the non-predictability of the processes of strategy making, lessons for effectiveness can be learned from specific rounds of decision-making. An empiric multi-case study has been carried out with regard to effective decision-making in different planning cultures. (3). The findings are presented in section 4. Finally (5) some lessons are drawn for enhancing ESPON's effectiveness for place based planning practice.

II. THEORETIC BACKGROUND

Patsy Healy pleads for collaborative planning. In "*Urban Complexity and Spatial Strategies*" she (Healey 2007) analysed aspects of strategy-making referring to experiences in Amsterdam, Milan and Cambridge Sub-region from a socio-institutional point of view. Her accounts of these experiences in planning practice illustrate the complex reality of urban life. There are a multiplicity of sectors influencing spatial development, institutions with different views, private companies and individuals with often conflicting interests, in which planning practitioners found their ways (or not) in the complex governance landscape.

However, the socio-institutional perspective of Healey's analysis does not fully address in practical terms the issue of how planning practice can prepare and support the decision-making towards an agreed direction of development. The interaction of actors in the integrated making of a vision deserves extra attention.

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Decision-making about strategic development is in practice seldom rationally organised with one responsible problem owner: integrative approaches require such a close involvement of relevant stakeholders that it becomes a confrontation of the diversity of institutional realities, each struggling for hegemony. (Hajer 1995)

Strategic decision-making should take account of Teisman's theory of the meeting of policy and politics streams in a complex institutional reality where no one single institution can assume responsibility for all spatial developments. (Teisman 2000)

The eventual success of a strategic planning process could be established according to the achievement of its ultimately envisaged goals, consisting for instance of such different components as realization of constructions, protection of natural areas, cleaning a polluted lake, enhancement of a town's historic identity or modernized regulations. But, establishing the success of (long-term) strategic planning would require evaluation after a long period of time, sometimes even decades. This is due to the fact that after concluding a decision-making process in an agreement about a future development concept, the next steps like identification of projects, elaboration, impact analysis, specification, organizing investment, final approval etc require time consuming procedures. During that period contextual factors will play a large role. The (in) stability of politics and economic conjuncture jeopardize previous achievements; the long term weakens their coherence and consistency.

Teisman (Teisman 1998) suggests that the decisive moment of complex decision-making can only be detected by hindsight. We distinguish eventual successful decision-making from the individual decision making steps, which promise progress towards ultimate decisions. Teisman called these steps "rounds" of decision-making, being components of a long process of a not predictable series of such rounds in various contexts, perspectives, forums and groupings of people. Acknowledging that actual complex society does seldom allow the long period of time needed to establish the eventual success of a spatial development strategy, he suggests analyzing the activities in a specific "round" for drawing lessons for effective decision-making practice (Teisman 2000).

The effectiveness of a single round cannot be defined by its final achievements on the ground and other effects on society, thereby being different from criteria for the success of the longer decision-making process. Therefore a round of decision-making is defined as effective if: (1) The decision-making ended in achieving an agreement; (2) The process continued, a next round followed; (3) The participants were generally satisfied. These criteria for effectiveness are applied empirically in a multi-case study.

III. EMPIRICAL STUDY

Within a Delft University of Technology PhD study about success factors for strategic planning⁴, practices in terms of the context, process management and content of specific strategic decision-making processes were analysed in five cases within different planning traditions (Dühr, Colombe et al. 2010) of four European countries. The selection of cases in different contexts was based on their general appreciation as successful proceedings in strategic planning among professional planners. These positive opinions consist of the appreciation of local or national planners of cases of strategy making within their different planning cultures. That includes that as far as they systematically applied criteria for assessing these cases as successful, different criteria are used according to the different local/regional/national planning culture. Planning practice has to deal with such differences if we do not want to impose theoretic categorizations and aim to enhance local regional diversity as component of Europe's spatial richness.

⁴ Vogelij Jan, Scenarios for Decision-making, Co-designing Scenarios for Effective Strategic Planning, (not yet published), TU Delft, faculty of Technology, Policy and Management and Research Institute OTB, faculty Architecture, Urbanism and Building Sciences.

The cases are: Drechtsteden, Bologna, Meetjesland, Grödental, Glasgow/Clyde Valley.⁵ Apart from the Drechtsteden case, which covers a sufficient long period of time to analyse its eventual impact, the cases are to be considered as single rounds in ongoing processes.

Literature of each of the cases was analysed on context, process and content. A checklist for gathering background and inside information was prepared. Then six to eight interviews per case were organised, with actors, representing different interests during the decision-making. The effectiveness of the specific decision-making “round” was established in each of the five cases if the round closed with an agreement, next round(s) followed. (unless...) and satisfaction occurred among actors.

The prevailing conclusion from the study Scenarios for Decision-making⁶ was that success and effectiveness are related to creating co-ownership and that co-ownership could result from co-designing options to be considered in a creative and participative process of comparing, improving and refining options towards an agreed concept. The occurrence of co-ownership among different actors per case appeared to be essential for successful integration of sectors.

Multi-level embedding and continued political support were equally important. Factors supportive for co-ownership were bottom-up approaches in a politically supported multi-level embedding:

- Initiative: Bottom-up or top down initiative?
- Multi-level: How was the multi-level embedding of the decision-making?
- Political support: Did political support continue?

Together with the three criteria for establishing the effectiveness, these aspects, important for co-ownership were considered in each of the cases. It must be noted that these factors for effectiveness were not, or only indirectly related to the quality of scientific data applied for preparing the decisions.

Moreover, in relation to the question about the effectiveness of ESPON and the application of ESPON results, extra specific questions were considered within the five cases:

- Data: Was NUTS 3 level data used in the studies preparing the decision-making?
- Referring to ESPON: Did project reports refer to ESPON studies?
- Awareness of ESPON: Were key actors aware of ESPON 's existence?
- Use of ESPON: Do key actors aware of ESPON hold an opinion about the applicability of ESPON results?

IV. FINDINGS

Findings per case:

Drechtsteden⁷ (1997): The collaborative search and deciding of 8 municipalities in Zuid-Holland for a common future development vision serving common interests.

Success of the plan:	Almost every single envisaged project was realized in 2012.
Effective “round”:	Agreement, Next rounds and Satisfaction.
Co-ownership:	Broad, still after 15 years.
Initiative:	Bottom-up.
Multi level:	Great support, stimulated with incentives from province.
Political Support:	Continuous during 15 years
Nuts 3 data:	No, apart from economic SWOT, only intern regional data.
ESPON:	— (too early, the process preceded the start of ESPON).

⁵ The analysis of the Glasgow/Clyde Valley case was underway at the moment of drafting this paper.

⁶ Jan Vogelij (not yet published) Scenarios for Decision-making, Co-designing Scenarios for Effective Strategic Planning

⁷ Scenariostudie Drehtsteden 2030

Bologna⁸ (2007): The making of the structural urban concept (7cities) within the capital of Emilia Romagna, with broad public participation.

Success:	— too early ? Some progress of projects on the ground
Effectiveness:	Agreement, Next round and Satisfaction.
Co-ownership:	Among actors, but diminishing
Initiative:	Bottom-up
Multi-level:	Poor, regional formal requirements discouraged next steps.
Political support:	Fading away, new focus on Metropolitan level
Data Nuts 3:	No
Referring to ESPON:	No
Awareness of ESPON:	No
Use of ESPON:	—

Meetjesland⁹ (2007): The search for agreed spatial development objectives of 12 small municipalities in a Flemish rural region.

Success:	Hardly, enhanced identity and common touristic policy
Effectiveness:	Agreement, Next rounds (suffocate), Satisfaction (shrinks)
Co-ownership:	Decreasing
Initiative:	Top-down, the region continued activity
Multi-level:	Higher level lost interest
Political support:	Continuous struggle of regional platform with mayors
Data Nuts 3:	No
Referring to ESPON:	No
Awareness of ESPON:	No
Use of ESPON:	—

Grödental¹⁰ (2011): Five municipalities in an Alpine valley, searching for a common concerted future development, agreed on a scenario.

Success:	early progress some common policies and projects on the ground
Effectiveness:	Agreement, Next rounds, Satisfaction
Co-ownership:	Broad
Initiative:	Bottom-up
Multi-level:	Active support from province
Political support:	Yes, even considering merging of municipalities
Data Nuts 3:	No
Referring to ESPON:	No
Awareness of ESPON:	Yes
Use of ESPON:	No, different scale

Glasgow/Clyde Valley (2012): Eight Municipalities together with the central city of Glasgow created a strategy based on a shared vision. The achievements of this legally regulated process has recently been approved.¹¹

Success:	— too early, ongoing process
Effectiveness:	Yes, Agreed plan approved by Scottish cabinet
Co-ownership:	Probable, (to be tested)
Initiative:	Bottom-up in formal procedure
Multi-level:	Support of government

⁸ Piano Strutturale Comunale di Bologna, 2007

⁹ Meetjesland 2020, Toekomstplan, 2007

¹⁰ Vision Gherdëina, Masterplan, 2011

¹¹ Apart from the items about ESPON, this concerns a provisional assessment

Political support:
 Data Nuts 3: No;
 Referring to ESPON: No;
 Awareness: No

Table 2.5 Summary of Simplified Findings

	Drechtst.	Bologna	Meetjes	Grödental	Glasgow
Success	+				
Effectiveness	+	+	+ (--)	+	+
Co-owner	+	+ (--)	+ (--)	+	+
Initiative	Bottom-up	Bottom-up	Top-down	Bottom-up	Bottom-up
Multi-level	+	--	--	+	+
Political support	+	+ --	--	+	+
Data	--	--	--	--	--
Referring ESPON	(...)	--	--	--	--
Aware of ESPON	(...)	--	--	+	--
Use of ESPON	(...)			Scale?	

V. LESSONS

In accordance with the distinction between a successful process and an effective round of strategic decision-making, we conclude that apart from Drechtsteden, the cases concern only specific rounds of decision-making. The local appreciation of success of the cases reflects the satisfaction about the achievements of a specific round. For those cases it is too early to establish the success of the strategy making process, but, with regard to the criteria for effectiveness, all cases can be evaluated as being effective. (The Meetjesland case being hardly effective; continuation in next rounds happened in a limited way, focussing on tourism and regional identity)

With regard to ESPON it is noticed that:

- The cases showed a limited influence of scientific input: they mainly concerned managing decision-making, negotiating, convincing and enticing actors.
- The information used consisted almost completely of internal regional problems and demands. Incidental SWOT analysis looked more or less systematically outside.
- There was no reference to ESPON studies, hardly any awareness of ESPON, and if there is awareness, ESPON results were considered not useful.

In general, theoretic issues are hardly seen as relevant on the local level. This presents the tension between theoretic generalizations and place-based differentiation. *“Yes, in general you are right, but with us it is different”* is the dominant local reaction when confronted with scientific studies.

With regard to the implementation of Territorial Cohesion, a main challenge for ESPON is supporting regions and cities to identify assets and develop local capital in order to enhance the diversity of the European regions. That implies to better balance planning research and place based planning practice in ESPON:

- Focus on lessons from achievements of planning practice, for instance in analysing specific cases or comparing cases.
- Strengthen the existing (priority 2) efforts to involve practitioners in ESPON studies. For instance by obliging mixed academic/practitioner team composition.

- Organize national contact points in relation to practitioners. For instance in UK, through the national associations of planners.
- Downscale ESPON's focus by assisting local/regional planners to translate EU strategies and Territorial Cohesion in the local context.
- But also: Steer ESPON with local/regional knowledge and insight. For instance by integrating regional knowledge and experience (CoR and ECTP-CEU) in the (now pure) national ministry composed Monitoring Committee.

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2.2.2 Spatial integration revisited – new insights for cross-border and transnational contexts

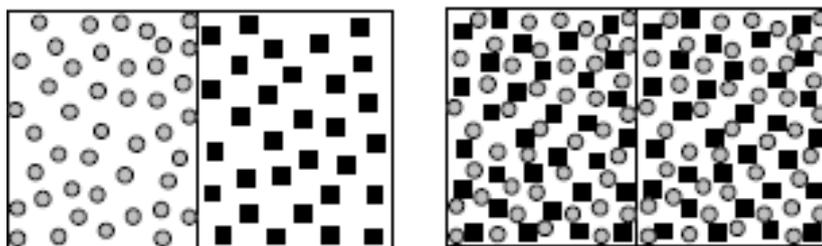
Tobias Chilla* and Estelle Evrard#

I. INTRODUCTION

In the early days of the discussion on European Spatial Development, the authors de Boe, Grasland and Healy made a very valuable contribution to the discussion on how ‘spatial integration’ could be understood (de Boe et al. 1999; cp. Grasland 2012). Their paper was part of the Study programme on European Spatial Development, the forerunner of the ESPON programme. During the last 15 years, this paper was an important inspiration for many colleagues and researchers within and beyond the ESPON programme.

Simplifying to a considerable extent, de Boe et al. 1999 reflected spatial integration in cross-border contexts predominantly as the dynamic resulting from the removal of barriers. Intensified processes of exchange and interlinkage lead to a territorial harmonisation and homogenisation (see Figure 2.9). The metaphor of ‘communicating pipes’ might come into mind here.

Figure 2.9 Homogenization as an important consequence from European Integration



Source: De Boe et al. 1999: 29

With regard to cross-border development, specific integration patterns of density and networks were developed as well as integration dynamics of connectivity and influence. Since then, a series of ESPON projects has applied and further developed this perspective (e.g. project 1.4.3 in the 2006 programme, Metroborder, Geospecs, Ulysses and others in the 2013 programme). These projects have many (explicit and implicit) references to this concept. In the following sections we will reflect some strands of this debate by formulating three postulates;

- Integration is not only about growing similarity and connectivity, but also about complementarity as driving force of integration processes (e.g. labour markets)
- Functional integration is selective and scale sensitive: border spaces can be integrated in European metropolitan networks and / or in local cross-border flows.
- In times of multi-level governance, a three dimensional perspective on integration seems necessary as integration on the local, regional and national level does not necessarily take place in parallel

II. THE COMPLEMENTARITIES POSTULATE

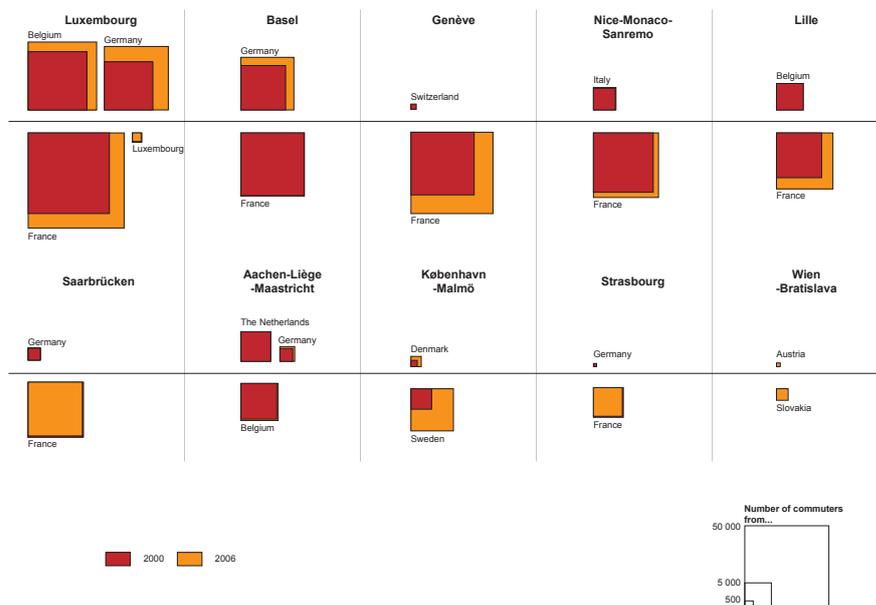
Without any doubt, cross-border integration has accelerated during recent years, as increasing numbers of cross-border institutions and increasing numbers of cross-border commuters show in particular in urbanised border regions.

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University of Luxembourg

Figure 2.10 shows the changes in commuting flows across borders in metropolitan border regions. Two findings are striking here: First, in almost all cases we see an increase in numbers, and this is a clear argument for increasing cross-border integration. Secondly, we see a certain asymmetry between the different poles involved in the process: There is at least one place of origin (places of domicile) and an attracting pole (place of work). In times of high economic dynamic the total number of commuters increases, but the asymmetry does not diminish. This example questions to a certain extent the ‘communicating pipes’ postulate: Even if we observe dynamic integration processes, homogenisation processes or convergence are not necessarily the consequence. Instead we see persisting differentials in GDP, income etc. (Metroborder, cp. Sohn et al. 2009).

Figure 2.10 Cross-border commuting in the case study regions of the Metroborder project



Source: Metroborder, CEPS Instead

In the cases presented, this can in part be explained as agglomeration effect (e.g. Geneva, but not in Strasbourg / Kehl). In other cases we see the consequences of a process of specialisation and concentration which is typical for processes of spatial integration from the economic point of view: economic integration enlarges economies of scale, and this leads to specialisation and concentrations (Aiginger / Pfaffmeyer 2004). Here we have to consider that the European integration process has led to differing degrees of harmonisation and integration in different policy fields (full labour market mobility, limited fiscal harmonisation etc.). These territorial differentials fuel the regional specialisation.

Territorial specialisation – which is also based on historical path dependencies – can be observed in two ways. Firstly, we observe *economic* specialisations (e.g. automotive sector in the Saarland, financial business in Luxembourg). Secondly, we have *functional* specialisations (one place as business core, another as cultural or retail destination or as growing zones of living spaces).

With regard to the policy implication, this finding is sensitive. In general, asymmetries do not necessarily mean that these asymmetries contradict the objective of territorial cohesion. Instead, cross-border integration allows new forms of regional functioning and prospering, offering opportunities for all partners involved. But indeed, questions of balancing prosperity and redistribution procedures are on the agenda and have to be addressed carefully.

III. THE MULTI-SCALE POSTULATE

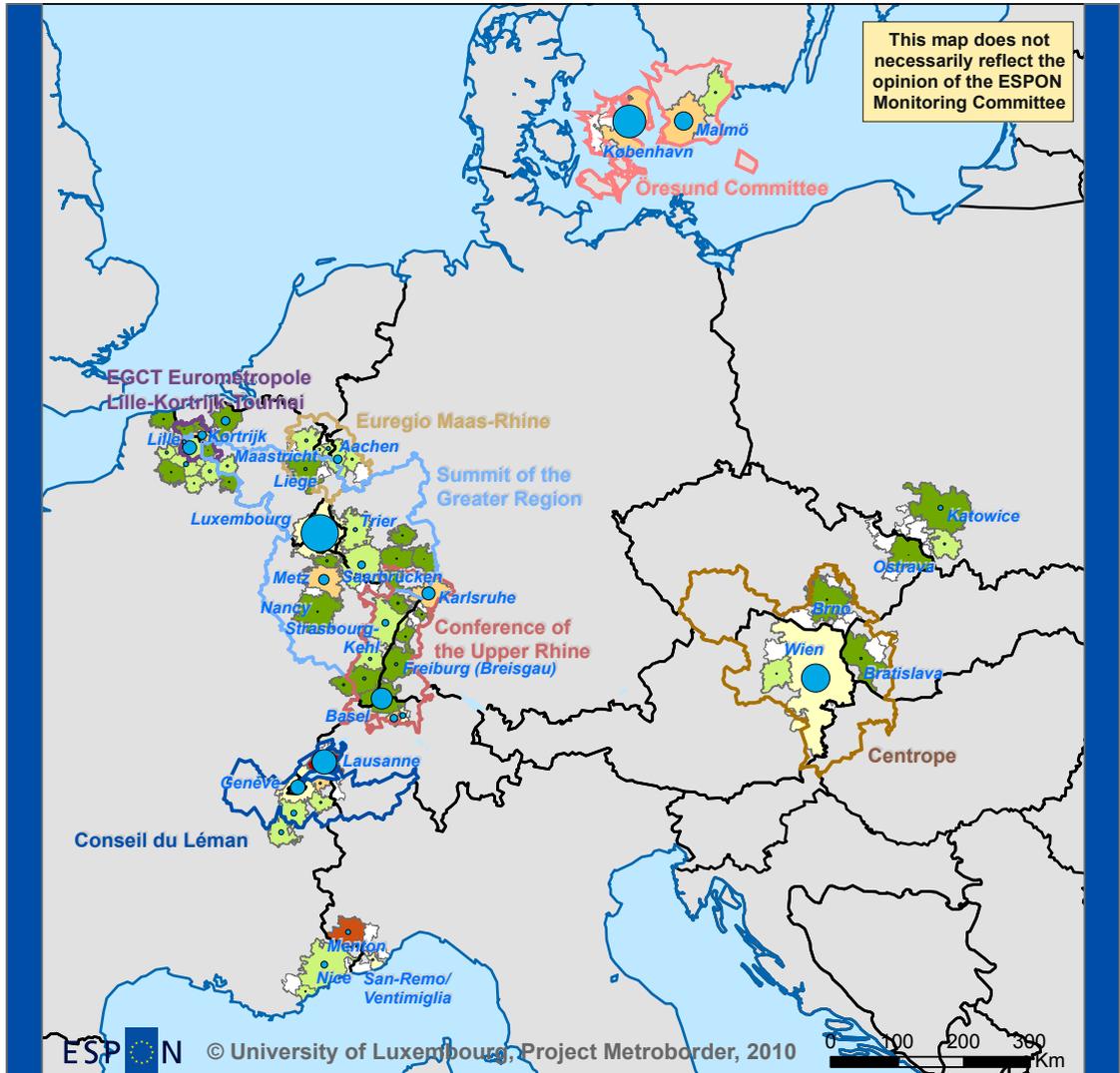
Cross-border integration is a spatial phenomenon that takes place on different scales. At first glance we see two scales of key importance: Firstly, the integration takes place on a regional scale, approx. 30 to 100 km on either side of the border. Within this zone cross-border commuting plays a particular role. ESPON has shown this for the cross-border context applying the concept of the Functional Urban Areas (FUAs, see project 1.4.3, Metroborder). In polycentric regions this extension can add up to larger spaces. These functional areas are mainly defined by commuting activities, and these trigger off a series of further dynamics – the more intense the commuting is, the clearer we see the implications on the real estate market, in the transport sector, in planning conflicts etc.

The second important scale is the global context. In particular in metropolitan border regions, the embeddedness into the global economy is of great importance as also the current crises shows. De Boe et al. (1999: 27) have referred to this constellation by referring to external and internal flows which has proven to be an appropriate framework.

Map 2.4 illustrates this for the Europe's metropolitan border regions: Their FUAs are presented as surfaces, representing the regional ('internal') integration. The circles illustrate the embeddedness within a globalised ('external') economy: the subsidiaries which are mapped here belong to the leading 3.000 companies worldwide and, thus, show a considerable presence in these border regions (cp. FOCI 2010).

However, reducing the spatial dynamic to these two scales would mean to simplify to a large extent. Within the Functional Urban Areas, the spatial complexity is enormous. Neither is commuting a spatially homogenous phenomenon, nor are the consequences equally spread. From the Upper Rhine region we know this with regard to commuting patterns (which remains largely a domestic phenomenon); from the Greater Region around Luxembourg we know that the economic patterns show different characteristics with the FUAs, having a prominent financial sector concentrated on the Luxembourgish side, an automotive sector in all parts etc. – but given the poor data situation, it is not easy to get the full picture.

Map 2.4 Europe's cross-border metropolitan regions and their integration into the global economy



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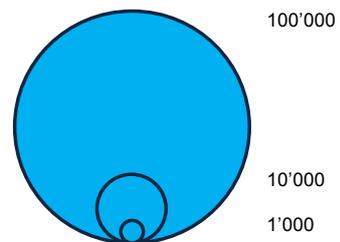
Level: FUA
Source: Team IGUL, FOCI 2010
Origin of Data: Team IGUL, FOCI 2010

© EuroGeographics Association for administrative boundaries

Controlled subsidiaries – subsidiaries from outside
Controlled subsidiaries + subsidiaries from outside

- 0,71 – 1,00
- 0,51 – 0,70
- 0,21 – 0,50
- 0,01 – 0,20
- 0,49 – 0,00
- 1,00 – -0,50

Controlled subsidiaries + subsidiaries from outside by FUA (except local links)



IV. THE MULTI-LEVEL POSTULATE

De Boe et al. (1999) referred to the reflections on multi-level governance that were very young at that time: “Multi-level relationships between territories can be quite complex [...]. Hierarchical relationships clearly exist between different territorial scales which combine with horizontal relationships between similar territorial units” (De Boe et al. 1999: 29).

The ESPON research on cross-border development has clearly proven and illustrated that assumption. Cross-border integration means the intensification and the institutionalisation of cooperation on all levels. This might take place on the local level (e.g. Euregios), on regional or the transnational level (e.g. European Groupings of Territorial Cooperation, Macroregions); these examples are completed by a series of individual, multilateral solutions (see the institutional mappings of Metroborder, Ulysses).

Different case studies have shown several so called ‘mis-matches’ (cp. Chilla et al. 2011). Firstly, institutional cooperation between institutions on the same level does not automatically mean that all partners have comparable competences. For example, the competences for transport infrastructure are in some countries concentrated on the national level, in others on the regional level. This kind of misfit poses some considerable challenges in the practical and diplomatic sense.

Secondly, the cross-border institutionalisations hardly ever bring together all important institutional partners and the fitting perimeter. For example, the Greater Region brings together very relevant political actors even if the perimeter is far too large for most pressing challenges of territorial development.

The political implication from this insight is that one-size-fits-all institutionalization in cross-border and transnational context is hardly possible. Instead we have to see the importance of soft and flexible instruments, and of horizontal and vertical linkage of hard competences.

V. CONCLUSION

Recent years of the ESPON programme have confirmed, illustrated and further developed important aspects from 1999 study programme with regard to cross-border and transnational integration. The complexity and dynamic in these territories is enormous and needs particular political commitment. For the coming years we have to underline the following points:

Firstly, spatial integration is more than homogenisation by cross-border flows, but instead we see the development of complementary structures and of opposing trends. This offers new development opportunities for all partners involved, but the question of balance is a delicate one: tailor made strategies have to work towards territorial balance that heads towards territorial cohesion.

Secondly, the complex character of overlapping multi-scalar developments has to be further reflected, and the still relatively poor data situation has to be improved. A solid research project on borders (beyond targeted analyses) seems to be necessary.

Thirdly, the institutional response to the multi-level challenge of cross-border cooperation has to consider soft, flexible forms of territorial governance.

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2.2.3 Deconstructing and re-constructing territorial governance: findings from ESPON TANGO case studies

Lisa Van Well and Peter Schmitt*

I. INTRODUCTION

This paper stems from findings developed within the ‘ESPON TANGO’ – project (Territorial Approaches for New Governance). One of the scientific objectives of TANGO is to delve into the conceptualisation and operationalisation of territorial governance across Europe. The lion’s share of the empirical work has thus been dedicated to twelve in-depth case studies. These illustrate a wide range of territorial governance situations across Europe and serve as the basis for both the main report and a Handbook on Territorial Governance.

Here we present our methodological approach for *constructing* the territorial governance concept as a framework to guide the case study work. We subsequently *de-construct* the empirical results of the case studies and then *re-construct* our reflections about the variations and commonalities territorial governance concept and the linkages between them. We also make suggestions for how our approach can contribute to theory-building around the concept of territorial governance.

II. CONSTRUCTING TERRITORIAL GOVERNANCE

The TANGO working definition of territorial governance serves as the central theoretical framework from which to study territorial governance processes at play. The point of departure has been to bring together various key points from the literature with regard to what is perceived as (most) essential and inherent to the concept of territorial governance. We took inspiration from not only literature on territorial governance (eg. Davoudi et al 2008, Gualini 2008, Faludi 2012), but also debates around the concepts of stakeholder participation (eg Healey 1997) as well as resilience and adaptability (eg. Gupta et al 2010). Finally, to address the lack of further specification of the notion of geographic specificity or territory which is often absent in the literature (Jordan 2008) our research approach includes the extent to which place-based/territorial specificities and components are addressed within territorial governance practices.

Based on the literature review and extensive discussion and negotiation with the experts on the project team, the TANGO working definition of territorial governance emerges as “the formulation and implementation of public policies, programmes and projects for development (an improvement in efficiency, equality and environmental quality of a place/territory) by, 1) coordinating actions of actors and institutions, 2) integrating policy sectors, 3) mobilising stakeholder participation, 4) being adaptive to changing contexts, and 5) realising place-based/territorial specificities and impacts”. We consider territory and/or place as social constructs that are not necessarily limited by jurisdictional boundaries.

A Delphi exercise performed in the autumn of 2012 largely confirmed our dimensions and the subsequent 12 qualitative “indicators” of territorial governance developed (Table 2.6). These were then used to generate questions in an extensive Case Study Guideline and Interview Guide which partners used in performing their case studies. All case studies were based on in-depth interviews with 8-12 relevant stakeholders, as well as analysis of policy documents. To ensure topicality, the objects of the 12 case studies are all from around 2000 until the present. The cases are representative of the major geographic areas of Europe and address a number of territorial policy areas as well as a range of institutional levels. But most of them address at least some form of ‘bottom-up’ governance process. They also involve territories bounded by ‘hard’ administrative borders as well as those with ‘softer’ functional delimitations.

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Table 2.6 Overview of the five dimensions and 12 indicators of territorial governance

Five dimension of territorial governance	Twelve indicators for assessing the performance of territorial governance
Co-ordinating actions of actors and institutions	Governing Capacity
	Leadership
	Subsidiarity
Integrations policy sectors	Public Policy Packaging
	Cross-Sector Synergy
Mobilising stakeholders participation	Democratic Legitimacy
	Public Accountability
	Transparency
Being adaptive to changing contexts	Reflexivity
	Adaptability
Realising place-based/territorial specificities and impacts	Territorial relationality
	Territorial knowledgeability and impacts

III. DE-CONSTRUCTING AND RE-CONSTRUCTING TERRITORIAL GOVERNANCE

Derived from our theoretical and conceptual framework and based on our analysis of the evidence generated in twelve case studies, 20 'components of territorial governance' have been distilled. These are representative of the structural and process-oriented facets of territorial governance. They link together central components of the five dimensions and the 12 indicators and are related to the observed practices, routines, but also mechanisms and partly structures of territorial governance. As such they enabled the following observations to be made in accordance with each dimension:

Coordinating the actions of actors and institutions

Within the case studies we see a distinction between distribution of formal power (governmental rights and responsibilities) and informal power (structures and processes for influencing the decision-making process outside of statutory mandates). In the cases involving transnational or cross-border actors much of the power exercised was of a normative character, rather than regulatory. But also in the local and intra-regional cases, most cases of territorial governance involved a mixture of both.

Clear leadership was a characteristic of the more successful cases of territorial governance, regardless the form of leadership. Clear leadership appeared to be a contributing factor to the success of other dimensions of territorial governance as well, in particular cross-sectoral integration. In the 'softer' spaces, consensus among actors was the main mode of decision-making, facilitated by transparent leadership. Several of the 'unsuccessful' cases were marked by unclear, opaque or contested leadership. Particularly in more centralised countries, national authorities often claimed more top-down power in an issue at the cost of formal leaders at local or regional level.

Enabling factors in the coordination of actors included previous cooperation among actors as well as the existence of various principles such as solidarity, subsidiarity or the desire to create and maintain a certain 'image'. Several case studies also noted that a unified political landscape was an important facilitation factor.

Integrating policy sectors

Acknowledging the conflicts among sectors and the actors representing them is the first step in potentially dealing with the conflicts. While all of the case studies had specific structures set up to promote cross-sectoral integration, the procedures for doing this were much less obvious. Working 'concretely' for synergies often occurred through dialogue among networks or partnerships associated with the drafting of programmes or strategies among trans-regional, transnational or cross-border actors. In the cases featuring municipal or local governance, synergies were often facilitated by formal or informal structures to promote public-private partnerships.

Boosting institutional capacity of administrative units was seen as a way to deal more effectively and equitably with conflicting sectoral interests. In those cases dealing primarily at the local/municipal level, greater decentralization of powers to lower levels was seen as a way to increase the capacity of the localities to mobilise resources for addressing sectoral conflicts.

Mobilising stakeholders

A key issue from the case studies was how stakeholder articulated viewpoints are actually being dealt with. It was also noted that it is important to understand the whole territorial governance process as such in order to assess where and when viewpoints might feed into it and the scope of their relative power to re-shape the policy, programme or project at hand. Barriers to stakeholder mobilisation included undefined or unclear processes and mobilisation of "the usual suspects" or stakeholders who are already active rather than 'outsiders' or newer stakeholders. Various media channels (online, radio, newspaper) seem to be powerful tools to make territorial governance more visible, but not necessarily more transparent, due to the prevailing high level of complexity.

Being adaptive to changing contexts

How knowledge is managed within institutions is certainly a question of resources, scope for (individual) capacity-building and mechanisms to secure this for future purposes. What is required is stability of institutional arrangements, various means to store and develop knowledge (monitoring system, annual reports) and mechanisms to safeguard personalised knowledge due to the fluctuation of individual actors. However, besides such structural aspects, leadership styles and the level of collaborative culture, as well interpersonal networks and trust can either promote or inhibit the opportunity for institutional learning.

In general, the less formalised the territorial governance arrangement, the greater is the scope of flexibility or even experimentation. Other factors promoting this are the possibility to integrate ad hoc debates, to create new partnerships, to develop soft leadership that allows for corrective actions or to search for new solutions in light of changing contexts. Limiting factors are scarce resources (budget) and business-as-usual attitudes. Another item that has been observed in this respect is the positive effect of robust institutional structures that are at the same time flexible enough to absorb the impacts of political changes or crisis.

Realising place-based/territorial specificities and impacts

The case studies represent two different types of intervention logics: a) the territorial scope being pre-defined by the jurisdictional boundaries of the lead institution (e.g. municipality) and b), the territorial scope based on functional/issue-based criteria (e.g. catchment area of river, nature conservation, labour market region). In some cases both options are integrated, which complicates a number of other components of territorial governance. It seems that a soft or functional approach can challenge prevailing perceptions and routines of actors and institutions being locked in 'hard' spaces, which can contribute to a more relational territorial understanding.

Today's territorial governance practices are supported by an enormous body of territorial expert knowledge. An issue in many cases is the question of who collects and owns this knowledge (and becomes knowledgeable) and to what extent the various actors and institutions involved in the territorial governance work are able (and willing) to share it. Other relevant issues are temporal continuity

of the use of territorial knowledge/analysis as once a plan is adopted the ex post use of knowledge could be low, and setting priorities due to limited resources. Examples for the latter are the selection of certain areas for territorial monitoring or the integration of territorial impact assessments for only strategic' projects (those that get high political attention).

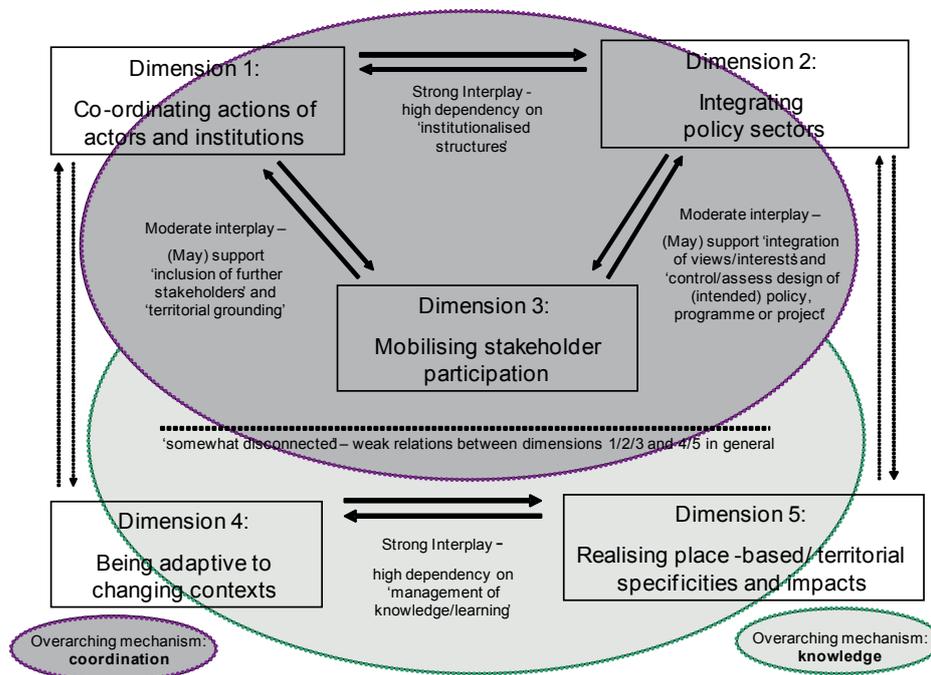
IV. REVISITING THE FIVE DIMENSIONS

Coordinating actions of actors and institutions (Dimension 1) and Integrating policy sectors (Dimension 2) are at the heart of what is usually called multi-level governance. These actions are often entangled within the scope of *government*. Central for the strong interplay between these dimensions is the distribution of various sorts of power (formal/informal as well as regulatory/normative) and ways to overcome the barriers, constraints or even gaps within the prevailing institutional structures. Mobilising stakeholders (Dimension 3) expands on the two aforementioned dimensions, as it accentuates and provides a tool for the integration of all relevant stakeholders. The analysis shows that mobilising stakeholder participation is a lynchpin for achieving both coordination among actors and sectoral integration. As a result, we can argue that Dimensions 1, 2 and 3 can be considered as forming a triangle that is characterised by coordination as the overarching mechanism as well as strong or at least moderate relations between them (see Figure 2.11).

However the linkage between Mobilising stakeholder participation and Being adaptive to changing contexts (Dimensions 4) and Realising place-based /territorial specificities and impacts (Dimension 5) is somewhat disconnected. This is perhaps because there is a different overarching mechanism at play. Dimensions 1 and 2 set the structural pre-conditions of multi-level governance, which demands coordinative capacities, while dimensions 4 and 5, as argued below, have knowledge as the overarching mechanism. The uniting characteristic of Dimensions 4 and 5 is that both have knowledge aspects at the core of their conceptualisation. The case studies show that in order to be adaptive to changing contexts it is necessary to have certain institutional structures in place to safeguard knowledge and ensure that individual learning is transposed into institutional learning. Knowledge also underpins the components of Dimension 5. Territorial knowledge sets the framework for the logic of defining an area of intervention and for further 'coping' with 'softer' or more functional boundaries.

We assert that the interplay within the triangle composed of Dimensions 1, 2 and 3 has been (largely) captured by the concept of multi-level governance. Nonetheless, we state that the territorial elements and the shift from 'multi-level governance' to what we define as 'territorial governance' become most explicit when incorporating Dimensions 4 and 5. To conclude, we argue that the five dimensions as such constitute a robust framework to analyse territorial governance. The 12 indicators and 20 components have been helpful to trace even further our study of territorial governance at play, instead of solely focussing on describing the institutional structures. Certainly, one can adapt them depending on the specific focus of any follow-up investigations. Overall, they offer a solid ground to make distinctions within the complex and nested field of territorial governance. In particular they offer room to assess the extent to which the territorial dimension matters within regular (multi-level) governance.

Figure 2.11 Inter-relations between the five dimensions of territorial governance



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2.2.4 Between self-organization and policies: spatial models of dynamic urban processes

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I. INTRODUCTION

The ongoing discourse about cities and regions with its sometimes argumentative basis means that when we discuss territorial matters (be it growth, change, form, fabric, flows, social behaviour, economy or many other aspects of 'urbanity') we cannot get an agreement even on the level of diagnosis. We describe reality using different measures and axiologies. We understand reality in different ways, each being imprisoned in our methodology and points of reference. Exposing these differences through a structured dialogue seems a fruitful thing to do. This may lead to more operational tools to be used in practice.

One such tool is planning, which broadly can be interpreted as a human attempt at conceptualising the spatial dimension of the future. This goal is reflected in policies and governance. Yet, planning powers – be they expressed in policies, strategies or plans – are limited by self-organizing forces (Portugali, 1999) of societies and, as a consequence, spatial patterns. Processes which shape space, being beyond control, need to be identified, understood and only then the plan could '*devise course of action aimed at changing existing situations into preferred ones*' (Simons, 1969). Planning needs to combine the empirical and normative as well as the wider theory. This ambitious framework requires tools which would allow to spatial processes in their dynamic form bridging past and future to be seen.

In this paper we would like to briefly discuss the advantages of using simulation models based on the intervening opportunities mechanism as an instrument which could help to foresee consequences of implementing spatial-relating policies.

II. MODELS IN PLANNING

Models represent the reality, they are not reality itself. Different kinds of models can be defined: physical (or 'analogue'), iconographic, conceptual, abstract. Since the second half of the 20th century the focal point of the models used in planning has moved towards abstract models describing relations and flows rather than physical form. The typical language of this kind of models is mathematics. Widely discussed models in urban studies were: linear programming, diffusion model, PERT, regression analysis, Lowry-Garin spatial allocation model (Garin 1966; Lowry 1964) urban dynamics (Forrester 1969), cellular automata (Batty 2005), gravity model (Voorhees 1965), intervening opportunities model (Stouffer 1948).

Simulation models are a specific group of models which allow 'experiment' instead of experimenting on the real system. These models could help with the designing of a tool which would bring together the decision making (=governance and policies) and the 'natural' driving forces shaping space at different scales (=self-organization). They additionally could reveal the possible 'response(s)' of the real system.

The spatial characteristics of the model are especially important for territorial governance.. There are many models describing spatial processes in the a-spatial way (i.e. Lowry-Garin) but the answer in what way the territorial system could react to implemented strategies/policies/investments is often a central problem. There are many sectoral (e.g. transportation) models already giving spatial interpretation to a specific issue. What planners and policy makers might be particularly interested in is a model which could simulate the performance of the spatial structure. It seems that the contacts representing essential, indispensable relations between activities located in the physical space might be considered as the most powerful component shaping territorial structure. There are two groups of models representing the configuration of such contacts in spatial structure - the first group is based

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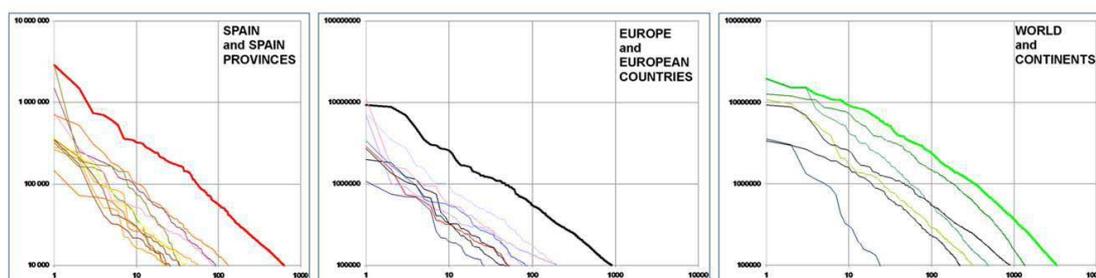
on the gravity model and the second group is based on the less used intervening opportunities model. The latter was the base of simulation models, including allocation model (Zipser, 1972) emphasising the process of generating concentration as a main driving force shaping urban structure.

III. CONCENTRATION AND HIERARCHY IN SPATIAL SYSTEMS

In order to foresee spatial effects of processes of urbanisation, the main driving forces or general rules which influence and control the performance of an urban system need to be defined. These rules are not models – they simply occur and perform within the urban system. They might be considered as kind of *lex naturalis*.

One of the most striking regularities of urban network is widely known as rank-size rule. The idea that the size distribution of the cities within a defined area (country, region) can be approximated was articulated in a precise way by Auerbach (1913) and then redefined, among others, by Zipf (1949). The significant regularity of rank-size distribution applies to the different spatial scales (Figure 2.12). The same regularity can be observed in relation to time.

Figure 2.12 Rank-size distribution of (a) Spain and its provinces in 1998, (b) Europe and the European countries in 2000 and (c) the world and the continents in 2000



Source: Mironowicz, Mlek-Galewska, 2011

This regularity may mean that there are driving forces able to keep urban networks in accordance with the rank-size rule. Nobody can ‘plan’ this order, nobody even can even influence this regularity easily. This phenomenon reflects the self-organisation ability of the spatial system.

Two driving forces can be clearly extracted from rank-size rule. One of them is concentration – as a consequence of the best possible distribution of the activities in the given network of contacts. Concentration is the most ‘noticeable’ feature of spatial arrangement. Many studies have been conducted concerning concentration – from describing this phenomenon to measuring it (i.e. Clark’s and Newling’s rule, Gini concentration ratio, Lorenz curve). What is especially fascinating is the mechanism of concentration in real spatial processes. Concentration itself is the result of this mechanism. The second is hierarchy as an expression of the predilection for the self-organisation of a spatial system. Hierarchy might be considered as a way of managing concentration. It is quite evident that spatial systems are not ‘flat’, quite the reverse, there is strong tendency to structure the network. Hierarchy is only one, but probably the most efficient of the possible patterns of this structure.

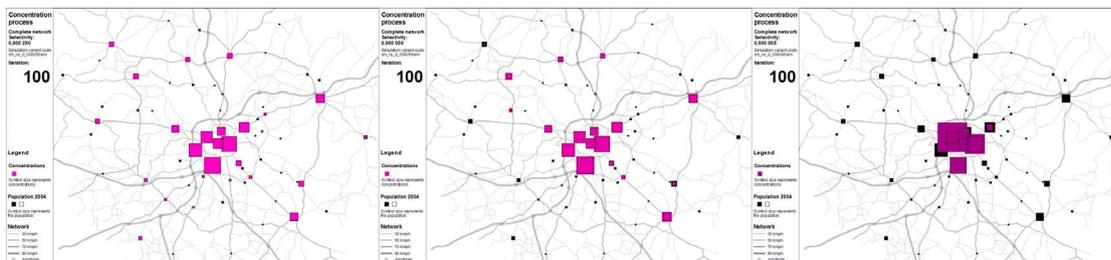
In this paper we consider concentration as a result of contacts that shape territorial structure. This creates the opportunities of modelling spatial scenarios for the future by using simulation models. Concentration as a result of contacts can be simulated by using mathematical models of this process. In this paper we focus on intervening opportunities model and explore the possible application of this tool in order to foresee spatial effects of urban intervention and, as a consequence, to help in decision making process in territorial governance.

VI. THE IMPACT OF DIFFERENT CONTACT TYPES

Observing the simulation of the Metropolitan Area of Wrocław, we can notice that the influence of a contact type (mirrored in the value of selectivity parameter) on simulation results is significant (Figure 2.14). Higher selectivity value ('soft') corresponds to the situation when travellers are satisfied with destinations which are quite close to them in the space of opportunities. Lower selectivity value ('sharp') means that many of subsequently encountered destinations are omitted by travellers before they find the destination of their trip. This expresses also the importance of the need, whereby 'sharp' selectivity is typical of higher rank needs.

Higher selectivity value in the simulation process will result in many small concentrations of destinations. We can interpret them as locally attractive places. Lower selectivity value is favourable to achieving one or a few high concentrations of destinations. Their locations are attractive in a wider (i.e. regional) scale for travellers who are prepared for a longer trip.

Figure 2.14 The impact on simulation results of different contact types represented by changes of selectivity parameter. Case study: Metropolitan Area of Wrocław



Source: Mironowicz, Mlek-Galewska, 2011

Note: Results after 100 iterations of the simulation conducted on the planned transportation network from initial real origins' and even destinations' distribution; the selectivity respectively $0,000250 = \text{'soft'}$, $0,000050$ and $0,000005 = \text{'sharp'}$

VII. THE IMPACT OF POTENTIALS

The basic assumption of the model is that a good measure of attractiveness of the place is how many people look for satisfaction of their need in the particular place. This is why the process of simulation is based on allocation of destinations from the nodes where they have not been accepted to the nodes where surplus of arrivals has been noticed. It is quite easy to notice that also potential of both starting points and destinations can reveal real or 'imagined'/planned values. These values describe an urban structure. Therefore model is able to test the response of the territorial system to various potentials. For example even distribution of the starting points can reveal predilection of the system to create 'natural' hierarchical territorial structure.

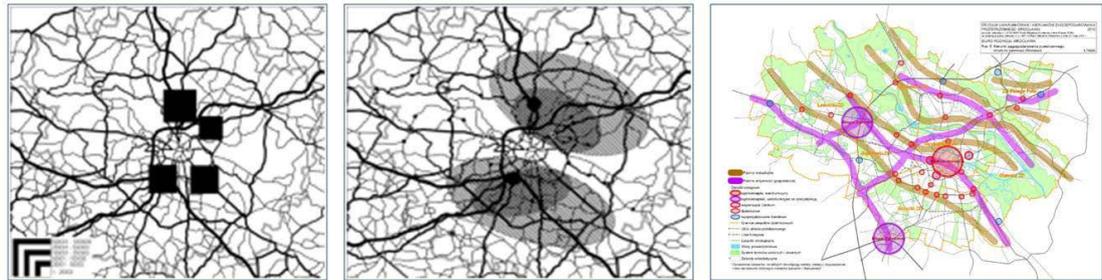
VIII. MODELLING AND GOVERNANCE: CASE STUDY

Simulation of the metropolitan centres in the city of Wrocław revealed the strong predilection to a bi-polar centre structure (Figure 2.15a,b), although the municipal spatial policy aims at a different solution. The idea is to improve cohesion between the western and central parts of the city by developing a strong western pole (Figure 2.15c) based on the motorway by-pass junction which is supposed to generate a new urban structure. In order to attract private investment the city located a new football stadium in this place.

The research question for the more detailed simulation was whether this western pole might grow benefiting only from privileged accessibility and existing investment. The response of the model was generally negative. Using the opportunity to simulate an urban structure on the basis of imagined

data, the source potential of the place has been increased by 10 (the highest growth in the region in the recent years), 100 and finally 1000 percent (Figure 2.16). Only the latter generated the beginning of the concentration process.

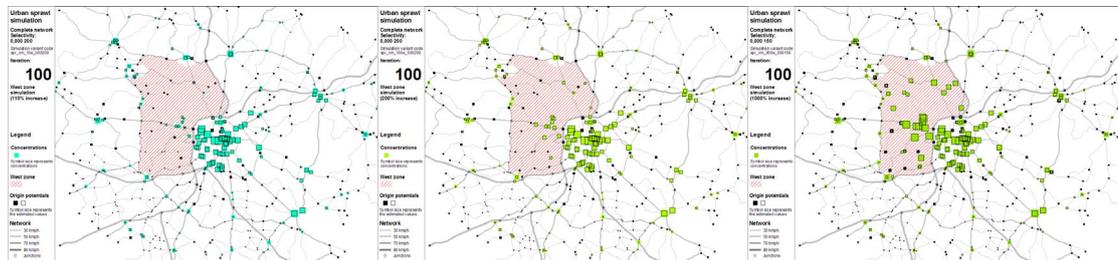
Figure 2.15 Simulation of Wrocław's metropolitan centres: (a) within the planned transportation network (b) final predilection of the bi-polar centre system and (c) municipal plan of developing three-centre system



Source: Mlek-Galewska, Zipser, 2007; Wrocław Development Office, 2010

In terms of spatial policy of the city, the result suggests that the growth would require either a massive investment (to generate this new potential) or time (to let the potential grow gradually).

Figure 2.16 Simulation of the imaginary structure of the Western Pole in Wrocław Metropolitan Area – results after 100 iterations with (a) 10 % (b) 100 % and (c) 1000 % increase of the source potential



Source: Mironowicz, Mlek-Galewska, 2011

In spite of quite significant public investment, there is no real business private sector interest in the place. What recommendation might be formulated for the municipal territorial policy based on the results of the simulation? First, the awareness that induction of the process of growth might be not successful when based only on the accessibility and existing investment. Secondly, that there would be a need of the significant increase of the investment (very likely public) in order to evolve the process of growth. Finally, that this investment might be interpreted also in terms of time – this process without external support would simply take a long time.

The simulation does not replace the spatial policy – this is only a tool which can test the policies and help with decision making process. However, policies which ignore the natural predilection of the territorial systems to self-organisation may either fail or generate massive costs.

IX. CONCLUSIONS

The tool we presented to support urban/regional planning should be applied with awareness of all its limitations and simplifications. Although not being perfect, it assists in obtaining a deeper insight into processes which are not clearly observed or imagined. We cannot interpret the simulation results as a straight answer because we use a model of urbanised space and a model of the concentration process. By observing simulation results we can estimate general characteristics of an urban

system. The model we use is a concentration model which does not encompass other factors of the paradigm of spatial decisions. The simulation results from more complex and sophisticated models (i.e. ORION = Optative Repartition In Opportunity Network) have yet to be interpreted.

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2.2.5 Rural development, female mobility and the provision of SGI – a target group oriented approach

Karin Wiest and Daniel Rauhut#*

I. A PLACE BASED APPROACH TO COUNTERACT DOWNWARD SPIRAL SIN EUROPE'S RURAL AREAS

Migratory movements, the provision of social and economic infrastructure and the socioeconomic development in Europe's regions are closely and reciprocally related. Two projects targeting these interrelations have been conducted in the frame of the ESPON 2013 Programme: The project SeGi and the project SEMIGRA. While SEMIGRA was dealing with the notion of (out-)migrating and the needs of young women living in rural, remote areas, SeGi analysed the territorial differences in the effective delivery of Services of General Interest (SGI)¹² throughout all regions in Europe. Both projects refer directly to equivalent living conditions in Europe and question how to foster territorial cohesion. In order to bring some results of these two projects together, the focus here is placed on rural, sparsely populated regions. These are territorial contexts where the problems of selective out-migration and insufficient provision of SGI are particularly challenging. Migrants as well as the users of SGI represent specific needs and interests in these particular regional settings – a target oriented regional policy has to take account of these different needs. The paper refers to the key principles of a place-based approach to policy making which aims to foster regional development through the production of integrated, place-tailored public goods and services, by considering local preferences and knowledge (Barca, 2009). The contribution has two aims:

- To discuss how the idea of a place-based approach can be implemented in research on Europe's regions by integrating a stronger qualitative research perspective. This objective is not only directed to particular regional structures and pathways but also to the perceptions and needs of the people living in those regions.
- to take a step forward in integrated thinking by bringing two ESPON projects together and by emphasizing interrelations. While in the frame of SEMIGRA the development of place tailored strategies was required with a strong target-oriented focus, in the context of SeGi a comparative analysis of the political and territorial organization of various SGI was conducted.

II. FRAGILE TERRITORIAL STRUCTURES: INDICATORS AND FINDINGS ON EU LEVEL

Regional disparities in Europe are mirrored in migration patterns, demographic structures and the accessibility of SGI. In the frame of SEMIGRA the analyses of the sex ratio pattern on NUTS2 level revealed considerable regional differences in the distribution of young men and women in Europe (Map 2.5). Most obvious is the shortage of young women in rural remote and economic weak areas, while they tend to outnumber the men in urban centers. Those demographic spatial patterns suggest that the outmigration of young women is to some extent an indicator for a socioeconomic re-evaluation of spatial structures in Europe (ESPON 2012).

The SeGi analysis shows that areas with concentrated demand benefit from higher availability of SGI, which in such areas tend to be more accessible, being of a higher quality and more affordable due to the economies of scale. Remote, mountainous, rural, and other regions with lower population densities have fewer services available (Map 2.6). Often declining demand for such services is a result of the outmigration of persons in active ages, depopulation and ageing.

Bringing the results of the both projects together we can conclude that there is a tendency that regions affected by a shortage of young women do not perform well in the SeGi regional typology of

¹² SGI contains of Social Services of General Interest (labour market services, education, healthcare, childcare, elderly care, social care, (social) housing and social assistance services.) and Services of General Economic Interest (technical infrastructure as e.g. gas, electricity, energy, transport, water and waste management and communication infrastructure as e.g. ICT, electronic communications, postal services).

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SGL. In this context it should be highlighted that the living situation of women, and also opportunities in the regional labour market are often closely related to the regional provision with social SGL. In many regions for example jobs for women are provided in the field of care and education and – on the other hand - job opportunities for women are often related to the availability of childcare facilities. Nevertheless the statistical analysis on NUTS2 level also revealed shortcomings with regard to policy implications in both of the projects.

The very heterogeneous set of services included in the term SGL, limits the explanatory power of the general analyses possible to make in the regional typologies. The indicators are sometimes very blunt indeed. The SeGL project found it troublesome to analyse investments in nuclear power plants and the consumption of child care in the one and same typology; hence both are defined as services of general interest. Furthermore, much effort is placed on accessibility of SGL in time or distance. The quality of the SGL is just as important, but usually ignored.

With regard to regional sex ratio imbalances in SEMIGRA, it turned out that they are highly dependent on the national context. There are even some pan-European trends in the regional pattern of sex ratio imbalances, and there are even more differences and national peculiarities. Territories affected by the out-migration of young women differ significantly in their resource endowment, geographical and demographical characteristics, cultural contexts and social and economic structures. As a conclusion, it should be highlighted that numerous factors are related to education, the labour market, the regional economic situation. Culture and gender roles also influence age- and sex-selective migration processes. Therefore an in-depth consideration of the structural framework conditions in different territorial contexts was required in both projects.

III. DIFFERENTIATED STRUCTURES ON REGIONAL LEVEL – LOOKING BEHIND INDICATORS

In order to look behind the indicators provided by the statistical analysis on EU level, and to better understand specific regional pathways, research on case study regions was carried out in SEMIGRA as well as in SeGL. Here the position of the case study region with regard to the national context and structural differences within the regions were considered. In this context inter alia intraregional disparities between (regional) urban centers and very small rural municipalities have of course fundamental impacts on the provision with SeGL as well as on the migration decisions of young people. A further key challenge is to learn more about the social realities behind statistical indicators and typologies. While quantitative data analyses are appropriate to point out the extent of structural demographic processes at the European, national, and regional levels, a qualitative research approach is more suitable to deal with the individual perceptions of living conditions and the social embeddedness of migration decisions. This is relevant in order to better understand migratory movement respectively and the individual pathways of regional demographic development. Hence, in order to explain the underlying impacts influencing regional processes, both structural elements and the subjective perceptions of individuals are required.

According to qualitative research understanding, the complexity of human behaviour and actions is the main research target rather than the generalisation of results. In particular, regard has to be paid to the different socio-cultural contexts that exist. Against this backdrop, in-depth interviews with young women living in or originating from the case study regions and expert interviews were both conducted in the frame of the SEMIGRA project. This served to better understand the context in which migration decisions take place and the opinions people assign to living in particular rural areas. The aim was to learn more about the social realities as well as the experiences and shared knowledge of the people living in the regions under consideration. To give an example: In Eastern Germany (study region Sachsen-Anhalt) we can identify a very pronounced shortage of young women compared to the European and national average. At the same time a strong female labour force participation rate and favourable provision with SGL in the field of childcare is prevailing, which facilitates the reconciliation of work and family. Those indicators denote female friendly framework conditions. Explanations for the shortage of young women based only on the demographic data are therefore difficult. Against this backdrop the life-stories of the women revealed how the living situation and the image of Sachsen-Anhalt are negotiated in every-day life, and how this influences individual migration decisions. So in some of the considered regions, a culture of out-migration among young people emerged, founded on an implicit knowledge that in these areas the most

entrepreneurial leave, while those lacking initiative stay behind. This in-depth knowledge on the local level is regarded to be crucial in providing differentiated explanations for the facts and processes elaborated on in statistical data, and in developing political strategies that take the needs of the local population into account.

IV. CONSIDERING THE NEEDS OF SPECIFIC TARGET GROUPS

Policy advice is more promising when focusing on specific target groups. In the frame of SEMIGRA, age and gender were regarded as social categories that basically influence migration decisions. These categories are also closely related to the demand and preferences for certain SGI (e.g. child-care for young families and health care for elderly generations). If young women leave regions, the insufficient targeted provision of SGI to meet the needs and preferences of this demand group, has to be considered as a push factor.

The impact of gender issues: SEMIGRA was dealing with the question of how gender-sensitive concepts and strategies could be helpful to break vicious circles in the regions affected by age- and sex selective outmigration. A strategy targeting women has to be considered as one element of an integrated cross-sectional oriented task covering topics like the female labour market, the regional image, the educational infrastructure and the possibilities to reconcile work and family. Table 2.7 illustrates how strategies targeting the needs of young women could be implemented in different policy areas.

Table 2.7 Place-based knowledge and target group oriented policy advice

Regional Structures	Strategies, Policy Advice	Target groups (here young women)
Economic Structure, Labour Market	Stimulate Entrepreneurship; Develop diversified economic structures ("New rurality"); Openness to flexible, innovative forms of employment; Foster a female friendly labour market; Skills to make use of ICT; Promote voluntary work	Women's education, skills + social capital
Image	Focus on atmosphere; Awareness raising for local and regional assets; Promote female-friendliness as locational factor; Promote female role models	Women's preferred lifestyles
Place attachment	Promote attractive SGI; Stimulate civic engagement; Foster political participation and social networks	Women's preferred lifestyles
Social Services of General Interest	Flexible/multifunctional solutions; Universities as drivers for innovation; Promote cultural initiatives; Ensure good quality of child care facilities; Offer meeting places for girls	Women's needs and living situation
Services of General Economic Interest	Exploit the potential of new ICT (e.g. remote work); Traffic facilities/public transport; support flexible and innovative transport solutions	Women's needs and skills

Thus, taking the needs of women into account is one part of a strategy to realise the idea of territorial cohesion and to make rural regions more liveable and attractive. Gender equality and the reputation of being female-friendly has to be considered as a locational factor and a significant aspect of regional development strategies, particularly in remote, rural and shrinking regions. With regard to feasibility of this, we can say that the willingness but also the possibilities to put these gender issues on the political agenda are quite different in different European regions. Many of the outcomes with regard to young women's migration patterns are also a function of external factors and policies on the macro level, like depopulation and aging, socioeconomic polarization, the narrowing of public budgets and infrastructure cutbacks. At the same time we assume with regard to our research findings that the significance of gender equality and female-friendliness as a locational factor will

rise in the future in particular in rural and economic weak regions. Awareness raising for gender issues in territorial contexts has to be considered as part of targeted regional strategies within the frame of territorial cohesion policy. However, women represent very heterogeneous living situations, for example in relation to employment status, family status, educational level, and family background. Different phases in the life of young women are connected with different needs and motives and migration decisions.

The impact of the life course: In order to develop suitable strategies to deal with selective migration, regard also needs to be paid to the demand-oriented provision of SGI, since we can distinguish different age groups in terms of the life course¹³. The starting point is the assumption that in certain age groups specific needs and situations of life prevail, that have a strong impact on user demand and on migration decisions. In an ideal typical model of the life course, we can distinguish several stages: Getting an education and entering the labour market in the very young adulthood (age group 20 to 24), getting a foothold in the labour market (age group 25 to 29) and forming a family/having children (age group 30 to 34). Each of these stages is characterised by a specific pattern of spatial mobility for both young women and men. While in the youngest age group learning mobility and educational structures are decisive, in the late twenties employment opportunities, and in the early thirties migration related to family foundation, and reconciliation of work and family come to the forefront. The life course is, of course, usually not that clearly structured and straightforward, there is a great deal of variability both in cross-national comparison and between different regions of the same nation, but also between educational, occupational or ethnic groups to name just a few. Nonetheless, the different stages of the life course are considered to be a suitable frame to investigate migration behaviour, to find explanations for unbalanced sex ratio structures and to derive tailored policy advice - not at least with regard to the regional and local demand for SGI. Examples are given in Table 2.8.

Table 2.8 Life course, policy recommendations, levels of implementation

Target groups	Policy recommendations, examples	Actors, cooperations
Age Group < 18 years, phase of learning mobility	Raise awareness for local job possibilities; Foster regional self-esteem; Foster ties to the home region e.g. by promoting social and political participation and engagement	Education policy Municipalities, local civil society Cooperation: Schools – local businesses
Age Group ca. 18- 29 years, labour mobility	Consider offered studies at regional universities; Foster social networks; Promote attractive clubs and leisure facilities	Cooperation: Local businesses– universities Associations–Municipalities
Age Group ca. 30-35 years, phase of consolidation and starting a family	Promote In- and Re-migration (“cultures of welcome”); Offer incentives for cultural and innovative projects; Improve the reconcilability of job and family, Assistance for business start-ups, coaching +networking	Labor market policy, State in cooperation with EU, Municipalities–Local businesses –Associations

Table 2.8 also illustrates, that migratory decisions in certain stages of life are directly connected with the future ESIF themes (8) “Promoting employment and supporting labour mobility”; and (10) “Investing in education, skills and lifelong learning”. Both themes are of fundamental importance when considering downward spirals and out-migration from rural areas.

¹³ The concept of lifecycle was picked up in the general analysis on the EU level as well as in the empirical research on the regional level.

V. IMPROVE THE UNDERSTANDING EUROPEAN TERRITORIAL COHESION AND DEVELOPMENT

The approaches applied in the frame of the projects SeGI and SEMIGRA are derived from the complex interrelations between regional structures, the needs of the people living in those regions and migratory decisions. Linking those two projects brings inter alia regional supply and demand together but also different views on the evaluation of structures and processes in European territories. The following conclusions derived from the implementation of the projects can be drawn to improve the understanding of European territorial cohesion and development:

- Implement approaches that aim to integrate qualitative and quantitative research perspectives. This refers on the one hand to particular territorial structures and pathways and on the other hand to the local thinking of people in order to derive tailored policy advice. Also the significance of the qualitative dimension in the provision of SGI exemplifies the limitations of pure quantitative considerations.
- It is a challenge to develop research strategies that take the perception of the people -“the users”- living in European regions into account. Examples have been given with regard to target group oriented examinations. Considering the requirements of different age groups as well as gender issues is one way of how policy advice can be adjusted to the needs of certain target groups. Also the different perceptions of experts/policymaker on the one hand, and everyday life experience of inhabitants on the other side should be given emphasis when thinking about the acceptance of policy strategies in order to reduce the underutilization of regional potentials.
- Basically the idea of “smart, sustainable and inclusive growth” refers to holistic explanations, considering the complex interrelations between regional developments, socioeconomic factors and demographic structures in European Regions in a certain environment. Against this backdrop the linkage between different ESPON projects is a way to strengthen cross-sectional thinking. Here in particular the exchange between applied and targeted research enables switching between different scales and explanatory contexts like e.g. bottom-up and top-down approaches.

The regional challenges identified in the SEMIGRA and SeGI projects with regard to female migration and SGI indicate problems to achieve the policy goals set by the EUROPE2020 strategy and the Territorial Agenda at an aggregated level. In the wake of the economic crisis major budget cutbacks have been made in the ‘soft’ social services of general interest and in the peripheral and rural areas (ESPON 2013). The transition from a social model aspiring to universal service provision to a more marketised model, spurred by austerity policies is uneven and strongly shaped at member state level. This negatively affects the demand of younger population groups in sparsely populated and remote territories - in particular young women. Considering the future themes of the ESIF on labour mobility and learning mobility the situation of rural regions has to be reconsidered in this context. They need to tackle the question of how much rurality we are willing to afford in future at the least.

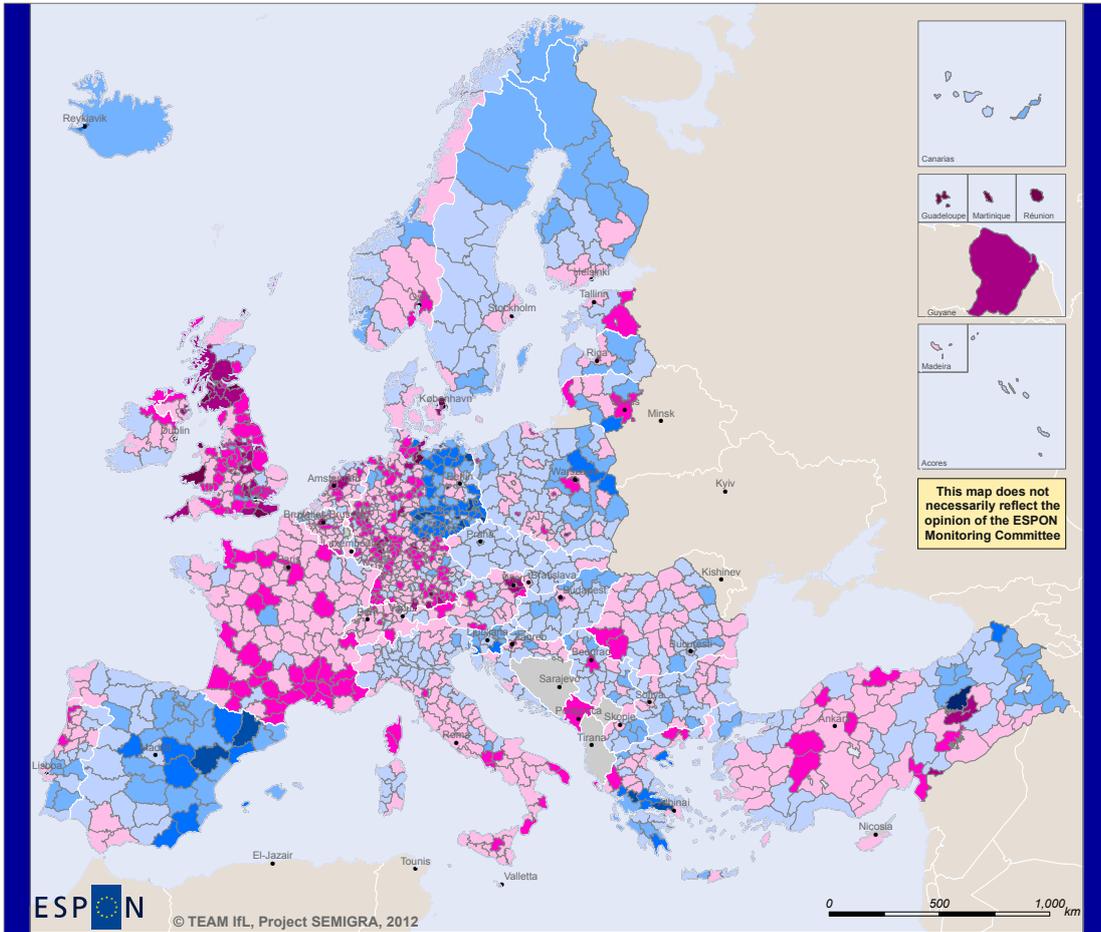
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Map 2.5 EU Level – Typology on sex ratios

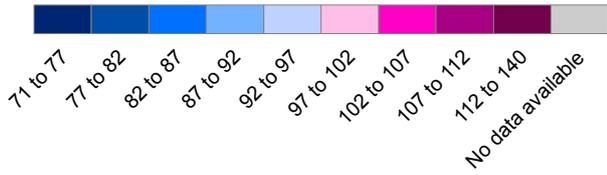


This map does not necessarily reflect the opinion of the ESPON Monitoring Committee

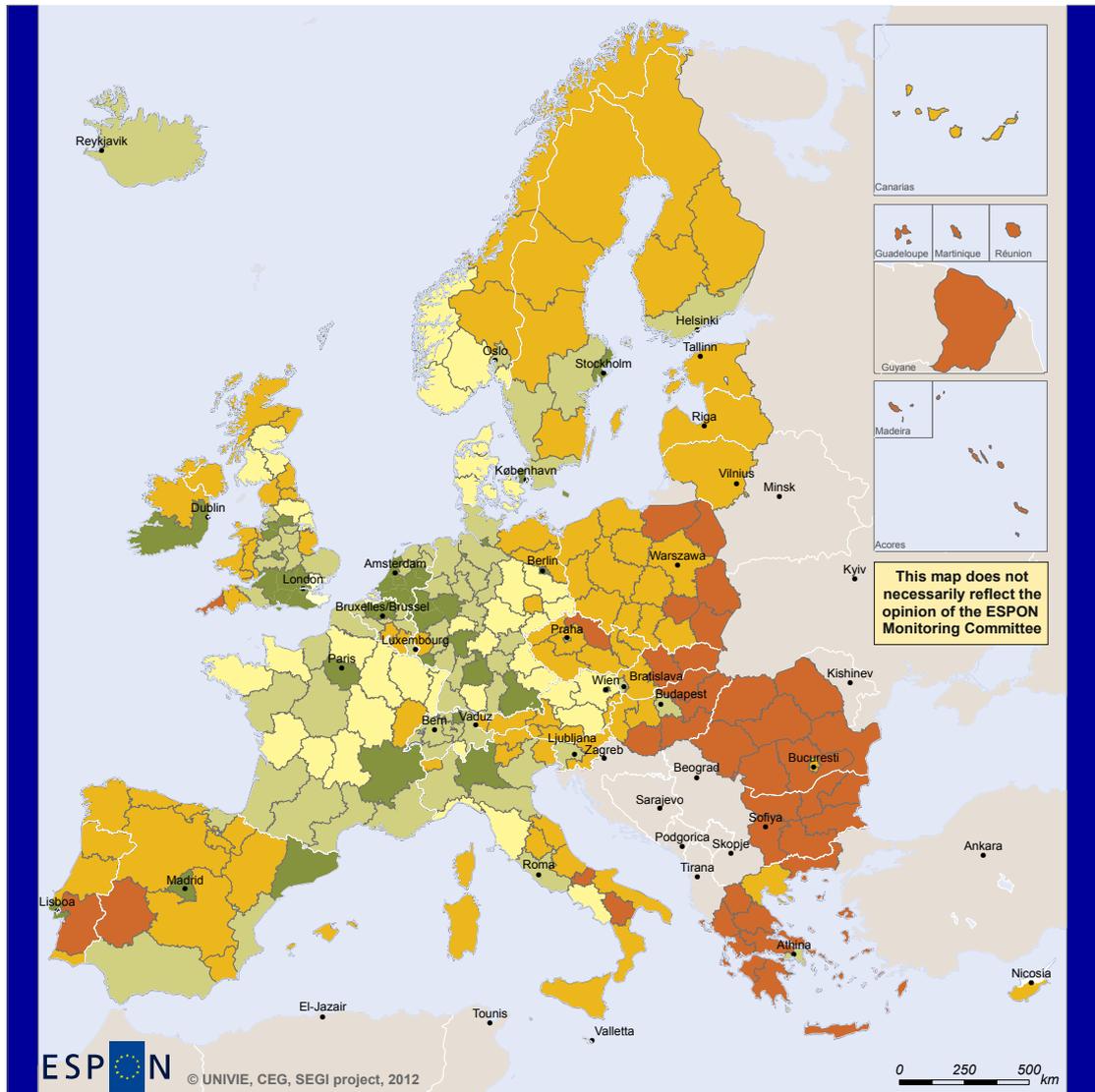
EUROPEAN UNION
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INVESTING IN YOUR FUTURE

Regional level: NUTS 3
Source: Own calculations, 2011
Origin of data: EUROSTAT and national statistical offices
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Number of women per 100 coeval men



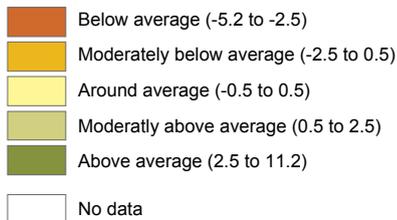
Map 2.6 EU level typology on SGEI



ESPON
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Regional level: NUTS2
 Source: EUROSTAT, 2012
 Origin of data: EUROSTAT 2012
 © EuroGeographics Association for administrative boundaries

Typology on service of general economic interest, 2009-2010
 (standard-deviation from European average)



Notes:
 With use of the following indicators, z-transformed; i.e. expresses deviation from mean in standard deviation:

- 1. High ranked transport infrastructure**
 Length of motorways in km per 1000 km² in 2009
- 2. High quality ICT infrastructure**
 Percentage of households with access to broadband in 2010
- 3. Vital business surrounding**
 Persons employed per 100 000 inhabitants in PR and consultancy in 2009
- 4. Public finance**
 National public expenditures on economic affairs per inhabitant in 2009

2.2.6 The location of logistics activities in Northwest Europe: an empirical analysis

*Mathieu Strale**

I. INTRODUCTION

Logistics activities, i.e. the activities that organize, manage and allow the exchanges of goods between economic actors, have grown rapidly in the context of flexibilisation and internationalisation of the economy (Dicken 2003; Hesse et al. 2004). These developments led to the geographical and economic empowerment of logistics activities. Thus, logistics spaces appear: distribution centres, logistics platforms and even logistics regions (Hesse 2008; Cidell 2010). At the same time, freight nodes, such as ports, airports or intermodal terminals, are gaining importance. In this context, public bodies seek to regulate their territorial impacts and promote their development to create business and employment. Scientific literature on this subject remains scarce, in particular in term of spatial analyses. In addition, the development of an autonomous logistics sector is new, so statistics are scarce.

In this context, the aims of the research (Strale 2013) were to identify and understand the geography of logistics activities and analyse their territorial impacts. The analysis was organized into two steps. First, there was the study of the location factors of logistics activities within Northwest Europe. Second, the policies pursued by the various levels of European public bodies in logistics and freight transport matters were analysed, in order to understand their interaction and highlight the general trends.

In this paper we want first to highlight the methodology we followed for studying the geography of logistics facilities within Northwest Europe. This is the most original part of the analysis. Secondly, we focus on the contribution of our analysis to the understanding of European territorial development and on the impact of logistics activities and related public policies.

II. CONTEXT AND RESEARCH QUESTION

Logistics activity raises both economic and public policy issues. Indeed, logistics has a key role in the current economy because it is a driver and a necessary condition for the expansion of the exchange of goods. The production of goods in short series, or even as tailored items, the acceleration of production cycles and inventory reduction cannot be achieved without logistic support. Therefore, the logistic function becomes a sector with its own spatial and economic existence. Logistics is made of players supporting various tasks that gain in complexity.

These developments necessarily have geographical impacts. These are of two types: static (warehouses, industrial sites, industrial estates...) and mobile (freight transport and related infrastructures) elements. However, scientific literature about the geography of this activity remains scarce. In addition, freight transport issues concentrate the interest of researchers. This is the result of the lack of data, the novelty of the sector and the fact that the most visible spatial elements are related to transport (container ships, transport hubs, trucks etc.).

However, at the same time, public bodies seek to promote and develop logistics activities in order to create new activities and jobs. Indeed, this sector is considered to be a potential growth driver in the so-called globalization era. So, in an entrepreneurial public policy approach, both European, national and regional authorities promote logistics activities.

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This raises two research questions:

- What is the geography of logistics operations, particularly its static elements, and what are the factors influencing these locations?
- What are the impacts of logistics activities in terms of territorial development and what are the consequences of the current actions of European public bodies?

III. METHODOLOGY

Regarding our research questions, the main methodological issue was the collection of data about logistics location within Northwest Europe. Traditional data sources are not sufficient. Public statistics at the European level do not meet the requirements for this study: outsourced logistics is a new sector, so it does not exist in the available statistical aggregates. In addition, onsite/inner logistics is integrated in the overall activity of enterprises. One potential solution is to use national population surveys, by analysing occupations (Savy et al. 2004). However, this raises the problem of the different methods used in different European countries, which prevent international comparisons.

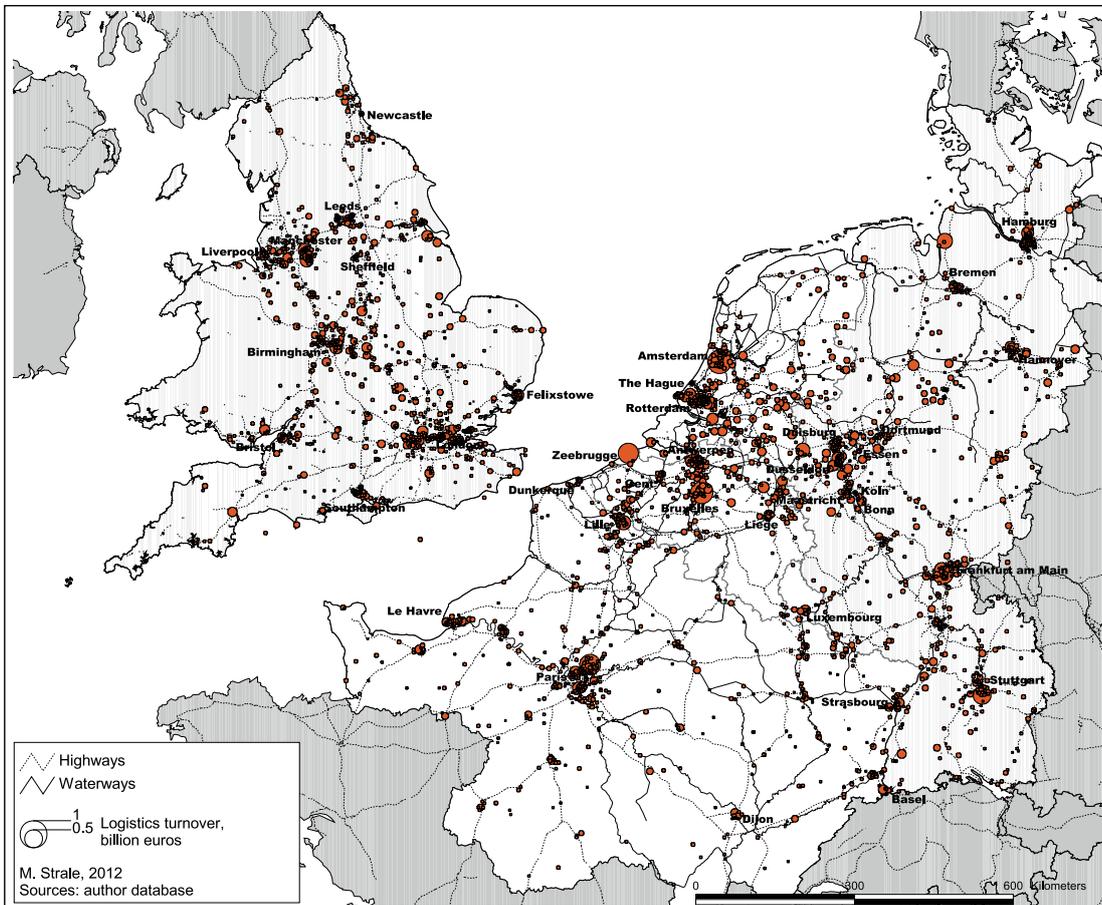
Facing this issue, we have chosen to use alternative methods: by surveying specialized press and professional directories, we collected the names of logistics companies (Strale, 2013). We built a list of around 400 companies. In a second step, we surveyed all the websites of these enterprises and the Amadeus database to collect data on: their locations within Northwest Europe, their turnover and their range of activity. Finally we created a database of 5000 logistics locations, registered at least at the municipality level (see Map 2.7).

These enterprises are divided into eight categories, based on their activity and on Samii (2001) and Carbone (2004): *general logistics, industrial logistics, automotive logistics, fresh and food logistics, transport logistics, parcel transport and express logistics, road transport and supply chain management and international transport*. Using similar methods, we collected the name of the biggest logistics real estate providers and we built a database of their main developments in Northwest Europe.

This method has already been used by other researchers (Carbone, 2004; Dablanc et al., 2010). However, the large number of logistics sites taken into account and the size of the space we study, is innovative. No other geographic study of the location of logistics activities goes so deep into detail, both in terms of space and of the differentiation of logistics activities. Since there are no complete statistics on this subject, our method may be the answer to the lack of data.

However, this also creates some methodological issues. The first and main one is the fact that only outsourced logistics are taken into account. We don't have data on inner logistics. Nevertheless, we also recorded all the distribution centres that were mentioned in the specialized press. This signifies that our survey covers all autonomous logistics locations. Internal logistics activities that aren't carried out on independent locations (such as distribution centres), may not be analysed as pure logistics locations: They are influenced by the rest of the activities of the enterprises rather than by logistics constraints. Another limitation is the fact that our survey is limited to the biggest European actors. However, we led a second survey at the Brussels Functional Urban Area level (ESPON 2007) for analysing the smallest logistics actors and the wholesalers.

Map 2.7 The location of logistics activities



Source: Strale, 2013

IV. RESULTS

The analysis of the geography of logistics activities is based on the survey database, which has been crossed with socio-economic indicators and other relevant facts about the location of logistics activities (proximity to transport nodes, to roads, or integration in an urban agglomeration). The analysis is carried out at regional, metropolitan and local levels.

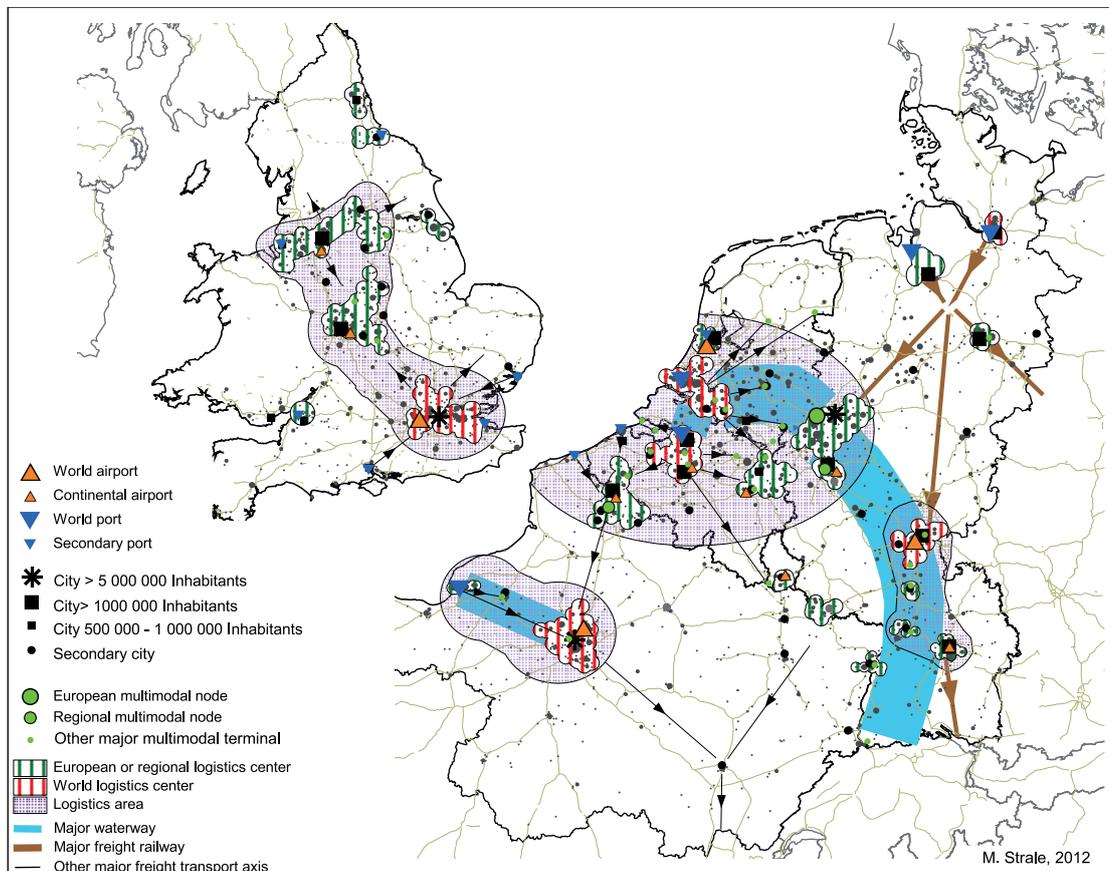
The results highlight the close relationship between the development of the logistics sector and the evolution of the European economy. It is the flexibility and the European integration of the economy that are causing the development of an autonomous logistics sector. In turn, this activity contributes to the continuation and intensification of the current economic organization, facilitating the exchanges of goods between economic actors. Therefore, the geography of logistics activities is the result of this search for flexibility, in terms of organization and location.

At the regional level, this signifies that logistics activities are concentrated in the most industrialised and populated parts of Northwest Europe. Therefore, the Rhine valley, the Benelux area and the axis linking the London agglomeration and the centre of England concentrate this activity. In particular, port and urban regions concentrate logistics operations. Indeed, there is a significant over-representation of logistics activities inside Northwest European functional urban areas (ESPON 2007; Strale 2013). In particular, port and medium-sized cities show an over-representation of logistics, because of the volume of freight exchanged there. In contrast, small cities and tertiary ones generate a lower attraction. Regarding freight transportation issues, the most important element seems to be the development of logistics hinterlands around seaports and along some inter-modal axes. At a more refined level, logistics prefer semi-peripheral locations, around urbanised spaces, along main roads

or in the vicinity of freight transport nodes (ports and airports). When analysing the distribution of the various logistics activities, the main division appears to be between activities similar to high level services, such as supply chain management operations, that have a geography very similar to these high level services, and more “banal” operations, such as warehousing or road transport, which have locations similar to those of manufacturing. Finally, we need to note the growing role of logistics real estate. The offer of warehouses and of logistics platforms heavily influence the location of activities; at the same time, real estate providers act in the same way as for other types of commercial property, creating numerous speculative sites.

The results highlight the close relationship between the development of the logistics sector and the evolution of the European economy. It is the flexibility and the European integration of the economy that are causing the development of an autonomous logistics sector. In turn, this activity contributes to the continuation and intensification of current economic organization, facilitating the exchanges of goods between economic actors. Therefore, the geography of logistics activities is the result of this need for flexibility, in terms of organization and location. These results are close to those for the geography of flexible economic activities (Dicken 2003; Carroué 2002). The preferred locations of such “flexible places” (Scott 1988; Harvey 2010) are close to urban areas, with an efficient real estate offer and good accessibility, and are away from socio-economically or environmentally damaged areas. In this context, at the regional level, logistics activities reinforce the metropolitanisation of the economic geography. However, there are differences between the various logistics activities and there are some contradictory logics between the various scales of analysis. This situation has consequences in terms of European territorial development and cohesion.

Map 2.8 The geography of logistics activities in Northwest Europe



Source: Strale, 2013

V. DISCUSSION

The results of this study may be very useful for improving understanding of European territorial development. Indeed, logistics activities are regularly seen as an economic (re)development tool both by the European Union and by national or regional authorities. Moreover, ESIF are frequently mobilized for logistics developments in Europe. Thus, understanding the spatial logics and territorial impacts of this activity is essential.

Our findings put previous knowledge into perspective and address the general gaps in knowledge about the economic geography of logistics. This geography seems to be exigent. It signifies that not all the European space is suitable and that logistics developments should be analysed carefully, to verify the real needs and the potential of the chosen places. Since economic activity is already concentrated in highly developed places, logistics may be not the best economic sector for redeveloping territories facing economic difficulties. Furthermore, logistics is a necessary tool for improving the efficiency of goods exchanges. Therefore, its development influences economic competition inside Europe, and between Europe and the rest of the World. In addition, the development of logistics providers is the result of the externalisation of this operation by economic actors; its growth is not associated with a similar increase in employment. So, it creates competition between European territories to attract or keep these jobs. Finally, there are many environmental issues linked with freight transport and logistics, so the knowing its geography is an important element. The preference for semi-peripheral spaces may be beneficial for road transport. However, the development of logistics hinterlands around seaports is a potential vector of goods consolidation, supporting rail or inland waterway development.

All these elements may be useful both for territorial and freight transport policies in Europe. In particular, this research shows that a more place-based approach is needed in European policy in logistics and in ESIF investment. Crucially, policies on logistics will not have the same results in all areas and some territories seem to be better suited than others for logistics developments. In addition, better integration between freight transport policies and logistics policies should be pursued. These are close and interlinked issues.

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2.2.7 European functional border regions: An urban potential typology

*Christophe Sohn and Nora Stambolic**

The research presented in this paper was conducted in the framework of the ESPON project GEOSPECS. The objective is to assess the urban potential of European border regions following a functional approach based on travel distance. Three research questions are investigated: What is a border region and how can we assess its urban potential? Where and according to what geographical pattern does the urbanization of border regions take place? What is the importance of the phenomenon in terms of demographic structures and dynamics?

Border regions are usually conceived according to their national territorial delineation, which leads to a lack of comparable data at the European level and therefore inconsistencies in the analyses. In this study, border regions are defined as places whose social and economic development is potentially influenced by the relative proximity of a border, whereas the urban potential is assessed according to its metropolitan functions.

The resulting typology brings to the fore nine border regions' urban potential categories and highlights their geographical patterns at the European scale. The use of demographic data allows us to better assess the importance of the urban potential of border regions and underline national specificities. More specifically, population change reflects the socio-economic dynamics of the border regions and, to some extent, their attractiveness or decline.

I. DELINEATION OF BORDER REGIONS

The delineation of border regions is based upon the hypothesis that what really matters is not the spatial proximity of a given area to a border, nor its contiguity, but the time needed for effectively reaching a border-crossing point. Based on travel distance, two categories of border regions are distinguished. The first called *core border regions* are composed of LAU2 units (municipalities) located less than 45 minutes away from the closest border. This travel distance is considered as reflecting the area of high influence of a border. The second called *adjacent border regions* are composed of places located between 45 and 90 minutes away from the closest border. This travel distance is considered as reflecting the area of lower influence of a border.

II. DEFINITION OF THE URBAN POTENTIAL

The urban potential of border regions is assessed in relation to the notion of Potential Urban Strategic Horizons (PUSH). PUSH areas are defined as all the municipalities that are located not more than 45 minutes away from a Morphological Urban Area (MUA). One strong limitation of the PUSH notion is that the range of influence is the same whatever the size of the urban centre. In order not to overestimate the influence of small cities, and rather focus the study on those urban centres that have a 'real' potential in polarizing their hinterland, a selection criteria has been applied and only MUAs with at least 100,000 inhabitants in 2006 are considered.

Among the 212 PUSH areas analysed, a distinction is made between *metropolitan areas* and *non-metropolitan areas*. The hypothesis underlying this analytical distinction states that the potential offered by a city with metropolitan functions is likely to be higher than the potential of a city that is not considered as a metropolitan centre. The categorization of the PUSH selected follows a two-step methodology. A first set of cities is selected according to a functional index elaborated in ESPON 1.4.3 and called the 'global score' (ESPON 2007). In a second step, the selection of the metropolitan areas is refined according to empirical comparisons with other metropolitan/city indexes (BBSR 2011, Rozenblat and Cicille 2003). This two-step procedure was necessary in view of statistical inconsistencies for some cities and the contradictory results that they generate.

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III. CLASSIFICATION PROCEDURE

The classification of the municipalities located within the entire border regions is conducted following a descending hierarchical method. The implementation of this supervised classification is done according to the following decision tree:

- Starting with all the municipalities located in the border regions under scrutiny (both 45 and 90 minutes travel distance to a border), the first splitting path is based on whether they are located within a PUSH area with metropolitan functions or without such functions. In case of an overlap between the two categories, the decision favours the former at the expense of the latter, as the influence of an urban centre with metropolitan functions prevails.
- The second splitting path relies on the location of the urban areas within the core border region or the adjacent border region.
- A third splitting path is applied according to the monocentric (one urban centre) or polycentric (multiple urban centres) pattern of the urban areas considered. In case of an overlap between urban areas belonging to the two types of border regions, the influence of the core border region with a polycentric setting prevails.
- All other LAU2 units that are not covered by the aforementioned categories are considered as being part of border regions with low urban potential. These are either composed of towns and cities (defined at MUA level) with less than 100,000 inhabitants or belong to category of sparsely populated areas.

IV. THE GEOGRAPHY OF THE URBAN POTENTIAL OF BORDER REGIONS

The mapping of the urban potential of functional border regions across Europe illustrates the following geographical patterns (see Map 2.9).

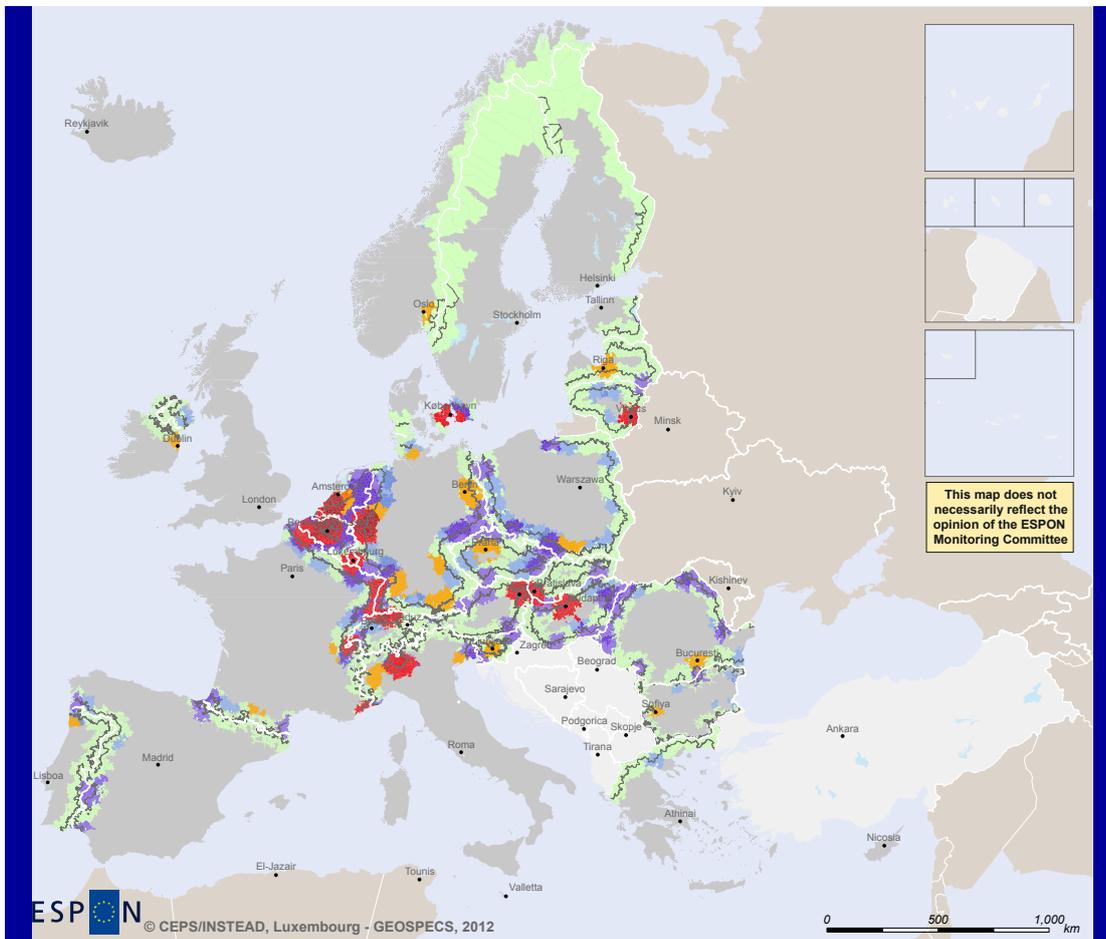
In terms of location, the majority of core border regions with metropolitan potential (in red on the map) are found in the North-Western part of Europe, notably along the borders between the Benelux countries, France, Germany and Switzerland. On the one hand, there are metropolitan areas polarized by cities located close to a border and that have cross-border potential. This is notably the case with Lille, Luxembourg, Strasbourg, Basel, Geneva or Copenhagen where cross-border functional as well as institutional integration is actually experienced (ESPON 2010). On the other hand, there are metropolitan centres located at a distance from the border, although still within a core border region, and that do not have any significant cross-border potential, like Brussels, Cologne, Dusseldorf, Milan or Budapest.

Adjacent border regions with metropolitan potential (in orange) are particularly well represented in Germany, due to the presence of metropolitan centres like Berlin, Munich, Hamburg located at a certain distance from national borders.

Border regions with non-metropolitan potential are distributed all over Europe, but with a higher concentration in the borderlands of the Benelux countries, France, Germany, Poland, Czech Republic, Hungary and Romania.

Finally, the border regions with a low urban potential are localized especially in Scandinavia, the Baltic countries, in the eastern part of Poland, as well as in mountainous regions like the Alps and the Pyrenees.

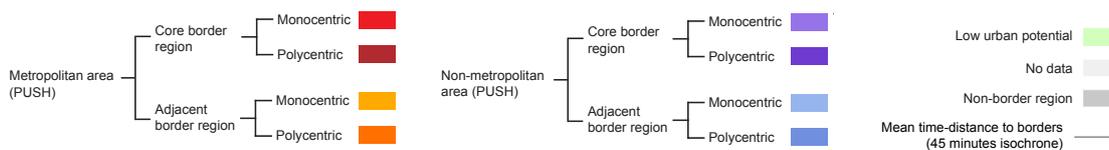
Map 2.9 Urban potential of functional border regions in Europe



ESPON
 © CEPS/INSTEAD, Luxembourg - GEOSPECS, 2012

Regional level: LAU2 (except Turkey LAU1)
 Source of data: Alterra, University of Geneva, GEOSPECS, 2012
 © EuroGeographics Association for administrative boundaries
 except Western Balkans and Turkey (national sources)

Urban potential typology of functional border regions in Europe

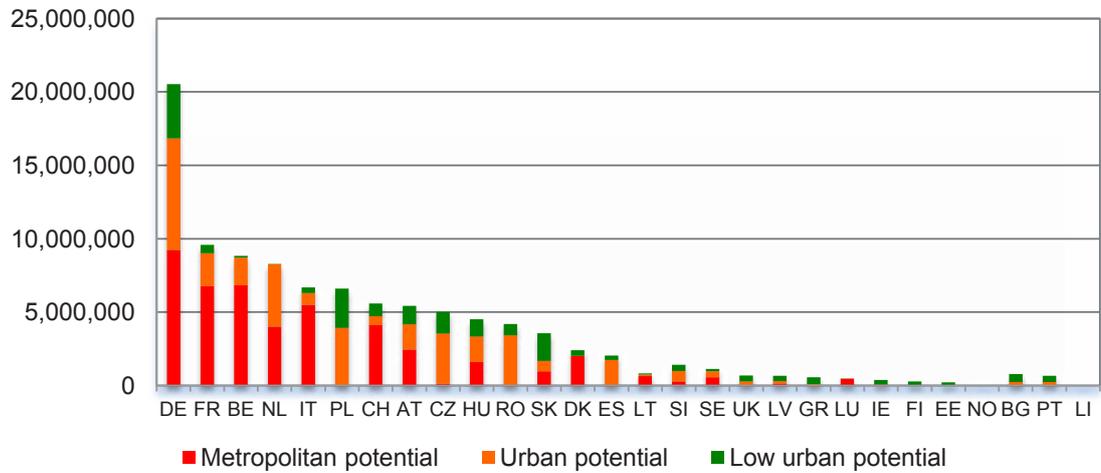


V. POPULATION POTENTIAL IN 2006

In order to complete the characterization of the urban potentials of European border regions, the analysis that follows takes into account the resident population in 2006. In order to simplify the analysis, the 8 categories presented in the typology have been aggregated into 3: metropolitan potential, non-metropolitan urban potential and low urban potential.

Within all European core border regions, there are 102 million inhabitants. Of these, 45 % are living in a border region with metropolitan potential and 35 % in a border region with non-metropolitan urban potential. In total, almost 80 % of the population living in European border regions can thus be considered as urban. The inclusion of the adjacent border regions results logically in an increase of the population considered (209 millions), but with no significant change in the distribution among the three main categories of potentials.

Figure 2.17 Population in core border regions in 2006



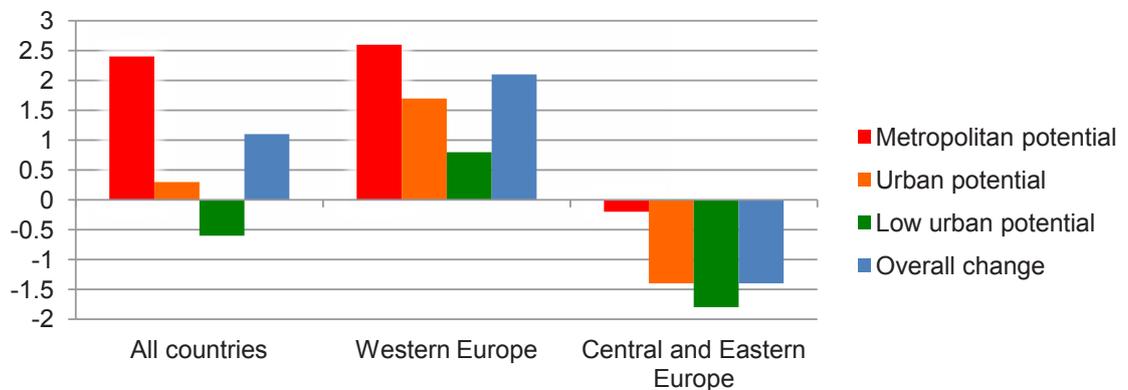
Source: authors

The analysis of the population distribution by country reveals some sharp contrasts (Figure 2.17). In absolute terms, Germany, followed by Belgium, France, Italy, Switzerland and the Netherlands are the countries that host the highest number of people living in border regions with metropolitan potential (almost 80 %). On the other side, the Baltic countries and East European countries like Poland, Czech Republic, Bulgaria or Romania show very low population potential for this category of border regions. The distribution of population in non-metropolitan urban border regions is less skewed and with East European countries like Poland, Czech Republic and Romania showing rather high values. Surprisingly, the country that hosts the highest number of inhabitants in border regions with low urban potential is Germany (3.6 million).

VI. POPULATION CHANGE 2001-2006

The analysis of population change is based on population statistics collected at LAU2 level for 2001 and 2006. The lack of reliable data in 2001 for Lithuania, Portugal and United Kingdom has resulted in the exclusion of these countries from the calculation of population growth.

Figure 2.18 Population change in core border regions 2001-2006 (%)



Source: authors

As shown in Figure 2.18, there is a clear trend towards an increase of population within border regions that have a metropolitan potential. At the European level, this represents more than one million inhabitants in 5 years (+2.4 %). In contrast, border regions with an urban potential that is not metropolitan were rather stable over the period (+0.3 %) and rural border regions experienced

a demographic decline (-0.6 %). In total, European core border regions witnessed an increase of population of about 1.1 % between 2001 and 2006.

When considering the data at a disaggregated level, a clear distinction appears between two groups of countries as far as demographic trends are concerned. On the one hand, there are the East European countries, most of them having joined the EU in 2004 or later, that show on average a demographic decline in their border regions (-1.4 %). This was basically also the case at member state level, except for Slovenia that experienced a positive growth. On the other hand, there are the older member states (EU15 plus Norway and Switzerland) that experienced a positive demographic growth both collectively (+2.1 %) and on an individual basis (except Finland and Greece). The contrast between the two groups of countries is confirmed by taking into consideration the different categories of urban potential. In Western Europe, border regions with metropolitan or urban potentials showed a clear increase of population (respectively +2.6 and +1.7 %) whereas within East European countries the border regions with metropolitan potential were stable (-0.2 %) and the two other categories were declining (-1.4 % for urban potential and -1.8 % for low urban potential).

VII. CONCLUSIONS

The trends highlighted in this paper prompt two final remarks. First, it appears clear that a border context is not incompatible with the development of competitive urban centres as suggested by classic location theories. On the contrary, the rise of metropolitan potential of border regions seems to be triggered by the opening of borders and the new opportunities that arise for their economic, cultural or political development (Sohn 2013). If such remarks have already been evidenced on the basis of case studies, this is the first time that they derive from a large scale empirical analysis. Second, the strong contrast between West European countries and East and Central European countries highlights the determining role of open borders in the urbanization of border regions. Whereas among old EU member states borders have undergone significant changes from 1980s onwards that have resulted in the affirmation of their interface function to the detriment of their barrier and control role (Anderson 1996), this trend is much more recent among the new EU member states. Therefore, policy making in the field of European Territorial Cooperation needs to take into consideration these historical contingencies. Different types of support, as well as fine-tuning cross-border cooperation and integration policies, could be envisaged based on a recognition of the differentiated nature of borders and the various economic and social contexts prevailing within European border regions.

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2.2.8 Polycentric metropolitan development: policy and research demand

Rudolf Giffinger and Johannes Suitner*

I. INTRODUCTION

The ESDP introduced the term 'polycentricity' back in 1999. Since then, the concept has been intensively discussed in politics and planning, with differing interpretations due to specific development contexts (Davoudi 2003; ESPON 2005). To illustrate this, we conducted a Google search request on the exact term 'polycentric metropolitan development', which delivered 2.800 results; the request on 'polycentricity in European spatial planning' even had 6.100 hits - both indicating an intense and broad debate on the topics.¹⁴ A number of hits refer to the ESPON project POLYCE, which concentrated on an assumed mutual relation between metropolisation and polycentric development (ESPON, 2012). Analyzing this hypothesis empirically for the 5 Central European (henceforth CE) metropolises Bratislava, Budapest, Ljubljana, Prague and Vienna, POLYCE revealed metropolitan profiles, strategic visions and important features for polycentric metropolitan development (henceforth PMD) by using quantitative and qualitative methods.

In this contribution we are pointing out that from a process perspective PMD has to be interpreted in the context of a territory's current development conditions and their perception and assessment by local stakeholders. If PMD in fact differs among European metropolises, then strategies need to be based on both development-dependent evidence and strategic assessments. Consequently, we will discuss the concept of polycentricity in a processual and place-based perspective and formulate resulting demands for further research.

II. CONCEPTUALIZING METROPOLISATION AND POLYCENTRIC DEVELOPMENT

The processes of metropolisation in the form of economic restructuring and specialization, multi-dimensional urban growth, global embedding and other aspects demands urban policy-makers and planners to engage in adaptation to changing challenges, and to take the opportunities of a newly emerging context (ESPON 2012). One chance of approaching this fast-moving development is the activation of local growth potentials and the promotion of area-based advantages in strategic endeavors of metropolitan positioning. Yet, because these reach far beyond city boundaries as concerns, their conception and their social and economic outcomes (Parkinson et al. 2003), strategies are often based upon urban-regional and inter-urban cooperation, and distinct forms of polycentricity. Thus, polycentric development is increasingly becoming an integral feature of well-arranged metropolisation processes (Davoudi 2003; Hall et al. 2006).

Based on these definitions, in POLYCE (ESPON 2012) a polycentric metropolitan region was conceptualized as a socio-spatially integrated territory, i.e. multiple urban nodes that are linked through vicinity, functional ties and common governance structures and measures. Accordingly POLYCE analysed structures and relations within and between five CE metropolises by looking at territorial indicators and stakeholder assessments, which were conflated in five metropolitan development agendas. Interestingly, polycentricity was approached very differently in these agendas, because of the very specific local challenges. Consequently, POLYCE concluded: *'The five metropolises need an evidence-based strategy that is tailored to their specific conditions of growth and their existing assets and identified potentials. Stakeholders and researchers should collaborate in a continuous way discussing research findings and recent trends from respective analytical and socio-political perspectives.'* (ESPON 2012: 157)

III. POLYCENTRICITY IN A DEVELOPMENT-DEPENDENT PERSPECTIVE

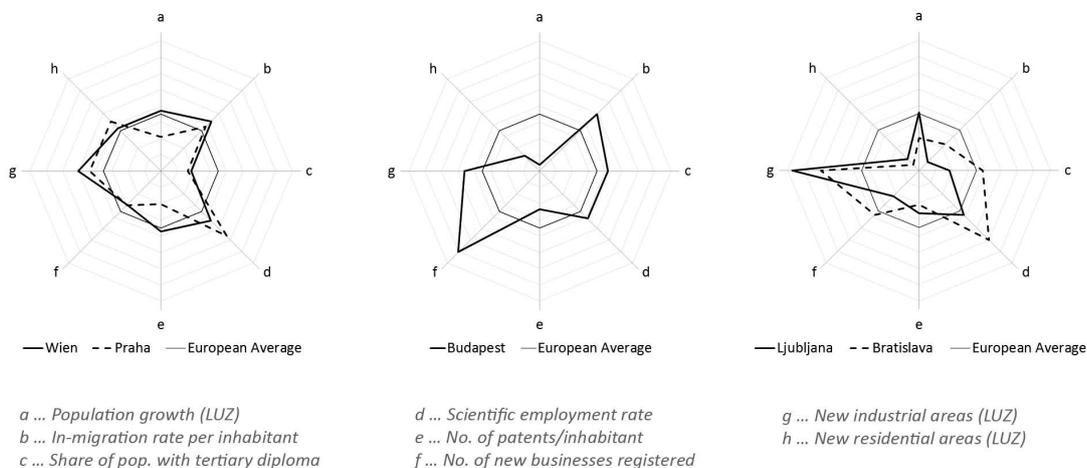
Polycentric development is theoretically and practically approached very differently in European metropolitan regions, although a common sense about approaching metropolisation in politics and

¹⁴ Google search request, conducted August 31, 2013

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planning seems to exist. Hence, we point out that the mutually related processes of metropolisation and polycentricity need to be discussed in an evolutionary, development-dependent perspective. The CE cities analyzed in POLYCE are a good example of how differently cities experienced the trends of globalization, European integration, and increasing inter-urban competition. Due to specific historical contexts, geo-political and socio-economic conditions, the five capital cities in Central Europe show large differences regarding their urban-regional development and particularly suburbanisation and re-urbanisation processes during the last decades (Friedrichs 1985; Szirmai 2003). Correspondingly, the metropolitan development potentials and challenges vary largely among the five territories due to these different paths and paces of transformation. Hence, also strategic planning in the five metropolises is still varying as it follows different paths, understandings and contexts (Giffinger, et al. 2008; ESPON 2012).

Figure 2.19 Indicators of metropolitan development in Central European agglomerations



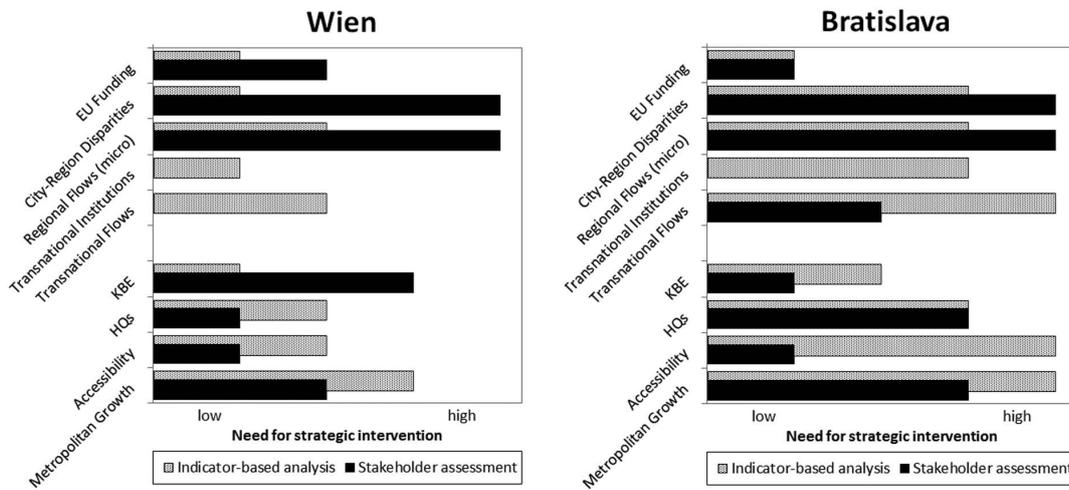
Empirically we can observe that different stages of metropolisation of these agglomerations converge with the common definition of metropolisation (Figure 2.19). Vienna and Prague are both experiencing above average spatial growth (indicators g and h). Their share of highly-skilled population is very low, while they have high scientific employment rates. Bratislava and Ljubljana perform very unsteadily overall. Spatial growth in these two metropolises is due to an imbalance between industrial and residential areas, and in general these two (smaller) city-regions are still largely determined by a process of catching-up in metropolitan development. Budapest, however, displays the typical features of a competitive metropolis. It is growing and already has the skilled human capital to become an innovative metropolis. Its extraordinary numbers in terms of new businesses and industrial areas further confirm this metropolitan development strategy. So, obviously European metropolises follow different approaches to steering development, which is due to distinct stakeholder experiences, planning traditions, and historic, socio-cultural and political-economic backgrounds. Hence, metropolitan development must be considered as depending on place-based evidence and the historically and politically determined conditions and capacities (Krätke et al., 2007). Building upon these considerations of development-dependency in metropolitan development and the fact that metropolisation and polycentric development processes mutually interact, PMD itself must be considered as development-dependent. Thus, the pace at which polycentric structures can be realised is deeply dependent from the question of which layer of polycentricity - morphological, functional or strategic - we investigate, and which place-based particularities a city faces.

IV. PMD STRATEGIES IN PRACTICE: BRATISLAVA AND VIENNA REVIEWED

The case of Bratislava and Vienna is an interesting example in the context of PMD. Both are actively attempting to position themselves upon their extraordinary geographical location at the heart of Europe and in close vicinity to each other by participating in governance networks of metropolitan development (Giffinger et al. 2009). Yet, as the above analysis of the metropolisation paths of the five CE metropolises has shown, Vienna's metropolisation process is further developed due to its size, agglomeration and recent development trajectory. Thus, we would expect that the strategic debate in the metropolitan region of Vienna emphasises different aspects of PMD than stakeholders in Bratislava do for their city-region. If they exist, such strategic dissimilarities must not be ignored in setting up cooperative metropolitan development strategies, as they might otherwise reinforce imbalances between metropolitan partners or at least cause inefficiencies in planning. We thus aim to explore to what degree evidence and strategy converge in each of the two metropolitan regions. The comparison of Bratislava and Vienna should then show the preconditions for joint PMD strategies within the two metropolises in respect of key structures and strategic attitudes.

Comparing the polycentric development of the two confirms the previous assumption. Vienna has already developed further as a metropolis and is thus also performing better in terms of polycentric development. The Austrian capital city region is well integrated, showing relatively low disparities, while for the Slovak counterpart the opposite is the case. For macro-polycentric features the situation is the same. Vienna performs largely above average, Bratislava vice versa. This is again the result of a more developed metropolisation process in Vienna that allowed for the allocation or expansion of high-ranked functions, which now foster macro-polycentric embedding. But how are these features of PMD perceived and assessed in the strategic debate on each city-region's development? To answer this question, we compare the evidence on polycentric development with the results of the strategic discussion conducted in POLYCE, where we analysed the assessment of metropolisation processes by local stakeholders (ESPON 2012). The comparison integrates qualitatively standardized results of the indicator-based analysis with equally standardized results from the stakeholder assessment to reveal the convergence or dissimilarities between the two cities. Variations between Bratislava's and Vienna's performance are evident (Figure 2.20). The need for strategic intervention in Vienna is overall very low, pointing at a good city-regional and transnational integration. In the case of Bratislava, though, the situation is very different with respect to micro-scale disparities and underdeveloped metropolitan functions as a precondition to transnational polycentric relations. In the strategic discussion, not all aspects are equally taken up in both metropolises; this indicates which factors are recognized as important for future planning. While Vienna's stakeholders very obviously over-emphasise the micro-level of polycentric development, they also underestimate the demand for activities fostering further metropolisation processes and macro-polycentric development. In Bratislava, stakeholders assess the development process differently on some aspects, particularly regarding macro-level integration of the metropolis in a wider urban system. They underestimate the role of transnational institutions and accessibility which currently is poorly developed, though the demand for initiatives on the city-regional scale is interpreted correctly in relation to the available evidence. Consequently, a cooperative metropolitan strategy cannot support a collective development approach, if the development-dependent differences and the distinct status of each territory in the metropolisation process are not seriously taken into account. Otherwise, planning efforts might fall short of meeting specific local development challenges, privilege particular actors, and thereby even spoil governance networks and earlier development achievements.

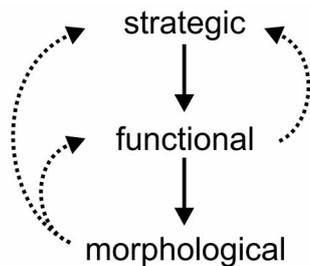
Figure 2.20 Confronting features of PMD with strategic assessments



V. CONCLUSIONS

The paper has shown that if strategies fail to build upon evidence, planning efforts are likely to fail or to be inefficient. Integrative concepts as recurrently pursued by European politics must build upon evidence on metropolisation and its specific links to polycentricity, while also displaying increased awareness of the influence of distinct development trajectories on the respective metropolitan region. Hence, if European structural policy aims at implementing polycentric development in the coming years, then policy objectives and political efforts should foster particularly those strategic concepts that are explicitly based on the locally specific metropolitan development trajectories.

Figure 2.21 Layers of PMD in a processual dimension



Overall, polycentric development has reached a pivotal position in the Territorial Agenda of the European Union (Council of Ministers 2011). Thus, PMD has a crucial role to play in building strategies for competitiveness and cohesion on both the urban-regional and interregional or global level. Yet, in the light of the empirical findings described above, the traditional understanding of polycentricity as a structural spatial concept has to be enhanced with a process dimension. Morphological, functional and strategic polycentricity have a logical sequence with feedbacks between each other. Thus, at every stage of metropolitan development, polycentricity has a different significance within an evidence-based strategic discussion process (Figure 2.21).

Macro-polycentric strategies often aim at strengthening a city-region's role in a transnational economic network by establishing metropolitan functions, but they should be equally based on micro-polycentric strategies that aim at social and territorial cohesion - a central goal in European cohesion policy (European Commission 2010: 8). A balanced micro-polycentric development is a precondition

to the improvement of macro-polycentric activities. Hence, territorial policies should foster strategies that explicitly integrate macro- and micro-polycentric development considerations. Similarly, structural programs should adopt a processual view to better tackle the temporal dependencies between development processes. The Leipzig Charter (2007: 1f) emphasises this notion by pointing to the need to understand integrated planning as a process. While it already refers to a (macro-) polycentric urban system as a factor for a more balanced territorial development, it still largely neglects the processual dimension and the consequent links between morphological, functional and strategic development challenges. And above all, related programs should be combined with social programs, as territory not only matters for economic performance but also for social and territorial cohesion.

Strategic territorial development concepts are the outcome of discursive processes. These should reasonably be based on analytical evidence and assessments by involved actors. The less place-based evidence is elaborated, the more interests of and power relations between stakeholders and actors will dominate the processes of strategy building. Hence, policy-oriented research should be undertaken, which concentrates on place-based evidence regarding territorial capital and the resulting territorial development potentials and challenges as a foundation to innovative strategic endeavors. Thus, European programmes should explicitly support those research activities that integrate analyses of spatial phenomena with analyses of territorial governance. In this regard, it is essential to distinguish stakeholders from actors within the research process. Whereas stakeholders are expected to assess strategies according to political goals, important actors are regarded as partners accompanying and co-designing the research process. Such an understanding demands a clear distinction between representatives of the political-administrative system as stakeholders with individual political-strategic interests and political-administrative actors as partners in research. The more the distinction between these roles becomes blurred, the more is policy-oriented, place-based research endangered in its ability to provide spatial development practice with useful results.

As was shown above, the metropolitan development trajectories and the evidence-based strategic discussions of polycentricity are deeply interlinked. They are not of the same importance and sequence within each and every territory. Hence, it becomes obvious that a more comprehensive development theory is needed. The focus of this theory should be the mutual relation of metropolisation and polycentricity, but with an evolutionary and development-dependent view on the changing relation between the two. This means, it has to integrate existing assets of metropolitan development, as well as attitudes and value systems as socio-political development conditions. However, more empirical evidence is needed for developing such a theoretical approach and for empirically grounding it in place-based strategic discussions and local policies. Hardly any relational data is currently available to analyze PMD processes. Hence, when talking about polycentricity, currently we only speak of the preconditions to potential polycentricity, as the data we build upon is mostly non-relational data. And, for describing morphological and functional aspects of micro-polycentricity, a grid-based operationalisation of information is recommended in order to overcome bordering effects.

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2.2.9 Population mobility: moving away from a 'sedentary' epistemology

Antonio Russo*, Ian Smith# and Loris Servillo‡

I. INTRODUCTION: INTEGRATING HUMAN MOBILITY IN TERRITORIAL ANALYSIS

The main challenge of the ATTREG project (*The Attractiveness of Regions and Cities for Residents and Visitors*) was to generate a conceptual and operational framework that would allow integrating the dimension of human mobility in ESPON policy development. To address this topic, mobility (flows, drivers, policy contexts) has been analysed in relation to different populations or 'audiences', which can hardly be positioned in the simple binary resident-visitor evoked by the project title, adhering instead to the notion – and a remarkable turn in the epistemology of social sciences – that sees contemporary society as 'on the move' rather than sedentary (Sheller & Urry 2006). This has bearings on the general approach of ESPON, as it compels to consider population mobility in its full complexity when analyzing the territorial impacts of external shocks and policies, or the formulation of future scenarios. This approach led us to analyse and contextualise different *mobilities* – the work-related migrations of different collectives, other lifestyle-related displacements, and the short-term, 'unsticky' mobility of tourists – under the same methodological lens, and focusing on their interrelations, synergies or conflicts.

This paper mainly focuses on the issue of relating 'types of attractiveness' to policy instruments within a multilevel perspective, advancing the notion that attraction *per se* is not always to be looked for, and should anyway be articulated in sophisticated strategies targeting specific audiences, taking into full account the spatial effects engendered. In the next section we introduce a typology of attractive regions. In the third we then relate it to specific policy spaces and instruments that regions in a specific class should be looking at. The fourth section refers back to the general EU policy objectives, and concludes reflecting on the validity of this work for the ESPON research approach.

II. FORMS OF INTER-REGIONAL MOBILITY AND THEIR INTERACTION

The three key bodies of literature on which our argument is built come from research looking at the relationship between migration and tourism (see Williams & Hall 2000; Hall & Müller 2004; Williams 2013), at substitution between commuting and migration (for instance Eliasson et al. 2003; Green et al. 1999), and at counter-urbanisation and 'escalator' regions where migration is differentiated by age/location within a career lifecycle (e.g. Champion 2012; Fielding 1992). The ATTREG project and subsequent work outlined the empirical regularities that appear to exist between indicators of these different forms of inter-regional mobility at the scale of NUTS2 regions across the EU for the period 2001-07 – namely, a picture of generalised mobility across Europe from north and east toward south and west that holds with regularity (increasing and positively correlated inward mobility for all working age groups and tourism) for three quarters of the regions for which we have data.

However in this short paper we are interested in exploring the policy implications of such interactions rather than reiterating the argument that forms of mobility inter-relate. Thus we have generated a regional typology according to forms of mobility attracted and their intensity, which relates to different challenges (or 'policy spaces') faced by policy agencies with an interest in regional development, with the aim to generate 'districts in the multi-dimensional variables space' in order to assess the nature of the mobility problematic in different regions¹⁵. Such typology is based on multi-year averages on four measures of mobility measured at the region of destination at the level of 287 NUTS2 regions

¹⁵ Clustering in the case of regional indicators tends to involve a degree of 'messiness' where clusters may have fuzzy boundaries. However this does not invalidate the discussion of the mobility challenges for the groups of regions: the clusters' validity in terms of being able to distinguish between different characteristics has been tested using ANOVA tests on regional features that had not been used in the construction of the typology. The clustering algorithm is based on the use of the Ward method of hierarchical clustering (for methodological issues and applications, see Mangiameli et al. 1996: 402).

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across the ESPON space. These are the annual net migration rates generated through a residual population model for 2002-07; the rates of annual net migration for two age cohorts (15-24 and 50-64 years old); the visitor arrival rates as the number of recorded persons staying in registered commercial establishments per 1,000 head of resident population.

Map 2.10 maps out this typology. 218 regions are included in four 'mainstream' clusters (according to the theory): net migration rate at all ages correlates positively to visiting rates, and four combined levels of intensity of the two variables can be distinguished, ranging from negative/moderate to very strong attractiveness for visitors as well as migrants in the 2001-07 period.

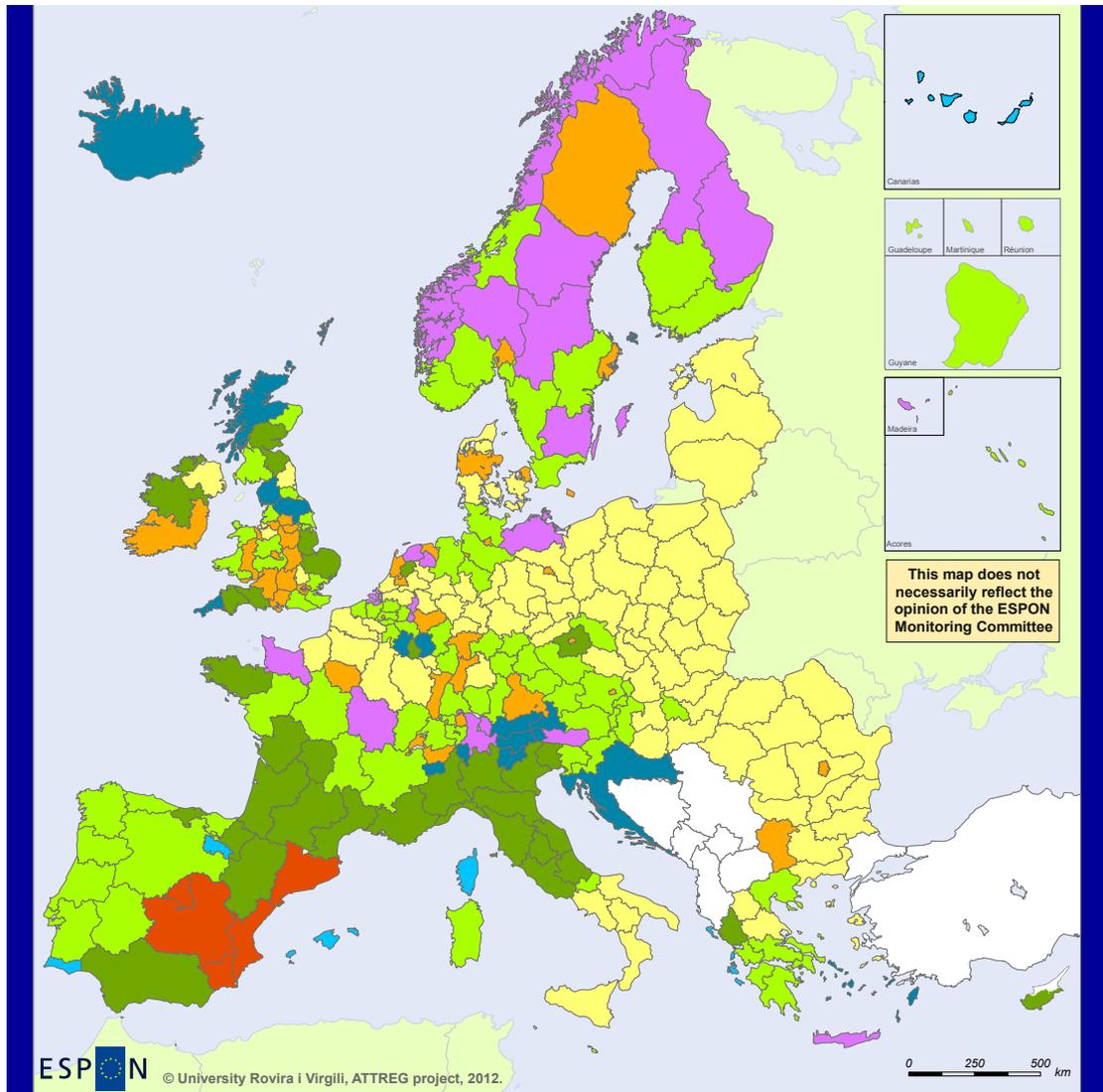
- Cluster 1 (coloured light yellow in the map) includes 90 regions, half of which are in the post-2004 member-states but also include areas of Germany, the Netherlands and northern France, experiencing on average net out-migration of resident population across all age groups and relatively low rates of visiting;
- Cluster 2 (light green) is made up of 79 regions mainly in the older member-states of the EU15 with (on average) net in-migration rates and a mid-level visitor rate;
- Cluster 3 (darker green) groups 34 regions mainly located on the western Mediterranean arc from Catalonia to Lazio, the Italian Adriatic coast as well as the Atlantic seaboard, registering moderate to high levels of both net migration and visitor rates;
- Cluster 4 (light blue) is a group of 5 regions made up mainly of Mediterranean regions where the data suggests that there have been generally very high levels of net migration combined with high levels of visiting.

The remaining 69 regions are in four other clusters combining characteristics that remove them from the main axis of increasing attractiveness across all types of mobilities. In this regard they could be thought of as either having actively 'specialised' in attracting particular audiences or having become specialist by accident. These four clusters are:

- Cluster 5 (orange) where net migration rates for the younger age cohort (15-24 years old) are associated with net out-migration by those in the older age cohort (50-64 years old). This is a group of 37 regions, mostly metropolitan and capital city regions, plus some university-focused non-metropolitan areas, which are experiencing demographic rejuvenation.
- Cluster 6 (lilac) is a group of 23 regions where net in-migration by the older cohort is combined with net out-migration by those in the younger age cohort. These are mostly located in northern and Baltic Europe. They are mostly aging but could also be considered 'retirement regions' that attract because of their 'soft' amenities and natural endowments.
- Cluster 7 (darker blue) is a group of 16 'tourism specialist' regions that experience relatively modest rates of net migration in comparison to the rate of visitor arrivals. Among them there are mostly mature destination regions in the Alpine arc and recreational destinations in the EU core.
- Cluster 8 (red) is made up of 6 Spanish regions including the Madrid community, Catalonia and their neighbours, whose high attractiveness for tourism has reached the natural upper bound of maturity in the early 2000s but have continued to be attractive throughout the decade for both highly skilled mid-career migrants and younger low-skilled immigration related to the construction and tourism sectors.

Considering the characteristics of regions clustered together helps understanding something more of these mobility patterns. Thus, Cluster 1 regions recorded a statistically significantly lower per capita GDP and higher unemployment rates in 2001 than the other cluster averages, whereas Cluster 5 had a significantly higher average p.c. GDP. This can be interpreted as an economic push whereby there are low rates of visitor arrivals to – and net out-migration from – 'source' regions with low levels of economic wealth creation and high levels of unemployment.

Map 2.10 Typology of attractive regions by types and intensity of mobilities attracted



ESPON © University Rovira i Virgili, ATTREG project, 2012.

EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: NUTS 2
Source: Own elaboration on EUROSTAT/LFS data
Origin of data: EUROSTAT/LFS data
Authors: I. Smith, A.P. Russo, F. Brandajs.
© EuroGeographics Association for administrative boundaries

Regional typology of inter-regional mobility rates

NUTS 2 regions (2006)

□ NO DATA

Typology

Cluster 1 (low level net mobility)

Cluster 2 (mid level mobility)

Cluster 3 (mid to high level net mobility)

Cluster 4 (high level mobility)

Cluster 5 (young net in migration)

Cluster 6 (older net in migration)

Cluster 7 (tourism specialist)

Cluster 8 (high migrant low visiting)

However regions that have higher rates of in-migration and visitors are not readily distinguished amongst themselves by reason of their economic and labour market characteristics alone. As demonstrated in ESPON (2012), there are a bundle of territorial capital indicators other than the traditional set of economic and job market variables which may explain attraction in relation to mobile populations. For the purposes of this paper we are however more interested in exploring the relationship between the profiles of mobility and economic change. Hence Table 2.9 sets out a series of economic and labour market change indicators for the six clusters with a membership of at least 10 regions (Clusters 4 and 8 are thus not considered). These changes (averaged within each cluster) are recorded for a period both leading up to and following on from the fiscal crisis of 2007-08.

Table 2.9 Economic and labour market performance of cluster types

Cluster #	N	change in GDP per capita		change in residents in employment (LFS estimate)		change in resident unemployed (LFS estimate)		Ratio of annual net migration to 1 year cohort aged 20 years
		2001-07	2007-10	2001-07	2007-12	2001-07	2007-12	2004-07
1 (low level mobility)	81	57.6	3.0	5.6	-2.4	-14.2	35.9	-0.05
2 (mid-level mobility)	71	29.8	-1.2	7.4	-0.9	20.3	47.5	0.30
3 (mid-high level mobility)	27	28.2	-4.9	14.2	-0.9	17.5	93.8	0.90
5 (young net in-migration)	34	31.8	-3.7	6.7	2.7	31.7	40.3	0.30
6 (older net in-migration)	17	26.9	1.8	7.5	-0.8	4.1	51.0	0.00
7 (tourism specialist)	12	29.7	-4.2	8.0	-0.8	15.0	45.6	0.60

Source: own elaboration on EUROSTAT data

Whereas Cluster 1 regions tended to experience net outward migration in the period 2001-07, they experienced a significantly higher average growth in GDP per capita over this period than the other clusters and a significant decline in the number of working age adults recorded as unemployed. Thus, out-migration did not appear to have dampened economic activity in this cluster. On the contrary, the figures suggest that regions that received on average more people in the years preceding the economic crisis experienced the most torrid downturns in subsequent years: a larger slump in p.c. GDP and a significantly larger hike in unemployment for the period 2007-12. GDP growth however does not seem to correlate at all with increasing levels of inward mobility as it is not possible to distinguish between the clusters of regions receiving more mobile population from those that receive fewer people.

The size of a year cohort in their early 20s is indicative of the importance of young people living in the region who are moving into the regional labour market.¹⁶ The figures indicate that the regional labour markets in Cluster 3 are exposed to extra-regional labour migration by 90 % – by contrast Cluster 2 regions are only exposed to 30 %. Internal inter-regional migration data might suggest that Cluster 5 regions are also highly exposed to in-flows of labour, but that this is hidden in the net migration figures. These mainly metropolitan regions are operating as a form of escalator where in-

¹⁶ The OECD has used a similar indicator to measure the importance of migration to territorial labour market dynamics drawing a comparison to the ratio of foreign inward investment to indigenous investment within a regional economy as an indicator of foreign exposure (OECD 2010).

flows of younger adults are balanced by outflows of older workforce; they appear to have benefited from migration-enhanced rejuvenation that contributes to high levels of economic output and the generation of employment even during economic downturns, although on-going economic growth in these regions does not appear to be greater than the accumulation of 'spare labour' since unemployment numbers grew both during the pre-2008 period of growth and during the economic downturn. Clearly these figures focus on gross flows of migrants and not actual flows. However even with this caveat, it might be argued (as is done in OECD 2010) that regions need to be mindful of their exposure to external inputs in their regional economies in order to benefit from the advantages that spring from the mobility of labour.

III. THE POLICY DIMENSIONS OF MOBILITY

Following up with the characterisation of clusters in the previous section, and using indications coming from the more qualitative work carried out in ATTREG at case-study level, our typology nuances a series of challenges or 'policy spaces' for regional policymakers who aim to mould regional development through the facilitation or influencing of mobility. For 'mainstream' Clusters 1-4, policymakers face opposite situations related with a generalised lack (1, and to a lesser extent 2) and excess (3 and 4) of inward mobility.

- For regions in Cluster 1, the low levels of inward mobility were not problematic throughout the early 2000s because outward migration appears to have helped tackle the issue of spare labour. However by 2007-08 these regions had (mostly) converged with the bulk of the EU, approaching a problematic juncture, whereby growth may deflate if it is not sustained by human capital development (and indeed regional disparities have widened in the last years). Opportunities in this sense may come from the facilitation of return migration, or the attraction of workforce from outside the EU (especially at its eastern border).
- For Cluster 2 regions, the main issue is to understand whether they are operating at levels of mobility that are easily integrated in the local structure of the labour market. Many of these arguably attract 'less than they could' given their territorial endowments and their resilient profile in terms of labour market exposure: thus policies that facilitate attraction and even more so retention (for instance, through investments in territorial capital and its branding) might be effective.
- Regions in Cluster 3 and 4 have needed to face up to the challenges of high levels of visiting and migration. Smith & Atkinson (2011) suggest that the high levels of migration may be at the very least a symptom of labour market vulnerability. Equally these regions are more heavily dependent upon tourism both in terms of exposing regional labour and housing markets to external pressures and shocks. Specific initiatives to favour labour market integration and regulate/upgrade tourism development were needed to prevent problems during the oncoming downturn; in most cases, that did not happen.

For the regions in the groups of 'specialist' clusters (5 to 8), where one of the dimensions of inter-regional mobility is working in the opposite sense to the other, the policy spaces face the challenges of potentially problematic interactions between inward mobilities.

- Cluster 5 can be simply accepted as regional escalators. Retention policies for students at the end of their career may allay their characteristic of being 'revolving door' regions with a transiency of talents; moreover careful campus development and planning may harness the gentrification processes typical of 'town and gown' contexts where the attraction of the young and talented favours the expulsion of the older and less protected citizens, leading to issues of exclusion.
- Cluster 6 regions experience the opposite situation of 'silver' in-migration and high visitor rates, but out-migration of the younger workforce. This may become problematic in the long term, although not necessarily in pure economic terms: these regions should be prepared to invest in health services and social support for an aging population.
- Cluster 7 regions may be effectively managing the demand for residence in the region but may then need to deal with a gentrification of residence. It may be appropriate in these circumstances to keep a tight grip on the housing market through regulatory arrangements and discourage potential low-income migrants that might be tempted by their lovely holidays.

- For Cluster 8 regions, which are currently under great strain from the crisis, an inversion of the immigration trend experienced until 2007 is natural and welcome; however they still need to think how to become attractive (or retentive) again without over-exposing themselves to the exhausted tourism and real estate-driven growth model.

IV. FINAL REFLECTIONS: FROM A LOCAL TO A PAN-EU APPROACH

In our approach, none of the ‘mobilities’ that regions have been able to activate (either outward or inward) are *per se* problematic, however they did show a certain correlation to trends and phenomena in the post-crisis period that opens the field for adequate responses and policy discourses. However, we want to conclude with a reflection on some mobility-related issues as well as some misunderstandings produced by a ‘sedentary’ policy approach, shifting to a prescriptive pan-European approach to population mobility, including tourism (which is now mostly dealt with in purely sectorial terms). Among many more that are listed in the ATTREG final report (ESPON 2012) we focus here on the following pointers:

- It is not only work-related mobility that can produce positive externalities in target regions. For instance, ‘silver migration’ of affluent groups to certain southern regions or to coastal areas in northern countries has led to the development of a form of economy which goes beyond the traditional forms of tourism exploitation and is arguably more sustainable. In general, there is evidence that there is room for synergies between labour attraction and tourism-oriented strategies.
- Positive effects can be seen not only in destinations of mobility but also in origin regions (Katseliet et al. 2006; Gagnon & Khoudour-Castéras 2011), where over time, the prospect of better future opportunities abroad has encouraged people in origin countries to acquire education and skills. This may also have spilled over into an increase in educational policies and in general measures dedicated to human capital, including services to specific sectors for retaining population.
- The evidence provided by ‘overheating’ regions (Cluster 4 and 8 in our analysis) indicates the presence of thresholds representing a balance between inflows of new regional users and quality of life and access to resources for local residents, beyond which local economic systems may become less attractive and/or resilient. In this sense it may be appropriate to develop policies that support mobility of the working population, especially in situations when a region approaches a ‘critical condition’. Such approaches could be developed in terms of partnerships of shared responsibility between receiving and sending regions; this would provide greater flexibility for these regions and more security for the mobile population.

As a general conclusion of this short paper, we gave some hints that human mobility should be incorporated as an important and ‘dynamic’ variable in ESPON research supporting territorial policy. On one side, it is important to consider at all times that human mobility is determined by – and determines – changes of territorial performances. Therefore, projections of dynamics, visions and scenarios in the next decades cannot be considered mobility-free. On the other, attention needs to be paid to the full effects that specific policies engender and population movements contribute to ‘propagate’ in space, from the point of view of regional development and territorial cohesion, and touching upon all the key themes of the European Structural and Investment Funds (ESIF). The uneven development of EU regions and the identification of mobility patterns taking place in relation to changes in perceptions and regional opportunities should reinforce the idea of creating an agenda dedicated to supporting mobility in its various forms, thereby contributing to the ‘founding’ objective of a free circulation not only of goods but also of people (Servilloet et al. 2013). Rather than encroaching upon national sovereignty, an integrated approach should activate EU, cross-regional and regional initiatives that facilitate and in some cases even stimulate the mobility of population, promoting the possibility for people to spend part of their life-cycle in a different context and assisting all those existing forms of mobility that are neither just tourism-based nor life-long migration. As the methodological difficulties encountered in the ATTREG project demonstrate, this approach stands upon the development of a monitoring system able to provide updated EU-wide data on mobility at the finest possible scale.

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3 Measuring territorial outcomes

3.1 Large data sets

3.1.1 Firm growth during stretches of recession: modes of resilience of Austrian firms 2002-2011

Michael Steiner* and Michael Wagner-Pinter#

I. HIGH GROWTH FIRMS AS „OBJECTS OF DESIRE“ OF PLACE BASED POLICY

The landscape of firms across economies and regions is usually marked by quite diverse forms of behavior – both in terms of firm sector (a reflection of specific market conditions) as well as in terms of firm size (a reflection of organizational structure). Such diversity is to be welcomed in that, amongst other things, it helps firms survive the ups and downs of business cycles and enables them to better face the challenges of recession. At the same time, however, the dynamics of firm growth is also an important element in securing the growth of regional and national employment: long term growth requires that such dynamics be sustainable. In practice, most firms are to a high degree immobile. This makes them highly desirable objects when attempting to formulate place-based policies.

Several aspects of firm-induced job creation have already been thoroughly discussed in the relevant literature. Common questions have been: Which type of firms drive aggregate growth? Who are the „gazelles“, i.e. the rapidly growing and young businesses? (Henrekson, Johansson 2009). Are these firms predominantly small? (Birch 1981, Davis, Haltiwanger, Schuh 1996, Neumark, Wall, Zhang 2011). How important are newly founded firms and entrepreneurship for job creation? (Acs, Armington 2006, Fritsch 2008, Tsvetkova 2012). Such research has also been associated with all kinds of methodological and data questions (Davidsson 1996, Okolie 2004, Hölzl 2013).

The general purpose of our present paper is to identify those firms in Austria which reveal the capacity for continuous development and furthermore, to produce a „landscape of firms“ which will enable us to spot firms exhibiting dynamic growth. The specific element of this paper is thus: how to select firms with sustainable job growth dynamics, so as to make them „objects of desire“ in economic policy, particularly in times of restricted budgetary means and place-based orientation.

II. OUR APPROACH: A „LANDSCAPE“ OF AUSTRIAN FIRMS

The first thing that needs to be done is to map out a „landscape“ of firms, in our case, Austrian firms, in such a way that those fields with an above average potential for growth dynamics may become visible. In undertaking our empirical validation of such a landscape the aim was to identify and categorize the growth cycles of Austrian firms and find those fields in which the frequency of dynamic growth cycles is disproportionately high. Dynamic in this context means exhibiting a continued process of job expansion, including the ability to achieve a successful turnaround during the time period under consideration.

The data base comprises microdata for Austrian firms and their employment for the period 2002 to 2011. We chose this longer period in order to cover the different phases of the business cycle and to concentrate on firms who survived the whole period. This enables us to identify different growth patterns (e.g. for firms which were active in 2002 and still active in 2011). This results in 113,884 „established“ firms (we omitted state-owned organizations).

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In order to structure the landscape of firms we develop a grid using two basic coordinates, firm sector, and firm size. We thus have:

- 20 sectors (according to a consolidated grouping of the standard classification of Austrian branches) serving as a proxy for markets where the firms offer their products and services
- 4 different sizes of firms (based on number of employees: from no more than 9, then 10 to 49, 50 to 249 and finally 250+ employees according to EU-classification and well-suited to catch the size structure of Austrian firms) as a proxy for organizational differentiation of the firm specific value chain; the reference year is 2002.

This results in a grid of 80 fields which allows us to further characterize the landscape of Austrian firms.

In the next step the firms within these fields are differentiated according to their growth patterns over the whole period. We are able to distinguish the following 6 different patterns of employment.

- a strongly fluctuating number of employees with significant ups and downs
- constant employment (i.e. hardly any fluctuations)
- continuous growth
- turnaround growth, i.e. an initial decline in employment followed by a noticeable increase
- „past their peak“, i.e. firms with an initial increase in employment followed by a subsequent decline
- continuous shrinking over the whole period.

Clearly, from the point of view of economic policy, those firms which are able to increase employment or to master a turnaround are of obvious interest. The firm-specific criteria operating here can be applied to a whole field (and furthermore to all fields) of the landscape: the higher the share of firms with “constant growth” or “successful turnaround” within a field the more attractive is such a field from the perspective of economic policy.

III. OUR FOCUS: CRITERIA FOR SELECTION OF „PROMISING“ FIELDS OF THE LANDSCAPE

Application of the criterion “growth intensity” (measured by the share of “dynamic” firms with constant growth or turnaround) to specific fields, or even all fields, is clearly attractive in terms of public policy. However, to make the degree of attractiveness more reliable (and “promising”) we add three additional criteria: job growth, skill intensity, and founding rate.

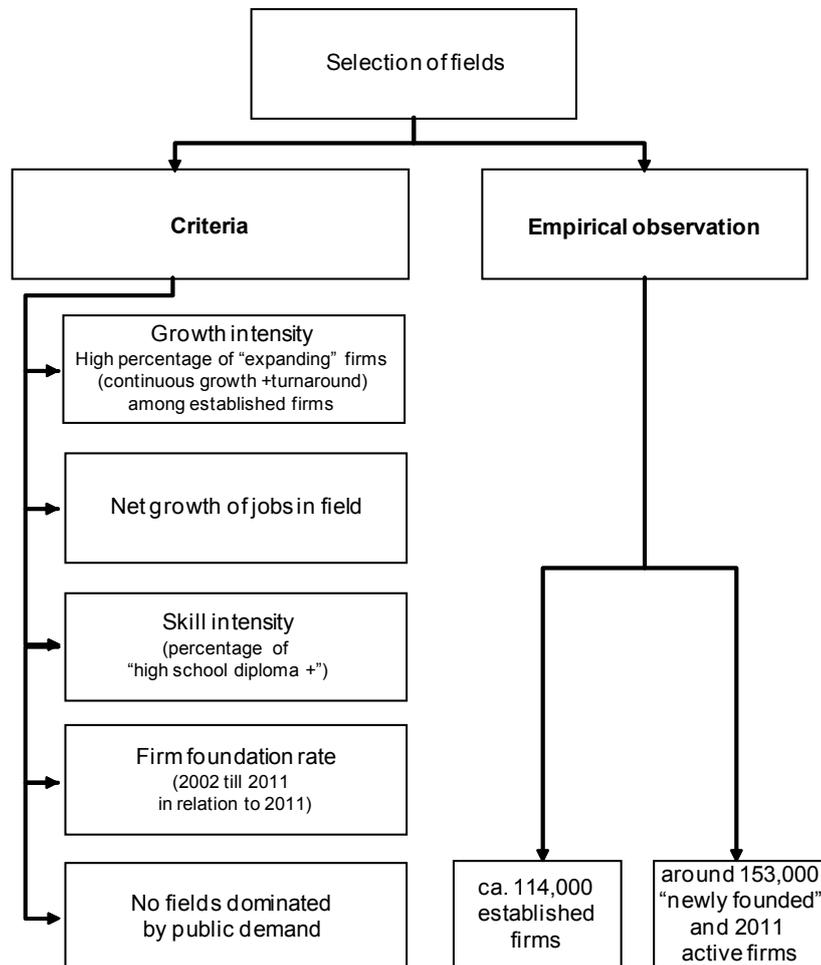
The “growth of jobs” criterion demands that for a field to be attractive the absolute number of jobs must have increased, i.e. there has been a net increase. Unless this is true, we may simply be dealing with a case of job creation accompanied by job destruction in the form of competitive crowding out. The latter is not the focus of the present paper.

“Skill intensity” constitutes a further criterion. We used the usual designation and defined it as the share of the highest qualification profile “high school diploma +” (thus including higher education).

“Firm founding rate” is added both for reasons of theory and policy. As mentioned in the introduction, “gazelles” are young, recently founded firms. Entrepreneurship is believed to influence job creation, thus policies designed to stimulate start-ups are assumed to be relevant (notwithstanding the counterarguments on the relevance of newly founded firms to job creation). Here, we define „firm founding rate“ as the share of newly founded firms (as a percentage of all firms in a field) who started their activities after the period under consideration and who were still active at the end of this period.

The extent to which demand in any sector is based on public bodies is a further factor in policy considerations. However, this was not taken into consideration here as there is a clear risk of double counting, i.e. including bodies which already receive substantial support is misleading when proposing additional support in the form of job creation schemes.

Figure 3.1 Criteria for selection of „promising“ fields of landscape



In order to make these concepts empirically observable we took the yearly average number of employees and their specific qualification profiles for the firms considered, and classified the firms according to sector and size. Using the data, the landscape fields were thus delineated, the firms were allocated to the specific fields, the growth pattern of the single firms determined, the share of firms with specific growth patterns identified, the change in the number of jobs for all firms in a sector calculated, and the share of firms becoming and remaining active during the period under consideration was determined.

This leads to several possible criteria for assessing each of the 80 fields. To aid comparability, there is thus a need for complexity reduction. To allow for rating of these 80 fields of firm activity we used a system of indicators based on index values derived for specific fields of the landscape. For each criterion the field with the highest "characteristic value" was given an index value of "100". All other values are calculated by dividing the characteristic value of the specific field (numerator) by the maximum characteristic value (denominator) and then multiplying by 100 (e.g. if the specific field has 20 %, the maximum field 80 %, then the specific field gets an index value of 25).

IV. RESULTS

In this way we were able to obtain index values for each of the criteria and for each of the fields. Adding all index values and dividing them by four gives us a possible total indicator for all of the 80 fields.

On reducing complexity further by ranking the fields according to the size of index values (leaving aside the fields dominated by public demand) and reducing them even more to “4 top fields“ we get the following results:

- independent professionals/scientific, technical services
- manufacturing
- other business services
- retail

all of them in the size of “250+“.

Table 3.1 The „top fields“: Overview

Selected criteria of the 4 top firms of landscape of firms	4 fields according to sector and size (number of employees)			
	Firms of size 250+			
	ind. prof., scientific / technical serv.	manufacturing	o. business serv.	retail
number of firms	12	333	69	158
number of “dynamic” firms	8	135	27	84
number of additional jobs 2002-2011	+3.500	+22.300	+21.700	+3.300
share of jobs with skill “high-school diploma +”	58,7 %	20,3 %	20,4 %	13,9 %

Source: Synthesis-Betriebsdatenbank

The result is a small list of empirically definable and delimitable firms derived on the basis of multiple criteria for growth dynamics. This allows us to answer the important question “Who are the high growth firms?“.

Based on the results we see that high growth firms exhibit the following characteristics:

- They are sufficiently well-established (at least 10 years in existence) to become reliable partners for economic policy. From an empirical point of view, this also means that they have been around long enough to reveal distinct growth patterns
- They continue to grow or have mastered a turnaround over a longer period
- They are active in the Austrian firm landscape and continue to contribute to job growth.

The group of high growth firms is fairly concentrated and comprises mainly big firms in a few sectors:

- firms in the „top 4“ are all larger than 250 employees
- the main drivers in job creation are manufacturing firms (creating an additional 22,300 employees) and other business services (creating an additional 21,700 employees)
- a limited number of firms within these fields are drivers.

Neither skill intensity (except with respect to independent professionals and scientific/technical services) nor the firm foundation rate are of great importance in these fields.

V. RELEVANCE FOR TERRITORIAL OBJECTIVES

The results are based on an Austrian landscape of firms, Austria being a small open economy within the European Union (comparable in size to some of Germany’s and UK’s regions). Since the

firms under scrutiny – especially the drivers – are to a large extent immobile and important players within their specific region, the results are of relevance for territorial objectives with a place-based perspective.

The good news therefore for such a policy is that obvious drivers do exist – there is an empirically clearly defined potential for growth within given places. These firms have grown over a remarkable stretch of time and have contributed to job growth in Austria and its regions.

Yet policy has to be aware that these firms represent a small group even within the „top fields“. The question arises how to reach and support firms with such growth-inducing characteristics in a manner that does not discriminate others. Also the successful and big firms deserve support – at least in the sense that forms of behavior and decision making which led to job-creating survival and resilience get endorsement and keep up further momentum (even in successful firms managerial strategies do not stay uncontested).

Small and medium sized enterprises – despite their limited contribution to job growth as a group – deserve further attention. Here again policies have to concentrate on specific criteria that enables them to survive and grow over longer stretches of time. For policies focusing on the potential of rather immobile and place-bound firms this altogether has as a consequence that selective forms of support are likely to be more suitable than programs designed on the basis of more general criteria: Handle with care.

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We gratefully acknowledge financial support by the European Recovery Program Fund of the AWS - Austria Wirtschaftsservice GmbH.

3.1.2 What can we learn from the territorial innovation dynamics in China, India and the U.S.?

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I. INTRODUCTION

Influential reports by the World Bank (World Bank 2009), the European Commission (Barca 2009), the OECD (2009) and the Corporación Andina de Fomento (2010) in different ways reflect the increasing attention of policy-makers for place-based approaches to economic development and innovation. While the World Development Report 2009 has the important merit of bringing economic geography at the centre of the formulation of development policies, the policy conclusions formulated by the OECD, the Barca Report and the Corporación Andina de Fomento fully endorse an integrated territorial approach to innovation which takes full account of the role played by complex institutional and contextual factors and global networks.

The development of progressively more sophisticated approaches to the analysis of the territorial dynamics of innovation has contributed towards a progressive shift in the policy paradigm from a purely 'science and technology' approach to the emphasis on agglomeration and spatial proximity that has characterized innovation policies targeting cluster development and firm incubators. However, the most recent evolution in the territorial theory of innovation opens the way to more balanced integrated policies that systematically account for the multifaceted influence of geography on innovation processes.

This paper contributes to this debate by showing how a fully place-based approach can be integrated into conceptual and empirical research. The conceptual section outlines the key components of a conceptual framework to understand and compare the territorial dynamics of innovation in both developed and developing countries. The empirical part shows how this framework can – in practice – form the basis of the comparative analysis and benchmarking of the territorial innovation capacity of the United States – as the leader system to be challenged by the European Union – and China and India as emerging competitors for international technological leadership. The final section concludes with considerations on how these tools can be used by policy-makers when dealing with territorial cohesion and innovation dynamics.

II. CONCEPTUAL FRAMEWORK FOR PLACE-BASED COMPARATIVE ANALYSIS AND POLICY LEARNING

The comparative analysis of innovative performance at the territorial level calls for an appropriate analytical framework. Let us briefly review the 'building blocks' of an 'integrated' and place-based framework for comparative territorial analysis of innovation dynamics.

R&D and innovation - The relationship between local innovative efforts and knowledge output is grounded into the endogenous growth perspective (Romer 1990), the Knowledge Production Function approach (Audretsch and Feldman, 1996) and the 'technology-gap theory' of technological development (Fagerberg 1994).

Social Filter Conditions – Innovation processes need to be 'embedded' into their socio-economic context by effectively integrating proximity, local synergy, and interaction (Camagni & Capello 2003; Iammarino 2005). These conditions are particularly important for the analysis of emerging countries (Lundvall et al 2009). A quantum leap in the usability of these concepts for comparative analysis comes from their operational translation into a set of 'measurable' features of the regional realm, directly dealing with concrete constraints in terms of availability of comparable and reliable data. This is the case of the analyses based on 'social filter index(es)': composite indicators based on the theory-driven selection of proxies for the 'structural pre-conditions' for the establishment of fully functional systems of innovation (Crescenzi & Rodríguez-Pose 2011). The Social Filter Index approach focuses on three main aspects of social structure (Crescenzi 2005): educational achievement; the productive employment of human resources; and demographic structure and dynamism.

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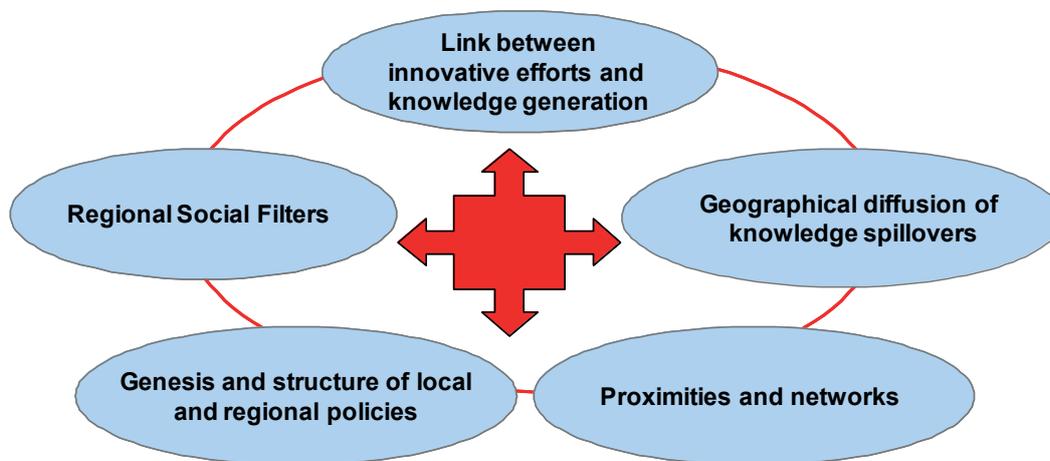
Localised Knowledge Flows - The third crucial component of such a framework comes from the literature on the spatial diffusion of knowledge flows (Storper and Venables 2004). The exposure of regional innovative agents to external sources of innovation in close geographical proximity is a persistent source of competitive advantage for the local economy.

Global networks - A set of additional dimensions (cognitive, organizational, social, and institutional proximities) – together with physical proximity - make it possible to diffuse and absorb knowledge shaping the innovative potential of regions and territories (Boschma 2004). An additional set of proximities is crucial for the generation of innovation by allowing the emergence of complex innovative network relationships, operating between and across different scales (from local to transnational) (Crescenzi et al. 2013).

Public Policies - Even if path dependency is very strong in the processes discussed so far, a given course of action is not 'written in stone' and comparative analysis has to take into account differential evolutionary patterns. External shocks (e.g. in the form of top-down policies) and/or collective action processes can change observed trajectories (Crescenzi 2009 for the EU; Greenbaum & Bondonio 2004 for the USA; Sun 2003 on China).

These key streams of literature allow us to identify five key factors shaping the geography of innovation in different territorial contexts. These factors can be interacted to form an Integrated Framework and are visualised in Figure 3.2.

Figure 3.2 Territorial drivers of innovation dynamics and streams of literature combined in the integrated framework



Source: Adapted from Crescenzi and Rodríguez-Pose 2011 & 2012

III. THE INTEGRATED FRAMEWORK IN ACTION: EMPIRICAL ANALYSIS OF TERRITORIAL INNOVATION DYNAMICS

The comparative analysis of the territorial dynamics of innovation should be based on the simultaneous (qualitative and quantitative) assessment of the five factors discussed above and of their reciprocal interactions. Following this approach our empirical analysis of the territorial innovation dynamics in USA, China and India is based on a modified regional knowledge production function. This approach extends the 'traditional' framework à la Griliches in order to account for the role of territorial characteristics and spatial processes discussed in the previous section (Audretsch and Feldman 1996, Crescenzi et al. 2007 & 2013, O'Hallachain and Leslie 2007).

We fit the following empirical model:

$$y_{i,t} = \alpha_i + \tau_t + \beta R \& D_{i,t} + \gamma WR \& D_{i,t} + \delta SF_{i,t} + \vartheta x_{i,t} + \varepsilon_{i,t} \quad (1)$$

where: y represents Regional Patent intensity; R&D is the share of R&D/S&T Expenditure in regional GDP; SF is the Social Filter Index; WR&D are spatial lags of R&D/S&T with appropriate Spatial Weights; x is a set of structural features/determinants of innovation of region i ; ε is an idiosyncratic error and where i represents the region and t time.

We assemble panel datasets for Chinese provinces, Indian states and US BEA Economic Areas (see Crescenzi et al 2012 and Crescenzi and Rodriguez-Pose 2013 for details). Data for China covers 30 provinces between 1995 and 2007 inclusive. Data for India covers 19 states between 1995-2004. Data for the USA covers 179 BEA Economic Areas, 1994-2007. The choice of empirical variables included in the model is set in Table 3.2.

Table 3.2 Empirical Variables included in the model

Variable	Internal Factors	External Factors
<i>Dependent Variable</i>		
Regional Patent Intensity	Regional patent applications per capita is used as a proxy for the innovative performance of the local economy.	
<i>Explanatory Variables</i>		
R&D	Local Investment in S&T/R&D	R&D Investments in neighbouring areas
Social Filter	Structural of 'innovation prone' regions: Human Capital, Sectoral composition, Use of resources (unemployment), Demographics	Same characteristics in neighbouring areas
Specialisation	Krugman Index	
Agglomeration econom.	Population Density	
Infrastructure endow.	Kilometres of motorways/railways	
Mobility of people	Migration rate	

IV. RESULTS

The results of the empirical analysis are presented in Table 3.3. The main results for China are given in column 1. Regional R&D spending is not significant on patenting rates, and spatially weighted science and technology spending is negative insignificant. The spillovers result may also reflect effects of a centrally planned economy, in which capital and labour are shifted via policy decisions. Richer regions with agglomeration activities, good infrastructure endowments and industrial specialisation have higher patenting rates. After controlling for these structural factors in the regional economy, net migration also becomes a force for innovation.

In the case of India, our results suggest a rather different and more dispersed configuration of territorial innovation from China and the USA (column 2). Here, regional R&D and the Social Filter explain a significant amount of variation in innovative activity. Spillover variables are also positive and significant, until net migration is introduced in the analysis. Taken together, the results suggest the importance of a number of several highly dense urban spaces driving innovation, plus wider social and institutional conditions.

Conversely the USA results (column 3) indicate a stable geography of innovation organised around large, specialised spatial clusters. The results suggest a consistently strong connection between regional R&D expenditure and patenting activity – a relationship that holds throughout the specifications. Unlike China and India, we find no significant effects of R&D spillovers in any specification.

This reflects wider analysis that knowledge spillovers within US regions exhibit considerable distance decay, tending to die out within the economic area in which ideas are generated. As with China and India, social and institutional factors exhibit a robust positive influence on innovation.

Overall, the China analysis suggests that the country's regional innovation systems are driven by the density-R&D nexus, and more broadly by traditional agglomeration factors. Patenting activity is concentrated in richer regions with big urban cores and good infrastructure networks. This may be because of China's sharper density gradient, plus the role of the state-directed economy – which appears to limit spillovers between regions. By contrast, India presents a more straightforward 'R&D plus spillovers' story, especially in a number of dense urban cores. Agglomeration measures play a less important role than in China; conversely, spillover variables are positive and (mostly) statistically significant as a driver of patenting. The results for India also highlight the importance of migration: there appears to be a very dynamic spatial matching of talent across regions, perhaps reflecting freer movement of labour. Also unlike China, the Social Filter is positive and significantly linked to innovation.

The US system shares some superficial similarities with both China (a traditional agglomeration story) and India (a number of innovation 'hotspots'). The generation of innovation occurs largely in self-contained zones relying on their own R&D inputs, favourable local socio-economic environments and on large pools of skilled individuals. However, we know from the previous territorial analysis that innovative activity in both China and India is far more spatially clustered than in the US. Knowledge spillovers in the US are largely localised: but the large number of innovation 'sites' helps raise the country's overall innovation performance.

Table 3.3 Territorial Innovation Dynamics in China, India and USA

VARIABLES	(1) China	(2) India	(3) USA
Regional R&D/S&T Expenditure	-0.0963 (0.0701)	1.545* (0.810)	2334*** (527.2)
Spatially Weighted S&T (Inverse Dist)	-7.98e-09*** (2.56e-09)		458.3 (1525)
Spatially Weighted S&T (First Order Contiguity)		1.24e-09 (9.54e-10)	
Social Filter	-0.000552 (0.000564)	0.000210* (0.000110)	0.00642*** (0.00144)
Spat. Weigh. Social Filter	-0.00210*** (0.000742)	0.000694 (0.000472)	-0.00433 (0.00313)
Krugman Index	0.0204*** (0.00408)	-8.15e-05 (0.00133)	-0.0253 (0.0225)
Railway Density (Road for India and USA)	0.134** (0.0604)	-4.53e-05** (2.12e-05)	3.29e-05** (1.42e-05)
Population Density	0.000176*** (4.91e-05)	1.41e-06 (1.26e-06)	0.000466*** (0.000162)
Net Migration (Gross Inter-state for USA)	2.83e-05*** (1.04e-05)	1.74e-05** (7.55e-06)	-8.07e-08 (5.75e-08)
Constant	-0.0798*** (0.0167)	-0.00622* (0.00348)	-0.189*** (0.0469)
Year Dummies	X	X	X
Observations	390	92	2327
R-squared	0.400	0.938	0.330
Number of id	30	19	179

V. CONCLUSIONS

This paper delivers rich, detailed descriptive analysis on key innovation inputs and outputs across the three countries. These results are situated within an analytical framework which allows us to identify individual components of innovation systems and their interaction. How does this type of comparative analysis add value to EU policymakers, especially at regional level? First, it enables us to isolate the factors that shape the genesis of innovation and economic dynamism at the territorial level at different stages of the process of technological development. In turn, this helps develop a better understanding of these processes for EU leading and lagging regions at the same time.

Second, the design of the analysis makes it possible to replicate it for the EU regions in a fully comparable fashion. Existing research shows that in Europe (differently from the USA) the direct link between local R&D investments and local innovation is weak. Conversely, exposure to localised knowledge flows is highly relevant for EU regional innovation performance (in contrast with our results for the US and China but similarly to India). In addition, 'social filter' conditions (in line with our results for both the USA and India) are very strong predictors for regional knowledge generation, absorption of external knowledge and, ultimately, for their translation into regional growth (Crescenzi & Rodríguez-Pose 2011).

Third, it supports 'policy transfer' where the EU aims to provide support to non-EU partners wishing to learn from the EU experience: comparative analysis provides a systematic framework for policy development work, for example the European Commission's 2010 China Regional Policy report.

With this in mind, what does our comparative analysis tell us? Overall, that there is no single 'best practice' or 'optimal model' for EU innovation, as territorial specificities are of crucial importance for regional/local economic development/innovation policies. Factors behind successful outcomes in China, India and the USA cannot be easily replicated in different contexts, calling for a fully place-based approach to innovation and cohesion.

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3.1.3 Territorial capital, territorial cohesion policy and services of general interest: a SWOT analysis of SGI

*Daniela-Luminita Constantin and Raluca Mariana Grosu**

I. INTRODUCTION

In line with Europe 2020 Strategy the services of general interest (SGI) have a special significance to the territorial cohesion concept: ensuring the proper provision of SGI in terms of availability, accessibility, affordability, quality and adaptability to special needs stand at the very origin of this concept (CEC (2008), European Union (2008)). From another perspective, regional competition and territorial cohesion are strongly related to the territorial capital of each area, describing all localized assets that determine the competitive potential of a given territory. SGI engage with the approaches to territorial capital when discussions concentrate on location, spatial patterns, agglomeration economies, local resources, quality of life, welfare regime, subsidiarity principle, etc. (Constantin et al. 2013). The novelty of this paper and of the research behind it consists of two interrelated features: in concept terms, it explores the relations, interactions between territorial capital and SGI, contributing to a deeper understanding and substantiation of the territorial cohesion concept and corresponding policies; in methodological terms, it proposes a comprehensive SWOT analysis of SGI, able to reveal the influence of territorial capital and territorial cohesion policy on SGI. More precisely, the SWOT analysis takes into consideration the basic trends and key challenges to SGI in demographic, economic, social, climate-environmental and political terms. It may be employed as a useful tool to underlie the policies aiming at an effective provision of SGI to the large variety of territories existing within the EU.

II. SGI IN RELATION TO TERRITORIAL CAPITAL IN THE CONTEXT OF TERRITORIAL COHESION

The concept of territorial capital was first proposed by OECD (2001), being reiterated by DG Regio of Commission of the European Union in relation to the policies addressing territorial development: “Territorial development policies (policies with a territorial approach to development) should first and foremost help areas to develop their territorial capital” (CEC, 2005, p.1). In a broad sense, territorial capital may be seen as “the set of localized assets – natural, human, artificial, organizational, relational and cognitive – that constitute the competitive potential of a given territory” (Camagni & Capello, 2011: 216). It incorporates “natural resources and social overhead capital, impure public goods or mixed public/private goods (...) (landscape, cultural heritage), agglomeration and district externalities, club goods such as proprietary networks, private fixed capital stock and relational private services, social and relational capital, human capital, entrepreneurship, creativity and leadership, cooperation networks and strategic public private partnerships in knowledge creation, governance structures” (Camagni & Capello, 2011: 216-217). Territorial capital elements may be structured into several components of a model describing the regional growth process. They mainly refer to territorial assets (found in economy – research and development, human capital, economic geography and territorial – urban structures – presence of large agglomerations, accessibility and peripherality), relationality (spatial spillover effects), agglomeration economies (in relation to urban structure and polycentrism), accessibility and connectivity (via market potential functions), governance and institutional effects, etc. (Camagni, 2008). All these components are considered by the policies aiming to support regional competitiveness and territorial cohesion.

If the services of general interest (SGI) are considered, the purpose of harmonizing the EU places through territorial cohesion can be achieved by making SGI accessible to all areas, including the remote ones. SGI stand at the very origin of the territorial cohesion concept. They have been initially defined as “market and non-market services which public authorities class as being of economic interest and subject to specific public service obligations” (CEC 2001: 23). The main emphasis in this field is put on the users of SGI, namely the European citizens, who “expect high quality services at affordable prices” (CEC 2001: 6). At present SGI incorporate *social* services of general interest such as labour market services, education, health care, child care, social care, (social) housing and social assistance services as well as services of general *economic* interest, which refer to gas,

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water, electricity, postal service, transport, waste management, ICT and electronic communications (Rauhut and Ludlow, 2012). In line with Europe 2020 Strategy, some of these services support the smart long run growth (e.g. education), while others are particularly important to sustainable growth (e.g. energy, waste management) or to inclusive growth (e.g. social care).

SGL meet the approaches to territorial capital when it comes to issues regarding location, spatial patterns, agglomeration economies, local resources, quality of life, welfare regime, cooperative networks, public-private partnerships, subsidiarity principle, etc. From the territorial impact viewpoint, SGL can be divided into three groups (Balalia & Rauhut 2012). The first group – so-called ‘explicit group’ – includes transport, electricity, gas, water, postal services and waste management. The second group, of ‘partial impact’ envisages ICT and telecommunications, tertiary education and health care while the third – lacking spatial component – comprises labour market services, elderly care, child care and social housing. Hence, according to this classification, in the context of crossing the territorial capital with the territorial dimension of SGL, the discussion would concentrate on the SGL that are identifiable in a certain territory, namely the SGL which are included in the explicit group. Lower significance from this viewpoint could be brought about by the SGL that are part of the partial impact group and it would be almost a challenge to find common points with SGL that are lacking spatial dimension.

Another discussion concentrates on the relationship between the provision of SGL and territorial structures – monocentric, polycentric. It implies a comparison between “densely and sparsely population structures and their preconditions to economise with restricted resources” (Borges & Johansson 2012: 4). In other words, whether the polycentric countries, characterized by more densely and spread population structure benefit from more SGL per capita than the sparsely populated, monocentric systems, characterized by rather concentrated settlement patterns with a few dominant big cities. The results of corresponding inquiries indicate that “connections between polycentricity/monocentricity and SGL are almost negligible” (Borges & Johansson 2012: 13) but emphasize the need of further investigations with regard to the relation between territorial development based on polycentric structures and welfare systems, considering the special significance of the latter for SGL and territorial cohesion.

Going further, whereas the territorial capital is associated with a certain territory, it is more difficult to determine the clear limits of the SGL within the same area. Some of SGL generate benefits beyond the border using the capital available within a certain territory (positive spatial externalities). On the other hand, as not all territories dispose of the same capital, differences in the competitive potential appear, determining territorial variations in the provision of SGL. In response to this situation the applying of proportionality principle with regard to the investment in territorial capital is recommended, so as to diminish the differences between regions in terms of SGL provision. The proportionality principle goes hand in hand with the applying of the subsidiarity principle, which has made it necessary and possible to formally recognize local and regional authorities as integral parts of the Community structure (European Union 2007).

In addition, different types of territories need different accessibility standards for SGL. Therefore the vast array of policies designed for the provision of SGL should have a territorial dimension and be coordinated with specific EU and national policies (e.g. transport, ICT) in order to ensure the broad and comprehensive accessibility to SGL for the general public (Böhme et al. 2011). A special responsibility belongs to the national governments, especially when it comes to the minimum provision of SGL in economically and demographically disadvantaged regions (ESPON 2012). In a broader view, the European Commission’s vision on SGL in terms of availability, accessibility, affordability, quality and adaptability to special needs implies the leading role of the state, accompanied by the market related advantages and complemented by the civic engagement in special situations. The EU supports all these efforts via programmes funded by the European Regional Development Fund, the European Social Fund and Cohesion Fund, revealing a complex SGL provision architecture (ESPON, 2012), which has to be integrated in and connected to the components of the Cohesion Policy.

III. A SWOT ANALYSIS OF THE SGI IN RELATION TO TERRITORIAL CHARACTERISTICS AND TERRITORIAL COHESION POLICY

The clear, objective evaluation of the opportunities and challenges to SGI derived from the economic, social, demographic, spatial elements involved in applying various policy measures is necessary. With this aim in view a SWOT analysis has been undertaken, seeking to explore how territorial characteristics – associated to territorial capital - and territorial cohesion policy affect the provision of SGI. A short version of this analysis is presented in Table 3.4.

Table 3.4 A SWOT analysis of SGI (short version)

	Territorial characteristics	Policy on territorial cohesion
Strengths	<ul style="list-style-type: none"> • high quality of SGI in regions of high expertise • low prices of SGI in territories of SGI concentration and high competition • clustering of SGI providers in densely populated and urban areas • the development of public-private partnerships based on the liberalization and deregulation of SGI resulting from EU directives • cooperation between different SGI providers 	<ul style="list-style-type: none"> • EU funds for new investments in SGI • various policy approaches to SGI applied by the EU Member States focusing on redistribution, fostering efficiency, privatisation of public services • long-term trend of increasing levels of public spending as proportion of GDP in the 90s and the beginning of 2000s
Weaknesses	<ul style="list-style-type: none"> • clear concentration tendencies in remote, sparsely populated, mountainous, insular and outmost regions towards major towns and city agglomerations creating imbalances in SGI provision • low / lack of SGI provision in less attractive territories from a market perspective • population decline in peripheral, sparsely populated regions determining significant problems in maintaining and financing SGI 	<ul style="list-style-type: none"> • incoherent policies at the various levels generating trade-offs and additional economic, social and environmental costs • centralisation of services in various dimensions in Europe • ongoing economic and financial crisis leading to reduction of investments in SGI • the deregulatory and liberalisation processes promoted by the EU • poorly professionalized bureaucracy and frequent changes in the law, negatively impacting the provision of SGI
Opportunities	<ul style="list-style-type: none"> • increase in the population density • reduction of population at risk of poverty and social exclusion • public investment or a mix of public and private funds, at the rate of private catchment of individual social contribution as a result of gradual substitution of the State by the private sector on the production and provision of SGI 	<ul style="list-style-type: none"> • EC's vision in favour of fair accessibility and well distributed SGI • high availability of SGI for all users when SGI provision is firmly linked to territorial policy and planning • use of European Regional Development Fund and Cohesion Fund for vital investments in regions suffering from a weak economic structure as well as from a population decline for the development of various SGI • expected improvement of the financial situation, especially by raising the GDP per capita

	Territorial characteristics	Policy on territorial cohesion
Threats	<ul style="list-style-type: none"> • declining, shrinking population base for most SGI meaning higher costs per remaining inhabitant and a weaker tax base • income substitution effects, feminine activity rate or post-industrial family composition leading to decline in fertility rates with impact on various SGI provision (e.g. childcare, education, etc.) • aging population, demographic decline, and imbalance of gender structure generating a severe constrain to financing SGI supply • decrease in active population, impacting the costs of SGI • movement of the highly qualified labour to metropolitan areas in the EU, putting pressure on SGI • uncertainty on maintaining the provision of SGI in rural areas that face a declining number of inhabitants as well as in areas characterized by high unemployment rates and low level of income • increase in number of peripheral areas suffering from depopulation • reduction of school early levels and improvement of third level education 	<ul style="list-style-type: none"> • relatively modest regional growth in many regions case • decrease in public expense relative to GDP, determining the reduction of social services and transfer to individual responsibility of some of social risks assumed until now by the community • reduced accessibility of SGI and relatively higher provision costs in sparsely populated, relatively lower income levels areas leading to a decrease in accessibility of SGI • political instability within the EU and its member states

Source: authors' synthesis based on the results and findings provided by ESPON (2012), *Indicators and perspectives for services of general interest in territorial cohesion and development*. Draft Final Report. ESPON: Luxembourg

The trends and key challenges emphasized by the SWOT analysis lay the foundations of normative and, especially, explorative scenarios regarding the competitive and social Europe. For example, the competitive scenario envisages the polarization of the development in existing urban and metropolitan regions, which will not lead to the enhancement of territorial and social cohesion. On the contrary, it will determine a stronger imbalance of SGI provision in peripheral areas compared to the urban ones. In turn, even if it is easier to invest in densely populated areas, the social scenario implies an emphasis on the investment and support in terms of SGI provision in peripheral regions, which will profit more than the metropolitan ones in this respect. (ESPON 2012)

Further on, the elaborated scenarios can bring valuable information for the formulation of strategies and policies in the field of SGI provision in the EU, which will be differentiated depending on the status of various regions in the next programme period, i.e. more developed, transition and less developed regions. Moreover, differentiations will be necessary even within the NUTS II regions considering that highly populated, developed areas may coexist with the sparsely populated ones in the same region.

IV. CONCLUDING REMARKS

Territorial cohesion translates the sustainable and balanced development goals into territorial terms, placing an explicit emphasis on the fair access of citizens and economic agents to SGI. Usually the provision of SGI at certain standards in terms of availability, accessibility, affordability, quality, variety and the territorial dimension is discussed in relation to the supply of minimum service levels by each EU member state, the threshold depending on macroeconomic performance, institutions, ideologies. The territorial capital and derived characteristics also influences the provision of SGI through the localized assets that determine the competitive potential of a given territory. At the same time SGI support the smart, sustainable and inclusive growth, contributing to the development of the territorial capital via ESIF

allocations oriented to territorial cohesion objectives. Thus, the two concepts interact – in a double way relationship - when it comes to location and spatial patterns related issues, agglomeration economies, local resources, quality of life, partnership and networking, etc., suggesting interrelated approaches in order to ensure the coherence, compatibility of the corresponding support policies.

The SWOT analysis has revealed the close relationship between territorial capital and the SGI drivers, also pointing out that the patterns of SGI provision may considerably vary depending on territory characteristics associated with densely populated/urban areas or sparsely populated/peripheral ones. As a result, variations in the role of SGI as support for a competitive and social Europe will be induced. In terms of territorial organization, a tendency towards the convergence to a high level of sub-national, shared responsibility for SGI provision (especially for social ones) can be noticed, serving as mainstream model for further political development and integration (Humer et al. 2013).

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3.2 Typologies of European regions

3.2.1 Analyzing land use change dynamics for policy development: identification of hot-spots of change

Rasmus Ole Rasmussen*, Ryan Weber# and Gemma Garcia‡

I. INTRODUCTION

Understanding land use change dynamics and monitoring these changes are becoming more critical as the activities in the landscape include a multitude of interacting and conflicting purposes. Some of these are directly related to available ecosystems and landscape services while others are related to the territory due to other constraints. All together these uses obtain a diverse set of functions (economic, environmental, social and cultural) from any particular form of land use constituting “a key part of territorial capital and therefore an important asset in the endogenous development of regions and cities” (ESPON 2013).

There is therefore a need to be able to identify areas where such changes take place whether it is in relation to increases or decreases in competing demands in multifunctional land use systems. And maximizing land use efficiency is seen as a direct mean of improving the sustainability of land use in general. It is important to consider how increased human landscape intervention is among the strongest pressures on biodiversity (Environment Council 2010), but also that protecting the environment and promoting resource efficiency generate a potential for eco-system goods and services which may “contribute to efficient resource use, regional economic growth and territorial cohesion” (ESPON 2013). Consequently the goal has been to provide a method for analyzing data from the CORINE database to identify “hot spots” of land use change in terms of a matrix of the amount and the intensity of change.

II. METHODOLOGICAL APPROACH

ESPON project EU-LUPA proposes a novel methodology for an optimal characterization of land cover status and changes, by means of CORINE Land Cover (CLC 1990, 2000, 2006) that can be analyzed vis-à-vis socio-economic dimensions. EU-LUPA defines regional typologies (regionalized information at NUTS2/3) as an analytical tool for the development of policy messages and recommendations for the ESPON territory. First approach is the Land Cover Characterization, reflecting the land surface bio-physical nature. A temporal analysis of CLC classification identifies the amount of land undergoing changes, which is then easily mapped and monitored through typologies. Second approach is the Land Use Intensity categorization understood as the degree of human intervention on the land caused by socio-economic activities, by means of the consideration of economic performance (GDP) and population density based on the inferred intensity hierarchy inherent in the CLC classification. It provides an indication of how land change processes reflect the magnitude of human intervention, how intensively the land is being used. Land use intensity responds to the understanding that while socio-economic growth is less and less attributed to land-based production, it is an ever-increasing driver of land changes. And third approach is the interpretation of the intensity change characteristics as basis for development change characteristics and as basis for policy recommendations. A challenge in the analysis has been the limitations of the CORINE data in terms of its uneven coverage and the fact that it predates the economic crisis.

III. LAND USE CHARACTERIZATION

In Figure 3.3 the process of determining *the prevailing characteristics of land use* in Europe based on CORINE data from 1990, 2000 and 2006 is outlined. The term “prevailing characteristics” is important in the land use characterization because it implies that the unchanged elements of

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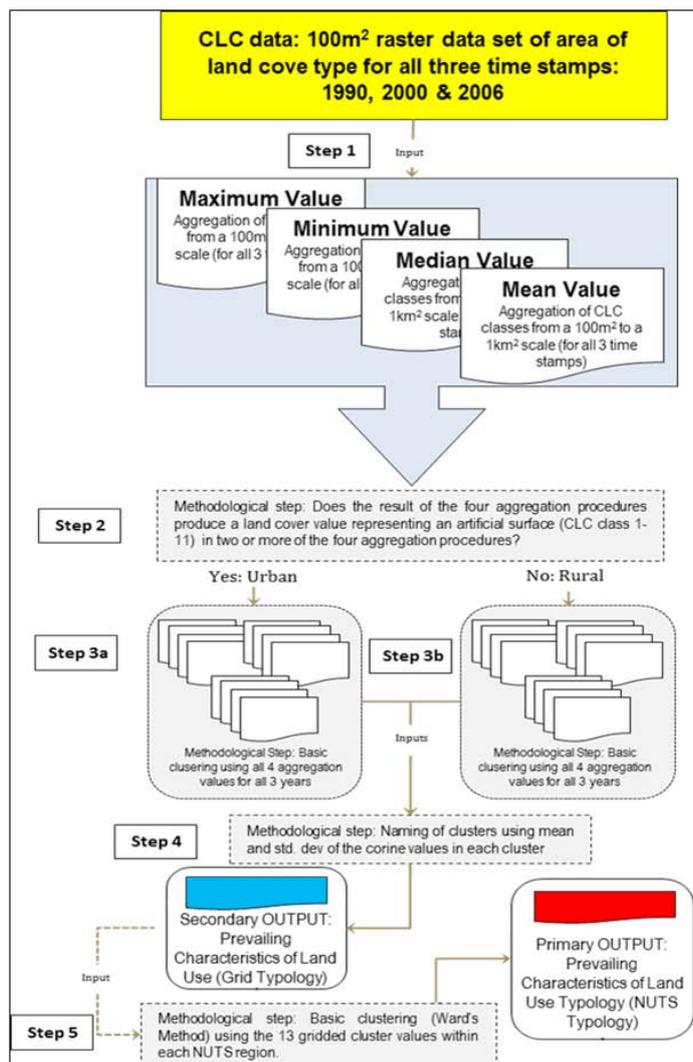
European land cover as well as any changes that take place are included in the typology developed for the analysis. It provides a comprehensive interpretation of land cover that does not infer that land change is a fixed process with a clear beginning and end, but rather a dynamic and on-going process through time and space.

A clustering of the data is performed with the maximum and minimum values of the aggregations representing the span of land cover types in each 1km² area, while the median and majority aggregation most effectively characterize the dominant land characteristics, as well as the association of vegetation characterizing the grid cell.

Two cluster procedures (Ward’s cluster method) are completed during step 3, one for the 815 590 urban cells and one for the remaining rural cells. The result is the generation of six clusters with a dominant urban component and seven rural clusters. The cluster results are smoothed by a 3km²x3km² filter and assigns the dominant cluster value to each of the nine 1km² cells in the matrix resulting in a set of 11 types covering the spectrum of landscape in Europe – from dense urban cores with intensive human intervention to sparse and remote natural landscapes.

Finally the gridded typology is regionalized to the NUTS2/3 level by means of a Ward’s Cubic Clustering Criterion procedure.

Figure 3.3 Methodological flow used to analyze prevailing land use characteristics



IV. THE CONCEPT OF INTENSITY

The concept of land use intensity is introduced into the EU-LUPA project to acknowledge and respond to the understanding that while socio-economic growth is less attributed to land-based production it is an increasing driver of land changes. Seen from this perspective, it is not only important to know how much land is changing, but crucial to know if land changes are minor which usually relates to on-going socio-economic processes, or if they reflect major shifts in land cover as part and parcel with structural socio-economic changes. In light of this, land use intensity is defined as: the degree of human intervention caused by activities taking place on a given parcel of land - activities that, in most cases, do not have a direct and one-to-one implication on the characteristics of land cover. The intensity is therefore not related to the amount of input used – a driver that usually leads to an increase of production from a piece of land (cf. Gabrielsen, 2005). Such a characterization would be reminiscent of what we are trying to avoid – land use characterization that is preferential the inputs and outputs of land-based production and with limited reflections on the environmental, social and cultural aspects of land use. But at the same time, land use intensity is not only related to the per capita use of artificial surfaces, for this is also too narrow a concept which tells more about the efficiency of land use than about intensity (cf. Prokop et al. 2011).

Table 3.5 Ranking of CLC classes based on Land Use Intensity

GRID CODES	INTENSITY CODE
1	1
3 to 9	2
2, 10-11	3
12 to 17	4
18-22	5
23-25, 29	6
26-28, 30-34	7
35-44	N/A

To assess land changes in terms of intensification or extensification of land use, all land changes are accounted based on the consumption intensity score, emphasizing what the land changes from, and the formation intensity score identifying what the land changes to. Thus, it provides an indication of how land change processes reflect the magnitude of human intervention on the landscape; or in other words, how intensively the land is being used. While this relatively simplified approach may be criticized for being too simplistic (Lambin, 2000), the structure of the CLC as an overall hierarchy show tendencies towards the intensity interpretation during a validation exercise carried out during the project. This exercise used indicators to infer the value of land in relation to the range of socio-economic activities it provides, especially those which are not related to land-based production. Two available indicators that best serve this purpose are population density and gross domestic product (GDP).

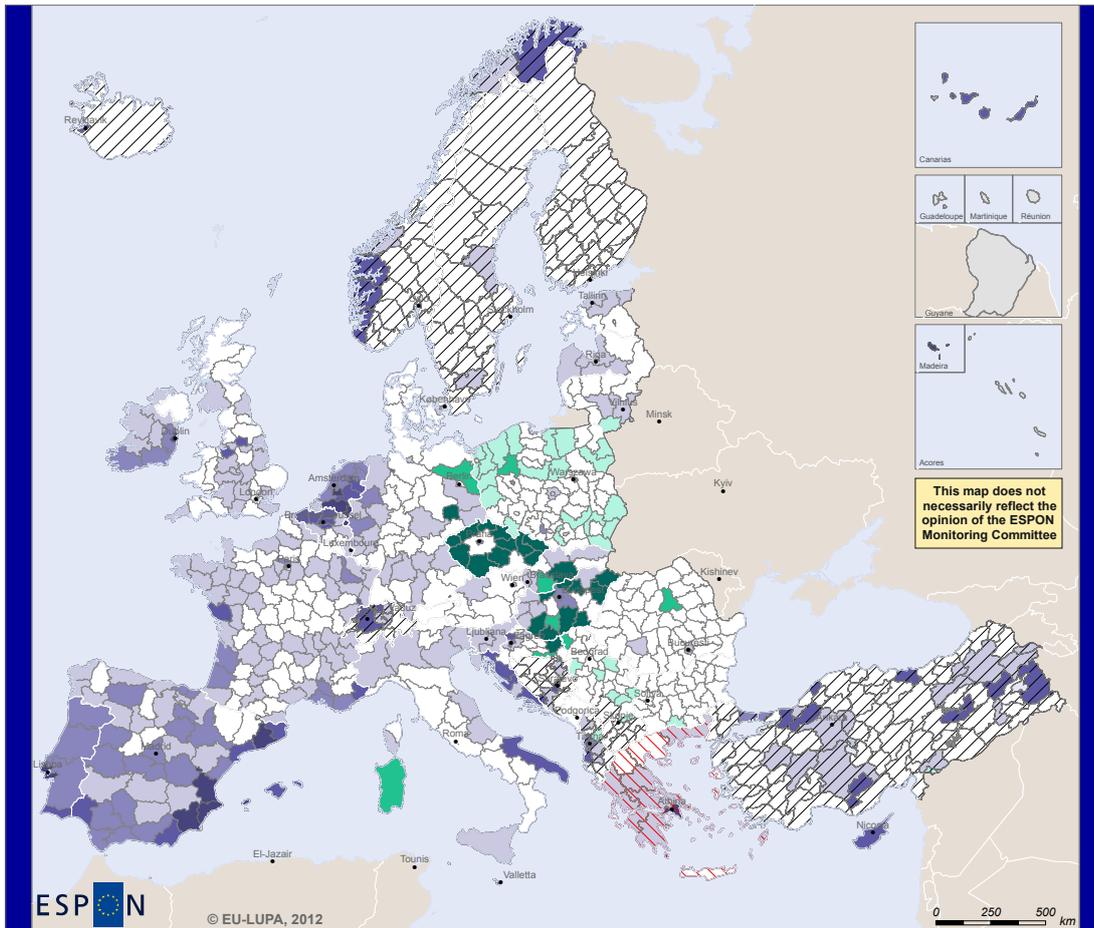
The level of correlation is generally much higher in relation to population density compared to GDP (-0.38012 and -0.23137 respectively). Even changes in demographic parameters may differ across regions, they are much more stable over time compared to shorter term changes in economic performance, and in this context, are primarily influenced by the territorial characteristics connected to urban versus rural structures. In contrast, regional economic performance is fluctuating much more because it is influenced by long term as well as short term changes where only a portion of capital is fixed, and therefore is less bound to specific territories. As a consequence the national setting – and thereby the more recent history – results in differences between nations which tend to fluctuate economically to a greater degree than does population density. The elimination of these differences is necessary in order to enable a more precise comparison between regions. A simple way to do so has been calculating national indexes for the parameters where such national differences exist.

V. INTENSITY CHANGE DISTRIBUTION – THE HOTSPOTS

The two previous approaches leads to the concept of “Hotspots of land use change” a generalized picture of which regions stick out in terms of high levels of physical land change, the degree of

human intervention on the land, or both. The Hotspots concept enables to identify areas where changes take place whether it is in relation to increases or decreases in competing demands in a multifunctional land use system. It constitutes one of the cornerstones of the EU-LUPA project on which messages for strengthening placed-based approach to policy development have relied on.

Map 3.1 Land Change Hotspots, 1990-2006



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: NUTS 2/3
Source: Nordregio, 2012
Origin of data: EEA, 2011
© EuroGeographics Association for administrative boundaries

Matrix of Land Change Hotspots

The x-axis shows the amount of land that has undergone change between the given years (in percent) while the y-axis indicates the change in intensity as a result of those changes. Therefore, regions in white represent those with relatively stable land cover characteristics while increasingly darker shades of green or purple identify “hotspots” of change where high intensifications or extensifications are coupled with increasing levels of overall land change are evident.

- only 1990-2000 data
- only 2000-2006 data
- No Data

Intensity of change	Above 1.50					
	1.00 to 1.49					
	0.50 to 0.99					
	0 to 0.49					
	Below 0					
		Below 2.5%	2.5-5%	5-10%	10-20%	Above 20%
		Amount of change				

Note: The color coding graphic reflects the two dimensions embedded in the concept, i.e. amount of change and intensity of change.

During the period 1990-2006 which is the time span for the conducted analysis Europe has undergone large amount of changes, even in some cases almost 30 % of an individual region has reported some form of change. Here, the spatial distribution of these changes is also quite territorialized, where vast changes are especially evident in areas such as Spain, Portugal, the Czech Republic, The Netherlands and Ireland. Some of the most significant changes between 1990 and 2000 take place on the Iberian Peninsula. In part, this is likely due to the ascension of Spain and Portugal to the EU in 1986, which resulted in a process where the former agricultural structure was broken up and in many places turned into more intensive forms of production. Also the land ownership reforms in Eastern Central Europe during the 1990s resulted in marked changes, a process which was further fuelled by the expectations regarding future membership of EU in the period up to and after the membership in 2004.

VI. POLICY ASPECTS

Land use implications on the compliance of the key EU policy objectives and targets are crucial due to its cross-cutting nature touching upon many different territorial challenges. However most policy targets are territorially blind which is strongly related to the fact that Europe has not any legal mandate on land planning. The above mentioned examples are just a few of the important observations that can be made based on the hotspot analysis, and to some extent ascribed to the intensification or extensification of land use with land as the major production factor. Yet all things considered, the most dramatic land change processes taking place in Europe are predominantly driven by Europe's path of socio-economic development, which is taking place due to the effects of globalization and its effect on the future division of labour and demand for land not only as a production factor but as *locus standii* for different dimensions of human life and environmental, economic, social and cultural activity. This is an issue reflected through the concept of intensity and therefore also essential in relation to the future focus on territory and related policy development as multi-functional entities that requires new and innovative approaches to land use related analyses.

The concept of "Hotspots" identifying the two dimensions of change, helps in the definition of policy messages for awareness-rising that should be considered for future policy development in line with the EU development principles and objectives (mainly under the EU Cohesion Policy, EU2020 Strategy and the Territorial Agenda): a) monitoring land use intensity will support responsible land management; b) identifying the drivers leading to "hotspots" would help in the resolution of conflicting land use demands affecting the economic, social and environmental performance of a region; c) assessing land use change dynamics would help in identifying the potentials for improving regional competitiveness and territorial cohesion towards sustainability.

Our key recommendation is that each region should undertake a regional assessment following the strategy defined for the assessment of the case studies, which would allow a proper contextualization of the land use patterns and dynamics, and support the identification of the policy options that would best respond to the territorial challenges and opportunities in each territorial reality.

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3.2.2 A spatial typology for European seas

Dania Abdul Malak*, Lynne McGowan#, Alberto Lorenzo-Alonso* and Marta Calvet†

I. INTRODUCTION

On land, spatial typologies are key building blocks in developing plans and identifying specific planning responses, yet the creation of spatial typologies is still very limited in the sea (Ehler & Douvere 2009). In Europe, the governments' recent considerations to include the sea as part of the territory for development and growth have increased, calling for the integration of a land-sea continuum into existing planning systems (EC., 2011) and linking further maritime considerations to territorial cohesion agendas. Limited knowledge of the marine environment, together with the rapid increase in sea-related activities within the European territorial space may lead to potential conflicts of use if no sustainable planning is envisaged (Meiner 2010; EC 2013). At present, a single instrument for the management of European land and sea is still lacking in Europe (Smith et al. 2011).

This paper reports on the outcomes of the research on *creating spatial typologies for EU Seas* (ESaTDOR) conducted by the European Observation Network for Territorial Development and Cohesion (ESPON) that was recently finalized. The paper begins with an overview of the EU Seas covering their anthropogenic activities and assessing their environmental conditions. It then describes the integrative approach used to spatially account for the environmental, economic, and social characteristics of the study area focusing particularly on transnational regions and on land-sea interactions. Based on the covered characteristics, the methodology used for the development of the spatial typology is described together with an account of the study results. It concludes with an argument on the key issues raised and on its usability for future typology development. The paper endorses more complex and place sensitive approaches supporting integrated Coastal and Marine Spatial Planning.

II. STUDY AREA

The research covers the six European seas including the Arctic and Atlantic Oceans, the Baltic, Black, Mediterranean, and the North Sea that are interconnected and cover an area of around 13'880'754km² shared between European and neighboring countries. A practical definition for the boundaries delimitation of the European Seas is adopted for this research based on definitions set by regional sea Conventions (ESPON, 2013). European Seas present a high degree of distinctiveness shaped by the complexity of natural and anthropogenic factors in addition to global and place specific interaction between these elements over millennia. European Seas are facing problems of pollution and unsustainable exploitation that, together with the impacts of climate change are posing evident conflicts between human activity and marine health (EEA 2010).

III. APPROACH

This paper reports on the approach developed for the creation of spatial typologies of the European seas focusing on the key trends in land-sea interactions. Three thematic priorities were set, focusing on both opportunities and risks, in terms of economic activity on land, environmental pressures on the sea and flows of goods, people, and services through the sea. In order to map land-sea interactions, common basics were set covering the availability of spatial data and their relevance for the analysis. This was followed by the development of a mechanism for data combination using a common reference system and a compatible platform capable of integrating land based and sea based datasets.

Simple sea based and land based maps were created from available datasets to provide indices related to the human use of the sea, maritime employment, and environmental effects related to

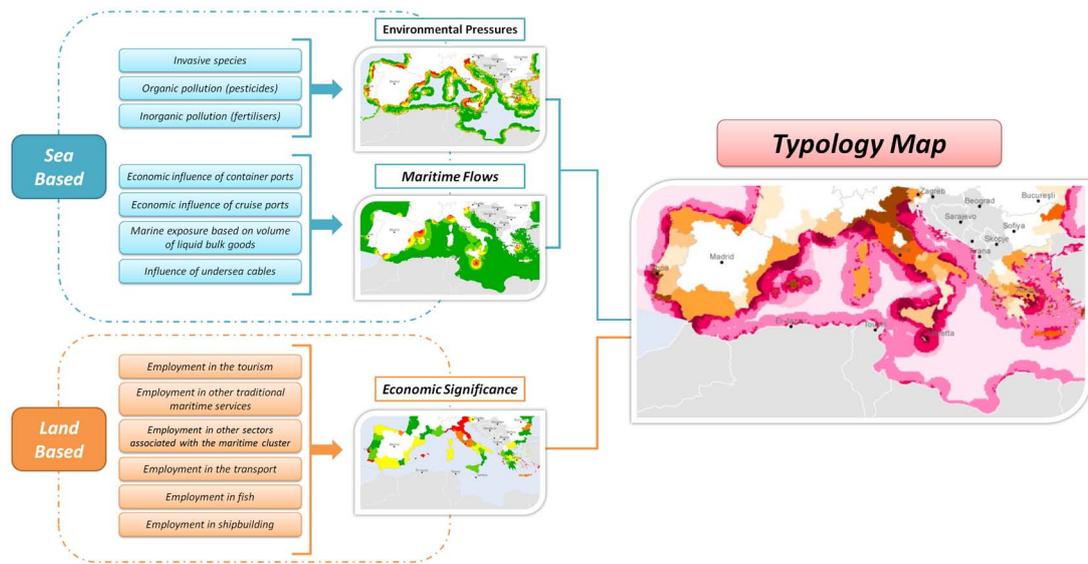
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anthropogenic activities. In a second stage, a selection of thematic datasets was combined to produce composite thematic indicators on environmental pressures, maritime flow, and economic significance. The three composite thematic indicators were integrated to produce European Sea typologies based on specific weightings and combinations. The approach used in this study is illustrated in Figure 3.4.

Figure 3.4 Illustrates the process of land- sea typology development



Selection of datasets / Simple maps

The selection criteria of key input land and sea based datasets considered their relevance to the set thematic priorities, their geographical coverage, scale, spatial reference and availability. The main sources of information included statistics from Eurostat and from the European Cluster Observatory. Simple thematic maps covering the general sea context, maritime economy, environment, energy and undersea infrastructure, and transport were produced (ESPON 2013).

The indicators on maritime economy are land based, collected at administrative level in the vector format and used as such. Employment, population and GDP are the main socio-economic indicators used for coastal regions. The resulting maps represent the state and opportunities in terms of the economic activity on the land. The environment, energy and undersea infrastructure, and transport indicators are sea based and collected in the raster format. All the sea based original data was transformed in a 10*10km grid using standardized procedures described in the technical documentation (ESPON 2013). The simple maps represent the risks on the Sea focusing on the environmental pressures and the influence of the ports and shipping lines activities on the Sea.

Composite maps

Thematic indicators were developed to account for the intensity of land-sea interactions. They focused on the opportunities based on the socio-economic activities generated from the Sea and on the risks considering the environmental impacts of anthropogenic activities, and marine and flows of goods, people, and services through the Sea.

Two land based economic indicators were developed. The economic use indicator was generated by summing the maritime cluster employees within each administrative region and classifying them into five categories based on quintile ranking. The total maritime employment composite map was calculated using the percentage of total employment within each region by grouping the values of each variable and summing the percentage of total employment for the six maritime clusters. The

environmental pressure was calculated based on the cumulative effects of organic and inorganic pollution and invasive species. No weighing was assigned as their individual effects were considered alike (expert judgment). The resulting environmental pressure composite map was classified into five classes based on quintile ranking and categories were assigned ranging from very low to very high. The flows composite map accounted for the hotspots for European maritime flows calculated based on the influence of different kinds of infrastructures on the sea. Simple datasets on freight, passengers, energy, and information were considered for the development of the flows indicator. The respective weights of 0.5, 0.3, 0.1; and 0.1 were assigned based on expert judgment. The resulting flow indicator was assigned five classes (from very low to very high).

Typology development

The development of a typology showing land-sea interactions, considered the intensity of maritime activities on land and sea and the cumulative anthropogenic impacts. For the land based activities, the total maritime employment indicator was used to account for the economic significance of the sea for the human activities on land through the assignation of five categories ranging from very low to very high land based importance. For the sea based activities, the environmental pressures on marine and coastal areas were accounted for using the environmental pressure indicator, and the impact of transport of goods people and services through the sea was accounted for using the flows indicator. The seas based combined indicator from environmental pressures and flows account for the anthropogenic impacts on the sea. The values of the two indicators were summed without weight assignation and classified using quintiles ranking into five categories from *Very low to Very high* representing the intensity of use and pressure on the sea. Based on this categorization, “hot” and “cold” spots of activity were represented on the land and sea continuum to identify areas on greater to lower land-sea interactions where the two highest or lowest quintile rankings for land and sea activities were shown respectively. These “hot” and “cold” spots maps were then used to identify maritime typologies using the following policy relevant classification: Core, Regional Hub, Transition, Rural and Wilderness areas to categorize the European seas.

IV. RESULTS AND DISCUSSION

33 simple regional maps covering the European seas according to European mapping standards were produced. A wide range of precise regional land related datasets proved to be widely available whereas the presence of appropriate sea related datasets was less evident. Inconsistencies in data quality and quantity were identified, such as shortcomings in resolution and in the extent or coverage of data, data gaps, and lack of relevant data sources. Data availability and quality varied among the different Seas proven to be best in the Baltic Sea in comparison to the other Seas (Janßen et al. 2013).

The two economic significance indicators represent the weight maritime economy plays in the territory from two different perspectives. The economic use indicator focuses on the interaction of land on the sea accounting for the number of total employees in maritime sectors dispersed over regions bordering European seas. The maritime employment indicator shows maritime employment rate focusing on the importance of maritime activities for the region’s economy or on the importance of specific maritime employment for the total employment in the region. The economic indicators are land based accounting for the economic significance of the sea in a given region. The result shows not only the net dedication of the regions to sea related activities but also the relevance of the sea sector to overall activity. The environmental pressure indicator is sea based and represents the main environmental pressures suffered by coastal areas and the sea, showing that the level of pressure is higher in coastal areas and closed or interior seas. The flows indicator identified maritime flows’ hotspots in the European Seas being land-sea interaction gateways characterized by high activity levels and focusing on the concentration of activities and/or routes, either due to clustering of port activities or as a results of natural conditions such as the presence of islands, straits that exert a pressure on these regions as a consequence of strategic positions.

Typology

Using the thematic indicators, a final typology map of maritime regions was produced accounting for the level of intensity of land-sea uses (Map 3.2). Based on this indicator and on expert knowledge, five land-sea typologies were identified defining regions that account for different levels of use (Map 3.3). The European Core region accounts for the highest intensity of land-sea interactions within the EU Seas representing the main spatial connection for the rest of Europe. The Regional Hubs determine regions that have developed an established diversity of their maritime economic activities. The transition areas are regions where maritime economy and sea use occur without defining a clear tendency of economic specialization. Rural and Wilderness regions have the least intense land-sea interactions and cover mainly the Arctic Ocean. These least impacted regions are vulnerable to future economic developments that will have direct effects on their characteristics if no strict considerations for the preservation of these regions are taken. The typology map suggests that it is difficult to prescribe a particular characteristic or label individual seas but rather its importance is in providing a mechanism to understand the tendencies in the use intensity of European seas.

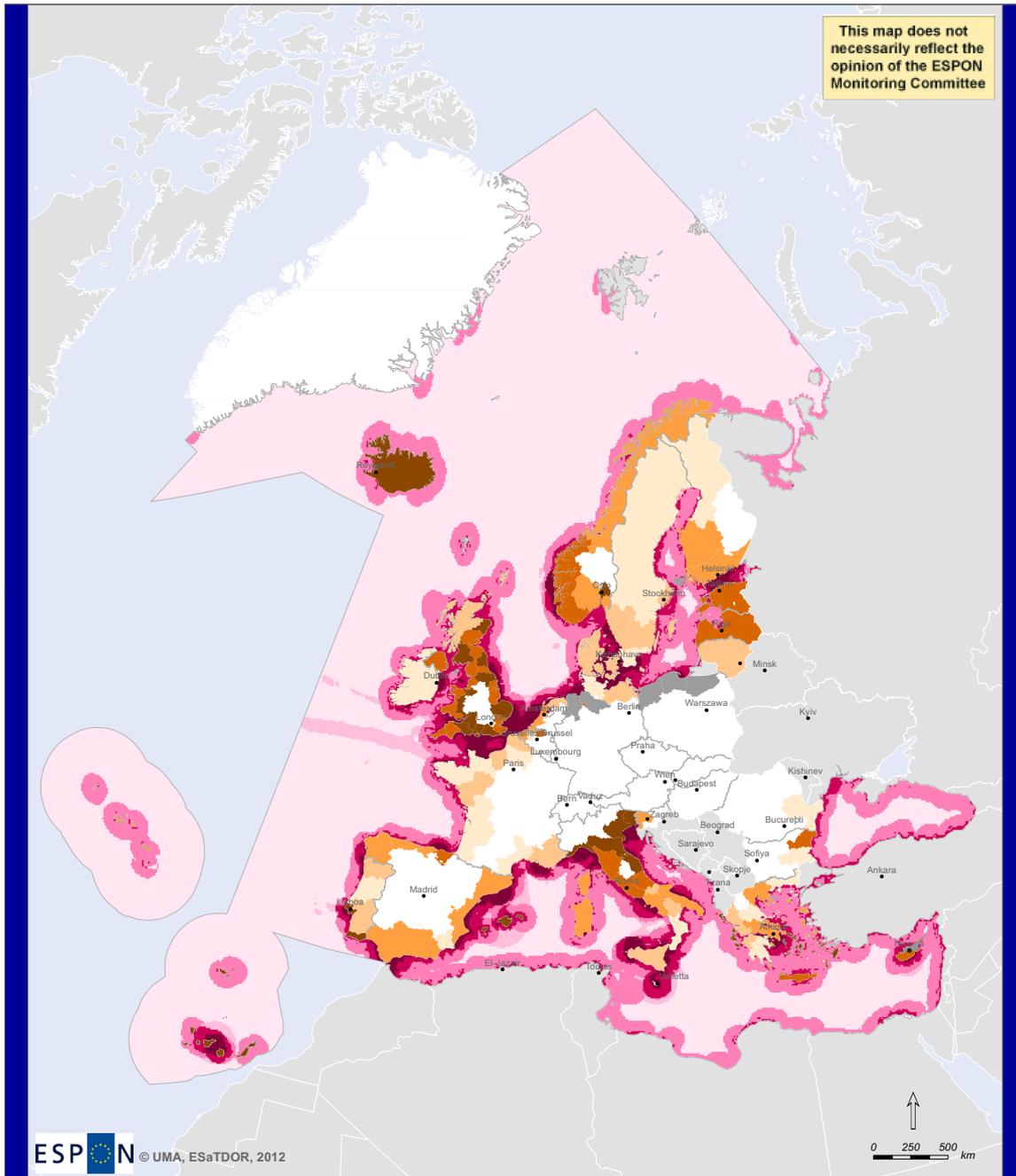
V. CONCLUSIONS

The typology developed in this study proves to be a valid spatial tool in showing the strength of land-sea connectivity and the spatial variations of coastal and maritime space across Europe. The exclusive conditions characterizing each of the five regions identified can be used to inform integrated maritime policy development, to stimulate debate about future development trajectories and to support the development of policy responses adjusted to the characteristics of these regions. Furthermore, the material provides a considerable source of coastal and maritime information that can be used to assist policy makers in the development of the next round of European Structural and investment funds. Additional development of the typology is needed with improved datasets and increased geographical coverage including inland areas. This approach will facilitate a closer integration in spatial planning of the land sea continuum overcoming national boundaries and contributing closely to the cohesion policy.

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Map 3.2 Intensity of land-sea interactions in Europe



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Thematic data: Typology Map, Economic Significance and Environmental Pressures Composite Maps
Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS2
Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

Typology Map (coldspots)

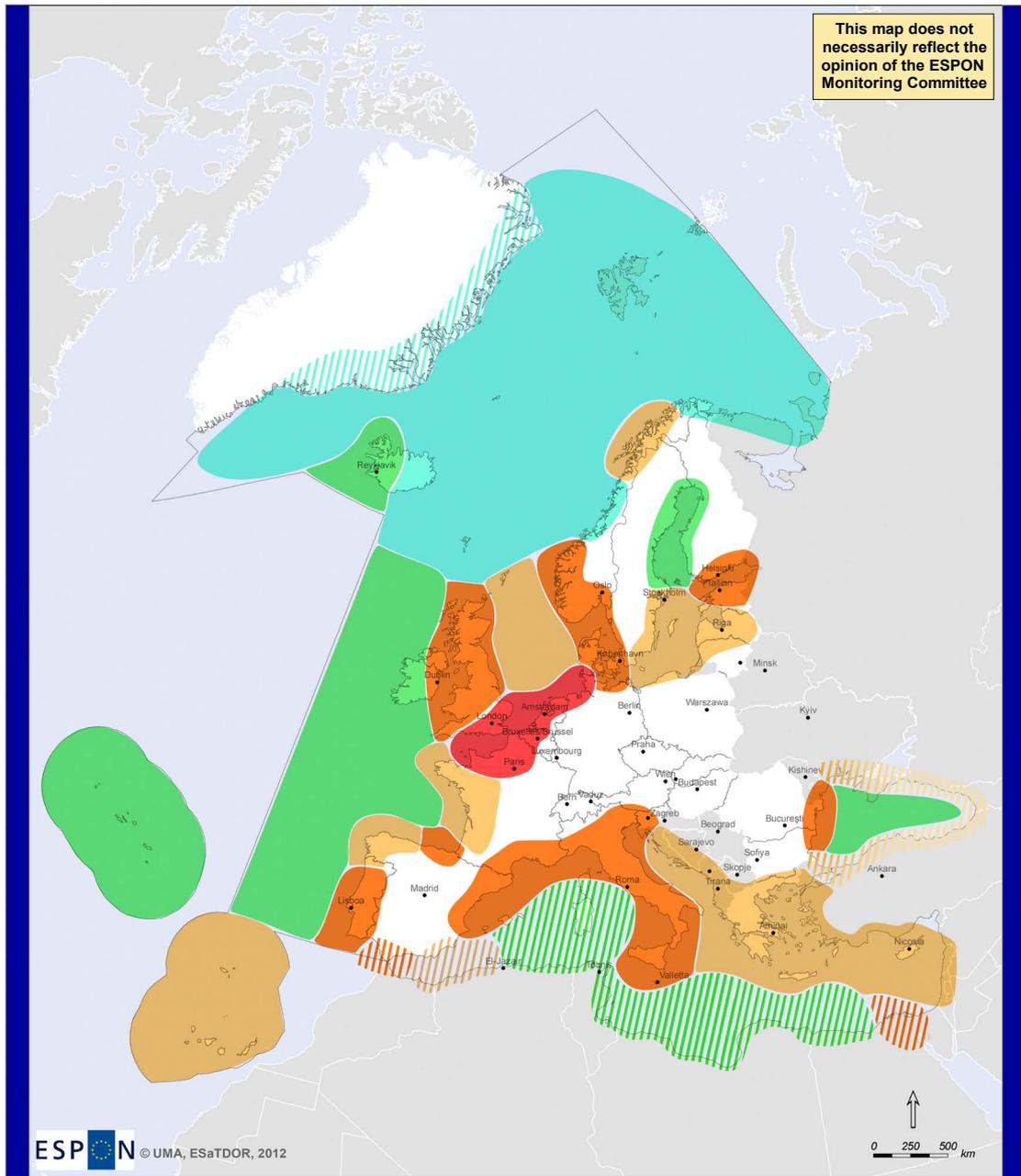
Sea (Environmental Pressures and Flows)

- Very low intensity
- Low intensity
- Medium intensity
- High intensity
- Very high intensity

Land (Economic Significance)

- Very low intensity
- Low intensity
- Medium intensity
- High intensity
- Very high intensity
- No Data

Map 3.3 European Land Sea typologies map



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Thematic data: Typology Map, Economic Significance and Environmental Pressures Composite Maps
Land boundaries: © EuroGeographics Association and ESRI, Regional level: NUTS2
Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ

Regions derived from typology map

- European Core
- Regional Hub
- Transition
- Rural
- Wilderness
- Typology influenced by lack of data

This schematic typology map shows how Europe's coastal and maritime regions may be classified based on the intensity of land-sea interactions (economic activities, flows of goods, people and information and environmental pressures). These interactions are greatest in the European Core and at their lowest in the Wilderness.

3.2.3 Characterisation of urban sprawl in Europe

Jaume Fons-Esteve and Mirko Gregor#*

I. INTRODUCTION

Urban systems emerge as distinct entities from the complex interactions between social, economic and cultural attributes, and flows of information, energy and material stocks that operate on different temporal and spatial scales. Such complexity poses a challenge to the identification of the causes of urban environmental problems, and how to address these without causing greater deterioration of the urban system.

Urban sprawl, as opposed to the compact city, has become to be recognised as one of the main problems of cities at the turn of the century for several reasons. These include the unsustainable loss of natural resources (Jenks et al., 1996; Williams et al., 2000; Jenks and Dempsey, 2005), and other major social and ecological problems (Burton, 2000; Jenks and Burgess, 2000). Urban sprawl first appeared as an American phenomenon, but recent works have described the specificities of this problem in Europe (EEA, 2006; Couch et al. 2007).

European institutions have also been progressively including the urban environment in their agendas, although the competence for urban issues lies at the level of the Member State. Cities and urban development are a focal point of current territorial development policy. In spite of the fact that there is not one single model of a European city, there is now a wide recognition of the importance of cities in contributing to an economically, environmentally and socially thriving Europe. In parallel to this concern with cities, there has been an increasing concern with the environmental consequences of city development linked to both the quality of life and the sustainability perspectives.

Urban sprawl has become recognised as one of the main problems of cities. In terms of urban form, sprawl is positioned against the ideal of the compact city, which is characterized by high density and centralised development, and a spatial mixture of functions. However, what is considered to be sprawl ranges along a continuum of some form of compact development to completely dispersed development. This study presents a methodology developed under the ESPON FOCI project that sought to explore forms of urban sprawl by integrating the key dimensions of urban form: density, continuity, mixed uses and proximity. As a result it is possible to cluster European cities in several typologies of urban development, and relate them to key environmental aspects (e.g. transport patterns, loss of valuable soils for agriculture, pressure on protected areas).

II. METHODOLOGY

Currently there is not a single index that would enable cities to be classified as sprawling or not. As a result, there is a need to consider different trajectories of cities leading to different types of growth, which in the most extreme cases could be defined as sprawl.

Different types of urban development concepts have been considered:

- Redevelopment: changing the use of existing urban land (e.g. industrial to residential). This would fit with the idea of land reuse or recycling.
- Infilling: development of new areas within the city.
- Expansion: urban development on the fringe of urban areas or in less dense areas.

Redevelopment and infilling can be related to compact urban development, while expansion will lead to more diffuse urban patterns.

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In order to characterise urban development in Europe an initial set of variables were selected that represented the current urban status and changes. After removing highly correlated variables and those that explained less variability in the factorial analysis, the following were selected:

- Extent of the built-up area: Percentage of total land area that was the built-up area.
- Degree of soil sealing: Percentage of the total land area that was sealed.
- Increase of built-up area: Change in the percentage of new built-up area since the beginning of the period.
- Land take per capita: Increase of built-up area divided by the total population.
- Degree of redevelopment: Percentage of redevelopment over all new built-up areas for the period.
- Destination of new urban areas: The growth rate of residential, industrial, commercial and transport areas, identified according to the CORINE Land Cover (CLC) nomenclature and methodology.

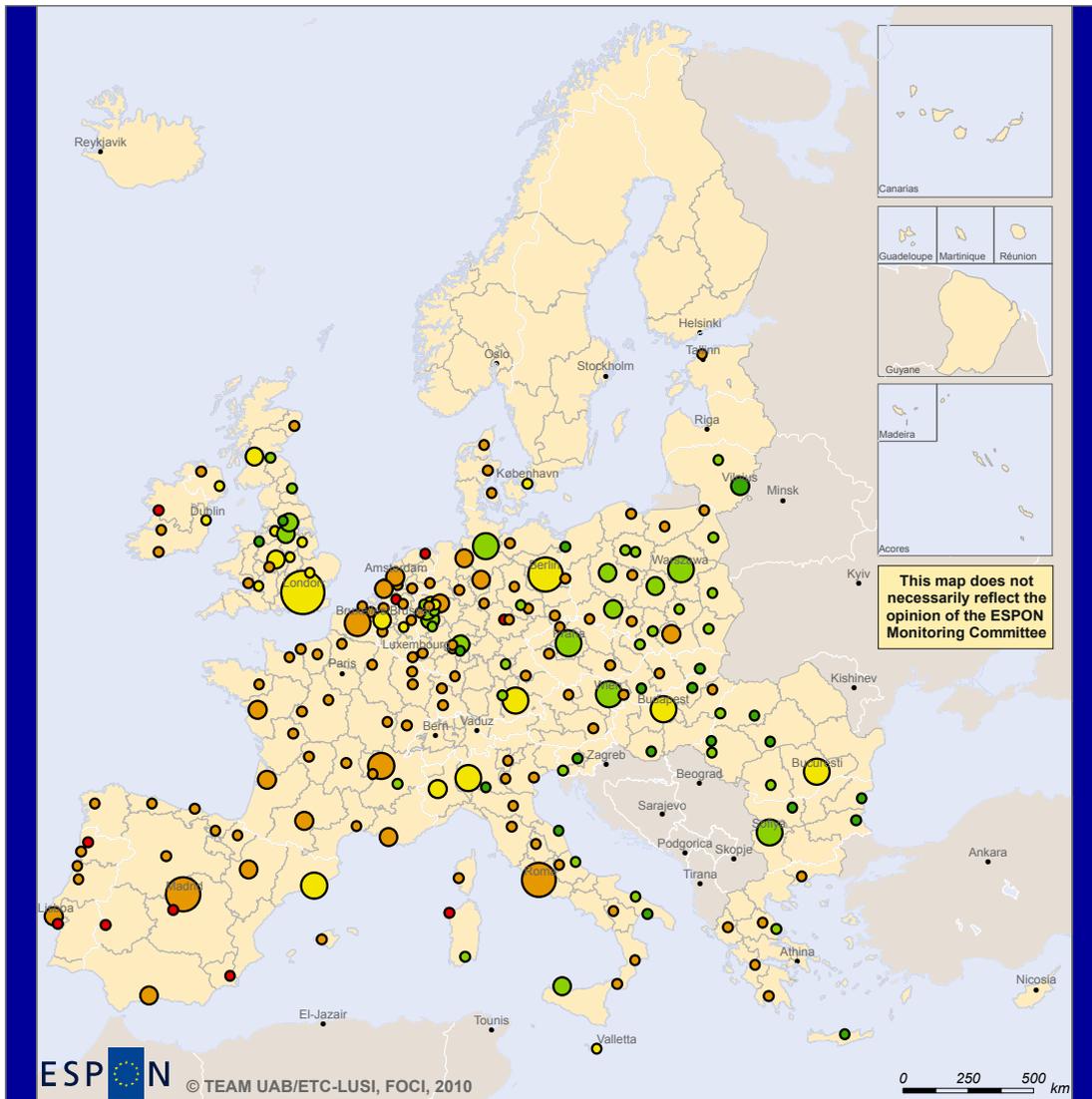
It should be highlighted that the information on built-up areas and related changes were also derived from CORINE Land Cover (CLC). There was a clear limitation on the resolution of the data, both in terms of the stock (percentage of certain types of land cover) and the changes. Limitations were evident on linear features (e.g. roads and rails) and also on plots below the CLC resolution that may be relevant for urban areas. However, the availability of the Urban Atlas should overcome this problem, but currently only one time shot in 2006 is available. The proposed methodology could be applied to the Urban Atlas when full time series are available.

III. RESULTS

Three main types of urban growth were identified (see Map 3.4 also):

- **Type 1. Slowly growing cities.**
 - Slowly growing cities that had increased the density of their existing urban areas. Cities with below 600 000 inhabitants and a low degree of sealing, with a very slow rate of urban growth and a high degree of redevelopment. However, the low percentage of soil sealing (also related to a low percentage of built-up areas) showed the potential for these cities to grow. The new developed areas were mainly residential in the core city. Some of these cities were losing population both in the core city and LUZ (e.g. Kaunas). These were mostly Eastern cities such as: Vilnius, Kaunas (LT); Szczecin (PL); Miskolc (HU); Bradford (UK).
 - Slow growing cities with diffuse urban development. The core city showed a higher degree of soil sealing (with a higher percentage of urbanised land), and had a relatively large LUZ. Consequently the rate of growth was about three times higher in the LUZ compared to the core city. The degree of redevelopment was very low both in the core city and the LUZ. The risk for these cities would be to increase the pace of urban development that could then lead to a more sprawled urban system. The population was very stable or had small rates of growth. Some of these were capital cities such as Budapest (HU); Brussels (BE), Berlin (DE), London (UK).

Map 3.4 Typologies of urban development, 1990-2000



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Regional level: Large Urban Zone (LUZ)
Source: UAB/ETC-LUSI, 2010
Origin of data: CORINE Land Cover 1990, 2000, 2006
© EuroGeographics Association for administrative boundaries

Urban development classes

- } **Slowly growing cities**
- } **Rapidly growing cities**
- Very rapidly growing cities**

Population of the Large Urban Zone

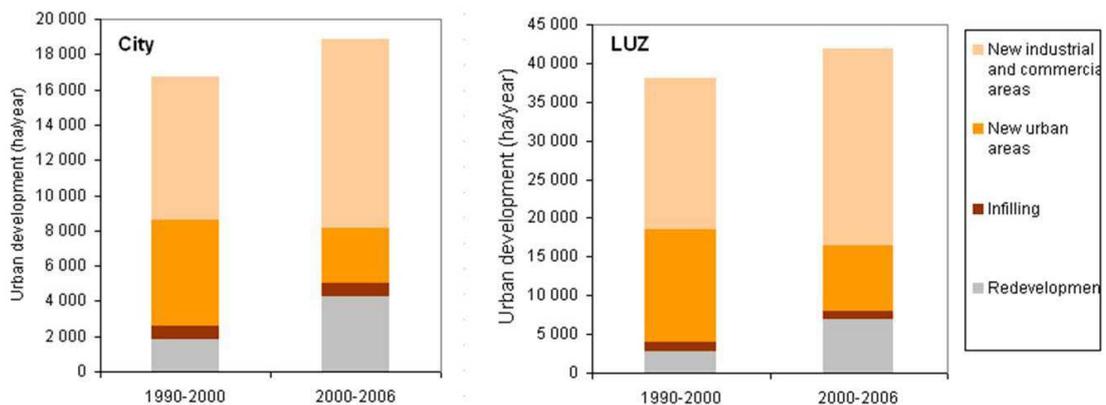
- Size of circle proportional
- 0 - 500000
 - 500000 - 1000000
 - 1000000 - 2000000
 - 2000000 - 3500000
 - 3500000 - 8000000

Sources: CORINE Land Cover 1990, 2000, 1990-2000 changes

- **Type 2. Rapid growing cities.** This type of city represented almost half of the European cities. Because of this variety, they did not have any particular size and form. This group was defined by an intermediate rate of growth and a low level of land recycling. New developments in the core city were mainly residential areas, whereas in the LUZ, the new developments were for industrial and commercial activities. However, there was a small sub-group of cities (2b) that had a relatively large LUZ. Comparatively the urban development in the LUZ was also very high. There was no specific geographic pattern of these cities, but the type included Madrid (ES), Rome (It), Prague (CZ), and Tallinn (EE).
- **Type 3. Very rapid growing cities with diffuse urban development.** This group included the cities with the highest degree of urban development, far beyond the average of the other typologies. In terms of city structure they had the lowest degree of sealing (so there was a high availability of space) and the city was almost half of the LUZ size. It seems that the availability of space was a factor that facilitated the expansion which showed similar trends in both the core city and the LUZ. Examples included Braga (PT), Groningen (NL), Erfurt (DE); Murcia (ES).

An initial look at the overall changes in the European cities indicates an increase in the land that has undergone some urban development (Figure 3.5). However, the areas under redevelopment significantly increased in both the core city and LUZ during the period 2000-2006. The development of new residential areas has been reduced, while industrial and commercial areas were still increasing and becoming the main source of urban expansion. This is a general trend observed in the last 20 years where urban sprawl is less and less associated with an increase of residential areas, and more related to other economic developments. However, there are some exceptions such as the Mediterranean coast, and specifically in Spain where second homes and speculation have been driving factors for urban sprawl still in the period 2000-2006. Many Eastern cities also show a varied trend, since the development of new residential areas dominant over new industrial and commercial ones. Overall, the densification process (redevelopment + infilling) was increasing slightly.

Figure 3.5 Urban development in cities and LUZ, 1990-2000 and 2000-2006



Source: CLC 1990, 2000 and 2006. UK and Greece are not included because data not available for 2006

In Figure 3.5 urban development refers to the total urban changes for the given period and aggregated for all European cities. The trends were similar in the city and in the LUZ as well. The hectares per year reused or redeveloped in 2000-2006 significantly increased compared with the previous period. Development of new residential areas decreased, while the development of new industrial and commercial areas was still increasing.

When the pathways taken by the different urban growth typologies are examined, it is observed that the slow growing and compact cities, Type 1a, experienced an increased rate of development and land take. The availability of space and the previous low rates in the 1990's may have facilitated these new developments. The new developed areas are mainly for industrial and commercial use in the bigger cities, whereas residential development is still prevailing in some smaller ones.

The slow growing and diffuse cities, Type 1b, showed a decreased land take during the period except on the LUZ. These cities had a relatively small city area compared to LUZ which might partly explain this evolution.

The rapid growing and diffuse cities, Type 2, included half of all the European cities. Their evolution fits very well with the overall picture: characterized by a reduction of the land taken in both the city and LUZ. However, the growth in the LUZ was still relatively higher than in the core city. The number of cities in the second group within this class (2b) has increased.

Finally, the very rapid growing cities in the 1990's have slowed down. This process has been more marked in the core city than in the LUZ.

There is a process of convergence between the different typologies, with few exceptions (Type 2b), as cities have become characterised by decreasing differences in the rate of land take, a general increase in redevelopment, and a more rapid pace of change in the LUZ.

IV. CONCLUSION

Urban development in the last 20 years has generally seen stable cities and the ones with slow development in the 1990s experience a relative rapid increase, while the cities that were growing very rapidly at that time have subsequently slowed down at the turn of the century.

The reuse of previous urban land has significantly increased in both the core city and the LUZ. The development of new residential areas has reduced, while industrial and commercial areas were still increasing and becoming the main source of urban expansion. This is a general trend observed in the last 20 years where urban sprawl is less and less associated with the development of residential areas and more to other economic developments. However, there are some exceptions like the Mediterranean coast, and specifically in Spain where second homes and speculation have been driving forces for urban development that has continued into the period 2000-2006. Many Eastern mid-sized to small cities also show a different trend, since the development of new residential areas were dominant over new industrial and commercial ones.

City form and the extent of compactness are the result of the history and evolution of urban areas, which include geographic and cultural factors. The available information indicates that several factors combine to have an impact in the more compact cities: a) the higher proximity of urban patches to the city centre or core city; and b) mixed uses of land.

However, more dynamic indicators like soil sealing per capita reveal that urban morphology and the extent of compactness do not alone explain the complexity of the system. Moreover, urban development in the last decade shows that intermediate cities are the most dynamic ones but also at risk of being less efficient in use of land resources (measured by soil sealing per capita).

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3.3 Availability of data at various geographical scales

3.3.1 Evidence from micro-data as a complement to aggregate analyses on regional disparities.

*Enrique López-Bazo and Vicente Royuela**

I. INTRODUCTION

Most of the analyses of regional disparities – the so-called regional problem – use aggregate data at some territorial level (see for instance OECD, 2011 and EC, 2011). They describe the amount of disparities by means of measures of dispersion and explain them by a regression analysis, in which the coefficients linking the variable of interest with its determinants are estimated. The variables involved in the specification are an aggregate or an average value in each of the territories under analysis. The aim of this note is to stress that this aggregate approach, while certainly of interest, should be complemented with evidence from micro-level data (for individuals and firms). In brief, the point is that analyses based on aggregate data: i) only focus on the average or representative individual in each region, ii) can only partially control for the regional distribution of individual characteristics, and iii) impose the same effect of the determinants in all regions. In this note we use some examples to illustrate how using micro-level data can improve our knowledge on the amount and origin of regional disparities. Implications include support for smart specialization and place-based policies.

II. REGIONAL DISPARITIES: ANALYSES USING AGGREGATE DATA

Most studies on territorial disparities make use of aggregate data to quantify the magnitude, and to analyse the origin, of the differences across regions in, for instance, income per capita, productivity, wages, unemployment, R&D, and human capital. Aggregate or average values for these magnitudes in each region under analysis are used to compute descriptive statistics (traditional and spatial) with the aim of summarising the amount of dispersion or inequality. For instance, it is common practice to compute the level of GDP per capita in the set of EU regions and then to depict this information in a choropleth map. In a similar vein, the coefficient of variation of GDP per capita (or any alternative measure of dispersion such as the Gini coefficient) is computed for different time periods to study the evolution of regional disparities. In some cases, the descriptive evidence goes beyond the computation of a synthetic measure of dispersion and instead employs a tool to represent the entire regional distribution of GDP per capita (for instance by means of the density function). However, in all cases such a type of descriptive analysis assumes that a single figure for each region, e.g. the level of GDP per capita, represents well all the economic agents in the region. This is in sharp contrast with results in Rodríguez-Pose and Tselios (2009) that shows that 80 % of the overall inequality in Europe is due to the within-region component (between individuals within regions), with only the remaining 20 % due to inequality between regions and countries.

In turn, most of the explanatory analyses are based on the specification of a regression model in which the coefficients measuring the impact of the determinants of the variable of interest (β) are estimated using aggregate data for the sample of regions under study. In brief, the standard specification is $Y_r = f(X_r, \beta) + \varepsilon_r$, where Y is the variable of interest, X the set of explanatory variables, and ε is a random error term. The function f can be linear or not linear in the variables and in the coefficients. Structural stability is assumed to exist in the vector of coefficients β , which means that the response of Y to changes in X is similar in all regions. At most, some exercises allow for differences in the responses for broad groups of regions. Imposing the same coefficient to all regions means that one assumes that the response of economic agents is the same in all regions regardless of the particular characteristics of the agents in each region and of the intrinsic features of each territory (such as the institutional, social and economic framework, the endowment of certain factors, and the geographic location). For example, this means imposing that the effect of increasing the endowment of human capital on productivity, employment, and in the level of income per capita is similar in all regional economies. The same applies as regards the effect of increasing R&D intensity on firms' competitiveness and employment generation.

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An immediate implication of imposing similar effects, i.e. coefficients, in all regions is that differences across them in the variable under analysis, say GDP per capita, are assumed to be caused by differences in the endowment of the determinants only; for instance by differences in the level of human capital. To illustrate this idea, let f be a linear function and assume $\varepsilon_r=0$, which results in $Y_r=X_r\beta$. Then, the difference between a region A and a region B in the level of GDP per capita is $Y_A-Y_B=(X_A-X_B)\beta$. However, if the effects differ across regions, $Y_r=X_r\beta_r$, and the difference in the level of GDP per capita between regions A and B is no longer equal to the above expression. Instead, it can be written as $Y_A-Y_B=(X_A-X_B)\beta_A+(\beta_A-\beta_B)X_B$. This is the so-called Oaxaca-Blinder gap decomposition, extensively used in labour economics. The last expression indicates that both differences in the endowment of the variables in X , and differences in the effect of these variables contribute to the gap between regions A and B in the variable of interest. It also reveals that a complete analysis of the origin of the territorial disparities requires an estimate of the coefficients, which is impossible to obtain by using aggregate regional data.

In addition, when the focus is on the growth effect of agglomeration economies, or if we are interested in testing if intra-regional inequality reduces or, on the contrary, enhances the growth prospects of regional economies, X must include a measure of agglomeration, in the first case, or of inequality, in the second case. Using aggregate regional data does not allow analysts to compute appropriate measures of intra-regional agglomeration and inequality. Consequently researchers need micro data that would allow them to compute appropriate indicators. As an example, Ramos and Royuela (2013) combine two micro-datasets - the European Community Household Panel (ECHP) and EU-Statistics on Income and Living Conditions (EU-SILC) - to compute a list of regional inequality indicators to show how inequality damages economic growth. Their results are of special interest for two reasons: i) the growth in inequality observed in Europe is due to an increase within regions rather than between them, and ii) such inequality would be harming growth, and thus regional policies should be promoting balanced growth between regions and also redistribution within them.

III. REGIONAL DISPARITIES: ANALYSES EXPLOITING MICRO-DATA

The increasing availability of micro-level data (for individuals and firms) in recent decades has allowed researchers to obtain empirical microeconomic evidence which has complemented the evidence obtained from a macro perspective, using aggregate data (for instance from samples of countries and industries). Although some studies in the field of regional and urban economics have used micro-level data to analyse spatial phenomena, so far analyses of territorial disparities have exploited only aggregate data and, correspondingly, methods from the empirical macro toolkit. This is likely to be caused by the fact that when studying regional disparities from a micro perspective we need samples of individuals representing the population of each region. Although data from surveys sometimes include the geographical location of the economic agents (either individuals or firms), it is less common for them to be designed to guarantee territorial representativeness. In connection with the argument in the previous section, samples for each region should guarantee an appropriate estimate of the β_r coefficients, that is to say, they have to resemble the population effects in each region.

Next, we illustrate the potential benefits of complementing the evidence on territorial disparities obtained with aggregate data, with that from micro-level data. In doing so, we use results obtained in some of our recent studies. Firstly, based on López-Bazo and Motellón (2012, 2013a, and 2013b) we show that the impact of schooling on employment and on wages substantially differs across regions. Secondly, we use results in López-Bazo and Motellón (2013c) which indicate that the effect of innovation on a firm's export activity strongly depends on the region in which the firm is located. To save space, we focus here on some of the results obtained in our recent research. The full set of results and details of the data and methods are provided in the above-mentioned references.

On the regional effect of educational human capital

The Spanish wave of the Labour Force Survey provides data on the labour market status of individuals, as well as information on some personal and household characteristics, and (when appropriate) of the job and the firm. Interestingly, the sample represents the NUTS2 and NUTS3 regional populations, which means that it can be used to analyse territorial disparities in the major labour

market variables. Unfortunately, it does not include data on worker earnings. Such information is, however, available from the Earnings Structure Survey (EES), which, as in the case of the LFS, provides information that represents the regional populations (though only for the NUTS 2 regions in this case). Data on wage earnings is also included in the 2000 wave of the ECHP, which is designed to guarantee representativeness at the NUTS2 regional level in Spain. In López-Bazo and Motellón (2012, 2013a, and 2013b) we use these data to analyse the effect of individuals' schooling on the observed regional disparities in unemployment and wages.

The first two blocks of rows in Table 3.6 summarise some of the results that we obtained. It is observed that the Spanish regions differ in terms of the average years of schooling of their working age population. The gap between the NUTS3 regions with the highest (Guipuzcoa) and lowest (Almeria) average endowment of education is around 3 years (similar to, for instance, the gap between Germany and Spain). In the case of the NUTS2 regions the gap in schooling is of a similar order of magnitude. Also, it can be observed that the Spanish regions differ markedly in terms of the incidence of unemployment and on the wage level. The unemployment rate in some provinces (NUTS3 regions) is 20 points higher than in other provinces, separated by a few hundred kilometres. In turn, the real hourly wage earned by an average worker in Madrid and in the Basque Country is around 2€ (one third) higher than the wage of a representative worker in Murcia and Valencia.

Interestingly, the last column in Table 3.6 shows that the effect of educational human capital on unemployment and on wages is far from being evenly distributed in the territory. On the contrary, the estimated marginal effect of schooling on unemployment in some Southern provinces (some with the highest unemployment rates) is much higher in magnitude than it is in some other provinces, such as Lugo and Guipuzcoa that are among the regions with the lowest unemployment figures. Estimates of the marginal effect reveal that schooling accounts for much of the differences across individuals in the probability of unemployment in regions with high unemployment rates, whereas it exerts a much more minor effect in regions where unemployment rates are moderate. Even more important for the purpose of this note, in López-Bazo and Motellón (2013a) we show that differences in the endowment of the individual characteristics account for just around one third of the regional gap in the unemployment rates in Spain; while the other two thirds come from the contribution of regional differences in the effects of the characteristics, particularly of educational attainment.

Similar evidence supporting regional heterogeneity of the effect of educational attainment is obtained from the exercise on wage disparities. In this case, the estimated return from schooling is slightly above 10 % in some of Spain's traditionally less developed NUTS2 regions, whereas the estimated return is much lower in regions such as Asturias, the Canary Islands, and Madrid. Actually, in López-Bazo and Motellón (2012) we prove that these substantial differences across regions in the effect of educational human capital account for a large portion of the regional wage gap.

Table 3.6 Some examples of regional disparities

	Schooling (years)		Unemployment rate (%)		Marginal Effect (%)	
NUTS 3 2011-12	Guipuzcoa	12.2	Almeria	35.5	Cordoba	-3.6
	Madrid	12.1	Las Palmas	34.8	Jaen	-3.5
	Vizcaya	12.0	Cordoba	33.6	Albacete	-3.2
	Almeria	9.4	Guipuzcoa	11.1	Lugo	-0.05
	Cuenca	9.5	Soria	11.1	Guipuzcoa	-0.07
	Zamora	9.6	Alava	11.8	Cuenca	-0.07
	Schooling (years)		Real hourly wage (€)		Marginal Effect (%)	
NUTS 2 2000	Madrid	11.9	Madrid	8.5	Murcia	10.6
	Basque C.	11.2	Basque C.	8.3	Extremadura	10.6
	Aragon	11.1	Aragon	8.3	Galicia	10.3
	Cast. La Mancha	9.4	Murcia	6.4	Asturias	1.2
	Canary Isl.	9.4	Valencia	6.5	Canary Isl.	5.9
	Murcia	9.4	Balearic Isl.	6.5	Madrid	6.8

	Product Innov (%)		Exports (%)		Marginal Effect (%)	
NUTS 2 2005	Catalonia	42.8	Catalonia	68.4	Aragon	44.1
	Madrid	35.8	Basque C.	62.1	Basque C.	43.7
	Basque C.	35.5	Valencia	55.9	Asturias	39.3
	Balearic Isl.	11.4	Canary Isl.	9.2	Canary Isl.	14.4
	Extremadura	15.1	Balearic Isl.	21.0	Cast. La Mancha	21.5
	Canary Isl.	20.3	Asturias	32.8	Cantabria	24.8

Notes: Regions with the highest and lowest values for each magnitude. Marginal effects are estimated from the corresponding empirical models, as described in the text. Product Innov and Exports refer to the share of firms that innovate in products and the share of exporting firms, respectively.

Innovation and firms' export status

There is broad consensus that innovation is a key for a firm's productivity, and therefore to its success in foreign markets, where competition is stronger. Empirical evidence confirms a positive link between innovation and firms' export status. However, some recent contributions suggest that the effect of firm characteristics (among them innovative activity) on exports is likely to be shaped by the geographic location of the firm. In López-Bazo and Motellón (2013c) we use firm-level data from the Innovation in Companies Survey (ICS) undertaken by the Spanish Statistical Office, which provides detailed information on technological innovations and on firm performance, including sales abroad, total sales, number of employees, high-skilled workers, and the firm's sector of activity. The ICS sample is designed to guarantee representativeness for each of the NUTS2 Spanish regions.

The bottom panel in Table 3.6 shows, in the first column, the regions with the highest and lowest shares of innovative firms in the manufacturing sector. The information refers to the implementation of product innovations. It can be observed that the share of innovative firms in Catalonia is more than double the figures in the two island regions and in Extremadura. Actually, innovative firms in a small number of regions (Catalonia, the Basque Country, Madrid, Valencia, and Navarra) are much more frequent than in the rest of the country. The second column shows that marked regional disparities also exist in the share of exporting firms. In Catalonia and the Basque Country around two thirds of the manufacturing firms do export, whereas less than one third does it in the island regions and Asturias. The share is around one third in other regions such as Cantabria in the North and Andalusia in the South. However, the most interesting result is that when conditioning to other aspects of firm heterogeneity (size, industry, etc.) the effect of innovation on export status varies widely between regions. With respect to otherwise non-innovative firms, the probability of exporting for firms that innovate is around 40 percentage points higher in Aragon, the Basque Country and Asturias. The difference in this probability is lower than 25 percentage points in the Canary Islands, Castile La Mancha, and Cantabria. As in the case of the effect of human capital in labour market outcomes, these results prove that differences in the propensity to innovate and in the effect of innovation account for a significant portion of regional disparities in the firm's export performance.

IV. CHALLENGES FOR FUTURE RESEARCH

In order to extend the studies on regional disparities based on microeconomic evidence, more surveys are required to include the geographic location of individuals, and guarantee regional representativeness. However, the latter condition is likely to raise the cost of statistical survey operations, since it will result in an increase in the sample size. Furthermore, the addition of the territorial dimension can affect confidentiality, as it is easier to identify individuals with particular characteristics when the survey data reveals the region in which they are located. In the European Union context, it would be important to have access to homogeneous micro-level data for as many Member States as possible (extending the regional dimension in the LFS, the EES, the CIS and the EU-SILC, and providing additional survey data on firm performance). In this regard, efforts must be made to implement appropriate ways for easing the access of researchers to these datasets, while at the same time ensuring confidentiality. On the other hand, there are already a lot of empirical procedures ready to be applied for obtaining evidence on regional disparities exploiting micro-data, as they have been developed and applied in other fields of economics and social sciences.

Finally, it is our belief that increasing the evidence on regional disparities based on micro-level data will stimulate further theoretical developments, as well as efforts to develop a framework for integrating the macro and micro approaches. In any case, we have proved in this note that analyses exploiting regional micro-data provide particular information for each region that remain hidden in the aggregate studies. Therefore, they are clear candidates to provide useful evidence on the ex-ante and ex-post evaluation of the effectiveness of smart specialization and place-based policies.

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3.3.2 Small area estimation of at risk of poverty rates

Andrew Copus* and Mike Coombes#

I. INTRODUCTION

The EU2020 headline target is to lift 20 million people out of poverty by 2020 (EC 2010). Three indicators were agreed in support of this:

- The number of persons at risk of poverty.
- The number of persons not able to afford four of the nine items indicative of material deprivation.
- The number of persons living in households where adults (together) work less than 20 % of a full-time year.

The number of persons in each of these categories are added together (but avoiding double counting of individuals), and each Member State has a separate target which, added together, gives the EU total of 20 million (Eurostat 2004, 2005, 2007, 2012).

The “at risk of poverty” (AROP) indicator which constitutes the first element of the EU2020 target was adopted by the EU Council as early as 1975. This indicator is defined as *the number (or percentage) of people who have a net income of less than 60 % of the national median equivalised disposable income (after social transfers)*. This indicator may be considered rather idiosyncratic when used to make comparisons at a continental scale, due to its dependence upon national benchmarks (Bradshaw and Mayhew 2010, Ward et al 2009). Nevertheless its wide acceptance renders it a key indicator in a policy context. More immediate than the EU2020 goals, the new programming period for the European Structural and Investment (ESI) Funds presents some opportunities for regional policy alleviation strategies. It is important (given the budgetary limitations) that such interventions are carefully targeted on regions where they may have the greatest impact. Regional targeting decisions thus generate a demand for more detailed information on regional and local patterns of poverty.

At present Eurostat publishes AROP rate data for about two-thirds of the countries within the ESPON space at NUTS2¹⁷. The remaining countries provide data at NUTS1 or NUTS0 (whole country). These data are derived from the EU-SILC (Survey of Income and Living Conditions). Sample sizes constrain publication of AROP rates at a more detailed regional level based upon this source. A few countries, notably the Nordic countries and the Netherlands, are able to generate AROP rates from administrative registers. In these countries (with the appropriate access to confidential data) it is possible to generate reliable AROP rates at NUTS3 or even LAU1¹⁸. Elsewhere, some form of estimation is necessary.

There are a variety of methodologies for estimation of regional AROP rates, of varying degrees of sophistication. They are generally quite demanding in terms of data requirements, and some of them require higher levels of econometric expertise. The most well-known of these is the PovMapmodel of the World Bank (WB) which combines survey and census microdata (Elbers et al 2002, 2005).

II. A TRICKY INDICATOR TO ESTIMATE

The AROP indicator has some rather unusual characteristics, which makes it rather difficult to model or simulate. It is both an indicator of the regional level of income, and of its distribution. The relative strength of these two sources of variation depends upon the choice of “benchmark” to define the “60 %” of median disposable income. Thus if a single European benchmark was used the

¹⁷ See Eurostat Regio database tables ilc_peps11 and ilc_li41.

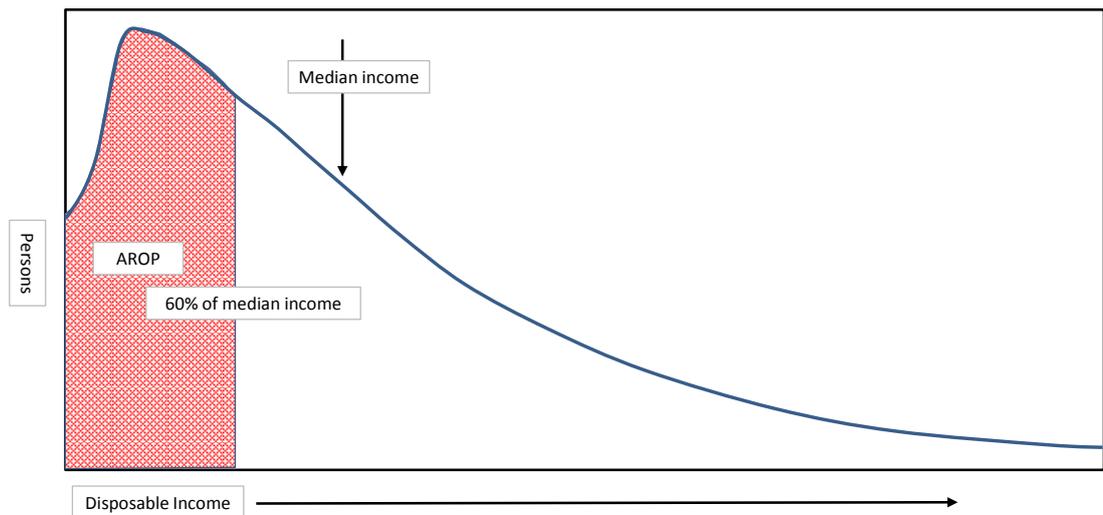
¹⁸ These will be published in the TIPSE Draft Final Report.

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AROP rate in any individual region would be closely correlated with the median disposable income level. At the other extreme, if each region had its own AROP benchmark, based upon its median income, variation in the AROP would be entirely a function of the local income distribution – or degree of inequity (Eurostat 2004). To express it another way, the geography of AROP rates is a complex combination of variations in income levels and distributions. In terms of Figure 3.6, regional rates vary partly as a result of *shifts* in the income distribution curve to the left or right, and partly due to changes in the *shape* of the distribution.

Figure 3.6 The AROP rate



III. POVERTY MAPPING STRATEGIES

In order to solve the problem of small regional sample sizes, and the complex behaviour of the AROP rate, a number of sophisticated modelling and estimation methods have been devised. The World Bank (WB) PovMap approach has the advantage of being manifest in a freely downloadable software package¹⁹. Furthermore, for the past year or more the World Bank has been working on Poverty Maps for most of the 12 “New Member States”. In this context the ESPON TIPSE project was asked to map poverty in as many as possible of the EU15 Member State, Candidate, and non-EU countries of the ESPON space.

The WB PovMap procedure was designed in a developing country context. The basic concept is that two separate, but related, (micro)data sources are combined. A sample survey provides income data, together with evidence of statistical relationships with a range of other socio-economic characteristics. This survey provides adequate sample sizes for several sub-national “clusters”, but not at a detailed regional or small area level. The second source is a Census, which provides a number of matching socio-economic covariates, the population, or a representative sample at small area or region level, but no income data. The information from the survey first provides a model of the relationship between income and the covariates, which is subsequently applied to the Census data in a bootstrap simulation procedure.

In a European context this approach has proved challenging, for a number of reasons. First of all, European population censuses have a separate purpose/history from EU-SILC survey, and the matching of variables required by PovMap has proved very difficult. Secondly, the 2011 population census, for the first time standardised across the EU by an EU regulation, has yet to deliver the necessary microdata.

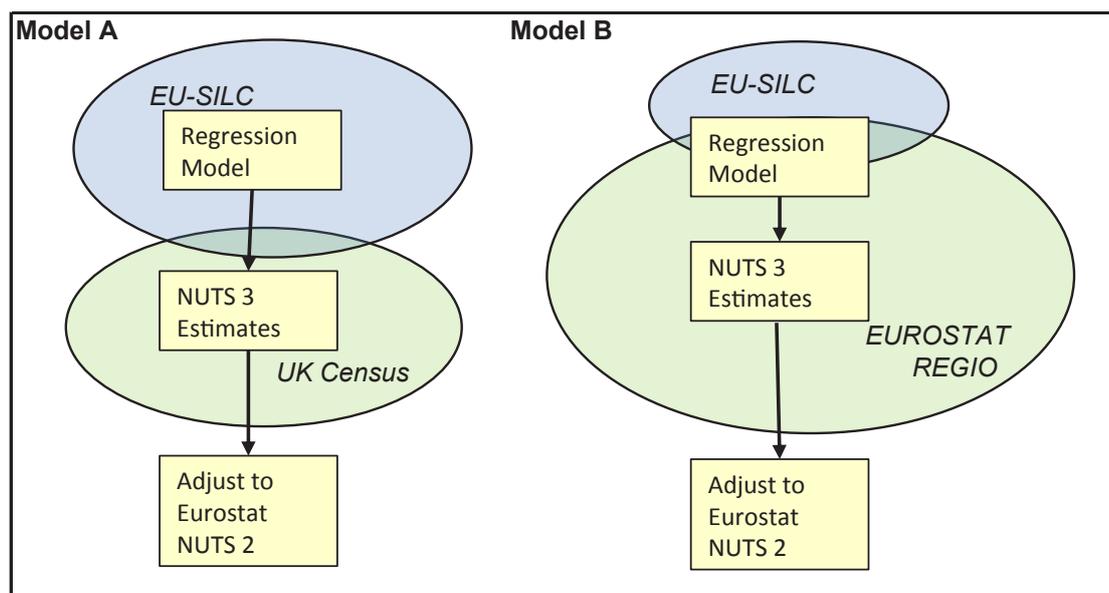
¹⁹ For a full description and software download see <http://go.worldbank.org/QG9L6V7P20>

In the light of these issues, the TIPSE project team have been experimenting with estimation approaches, based upon regional data, and using basic OLS regression (Heady and Hennell 2001). This approach is intended to be relatively simple and transparent, not requiring high levels of expertise, and “parsimonious” in terms of data requirements. A further advantage is that the resulting NUTS3 AROP estimates will be consistent with Eurostat rates published at NUTS2 or 1.

It is perhaps important to stress that this methodology is not intended to replace PovMap, except in countries where microdata is not available. It is seen primarily as a short/medium-term solution to meet a policy requirement. The approach involves 3 stages:

- a) Estimate the relationship between AROP rates and a selection of socio-economic indicators at NUTS2 using basic OLS regression.
- b) Estimate (first round) NUTS 3 AROP rates by applying coefficients to NUTS 3 data for the same independent variables.
- c) Adjust these (first round) NUTS 3 AROP rates so that they conform with rates published by Eurostat for larger regions (e.g. NUTS2).

Figure 3.7 Two alternative ways of using available data in UK



IV. SMALL AREA ESTIMATION MODELS FOR THE UK

In the UK the only possible starting point for the regression stage is AROP rates estimated from EU-SILC microdata, since Eurostat NUTS 2 rates are not available. By contrast there are at least two options for sourcing independent variables:

- a) NUTS 2 averages derived from the EU-SILC microdata.
- b) Data from “external” sources, either UK (e.g. Census 2001²⁰), or Eurostat.

²⁰ At the time of writing 2011 Census data was not available. The EU-SILC microdata for 2005 is the closest match in terms of date.

These two approaches are illustrated in Figure 3.7 as “model A” and “model B”. Model A tends to result in a more closely fitting regression model. However the second stage of the procedure requires NUTS3 data to match the EU-SILC independent variables, and inevitable definitional differences mean that this stage of the estimation is less likely to be satisfactory. On the other hand, since Model A uses Census data, estimates may be generated for any compatible small area geography.

Model B brings the definitional differences into the regression stage, and makes it a little more difficult to fit the equation. On the other hand there are no definitional differences between the NUTS2 and 3 independent variables, so the second stage is more satisfactory. In addition, the second approach should be more “transferable” between member states, since it could be based entirely on Eurostat published data (where NUTS 2 AROP rates are published). On the down side, NUTS3 is effectively the smallest geography for which estimates may be made.

V. PRELIMINARY RESULTS

The two approaches have been implemented with UK data. In the case of Model A, more than 100 EU-SILC variables were screened as potential independent variables (IV). An initial short-list was derived on the basis of correlation with the independent variable. The final selection of IV was made on the basis of a backward elimination procedure, implemented in SPSS. A similar exercise was carried out for Model B, this time starting from a selection of approximately fifty potential IVs, mostly derived from the Eurostat Regio database, but also including one indicator published by the UK Office for National Statistics, and one from the ESPON Database. The resulting models are described in Tables 3.7 and 3.8.

Table 3.7 Specification of Model A

Variable	Source	Coefficient	p-value
% working age economically inactive	EU-SILC microdata	0.565639	0.000725
% living in a detached dwelling	EU-SILC microdata	0.201623	0.000140
% couples with 2 or more children	EU-SILC microdata	-0.43404	0.013432
% married couples	EU-SILC microdata	-0.38073	0.001166
% legislators, senior officials or managers	EU-SILC microdata	-0.69571	0.000183
% service workers, shop or market sales	EU-SILC microdata	-0.33027	0.024343
% in public administration and defence	EU-SILC microdata	-0.43935	0.048261
% having good or very good health	EU-SILC microdata	-0.14941	0.117119
Constant		54.72232	0.000001
Adjusted R-square:			0.86

Table 3.8 Specification of Model B

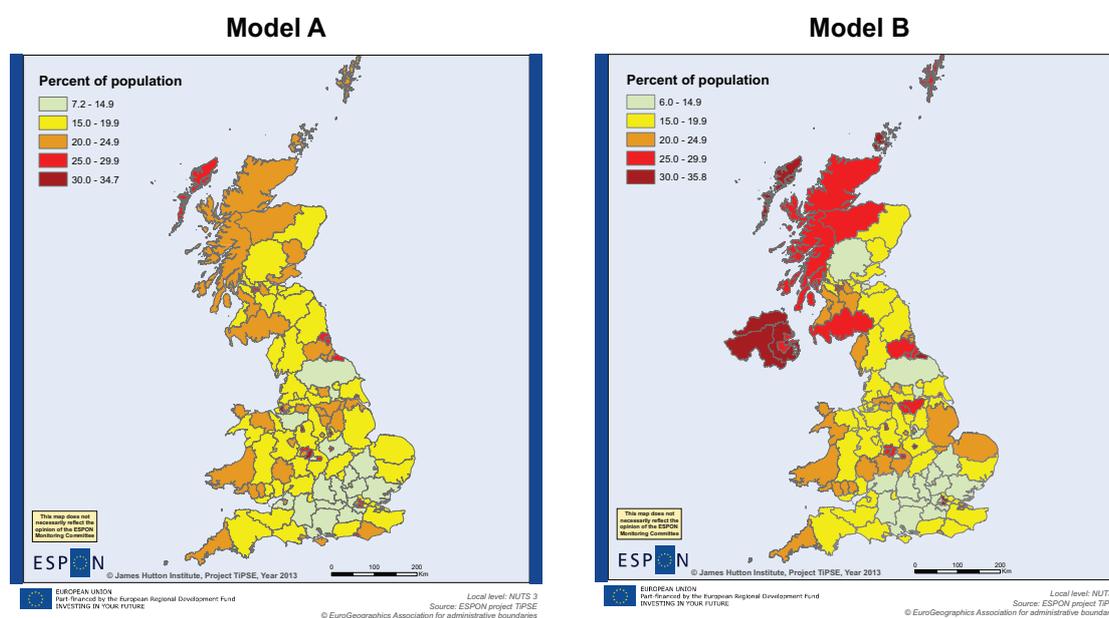
Variable	Source	Coefficient	p-value
population density	Eurostat Regio	0.003	0.000015
% with only primary education	Eurostat Regio	0.498	0.000174
% lone parent households	Eurostat Regio	-1.124	0.065994
gross domestic household income (UK=100)	UK Office for National Statistics	-0.233	0.003620
multi-modal accessibility index	ESPOON Territorial Observations No. 2	-0.052	0.105950
Constant		44.923	0.000068
Adjusted R-square:			0.65

A preliminary assessment of the results suggests that:

- the spatial patterning of results from the two models (Map 3.5) show many similarities;
- as shown by the Adjusted R-square values (Tables 3.7 and 3.8), at NUTS 2 level Model A (unadjusted) is a closer fit to the SILC data;
- the relationship between NUTS 3 (adjusted) Model A and Model B estimates is $r=0.74$.

Initial results have been generated using the World Bank PovMap software and correlation between these results from PovMap and the Model B NUTS 3 estimates (both adjusted to conform with the EU-SILC microdata at NUTS 2) is $r=0.89$ ($\rho=0.90$). A comparison of the top quintiles of the PovMap and Model B estimates (Annex 1) shows that the two procedures identify a broadly similar group of regions as exhibiting the highest AROP rates. It may be important that the main exceptions are major urban areas (especially Inner London West).

Map 3.5 Estimated AROP rates for NUTS 3 regions of the UK 2005



VI. LOOKING AHEAD

Further work with the PovMap software is underway (it is likely that updated versions of these will be presented in the project's Draft Final Report). Potential developments of the regression-based approach include:

- the use of 3 year average AROP rates derived from EU-SILC;
- experimentation with Eurostat published NUTS 2 AROP rates (where available) as the dependent variable;
- a move to 2011 Census data when available;
- estimation for other countries, perhaps involving work on macro regions to explore the stability of relationships across adjacent countries;
- comparison of the model results with Register-based maps in the Nordic countries.

VII. CONCLUSIONS

In a number of EU Member States 2011 microdata publication dates are likely to be too late to allow PovMap estimation in time for policy requirements. In this context, area based models seem capable of providing timely intelligence on regional patterns, with an acceptable level of accuracy. There may also be a trade-off between sophistication and transparency of methodology, area-based models being more easily understood and reproduced by non-specialists.

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Annex 3.1 Comparison of NUTS 3 region rankings on estimated AROP rates by PovMap and Model B: first quintile of PovMap estimates

Ranking according to...		NUTS 3 region
PovMap	Model B	
1	4	Belfast
2	3	North of Northern Ireland
3	9	Eilean Siar (Western Isles)
4	1	West and South of Northern Ireland
5	7	South Teesside
6	16	Glasgow City
7	18	Sheffield
8	8	Leicester
9	12	Lochaber, Skye & Lochalsh, Arran & Cumbrae and Argyll & Bute
10	23	Birmingham
11	11	Hartlepool and Stockton-on-Tees
12	20	Caithness & Sutherland and Ross & Cromarty
13	29	Nottingham
14	10	Durham CC
15	2	Inner London – East
16	15	Inverness & Nairn and Moray, Badenoch & Strathspey
17	6	East of Northern Ireland
18	22	Darlington
19	13	Barnsley, Doncaster and Rotherham
20	21	Stoke-on-Trent
21	26	Kingston upon Hull, City of
22	27	Coventry
23	17	Outer Belfast
24	14	Inner London – West
26	5	Orkney Islands
26	24	Shetland Islands

3.3.3 Macroeconomic conditions beyond territorial elements in forecasting regional growth: the MASST3 model

Roberto Camagni and Roberta Capello*

I. INTRODUCTION

As a result of the recent economic crisis, the role of macroeconomic elements in forecasting regional growth has come to the fore. In Europe, national economies entered the crisis with different levels of sovereign debt, different public deficits, different taxation levels, different productivity growth trends, and therefore different chances of recovery and growth. Austerity measures “suggested” by the Union to diverging countries set limitations on some national economies, conditioning the way out of the crisis especially in those countries where the stability and growth pact exerts strong pressures on national debts and deficits. Moreover, the impact of the ongoing financial crisis on the service of public debt for the five largest EU economies has been severe. While the positive GDP growth rates registered in the late 1990s and early 2000s allowed a progressive reduction of the outstanding stock of debt ratio, the recent economic downturn has imposed a halt on this process, boosting public deficits and justifying severe cuts to public expenditure and investments. After the decade of financial stability brought about by the inception of the common currency, with all EU countries servicing their debt at very low prices, international markets have recently begun associating a higher probability of default with certain government debts, with a consequent rise in the risk premia requested with respect to risk-free bonds, typically German ones.

All these macro conditions exert an influence not only on national growth patterns but also on regional ones, and consequently on the overall European convergence process. In fact, despite the lack of analysis in the literature, macroeconomic trends and policies have differentiated regional impacts, and they therefore exert different pressures on regional growth. The aim of this paper is to explain the importance of macroeconomic trends (and policies) for regional growth. One of the main results of the conceptual reasoning presented in the paper is that it is impossible to deduce conceptually which territory is more resilient to the macroeconomic trends that accompany a period of economic downturn. For this reason the importance of building forecasting regional growth models for understanding the spatially differentiated effects of the crisis increases.

In particular, the paper shows conceptually and empirically the feedbacks on regional performances deriving from the constraints on public deficits and debt. As is evident today, these constraints are very powerful and may jeopardise the convergence process of many lagging countries (Greece and Portugal, for example) in spite of their cost advantage. The paper will also present an application of the conceptual reasoning to territorial scenarios developed through the MASST3 model, enlarged and reinforced to take macroeconomic constraints into account, as part of the ESPON ET2050 project.

II. THE IMPORTANCE OF MACROECONOMIC TRENDS IN FORECASTING REGIONAL GROWTH

During a period of economic crisis like the one encountered by the world economy in recent years it is impossible to forecast regional growth without taking account of national, macroeconomic elements, mainly linked to public finance. These elements add to the already severe and regionally differentiated effects of global trends in international trade and finance.

The reasons for claiming an “asymmetry” in regional impacts of macroeconomic trends in a period of crisis are manifold. The first, and most straightforward, explanation lies in the fact that regions belong to different nations, and nations have differing resilience to the economic downturn because of the different levels of sovereign debt, different public deficits, and therefore different availability of public resources to be devoted to growth policies. The austerity measures imposed by the European Union set additional limitations on growth, especially in those countries where the stability and growth pact exerts stronger pressure on national debts and deficits.

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Supply-side elements, related to the structural characteristics of a local area and to a differentiated availability of territorial capital (Perloff et al. 1960; Camagni 2009), are an immediate and logic explanation for the differentiated spatial impacts of the crisis (Gorzela and Goh 2010). The same cannot be said for the demand-side, macroeconomic elements that – at first glance – are not expected to generate asymmetric effects at regional level. And yet, macroeconomic elements have differentiated inter-national and intra-national regional impacts on growth. Let us explain how.

The widening of the spread – the risk premium requested with respect to riskless bonds – has characterized the past year of the crisis because international markets associated a higher probability of default with certain government debts. The increase in the spread in some problem countries (Italy, Spain, Greece, Portugal, Ireland) generated three main macroeconomic effects, and interestingly, each of them can be expected to involve different actors and different regions:

- 1) strong control on public expenditure and on its forced reduction was imposed by the EU, especially in those previously indicated countries. The effects of such a reduction are expected to be stronger in those regions with a higher share of public demand compared to those with a higher share of private demand, the former being generally the poorer and less productive ones;
- 2) private investments decreased as a consequence of the increase in interest rates on private loans and bonds, penalizing private actors, and particularly industrial regions with large shares of SMEs;
- 3) a credit crunch came as a consequence of the financial intermediaries' decision to prefer investing in public bonds rather than in the private sector, when sufficient guarantees existed on possible sovereign default; the real sector and the most productive regions hosting it were once again penalized more than others.

The spatially differentiated effects on macroeconomic trends prompt an important further consideration. Ex-ante conceptual reasoning on which type of region is more resilient to the crisis is impossible. In the first phase of the crisis, when it was associated with real estate mortgage bankruptcy, the negative effects were easily attributed to the presence in the area of financial activities, directly or indirectly related to real estate, and of a hypertrophic and overvalued building and construction sector. In a second phase, the crisis rapidly involved the real sector through the credit crunch and the shrinking of global demand. In a third phase, the crisis retroacted on the financial sector. This was a consequence of the condition of the sovereign debt of many European countries, and the exposure of the financial sector to public debtors. This evolution led to higher pressure on industry and on 'exposed' sectors, but also cumulatively on internal consumption growth in general and on demand for investments. Industrial areas are those most exposed to massive unemployment growth and to the loss of GDP potentials.

If one distinguishes between international regions open to world trade, and more autarchic closed ones, the complexity of an ex-ante conceptual reasoning becomes even more evident. International, open trade regions certainly suffer from the decrease in world demand, but if they can count on a strong supply structure able to show higher resilience, they can more easily recover (as many German regions did). The closed nature of peripheral regions protects them from the decline in world demand; but at the same time, these regions suffer from a weak and rigid supply structure unable to react and to adjust to structural changes brought about by the crisis, which reinforces their degree of autarchy and their need for public debt.

An ex-ante assessment of the likely macroeconomic trends out of the present crisis and of their regional distribution can only be obtained through forecasting regional growth models. A recent model, called MASST, was used in many ESPON projects (Capello 2007; Capello et al. 2008; Capello et al. 2011; Capello et al. 2013). The new version of the model (Capello et al. 2013) warrants particular attention since, with respect to the previous versions, it can be used: i) to measure the costs of austerity measures vis-à-vis growth measures, and their interactions and feedbacks, in periods of crisis compared to those of economic expansion; ii) to interpret regional heterogeneity in the effects that the economic downturn and the subsequent macroeconomic measures generate at regional level.

III. HOW TO ENDOGENISE MACROECONOMIC TRENDS: THE MASST3 MODEL

Macroeconomic constraints on deficits and debts are very powerful, and they may jeopardise the convergence process of many lagging countries in spite of their cost advantage (as in the case of Greece, Portugal, and most of the southern European countries). This consideration highlights the need to endogenise the public expenditure growth rate, and its mechanisms, in a regional growth forecasting model.

The logic with which public expenditure is endogenised in the updated and reinforced MASST3 model is summarised in Figure 3.8, which also shows how these elements are taken into account in the model. In the period of crisis, the public expenditure growth rate is bound to increase, being pushed upwards by the increase in welfare measures, such as those intended to cushion the effects of unemployment, and all the social safety nets that must be put in place. By the same token, the strict stability pact parameters, once assumed, must foresee the availability of public resources to repay public debts and deficits. This logical cause-effect chain is not fully endogenised in the model (Figure 3.8) and requires a decision on exogenous public expenditure growth rates (given the “political” decision to allow a stricter or more relaxed time to different countries for rebalancing public finance). Once these new levels of public expenditure have been decided (technically, through the constant term of the public expenditure growth rate variable), the model endogenously calculates all feedbacks on GDP growth rates and on the new levels of deficits and debts.

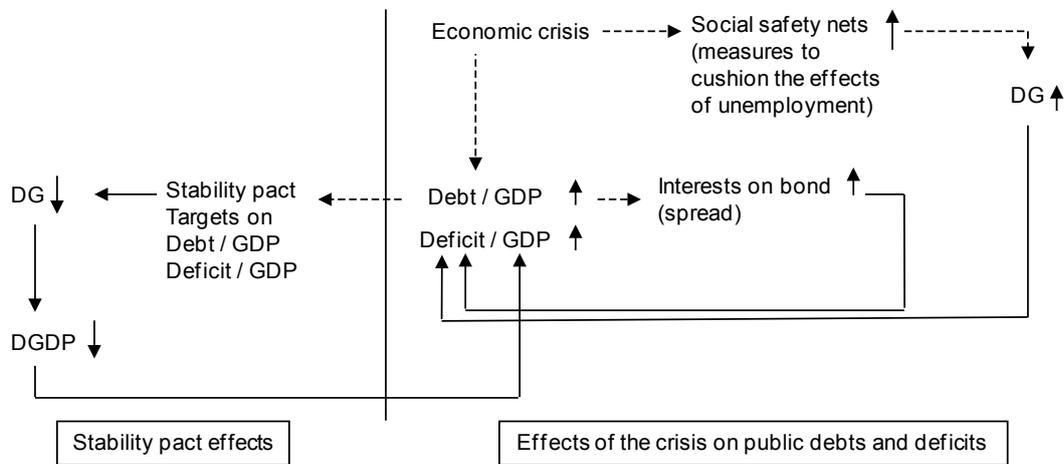
Whilst these are advantages, the lack of a closure of public expenditure requires particular attention and consistency in the assumptions made while implementing scenarios. If the crisis is foreseen as lasting for a long period of time, an increase in public expenditure must be assumed for those aspects that pertain to social safety nets, and consequently a difficult decision on a higher or lower total expenditure has been assumed (e.g. via the constant term of the public growth rate equation) (the right part of Figure 3.8).

IV. A BASELINE SCENARIO: THE CONVERGENCE PROCESS INTERRUPTED

The strength of the MASST3 model in forecasting regional growth taking macroeconomic effects into account is presented in the baseline scenario run within the ESPON ET2050 project. The baseline scenario is a scenario where present restricted macroeconomic policies will not be relaxed (keeping the present 3 % of yearly deficit over GDP allowed), no new policy tools (like Eurobonds) will be implemented, cohesion policy budget will be maintained at present levels, and economic growth is mainly driven by macroeconomic trends under the assumption that the crisis will end in the near future (2015).

Map 3.6 depicts the annual average regional GDP growth rate in the 2012-2030 period, showing that *GDP growth is positive in all European regions*, with the exception of a very limited number of regions in southern Europe, where recovery after the crisis has not been able to overcome the negative effects of the crisis in the first years of the period 2011-2030. These regions are the rural areas of Greece and Castilla-La-Mancha in Spain. Moreover, in terms of GDP growth rate, there is a *two-speed Europe*, since regions belonging to southern peripheral countries grow in general significantly less than northern countries. Finally, the *convergence process by New12 countries remains incomplete*. Eastern European countries still grow more than the others, but not enough to catch up with the GDP per capita levels of the Western countries by 2030.

Figure 3.8 The vicious cycle of the crisis and the stability pact effects: endogenous and exogenous relationships in the MASST model



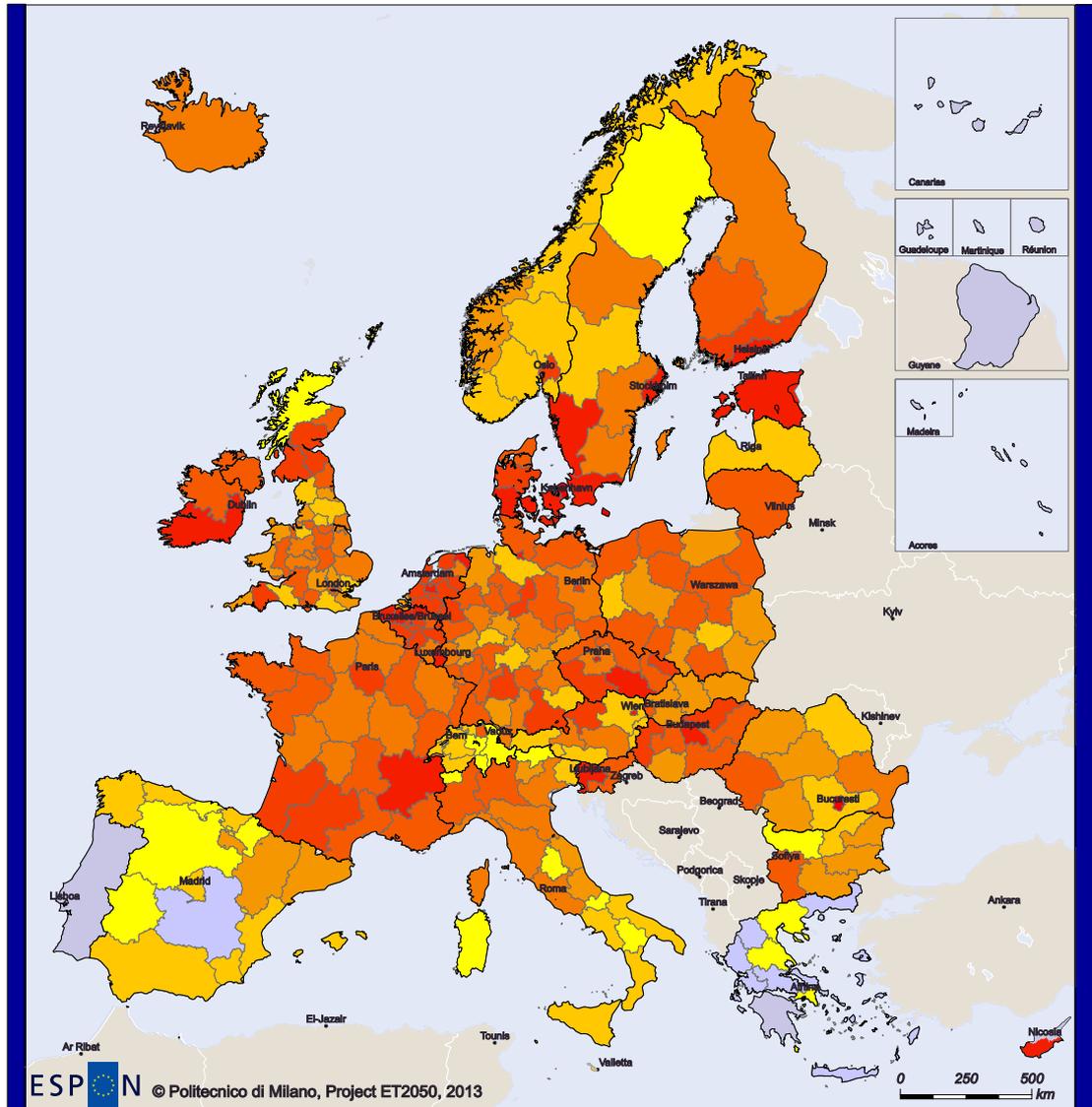
Legend:
 Continuous line: endogenous relationships
 Dotted line: exogenous relationships

These simulation results confirm that the crisis does have permanent effects, and considering the business-as-usual nature of the simulated scenario presented here, these results demonstrate that the 15 years of non-crisis (2016-2030) are not sufficient to reverse the negative trend experienced in the years of crisis (2008-2015), since they point to a striking persistence of the current slowdown of Mediterranean countries compared to Nordic areas. This also holds for some peripheral areas in Spain, and especially in Greece, where even a negative (although modest) GDP growth rate is maintained for the simulation period, as a result of both out-migration (with a consequent reduction of the size of regional economies) and poor productivity performance. Greece seems to be paying the direst cost in this scenario, and in the absence of more expansive policies, most Greek regions would not fully recover from the current contraction of investment and consumption.

All these results testify that the growth engine, in the absence of policies able to correct the current imbalances, seems inefficient in restructuring the damage caused by a long period of downturn.

Within- and between-countries regional GDP variations are identified in Figure 3.9, where the values of the Theil indices are plotted for the period 2010-2030. The Figure suggests that the long-run convergence process is indeed severely threatened by the crisis. Disparities between countries continue to narrow, though at a slower pace than in the last 15 years. However, disparities within countries are driven upwards by the long-run effects of the current economic slump. This upward trend is so strong that it also shifts overall regional disparities upwards. The simultaneous process of convergence slowdown and regional concentration implies that future cohesion policies will play a major role in steering the process, especially in prolonged periods of fiscal contraction.

Map 3.6 Average annual regional GDP growth rate forecasted by the MASST3 model, baseline scenario, 2012-2030



ESP N © Politecnico di Milano, Project ET2050, 2013

EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: NUTS2
Source: Politecnico di Milano, 2013
Origin of data: MASST3 model
© EuroGeographics Association for administrative boundaries

Average regional GDP growth rate

Baseline Scenario (forecasted by MASST3 model on 8 October 2013)

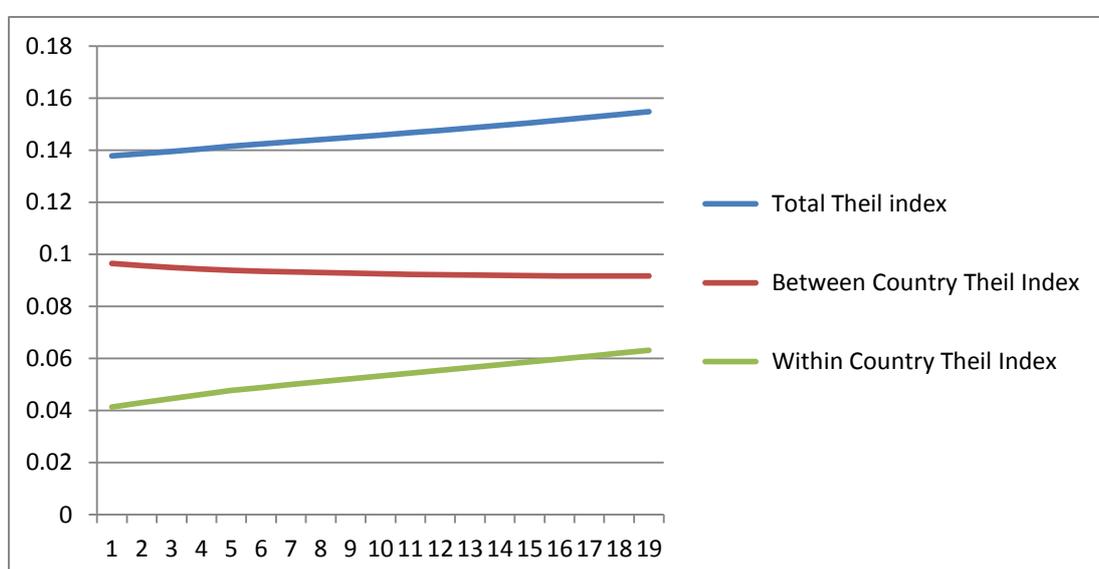
- < 0.00
- 0.01 - 0.82
- 0.83 - 1.16
- 1.17 - 1.45
- 1.46 - 1.76
- 1.77 - 2.09
- 2.10 - 2.46
- 2.47 - 2.94
- > 2.95
- No Data

Source: Authors' elaboration

V. CONCLUSIONS

The constraints on public deficits and debt constraints followed inside the EU as a consequence of the present crisis are very powerful, and they may jeopardise the convergence process of many lagging countries and regions, in spite of their cost advantage. The main reason for this is that, contrary to general belief, macroeconomic trends have spatially differentiated impacts that exert different pressures on local economies. Moreover, the complexity of the macroeconomic trends evolving during a long period of time makes it impossible to judge ex-ante what are the territories most resilient to the crisis. For this reason, the importance of regional growth forecasting models becomes evident; these models become powerful instruments to raise awareness on the differentiated regional impacts that the crisis may have.

Figure 3.9 Overall, between- and within-country disparities (Theil indices), 2011-2030



Source: Authors' elaboration

An example in this regard is the baseline scenario obtained by the MASST3 model. By assuming a short recovery from the crisis (2015) and no new intervention policies, the simulation results show a *two-speed Europe*, with relatively high GDP growth rates in Northern Europe and both a lagging Southern part of Europe and a slowly growing Eastern part. These simulation results confirm that the crisis does have permanent effects; considering the business-as-usual nature of the scenario, the 15 years of non-crisis (2016-2030) are not sufficient to reverse the negative trend experienced in the years of crisis (2008-2015). Under these conditions, the long-run convergence process is severely threatened.

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3.4 Innovative types of data

3.4.1 Exploring Big Data for analysing territorial development

*Sofie Jæger, Kai Böhme and Erik Gløersen**

This paper explores the potential usefulness of big data for ESPON. Based on examples of big data drawn from Twitter, it describes some of the key features of these data. It shows that these data could be useful in a number of respects, especially as they provide information on recent trends and on flows. However, because of their complexity and numerous potential biases, they are unlikely to provide an alternative stand-alone evidence base on territorial development, which could be exploited directly by policy-makers.

Increasingly data and information from analysing internet activities or social media can be used for observing development trends. Such data can be collected at very short notice and does not need to go through a long-winded harmonisation and collection procedure. This allows for easy and cost-efficient compilation of up-to-date data compared to more conventional European data sets. This paper is based on work currently being carried out in the FP7 Flagship project, as part of efforts to understand and assess the state of the art of forward looking methodologies in relation to Grand Societal Challenges.

Facebook, Google, Twitter and blogs are examples of interesting sources of data, already widely used for marketing purposes in the private sector. However, interest from the scientific community and social scientists is growing as these sources contain valuable information, which can be hard to gather by other means (Cukier and Mayer-Schoenberger 2013; Lee, Cesare and Shojaie 2013). Within this field, the scientific community is drawing inspiration from corporate data-informed decision-making. In 2011, McKinsey Global Institute and McKinsey's Business Technology Office published a joint report entitled "Big data: The next frontier for innovation, competition, and productivity" in which these data are *inter alia* promoted as sources of increased transparency, more accurate measures of performance, and narrower segmentation of customers (Manyika and Chui 2011).

This paper discusses to what degree such new 'big' data collection approaches can be used to supplement data sets traditionally used in territorial research and ESPON projects. Careful use of such data can enrich existing territorial research and provide more up-to-date information. The paper focuses on Twitter data in order to get a picture of ICT usage in Europe at the moment. Twitter is a social network, which was created in 2006 and has grown rapidly since. A tweet is a small text (maximum 140 characters), which the user publishes to be read by followers and anybody else interested. One can either respond to the tweet or re-tweet it to one's own network – or ignore it.

The approach presented in this paper is inspired by a growing number of analyses and applications using Twitter data. Among others are: Twitter Heartbeat (SGI 2013), Geography of Tweets (Twitter blog 2013), Languages on Twitter (Gilles 2013), TweetPing (Ernewein 2013), Geek vs. Nerd (Settles 2013) and the Twitter Political Index (Twitter Election 2013).

I. DATA GATHERING

Everyone can freely collect live stream Twitter data. The data is collected using the Twitter Application Programming Interface (API). By default a global sample of tweets is collected as tweets are published (collecting all tweets requires special permission as the volume of tweets is very big). However the API offers some possibilities to focus collection, which also allows for a complete data set instead of a sample. It is e.g. possible to limit collection to a specific geographical area by specifying a bounding box, or to only collect tweets with certain keywords in, or tweets from certain users or in a specific language (Twitter 2013).

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In our case we restricted the collection to tweets that contain information on geographical coordinates and were within a bounding box set for Europe. The data (tweets) were gathered using a Python script. The script ran for most of the time in the time period of 5 - 9 August 2013.

In order to be able to analyse the data, a process of cleaning the data was created. For that purpose another python script has been developed, which besides the tweet itself, extracts the 'user id', 'place of user', 'tweet id', 'time and date', 'coordinates', 'country code of tweet' and 'language of tweet'. If the tweet is a reply, two additional fields ('reply id' and 'user id (of initial message)') make it possible to follow the thread of tweets. In total 4.5 million tweets were collected, a large amount of data. Each entity (tweet) was stored in an SQLite database.

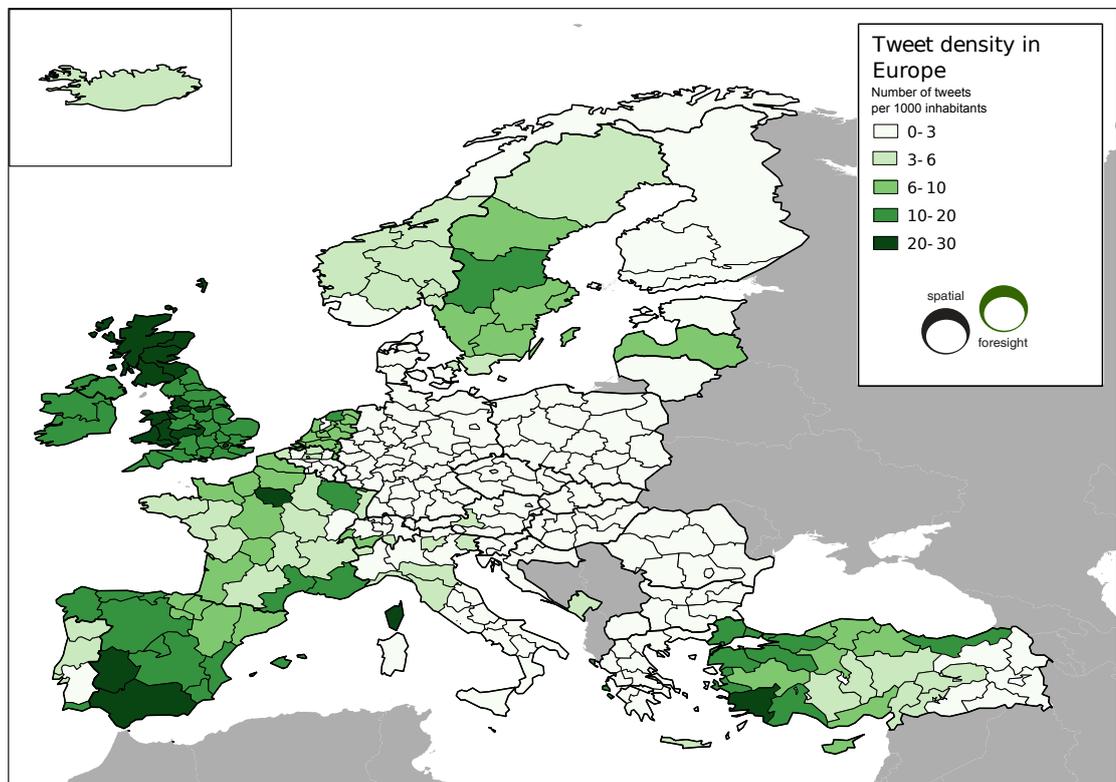
Finally, the tweets were geo-coded by using the coordinates. This made it possible to assign each tweet to a geographical entity (in this case NUTS2 regions and LAU2 units) and thereby aggregate them for further analyses.

For further information on the data gathering technique and to access a sample dataset, please visit www.spatialforesight.eu/exploring-big-data.html

II. DATA USE

The maps show a first attempt to analyse the collected data. The purpose of the maps is to illustrate the results that can be derived from this data collection approach. Therefore, we have not carried out a detailed territorial analysis of these examples. As the data was collected in the holiday month of August, as part of a pilot study, they do not necessarily give a correct picture of typical ICT usage. For the FP7 Flagship project, we envisage a longer collecting period, to compile a more representative sample.

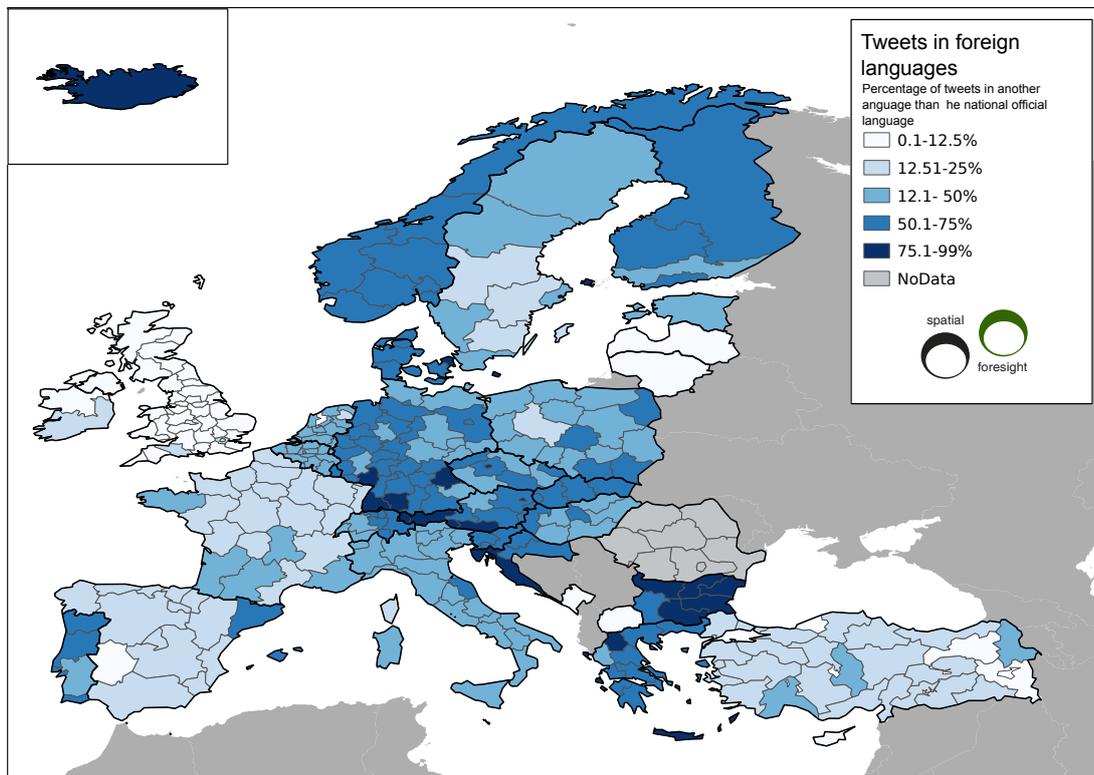
Map 3.7 Tweet density in Europe, measured in number of tweets per 1000 inhabitants



Source: Twitter data collected by authors (August 2013) and Eurostat (2011)

Map 3.7 shows tweets per 1,000 inhabitants at NUTS2 level. This gives an immediate impression of ICT usage at regional level. Turkey, Sweden, United Kingdom, Ireland, Benelux, France and Spain have a high density of tweets in comparison to e.g. Central and Eastern European countries. Furthermore London (25.8 tweets per 1,000 inhabitants) and Paris (22.3 per 1,000 inhabitants) have very high densities of tweets. However, the highest density is found in the Scottish Highlands and Islands. Looking across countries, the metropolitan regions have the highest density of tweets. Such information could e.g. complement existing ESPON results on internet access or e-commerce and thus help to provide a broader picture (e.g. ESPON SIESTA 2012). However, as discussed below, a number of constraints need to be taken into consideration in order to interpret the results appropriately.

Map 3.8 Percentage of tweets in a foreign language



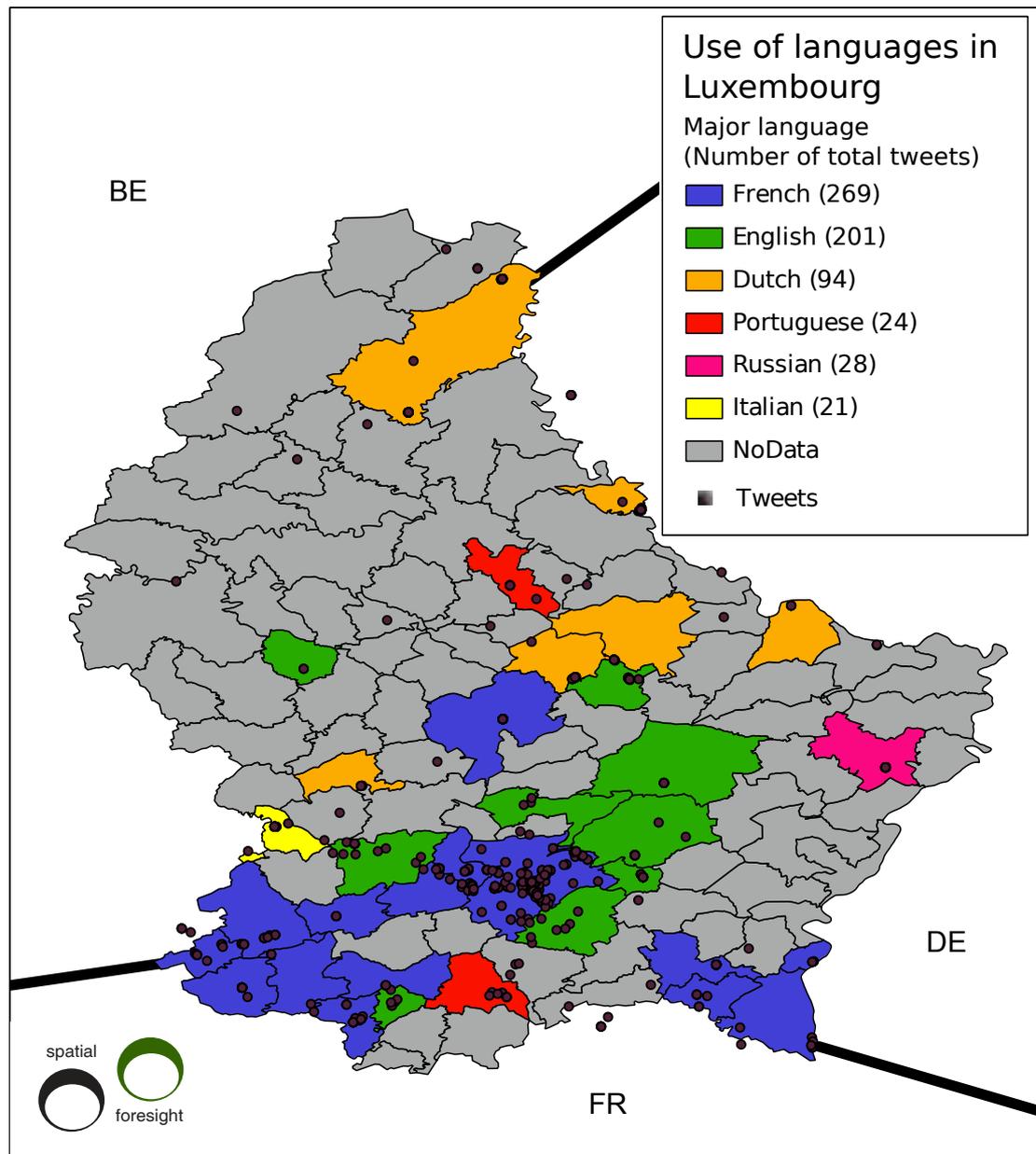
Source: Twitter data collected by authors (August 2013)

On Map 3.8 the ratio between the usages of the official national language(s) and of foreign languages is shown. This can be an indication of the popularity of a place for tourism (given the season of data gathering) or migration, as well as the general “internationality” of a region.

A high share of foreigners may be interpreted as a sign of attractiveness (ESPON ATTREG 2013). However, a high share of tweets in foreign languages may also be an indication that a large proportion of the population speaks more than one language.

The pattern observed in Map 3.8, is somewhat different than in Map 3.7. Countries that had a low density of tweets tend to have the highest share of foreign language usage. The explanations could be manifold, differences in users’ segments, seasons and so forth need to be considered. This example shows that extensive enquiries would be required to analyse these and understand the observed patterns.

Map 3.9 Majority language used in Luxembourgish municipalities (LAU2)



Source: Twitter data collected by authors (August 2013)

As the tweets are collected as point data, the same analysis can be done at various levels. In relation to usage of languages Luxembourg is an interesting case. Luxembourg is a multi-lingual country with 3 official languages (Luxembourgish, French and German) and also has a large proportion of foreigners. Map 3.9 shows the most common language used in the sample is French, closely followed by English. The use of German and Luxembourgish²¹ was very low. As Map 3.9 indicates, French is the main language in Luxembourg City, as well as in the municipalities along the Belgian and French borders. English is most prevalent in the municipalities surrounding Luxembourg City. Furthermore, Dutch was detected as a major language, which could partly be explained by the presence of Dutch tourists. The analysis of languages used in tweets therefore can enrich insights

²¹ The application Twitter uses to detect languages, does not detect tweets in Luxembourgish. Instead they are categorised as German.

into linguistic preferences, language competencies and flows. The challenge may be to dissociate different types of effects.

Another exciting potential of this dataset is to analyse the links within and between countries. Twitter data offers several possibilities for gathering network data. For this purpose, one could envisage collection of information on the followers of a given user and the re-tweet or replies, which a given tweet triggers. Such analyses may also reflect asymmetric relations between neighbouring regions and countries with respect to cultural, political and economic influence.

In addition, the tweets offer a range of possibilities for extracting content to be analysed. The users themselves index the tweets by using hash tags to define keywords (e.g. #ESPON). This has already been used to analyse election campaigns, follow the impact of natural disasters etc. However for a Europe-wide analysis of tweets, the use of different languages adds an additional challenge in data gathering and analysis. Yet it would be an interesting field for further studies. The ESPON CityBench project is currently undertaking first attempts in that direction.

Advantages and limitations

Even though Twitter data brings many new possibilities, it also has its limits. Among the most prominent limitations are:

- Good sample representativeness is not possible. A survey shows that the average twitter user is a 28-year-old American woman. Furthermore, only 1-2 % of tweets are geo-tagged. However, with the amount of tweets generated, the main problem is in the specific profile of those who use geo-tagging. Studies have shown that geo-tagging in social networks is dominated by users with a high level of formal education, general comfort with digital technologies and, within these groups, by males (Freelon 2013). Twitter is also more popular in some regions than others, and may be used by different population groups and in different ways in each region.
- All information fields available in Twitter are not mandatory to fill in. From a data collection point of view this logically results in incomplete datasets. Likewise the chances of incorrect data are also high, as the users are free to indicate whatever they like. Some obvious errors, like giving the Moon, Mars or Utopia as place of residence, can be corrected. However, in other cases it is either impossible or extremely time-consuming to check if a user has given the correct information. This gives a lot of “noise” in the data and requires data cleaning in order to obtain useful datasets.
- As the network is based on the needs of the users, additions and changes are occurring continuously. An obvious risk is that the service may lose popularity or even be shut down. All this implies that compiling corresponding/similar time series data might not be possible.

However the advantages of using Twitter outshine the limitations as long as these are considered and appropriate precautions are taken. Among the main advantages are:

- You can get data from parts of the population, which normally can be hard to get to reach with surveys and questionnaires (Lee, Cesare, and Shojaie 2013).
- Recent data that can be hard to obtain at short notice through other means (e.g. opinions about current events) are available in Twitter. Furthermore it can give some idea of flows and interactions within and between countries and/or regions.
- The dynamic of the network provides a current picture of reality. Nevertheless this type of data should be considered as time-bound and dependent on current trends. Indeed, we will most likely be using another data source or technology in 2, 10 or 20 years, as new services emerge.

III. POTENTIAL USE FOR ESPON

The above discussion and examples show that use of big data could create interesting possibilities for ESPON to enrich its applied territorial research.

Given the constraints, the focus could rather be on complementing the type of regional data used by ESPON so far, and also on investigating possible cross-analysis with existing data sets.

This might offer a chance to benefit from more timely data sets than those that are currently used in European territorial research. Big data can provide information on emerging trends long before their effects become visible in traditional data sets. While they will generally not provide a sound evidence-base to inform policy-making, they are a good basis for monitoring of trends and exploratory investigations.

In addition, big data also make it possible to go beyond NUTS3 and explore patterns at more local levels (LAU2 and LAU1). This may provide a basis for the estimation of local values based on NUTS3 data, in areas where data availability at this scale is limited.

Furthermore, the use of big data can offer opportunities to explore flows between different locations in Europe. The lack of data on flows has been one of the major challenges for the ESPON programme. Therefore, in spite of the drawbacks of big data from Twitter, they may offer interesting research perspectives.

Finally, the possibility of carrying out analyses on the content of the information exchanged, both alone and in combination with the points from where the data has been sent, may allow for interesting territorial research. Levels of interest in specific issues of relevance for territorial cohesion and regional development may be assessed, for example. To a certain degree big data might provide new insights into territorial dynamics, and support a more coordinated placed-based approach in European policy making, e.g. in relation to the territorial keys advocated by Böhme et al. (2011).

Research on big data is still at an early stage. In this regard, the present paper could only hint at a few points and hopefully contribute to a debate about how, and for what purpose, big data could be useful in future ESPON work.

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3.4.2 Spatial disaggregation of socio-economic data and combination with spatial data by means of OLAP technologies

*Roger Milego, Maria José Ramos and César Martínez**

I. CONCEPTUAL BACKGROUND

The challenge of integrating data which are thematically, spatially and/or temporarily heterogeneous was faced in the ESPON 2006 Programme. Projects mainly used a fixed spatial division (NUTS3) to harmonise datasets. However, this gave rise to some doubts and the results were not always convincing. Another strategy for data integration was needed.

The Modifiable Areas Unit Problem (MAUP) study (Grasland et al. 2006) highlighted the integration of heterogeneous databases as one of the most promising applications for gridding methods for ESPON. Two potential fields of applications were identified: time harmonisation of changing territorial units and thematic harmonisation and combination of heterogeneous spatial sources. Furthermore, Grasland et al. recommended that the so-called “Eurostat-oriented” strategy be replaced by another strategy that could be named “EEA-oriented”, where all the data would be transformed into a grid and integrated on this basis.

The terms of reference for the ESPON 2013 Database project emphasized the need for a different way of data integration, where socio-economic information was put into smaller units comparable to those used for environmental or natural data. The analysis of different experiences of data integration worldwide (Deichmann et al, 2001; Gallego, 2001; Nordhaus, 2006) led to the conclusion that the best way to downscale socio-economic data and make it comparable with other kinds of data, is by using a regular grid structure, in which each cell takes a figure of the indicator or variable.

Moreover, territorial cohesion policies derived from the Territorial Agenda 2020 highlight the importance of a place-based approach and the territorialisation of policies (Zaucha 2013), which can benefit from spatial data integration like the one presented in this paper.

The release of the GEOSTAT 2006 population grid²² was an important step for the methodology discussed here. It was an initiative of the European Forum for Geostatistics and Eurostat, through the GEOSTAT project, published in April 2012. It is a one square kilometre gridded dataset containing population figures for the year 2006. It integrates data from national grid initiatives and, wherever this has not been possible, the European disaggregated dataset produced by the Austrian Institute for Technology (AIT) by means of detailed datasets, such as a Soil Sealing layer at 30x30m resolution.

To conclude this first section, an introduction to OLAP should be made. Online Analytical Processing is a computer-based technique to address multi-dimensional analytical queries swiftly. OLAP tools enable users to analyse multi-dimensional data interactively from multiple perspectives. Its use grew in the late 1990s, but it was mainly applied to business data in the search for business intelligence. The application of such a technique to social and geographical information as shown in this paper is rather innovative and provides added value to the integration of data by means of a grid. Moreover, integrating such a technique in a web tool, to make it easier for any user to use the database is a further benefit of the methodology implemented during the ESPON M4D and its predecessor 2013 Database projects.

II. METHODOLOGICAL APPROACH

In order to combine socio-economic data with other types of datasets within an OLAP database, the 1 km² European Reference Grid (ERG), adopted by several European stakeholders at the First Workshop on European Reference Grids (JRC-IES-LMU-ESDI, 2003), is used as the common integrator

²² http://www.efgs.info/data/GEOSTAT_Grid_POP_2006_1K

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layer. This means, in the end, that each single grid cell must store a single figure for each variable, either numeric or alpha-numeric. Actually, depending on the nature of the dataset or variable, we distinguish:

- Geographic dimensions: they define the geographical unit each cell belongs to (NUTS region, LUZ, UMZ, bio-geographical unit, etc.)
- Thematic dimensions: they define a physical characteristic of a grid cell, such as land cover type.
- Measures: they are numeric variables which can be aggregated by any combination of the data dimensions available in the system. They are surface units (e.g. hectares) but also socio-economic figures (population, unemployment, GDP...).

As for geographic dimensions, an overlay between the dimension and the 1 km² ERG is undertaken, in order to give each grid cell a single feature code (e.g. a NUTS3 code, a LUZ code, etc.). To avoid coastal discrepancies, some dimensions, such as NUTS regions, are previously submitted to spatial extension processes that generate proximity layers.

Since some thematic layers have a higher resolution than 1 km² (e.g. Corine Land Cover is available at 100 m² resolution), the combination of such information is carried out at 100 m². In this way, it is possible to store, for instance, the different land cover classes and their surfaces for each grid cell. The grid cell index (unique identifier for each grid cell) might appear repeated in the resulting output table, as many times as different land cover classes exist within the square kilometre. Geographic dimensions will have their code repeated as well (Figure 3.10).

Figure 3.10 Example of unique combination of units within a grid cell

Index	NUTS99	NUTS03	NUTS06	NUTS10	FUA	LUZ04	LUZ12	MUA	UMZ00	CLC90	CLC00	CLC06	HA
26421951	1178	1202	1004	1141	745	267	535	1013	117593	111	111	111	58
26421951	1178	1202	1004	1141	745	267	535	1013	117593	112	112	112	42

UNIQUE COMBINATION OF UNITS

26421951-1178-1202-1004-1141-745-267-535-1013-117593-**111-111-111**
 26421951-1178-1202-1004-1141-745-267-535-1013-117593-**112-112-112**

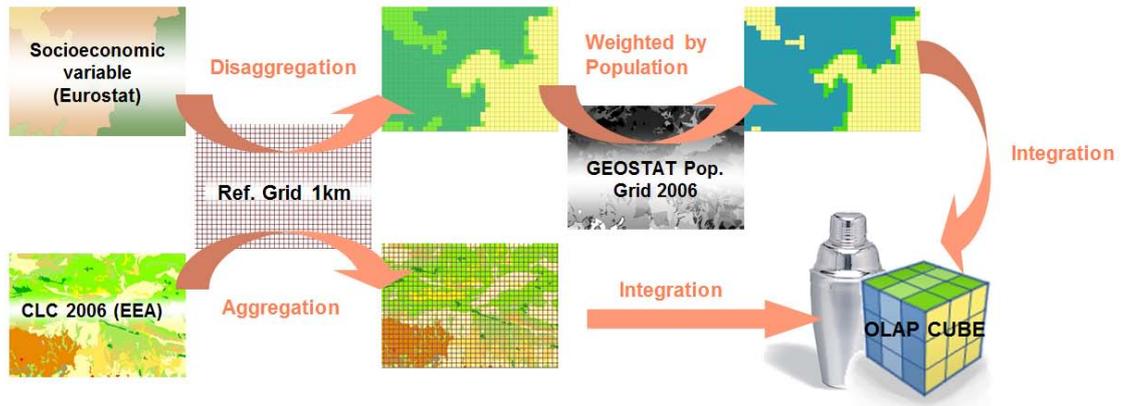
When it comes to socio-economic data, typically stored by NUTS3, the main challenge is how to disaggregate such figures and get a single value for each cell. In order to do so, population has been used as an ancillary variable. With the release of the GEOSTAT 2006 population grid, high quality 2006 population figures are available at 1 km² resolution. That valuable information is used to redistribute population figures at NUTS3 level for the time series 1990-2011 (compiled by ESPON M4D) proportionally to the distribution of population in 2006. When doing so, figures for each grid cell are a proxy of the actual value, but they compensate each other when grid cells are aggregated back to show the result of a query, which always should be done by a bigger reporting unit (NUTS3, LUZ, UMZ...). The other socio-economic variables, such as GDP/capita or unemployment are redistributed in the same way, weighting the figures by population in each grid cell. In this way, those figures can be aggregated back in a query, despite the different NUTS breakdowns or geometries involved (urban delimitations, administrative levels, etc.).

Whenever a grid cell falls in the boundary of different NUTS units, the figures are disaggregated proportionally to the share of area of each administrative unit within the grid cell:

In the example above, the weighting figure corresponds to the share of population living in that grid cell. In this way, a single figure for each socio-economic variable is calculated for each unique grid cell.

In Figure 3.11 a general schema of data preparation for integration within an OLAP database is shown.

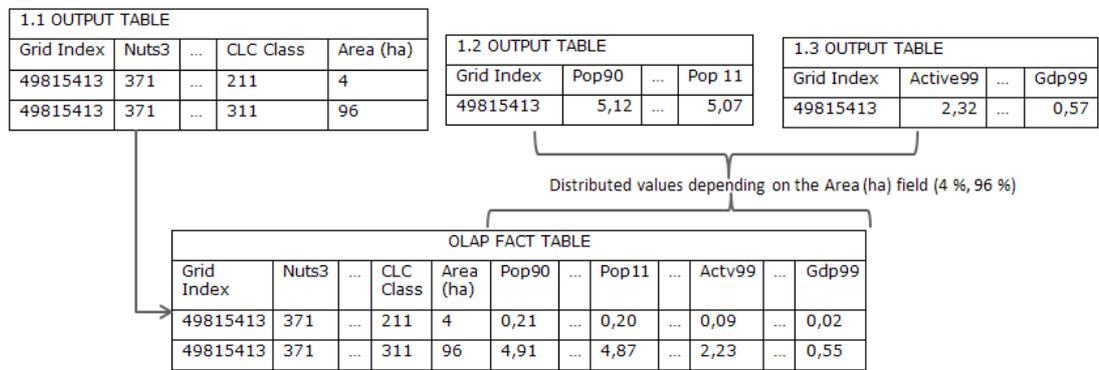
Figure 3.11 General schema of data processing for OLAP integration



Once the data dimensions and measures have been overlaid with the ERG and each grid cell has a single figure for each variable (or more, in the case of Corine Land Cover), then it is possible to join all the information in a unique OLAP database. In order to build it up, a star schema has been selected. It is composed by one Fact Table and one Dictionary Table for each geographical or thematic dimension.

The Fact Table stores, in the end, all the data dimensions (geographic and thematic) and all the variable measures. They are all referred to a unique identifier for each grid cell. Whenever different land cover classes occur in a single grid cell, the cell code and geographic codes appear as many times as different CLC classes exist. As for measures (numeric values) they are distributed proportionally to the area share of each grid cell piece (Figure 3.12).

Figure 3.12 Schema of OLAP fact table built-up



The Dictionary Tables store the description of a specific dimension (e.g. NUTS names). They are put into relation with the Fact Table by means of the dimension codes.

Once the Fact and Dictionary Tables are built, then the OLAP database (also named OLAP cube, as a shortcut for multi-dimensional) is ready to be created. It is done by means of Microsoft SQL Analysis Services 2000. The resulting product is a .CUB file that can be analysed using Microsoft Excel or an online connection to a remote server. The next section shows the results derived from the OLAP Database that was developed, including an advanced web tool to explore those OLAP Cubes through a simple web browser.

III. RESULTS

Different OLAP Cubes can be created according to the user's needs, including chosen data dimensions and measures if they have been prepared for OLAP integration as explained in the previous section. The ESPON OLAP Cube v.6, delivered in June 2013, includes the following:

- Data dimensions (geographic or thematic): Corine Land Cover 1990, Corine Land Cover 2000, Corine Land Cover 2006, Land Cover Flows 1990-2000, Land Cover Flows 2000-2006, Land Cover Flows 2000-2006, NUTS 1999, NUTS 2003, NUTS 2006, NUTS 2010, Functional Urban Areas (FUA), Morphological Urban Areas (MUA), Urban Morphological Zones (UMZ), Large Urban Zones (LUZ).
- Measures: Area in hectares, GDP 2000, GDP 2003, GDP 2006, GDP 2009, Population 2000, Population 2003, Population 2006, Population 2009.

Those OLAP Cubes can be worked on by means of Microsoft Excel through a dynamic table, allowing the user to choose what dimensions appear as rows or columns and which measures will be shown as values after the query. In this way, the user can swiftly get results like the example in Figure 3.13.

Figure 3.13 Sample result of an OLAP Cube analysis within MS Excel

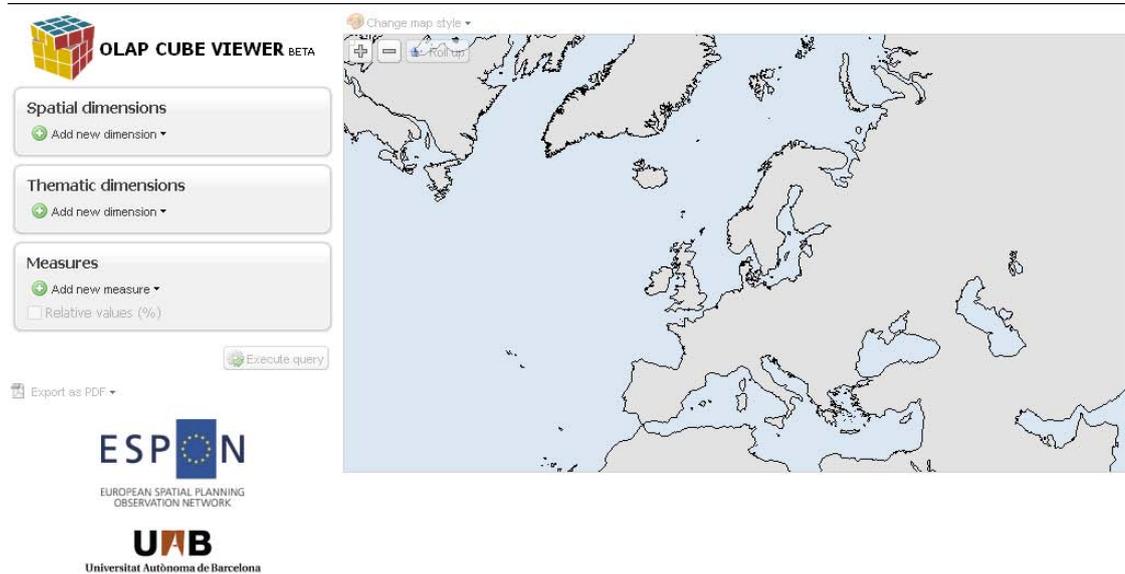
	A	B	C	D	E	F	G
1	NUTS3 (2010)	Population 1990 thot	Population 1998 thot	Population 2001 thot	Population 2005 thot	Population 2010 thot	GDP 2006 Million Euro
19	IS	253,79	272,38	283,36	293,58	317,63	,00
20	IT	56.618,42	56.832,68	56.890,15	58.381,92	60.254,84	1.440.002,47
21	ITC	14.933,24	14.851,57	14.884,49	15.399,88	15.975,45	468.376,67
22	ITC1	4.310,28	4.224,99	4.205,74	4.316,11	4.431,88	118.838,66
23	ITC11	2.257,67	2.187,64	2.169,09	2.236,30	2.296,93	63.428,96
24	ITC12	185,14	179,31	177,73	177,57	180,10	4.858,60
25	ITC13	191,90	188,24	187,60	188,19	186,72	4.935,15
26	ITC14	154,36	152,23	151,52	153,69	155,17	3.436,16
27	ITC15	328,95	333,36	337,02	348,93	363,84	9.867,97
28	ITC16	543,93	551,01	554,92	569,49	589,07	16.369,90
29	ITC17	206,96	207,27	207,94	213,06	220,82	4.933,67
30	ITC18	441,37	425,92	419,93	428,87	439,23	11.008,25
31	ITC2	115,23	118,87	120,04	123,68	128,70	3.690,50
32	ITC20	115,23	118,87	120,04	123,68	128,70	3.690,50
33	ITC3	1.699,93	1.613,74	1.584,52	1.597,82	1.621,60	36.948,34
34	ITC31	214,15	208,44	205,76	215,37	221,66	4.367,01
35	ITC32	286,88	277,50	274,30	282,71	288,43	6.329,12
36	ITC33	965,85	903,15	883,25	875,81	883,26	21.102,23
37	ITC34	233,05	224,65	221,21	223,93	228,25	5.149,98
38	ITC4	8.807,80	8.893,97	8.974,19	9.362,26	9.793,27	308.899,17
39	ITF	13.887,83	14.017,39	13.938,78	14.085,78	14.167,64	227.661,38
40	ITG	6.607,85	6.657,64	6.614,65	6.663,13	6.715,40	107.719,64
41	ITH	10.346,29	10.451,05	10.588,16	11.026,92	11.547,94	325.847,11
42	ITI	10.843,22	10.855,03	10.864,06	11.206,21	11.848,42	310.397,67
43	LI	39,20	42,80	33,77	46,42	48,21	41,62
44	LT	3.693,05	3.561,58	3.486,33	3.424,67	3.328,42	23.876,93
45	LU	377,81	420,22	437,02	459,05	499,51	33.163,85
46	LV	2.668,35	2.420,98	2.364,44	2.306,63	2.248,59	15.902,80
47	MK	176,87	183,13	183,42	181,31	179,85	,00
48	MT	352,43	376,51	391,42	402,67	416,96	4.602,48
49	NL	14.860,29	15.622,33	15.954,64	16.273,11	16.542,57	536.973,42
50	NL1	1.590,79	1.637,84	1.668,47	1.698,32	1.710,81	54.343,44
51	NL11	548,31	552,56	560,98	569,58	571,26	24.901,60
52	NL111	145,73	146,76	148,24	148,08	146,24	2.770,09

Although a user manual has been produced to facilitate the usage of OLAP Cubes within MS Excel, a user-friendly web tool, built up on open-source technologies, has also been created with a dual purpose: to help users to work on the OLAP Cubes via a web browser, and to be able to limit some specific queries if needed.

It is not the purpose of this paper to explain in detail how the web tool has been developed, but just to present it as one of the results of the methodology that has been implemented.

The web tool is used to analyse an OLAP Cube through a simple web interface, by choosing the data dimensions and measures the user wants to see (Figure 3.14).

Figure 3.14 Screenshot of the OLAP web tool homepage



Results are shown at the same time in a table, chart and map (Figure 3.15).

Figure 3.15 Screenshots of the OLAP web tool results after a query



The results obtained via the web tool can be exported as PDF files.

IV. CONCLUSION

The methodology and results presented in this paper respond to a need for data integration within the ESPON context, and for data use in analysing territorial development and cohesion in Europe. They might also be helpful in the framework of territorialisation and place-based approaches for different sectorial policies, as they enable the integration and analysis of spatial data together with socio-economic statistics. Although it has not been tested for policy-making purposes, the OLAP approach presented might be useful for spatial planning and spatial monitoring at different scales.

Furthermore, this methodology overcomes several classical problems, like working with different NUTS breakdowns or the combination of thematic with administrative and socio-economic data. It should be stated that the purpose of this method is not to get detailed disaggregated datasets, but rather to use disaggregation as an intermediate process to combine data, and to make it possible to explore that data to get sound results in a fast way that might help us to analyse trends or facts about territorial and social development. Similarly, the more disaggregated datasets are built up in Europe, or the better that disaggregation techniques can be applied, the better will be the OLAP database produced.

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3.4.3 Data needs and workarounds for cross-border studies: experiences in ULYSSES²³

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I. INTRODUCTION

Based on experiences within the ESPON project ULYSSES, this paper will diagnose a structural *mismatch* between the expectations about research results by scientists and local stakeholders. It will review the corresponding data needs, and the possibilities of delivering with regard to the nature of data which is normally used.

The general approach

The ideal successful ESPON approach in Priority 2 (User demand) projects involves an international scientific team working closely with local stakeholders. The projects focus on a specific subject defined by the stakeholders, collecting, processing and presenting relevant quantitative geo-data. Through this, phenomena like correlations between employment rates and public expenditure in the R&D sector are investigated in order to explain development lags, for example.

Though subjects and data differ between projects, the data, on which the great majority of ESPON studies are based, derives from sources such as Eurostat, as well as from harmonized national or regional sources and are generally processed in the framework of spatial data containers called NUTS²⁴.

This approach has some particularities: NUTS are inherited from spatial administrative units as defined by the nation states; content and availability of the data depends on the good will of the responsible public institutions; data provided usually consists of mono-dimensional values linked to spatial containers; and in order to be comparable, values have to be levelled to the lowest common denominator.

Changed conditions

Even though this procedure has provided invaluable insights into European development processes, it is questionable whether the research framework used so far will suffice in order to keep pace with scientific progress. Experiences in ULYSSES suggest that there is a risk of falling behind. The changing conditions in the research environment can be summarised as follows:

- (1) European integration continues. Despite setbacks in the *emotional cohesion process* the integration process is advancing. This alters effects and phenomena which spatial analysts are investigating. Cross-border and trans-European interlinking have increased considerably, thus we need data that is able to capture this dynamic.
- (2) Objectives are constantly changing. In order to identify specific problems, with regard to increasing budget cuts, cohesion investments must be precisely targeted through well-informed, concerted and complementary action. Spatial research hence provides the basis on which decisions about priorities for action are taken. Provision of data for *evidence-based policymaking* in the light of on-going change is a constant challenge for applied science.

²³ The region under study by the authors was the Tri-national Metropolitan Region Upper Rhine, which is situated in the border region between Germany, France and Switzerland, one of six cross-border regions in ULYSSES.

²⁴ Counter examples can be found, amongst others, in METROBORDER or FOCI.

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(3) Scientific progress continues. Expectations towards spatial research, which is considered *innovative*, are constantly rising, and so there is a continuous demand for just as innovative data. This not only applies to the phenomena observed (e.g. commuting relations), but also to approaches and research questions which enable us to study increasing dynamics as well as newly emerging effects (e.g. potential cross-border usage of public services).

(4) Newly emerging sources. While the primary source of data used to be National Statistical Offices, today private commercial providers and non-profit *open-source* organizations offer large amounts of spatial data, which can be used in the context of spatial development research.

(5) Technical possibilities are advancing. This greatly alters the quality as well as quantity of data which can be handled. What was at the edge of technological progress is outdated in ten or even five years. The framework in which data is provided should thus be *sufficiently flexible* to keep pace with the dynamic of technical possibilities.

II. DATA MISMATCHES IN ULYSSES

Stakeholder interests

The ULYSSES project achieved generally positive outcomes for the stakeholders because it helped to foster a common perspective and mutual understanding of the regional cross-border realities.

Nevertheless, it was also pointed out that, “for a more profound understanding of the cross-border reality a significant improvement in availability of data is indispensable” (RVMO 2012, p. 10). Particular interests that could only partly be covered by the project were mentioned as:

- 1) The measuring of cross-border interactions, in particular cross-border commuting patterns: to what extent is everyday life overcoming cultural and linguistic boundaries?
- 2) The assessment of urban-rural-relationships which extend across national state borders: do urban areas on one side of the border provide services for rural areas on the other side of the border?
- 3) Examination of potentials for reducing public expenditure: to what extent could functional relations provide an indication of potentials for avoiding duplication of public services and infrastructures?

This points to general dissonance between what is considered to be cutting edge knowledge in the region and what is feasible using the data framework provided. At the start of the project research questions were formulated that anticipated the limited nature of the data likely to be available. However, this meant that stakeholders’ expectations were unlikely to be met.

One must not underestimate the merits of the project and the benefits that it brought to the region; in particular it delivered transnational networking on a European scale as well as mutual learning about best-practice examples and development dynamics in comparable cross-border regions. However, on an intra-regional level, expectations could not be met.

Four aspects of data mismatch

This *dissonance* between expectations and results can be attributed to a general gap between demand and supply of data. During ULYSSES, this was evident in four different aspects. While the first point can be seen as an issue of *coordination and political will*, the following three items can be summarised as *problems caused by the inherent logic of spatial data containers*, i.e. NUTS, which formed the statistical building blocks of the research framework.

(1) Availability and access. In the course of the project, it became apparent that data sets would be largely incomplete. The shortcomings concerned timelines, specific topics and data availability on lower administrative levels, especially for non-EU member states. Existing data was often only

available on NUTS-2 levels. Furthermore, processed cross-border geo-data could not be used due to restrictive property rights.

(2) Coarseness. The lack of data on LAU levels turned out to be quite compromising for our analyses. Even at NUTS-3-Level, thorough investigation of small-scale intra-regional border effects is arbitrary, at best. Indicators and numbers are applied to the whole statistical unit of course, often blurring structural patterns beyond legibility. For instance, the NUTS-3 perimeter for the city of Strasbourg, the most important development pole on the French side of the Upper Rhine region, is represented by the national administrative unit of the *Département Bas-Rhin*. This area not only covers the agriculturally oriented area in the Rhine Valley around the city but also very rural areas a good 100 km westwards from Strasbourg.

(3) Relationality and interlinking. A particular weakness was the missing interlinkage between spatial units. Data consisted exclusively of mono-dimensional values about varying subjects linked to single administrative units, usually NUTS-3 or -2. Since an extensive survey for data was conducted in the preparation of the project and none of the data sets contained relationally interlinked data, the observed shortage seems to be a structural issue. The importance of relational patterns for cross-border and intra-regional analyses cannot be underestimated, especially for the increasing cross-border linkages in a region like the Upper Rhine Tri-national Region. As pointed out above, this view is shared by the stakeholders.

(4) Integration of point/line data. Even if it is not possible to find extensive data that fits the general quantitative approach of comparing NUTS units, the framework should still be sufficiently flexible to enable creative use of other sources of information. This could even bring advantages over the approach initially envisaged. For instance, we could get access to locations of research institutions around the city of Strasbourg, which showed a concentration in Strasbourg as well as the neighbouring town on the German side of the Rhine. In order to fit into the framework of other data sets, those numbers had to be attached to the corresponding NUTS-3-unit, a process that blurred the previously clear picture that Strasbourg's gravitation attracts a great number of research facilities while the countryside remains stripped of them.

III. STRATEGIES FOR ADDITIONAL DATA

Acquisition of new sources

The first approach was the acquisition of new data sources, e.g. by regional project stakeholders and official statistical offices, as well as prior studies by ETH Zürich and EPF Lausanne etc.

What did we learn from this? Our experience was that when data sets are owned by an extra-regional organisation or the organisation consists of different political partners with possibly conflicting interests, as is common amongst cross-border institutions, then support for your case will be cautious at best, and access to data is unlikely. On the other hand, when data is owned by independent regional institutions with an interest in the outcome of the project or the promotion of the region, then support will be stronger and there is a realistic prospect of getting access to data. Personal contacts help, but will get overruled by administrative regulations.

Creative recombination: The factor analysis

One strategy in response to problems of data sources was to revise the analytical framework. In ULYSSES, the project team members at the University of Aveiro and University of Thrace proposed a revised workflow with a recombination of existing data sets. This factor analysis aimed at identifying border-effects in spite of the coarseness of statistical units, comparing NUTS adjacent to the border with national average values.

Open Source data and tools²⁵

Another strategy was to use Open Source data, which is free of charge and readily available over the internet. Since the original objective of ULYSSES was to perform analyses which might be able to reveal cross-border dynamics, we decided to investigate the regional accessibility of research facilities by car from every point in the region, considering time of travel and the size of the institutions.

For this investigation, geo-data of the regional road network would be required, which could be obtained free of charge from Open Street Maps (OSM), an open source geo-data project. OSM actually offers a separate website for downloading data packages for various countries, including all member states of the European Union. These packages comprise not only road networks, but also public transport or land use layers. Unfortunately, the quality of the data varies, therefore the downloaded road network showed several gaps, which had to be closed later on, employing an automated routine from the (also open source based) GRASS GIS.

Yet another problem arose and could be solved using free of charge geo-services on the internet. As already mentioned, in an earlier project one of the stakeholders had produced a comprehensive compilation of research institutions in the region, including location, field of research and an indicator of size, i.e. number of subscribed students where applicable. Unfortunately, the compilation consisted only of a list of addresses, instead of a geo-referenced GIS layer. Using a script provided by a fellow researcher, we were able to convert the physical addresses into GPS coordinates making use of Google Maps. The coordinates could then be imported into the GIS, creating a geo-referenced layer of the research institutions, which still contained all relevant information about their size or field of research.

IV. CONCLUSION

In the course of the ESPON project ULYSSES a structural mismatch between data needs for *innovative* research and current data frameworks became apparent. Within the context of ULYSSES several interesting analyses which were considered pertinent both by the scientific team and by the local stakeholders could not be carried out (e.g. commuting patterns; cross-border urban-rural relationships; redundant public services) due to shortcomings of the data infrastructure provided. The most important source of alternative data sets became free of charge open source data readily accessible over the internet, i.e. through Open Street Maps and Google Maps.

The concern is that the scientific framework, which ULYSSES was based on – and which presumably will be the basis for future ESPON studies – faces a structural risk of being outdated, first and foremost because of its conceptual design. Solving these issues would require, above all, planning and political determination, which appears to be reasonable, considering what is at stake. Today ESPON is one of the most important *scientific* foundations of European integration.

For the future, we suggest the following measures in order to ensure a continuously high quality of spatial research within the framework of ESPON:

(1) Accessibility and access - A central portal for access to spatial data should be established which provides direct access to regional and national data sources as well as the respective meta-data in order to work with comparable data sets. In addition, it should be possible to be equipped with a *carte blanche* permission to use whatever data is the property of the involved stakeholders. At least, stakeholders should define *beforehand* the data that will be available to ESPON research partners. This way, time-demanding administrative permission processes can be avoided.

(2) Resolution and coarseness - While NUTS3 statistical data can be useful for investigations on a pan-European scale, NUTS3 is generally too coarse for analysis of intra-regional and cross-border

²⁵ Other examples of studies making use of readily available data are: BBSR (2010): Metropolräume in Europa or Centre of Regional Science, Vienna UT (2007): Smart cities.

effects. We would urge that further efforts are made to ensure the provision of detailed statistics on communal, i.e. LAU2-level, so that local dynamics can be properly researched.

(3) Relationality - Since European integration is constantly intensifying, so is regional cross-border interlinking. In order to keep pace with the ongoing dynamics, data sets used in cross-border and trans-European spatial research have to include relational patterns, such as commuting patterns.

(4) Point-line data - Data as well as research frameworks should be flexible enough to include exact point or line data, where it can be obtained. In particular the data gaps at the detailed community level could be filled with alternative vector data sets, allowing for the investigation of small-scale border effects and dynamics.

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4 Science-policy interaction revisited

4.1 Methods supporting policy decisions and implementation

4.1.1 Calculating regionalised scenarios meeting Europe 2020 objectives²⁶

*Christian Lüer, Maria Toptsidou and Sabine Zillmer**

The Europe 2020 Strategy provides the framework for the design and development of European policies. It sets targets related to innovation, employment, climate change, education and poverty by means of eight quantitative indicators (cf. COM(2010) 2020 2010) and applies the means of parametric governance. This governance form is usually applied by policy stakeholders of higher levels who try to influence governance processes of lower levels. In order to do so, they define target values and indicate a concrete time horizon for achieving them. It is discussed in different policy fields, including e.g. spatial planning (cf. Dasí 2007; Fürst 2006; Schäfer 2007). These targets can be either input- or output- or outcome-related (cf. Cools, Fürst, Gnest 2003). The Europe 2020 Strategy is an example of outcome-related parametric governance, for which the target values aim at objectives that were formulated beforehand. These European targets, which are mainly based upon considerations of the European Commission, have been transferred to national targets that are formulated in the Member States' National Reform Programmes (NRP). Thus, they become more relevant and binding for regional and local stakeholders.

The targets of the Europe 2020 Strategy can only be met if stakeholders at local and regional level take the initiative for the targets' implementation. Regionalised scenarios are useful for illustrating possible regional development paths for achieving these targets. The presented approach shows by means of examples of Europe 2020 indicators how a range of the needed change may be calculated. This type of scenario building therefore helps to demonstrate the needed change to regional policy makers and to illustrate the different perspectives of policy makers at different territorial levels.

The first chapter introduces the methodological approach both from a theoretical perspective and an application example. Since this paper is based on a project dealing with the perspectives of German regions in the light of the Europe 2020 Strategy, the example depicts possible development paths of R&D expenditures in German NUTS1 regions aiming at the German target value. Afterwards, two scenarios for employment rates of all EU28 NUTS2 regions aiming at the overall target of the EU are presented. Furthermore, scenarios for NUTS2 regions aiming at their respective national target value were calculated for three countries. It is shown how future territorial patterns and disparities – assuming that targets are realised – may be affected by the NUTS2 regions' perspective meeting the EU or their respective national targets.

I. METHODOLOGICAL APPROACH

During the original project work, for all eight indicators of the Europe 2020 Strategy four scenarios were calculated for German NUTS1 regions in relation to German national targets as they are specified in the German NRP. These scenarios were subject to different assumptions concerning their future development across regions, varying from increased 'concentration' to increased territorial 'cohesion'. The applied approach in all scenarios, which assumes regionally differing contributions to the Europe 2020 Strategy, is in line with the European Commission. DG Regio points out that different regions should contribute in different ways instead of being obliged to hit the respective national target. For some regions the distance to national targets is too great and for some issues, due to territorial disparities, it is not desirable that all regions reach the same target (cf. European Commission 2011: 6).

²⁶ This paper is based on work carried out for the project 'Territorially differentiated implementation of the Europe 2020 Strategy in Germany' for the German Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR) in 2011/2012 (cf. BMVBS 2012).

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For simplicity reasons, the following focuses on the two most extreme scenarios, the ‘Concentration’ and the ‘Cohesion’ scenario. For the former it is assumed that strong regions will become even stronger. The Cohesion scenario implies that weaker regions will improve their performances as compared to stronger regions by 2020. The regional changes in each scenario sum up to the respective national or EU target. Each scenario calculation is based on relative and absolute figures of the respective indicator in order to weight regional contributions to the Europe 2020 target correctly. Each indicator is calculated simultaneously for all regions. This implies that each region’s predicted value for 2020 depends on its own and all other regions’ values in the base year as well as on the overall distance to the target.

For reducing the complexity of calculations, some additional assumptions are made:

- The territorial distribution of the reference values for the weighting of the regions is assumed to remain constant for the administrative units until 2020. Predicting and calculating these reference values for 2020 would have required territorially differentiated calculations for each region.
- Each region is supposed to contribute to the targets, even if the contribution may be very small. In other words: No region will change for the worse by 2020.
- While the respective target shall be met, each scenario is supposed to be possible to be achieved. Although the calculated values may be challenging, the upper end of the concentration and the lower end of the cohesion scenario is supposed to be feasible. The end values are based on expert knowledge, while considering the principal directions of the scenarios towards territorial cohesion or concentration.

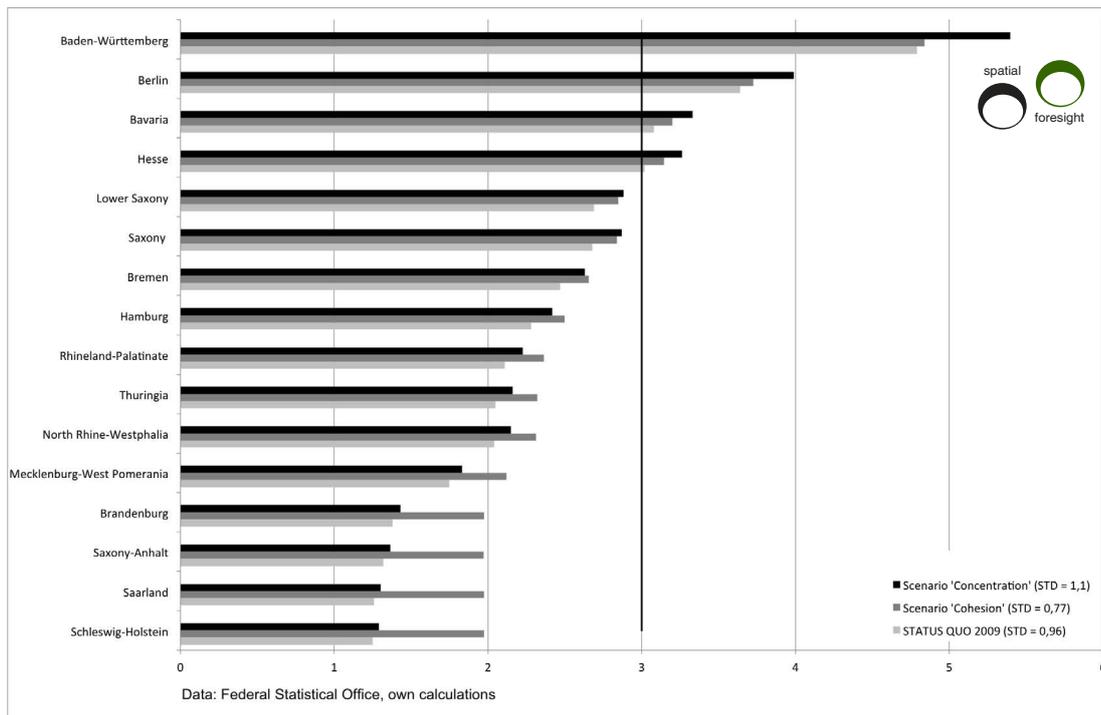
The innovative element of the selected approach is twofold. The first is linked to the assumption of an achievable spectrum of possible developments. Neither scenario is likely to occur in exactly the outlined way, yet it shows very different development paths. The second innovative element is the provided link between a concrete regional break down of Europe 2020 targets and the perspectives and implications of these for the regional level within a multilevel governance system.

II. SCENARIOS FOR R&D EXPENDITURE RATES IN GERMAN NUTS1 REGIONS BY 2020

The above-described methodology may be best illustrated by means of an example calculated for German NUTS1 regions. Since the Europe 2020 target for R&D expenditure is well known and no additional clarifications are necessary, the following example is based on the corresponding indicator ‘R&D expenditures as share of GDP’. As one of the smart growth targets of the Europe 2020 Strategy the EU aims at increasing R&D expenditures as share of GDP to 3 %. The national target formulated in the NRP for Germany is identical and specifies an additional target for increasing private R&D expenditures to 2/3 of all R&D expenditures (cf. Bundesministerium für Wirtschaft und Technologie 2012: 9). Figure 4.1 compares the 2009 status quo of the German NUTS1 regions with the calculated scenario values for 2020.

Zooming in the German pattern for 2009, a north-south-divide becomes apparent. Except for Berlin, only southern German states have already R&D quotas above the target value. For the ‘Concentration’ scenario, these states would have to increase their shares more than the states with the lowest current R&D expenditure quotas. In the ‘Cohesion’ scenario it is vice versa. In this scenario the necessary increase of the states at the lower end, however, would have to be comparatively higher than the increase of the strongest states in the ‘Concentration’ scenario. The increase of the four weakest states would have to amount to 0.60-0.73 percentage points, which matches growth rates of 43-58 %. In the ‘Concentration’ scenario, strong states like Bavaria, Baden-Württemberg, Berlin or Hesse would have to increase their shares by 0.24-0.61 percentage points, which matches growth rates of only 8-13 %. Therefore, in terms of the highest necessary regional contribution, the ‘Cohesion’ scenario seems to be more demanding and is probably more unlikely than the ‘Concentration’ scenario which only requires moderate relative increases.

Figure 4.1 R&D expenditures 2009&2020 (scenarios) in German NUTS1 regions [%]



III. SCENARIOS FOR EMPLOYMENT RATES IN EUROPEAN NUTS2 REGIONS BY 2020

The same approach as presented above maybe generalised for all EU regions. This is best illustrated by the employment rate as share of people aged 20-64, since regional data and national target information are better available than for other indicators.²⁷ In 2010 the employment rate differed between 43.7 % and 83.6 % in the EU28 NUTS2 regions. The corresponding 75 % target value of the Europe 2020 Strategy is to be achieved in both scenarios. In this case the scenarios are directly linked to the European target rather than national targets. Calculating the scenarios for national targets leads to different regional contributions. This results only partly from the fact that the sum of national targets in several cases is not sufficient for achieving the European target. In addition, scenarios for national targets mirror a different political perspective than scenarios for European targets.

The grey area in Figure 4.2 shows employment rates of all EU28 NUTS2 regions in 2010, ordered from the lowest to the highest value. While the black solid line indicates values for 2020 within a European 'Cohesion' scenario, the black dotted line indicates values within a European 'Concentration' scenario. Both scenarios refer to the EU target value of 75 % (horizontal grey solid line). The flagged dashed and dotted horizontal lines show respective national target values of the Bulgarian, German and Italian NRPs. The flagged circles show values of national 'Concentration' scenarios for NUTS2 regions of the above-mentioned countries. Likewise the European scenarios, the respective national target values are met in the national scenarios in 2020.

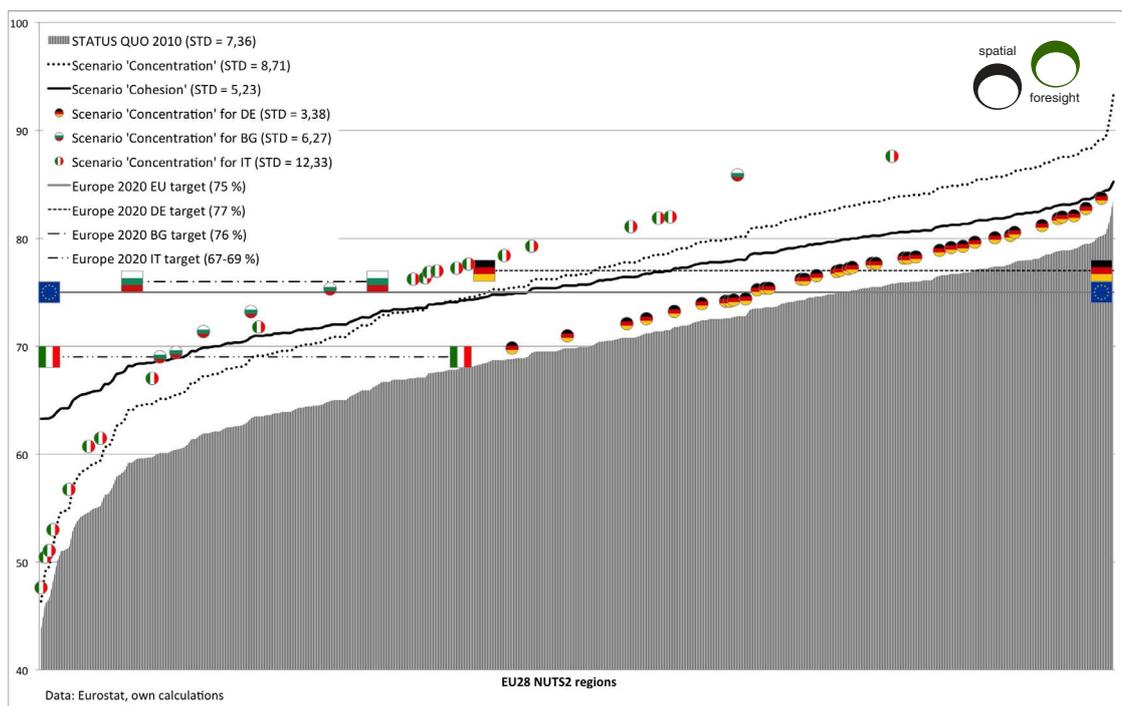
The two scenarios aiming at the European target show very different development paths for regions that have either very high or very low employment rates. While the 'Concentration' scenario requires increases of 3-10 percentage points, the 'Cohesion' scenario requires increases of 2-20 percentage points. At first glance, the 'Concentration' scenario therefore seems to be more likely. For this scenario, however, realistic increases of employment rates may be 'naturally' limited for the top regions.

²⁷ However, for six out of 272 NUTS2 regions (DE, IT, UK; two in each case) no population figures, which are also needed for the scenario calculations, were available for 2010 so that 2011 population figures were used to replace them.

For instance, the Top 5 regions already achieved employment rates of more than 80 % in 2010. The 'Cohesion' scenario requires much more efforts from weaker regions. As employment rates refer to 2010, disparities and problems in some of these regions have even changed for the worse due to the current financial and economic crisis.

As national and regional stakeholders focus on national target values of the NRPs rather than on EU targets, the following sections compare the scenarios aiming at the European target with scenarios for NUTS2 regions aiming for their respective national targets. For simplicity reasons, the latter focus on the national 'Concentration' scenarios only. The selected examples may illustrate different relations between European and national targets.

Figure 4.2 Employment rates 2010 & 2020 (scenarios) in EU28 NUTS2 regions [%]



As disparities are greater across Europe than in Germany, German regions have to make more efforts in scenarios that are aiming for the European target of 75 % than in scenarios that are aiming for the higher national target value of 77 %. This is even evident when comparing the EU-level 'Cohesion' scenario and the German 'Concentration' scenario, where the needed efforts of all German regions are lower in the national 'Concentration' scenario than in the EU-level 'Cohesion' scenario.

Bulgaria is an example for a country with a comparatively low national employment rate in 2010 (65 %). However, all regions would have to be above EU-level scenarios, for hitting the national target value of 76 %, which is thus very ambitious. In the national 'Concentration' scenario only one region reaches the national target value and therefore has to balance the values of all other regions. Thus, this region would have to achieve a higher employment rate than any German region in the German 'Concentration' scenario. Even those regions that remain below the Bulgarian target value would catch up with some German regions.

Italy is an example for a country with a low average employment rate (61 % in 2010), very wide disparities and an employment target below the European target (67-69 %)²⁸. Its national 'Concentration'

²⁸ For the scenario calculation the upper end of the target (69 %) has been assumed.

tion' scenario parallels the EU-level 'Concentration' scenario. Despite the currently low employment rate and target value for 2020, many Italian regions would catch up e.g. with German regions that are following their national 'Concentration' scenario. On the other hand, the 'Concentration' scenario would considerably and further deepen disparities in Italy.

The EU-level scenarios are based upon the assumption that every region's employment rate increase depends on both its own and all other regions' values. The national scenarios only focus on national target values and ignore NUTS2 regions from other countries. Provided that national and regional stakeholders succeed in meeting their respective national target values, the European picture could look rather different in 2020. This also creates doubts about how useful and realistic at least some national target values are. Especially the crisis has made it more difficult for weaker regions to reach the Europe 2020 targets due to reduced employment rates and increasing poverty and social exclusion (cf. European Commission 2013, 15). While the overall European target value seems to be somehow realistic for EU28 NUTS2 regions – at least in the 'Concentration' scenario (see above) – the national target values seem to be more inclined to reshape the EU and its regions: The examples show, how disparities between member states would decrease by 2020 and to what extent weak regions would have to catch up to achieve their national targets, thereby partially even out performing regions that were strong in 2010 and aiming at not very distanced national targets. Considering territorial cohesion, from a European perspective, low national targets of countries with high performing regions could therefore be even desirable. Focussing on a European 'Cohesion' scenario, on the other side, seems to be very ambitious especially for low performing regions, given the percentage points distances to be overcome. Overall, the comparisons of scenarios aiming at European and at national targets may give rise to reviewing future territorial perspectives of European regions. This may be helpful for European, national and sub-national discussions of policy makers and stakeholders – a discussion for which ESPON could provide substantial inputs.

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4.1.2 Researching in geography beyond the spatial planning, matching science, theory and practice

Maria Prezioso*

The participation of Economic Geography in public policies, in particular in European ones, highlights some scientific questions in relation to: 1) territorial diversity as the main factor for managing impacts and effects of the global crisis by offering endogenous and sustainable solutions; 2) the capacity of European policy to achieve these goals by means of general directives and common methodologies and procedures; 3) the potential of territorial dimensions to generate a competitive reaction to the crisis by translating general directives in endogenous place-based strategies and by applying a common planning methodology.

In particular, this paper will discuss some main issues:

- *In relation to a more economic development approach, what was the degree of inclusion of the territorial dimension (in terms of place based evidence and capability) within the policies aimed at competitiveness and sustainability (Lisbon/Gothenburg Strategy ex ante evaluation) in the European context before the crisis?*
- *In relation to a more integrated development approach, how the territorial diversity concept could be used to face the crisis and by what planning methods?*

The aim is to reflect also on the decision making process, on how to recover impacts of the crisis and the gap between the regional adaptive capability and goals of the competitiveness re-launch (Europe 2020 Strategy). The introduction in the planning practice of new concepts, terms and localised phenomena studied by ESPON applied research appears a useful way to integrate and update the current strategic plans in a European shared approach. However, the main issue is related to new planning methodologies which are able to achieve the objectives of the Territorial Agenda 2020.

I. TERRITORIAL DIMENSION IN DEVELOPMENT POLICIES

ESPON 2006 applied research focused mainly on boosting European competitiveness, sustainability and governance²⁹ by looking at the European position in the global market. In order to complete the achievement of the Lisbon Strategy goals before the crisis, this focus especially affected the 2013 programming period.

In all events, the findings of both ESPON 2006 and 2013³⁰ suggested that policy makers should take into account that the European position in the world was changing as a result of new globalisation challenges and of the new conditions of an aging workforce, energy risks, climate change, etc. (ESPON TIGER Project 2012). Secondly, new integrated spatial planning strategies and models would be required to deal with them.

In 2009 and because of the crisis explosion, the changing process towards more integrated spatial planning ended (Davoudi, Strange, 2009; Faludi, 2009) and countries looked for intervention on economic, financial and social aspects while maintaining the traditional separated sector policies, and above all concentrated their actions on macro-economic drivers without paying attention to the territorial dimension. The widely – debated theme of territorial diversity lost its main ability, both to stress values of territorial cohesion, sustainability, social inclusion at regional level and to create new and different forms of bottom-up competitiveness.

²⁹ Espo projects 2.3.2 (2007), 2.4.1 (2007), 3.2 (2007), 3.3 (2007), 3.4.1 (2007), 3.4.2 (2006). See: http://www.espon.eu/main/Menu_Projects/Menu_ESPON2006Projects/

³⁰ For ESPON 2013 projects referred in this contribution, see: http://www.espon.eu/main/Menu_Projects/Menu_AppliedResearch/ and http://www.espon.eu/main/Menu_Projects/Menu_TransnationalNetworkingActivities/

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Nevertheless this connection between territorial diversity, cohesion and competitiveness has already been pointed out by some economists: from Schumpeter (1954) - contrasting with the Keynesian vision - in relation to contents and categories acting in the field of macro-regional geo-economics in a period of crisis; to Porter (1990) with regard to the role of strategic localization and local demand in the micro-economic theories of enterprise agglomeration; or to Senn (1992) *in order to* design sustainable regional policies for employment.

The sustainability criteria erected pillars of development when Scott & Storper (2003) assumed that the regional scale (New Regionalism Theory) was the geographical basis of economic development, and the external economies are the necessary factors to make domestic businesses competitive. Cheshire & Gordon (1996) clearly speak of a 'territorial competition' phenomenon, which particularly affects the cities, and involves local policies for economic development.

A further aspect of the microeconomic analysis of competitiveness was related to the regional dimension of the phenomena, so it was attempted to establish which relations existed between competitiveness and its dimensions. Some contributions focused on the industrial district experience (Martin 2005; Jørgensen et al. 2006) and asserted how the peculiar characteristics of territorial systems can influence the employment and productive dynamics of the enterprises.

The reference to the local scale becomes important as it implies the idea that policies must be focused, before attracting international capital, on keeping a favourable environment for domestic business growth. As a result of these theoretical insights, the "territorial" competition phenomenon becomes the "objective" of the territorial policies which regions have to develop in a globalization context.

Several evolutionary and applied theories on sustainability present interesting suggestions for the development of territorial competitiveness in Europe. Among them, it is useful to mention the symbiosis and the ecological models that conceptualise the relationships between firms and natural environment.

Contrary to this approach, in the European Commission's vision, which is also supported by the Krugman (1995) and Kok (2004) analysis, internal and territorial factors appear less dominant on competitiveness performance, considering, within the theory of international exchange, the competitive behaviour exclusively related to the technological problem, the financial capital structure, the global financial pressure and the costs of a asymmetric information, etc.

This vision implies the adoption of the same "recipe" for all levels of policy action, from national to regional, simply by zooming in on a few indicators. A clear example is the policies implementation of the Strategy of Lisbon/Gothenburg, focusing specifically on the 14 Indicators of the "Spring Report" (European Council 2004).

In the context of ESPON research and in contrast with this simplification, starting from a critical review of the huge amount of literature on the Lisbon/Gothenburg Strategy, the use of 164 indicators has been proposed – organized into 4 main determinants³¹: Innovation&Research, Global/Local Interaction, Quality, Resource&Funds – to measure and to assess the territorial capability and sensitivity to achieve competitiveness in sustainability on a territorial cohesive basis at regional and sub-regional level in Europe (Prezioso 2006), compared to 2013 programming (Barca & Mc Cann 2011; Eurostat 2012).

Recommendations were made to policy makers to promote closer inter-dependence relations among economic and territorial (not spatial) variables according to different normative planning models. The inclusion of innovative tools and procedures, such as Territorial Impact Assessment at regional

³¹ Texting and making a critical review of the territorial capability and sensitivity with respect to 2013 policies and programmes to re-launch the competitiveness *in* sustainability on territorial cohesive base in Europe. See the indicators' introduction in the ESPON 3.3. project and its revisiting applied to the territorial cohesion (Prezioso, 2008).

level or Strategic Environmental Assessment at local level, was also suggested to directly innovate planning methodology.

Supported by some practical applications on plans³², all this work helped to complete the methodological revision which enabled the development of the Lisbon/Gothenburg Strategy in the European regions before the crisis, confirming the advantages of the adopted complex approach despite the resistance of the European Commission, which preferred simple and short-term solutions which were not related to territorial planning. The mainstream European line of thinking did not consider regional competitiveness as being something linked to the territorial capital and therefore exploitable only through the sustainable action of a plan. Subsequently, the design of the 2007-2013 Cohesion policy shows this approach.

Nevertheless, also thanks to the dissemination of ESPON results, new research in this field, which overcomes the concept of geographical space (understood as an indifferent and homogenous place), introduces territory (understood as a system of relationships between environmental, social, cultural and economic components) as a fundamental variable for each policy (Barca 2009).

However, faced with the crisis, this evolution does not seem to have influenced the strictly macro-economic requirements which are related to the reduction of public debt. This rigor has been coupled with the top-down offer of strategic empirical solutions by regional plans. International, national and regional trends are now interpreted in a different way, stressing the need to align the future cohesion policy to the Europe2020 aims, and to concentrate funds on the growth capabilities of the regions. The review of banking rules concerning territorial investments for entrepreneurship and the re-launching of employment, are a fundamental part of this Strategy.

Now in the face of this long-term crisis, a different approach in design cohesion development policies needs to be adopted. The economic dimension must be integrated within the territorial development plans. The contents and the forms of such plans would emerge as the consequence of sharing common critical thinking (by concepts, methods, tools, procedures, experiences, etc.). This revision of the spatial planning models (again rooted in functional and predictive town planning) should complete the European framework of structural reforms and should permit the adoption of measures which would not invalidate the efforts implemented by the European Union regions in the face of the 2007 – 2013 period of crisis.

The debated concept of territorial cohesion is fundamental for these innovative competitive planning models, which are oriented at developing the local capabilities, the well-being of citizens and the quality of life.

Critical thinking confirmed this connection as being useful to face the crisis (see for all: Rodriguez-Pose 2010; Faludi 2011; Prezioso 2013) and suggested acting on the added value offered by territorial diversity and its potential for development (territorial capital. Camagni 2009). Those studies warned against: i) “destructive and harmful” effects that a fiscal policy - unique and centralized, limited to the solution of problems within the EU - would have generated without a wider economic policy; ii) some effects of a regional development policy that did not understand the close relationship between cohesion and *aménagement du territoire* (Faludi, 2011). In this context, the need for “good governance” was quoted.

Realized in most cases thanks to the Structural Funds 2013, public investment choices have followed sectorial logic elaborated at national level instead of evaluating the territorial demand on different scales (infrastructure, innovation, energy, etc.). Filtered since 2009 by the European policy of fiscal restraint - sometimes even by the ideological short-sightedness of central and local governments - public investments have minimized the importance of existing resources in the regions, aiming

³² I.e. Metropolitan area of Rome case study in ESPON 1.1.2 project; Veneto and Marche Regions and Province of Gorizia in Italy, provinces of Magnesia and Fthiodita in Greece, North and centre-South Regions and Capodistria Municipality in Slovenia, Metropolitan City of Sophia in Bulgaria, Bratislava Municipality in Slovak Republic in Cadses project Poly.DEV.

indeed at the *re-concentration* of economic activities in these areas which are already equipped with the necessary framework conditions.

II. PLANNING APPROACHES TO DEVELOP DIVERSE TERRITORIES

“Geography matters” for those who believe that the crisis should be overcome in cohesive territorial terms (Faludi, 2011, p. 51) and not only in terms of debt, competitiveness and the weakness of European Institutions (Tirole 2012), changes need to be made to approaches to the development of policies and their contents within the plan. The adoption of instruments for recovering the negative territorial impacts of the crisis and the gap between the regional adaptive capability and the goals of competitiveness re-launch (Europe 2020 Strategy) seems unavoidable.

From the ESPON comparative analysis on the integrated planning strategies in Europe (ESPO INTERSTRAT 2012), first of all, it seems the plan should also be directed by several common European principles: subsidiarity, sustainability, competitiveness, cohesion and equalization and be able to implement them.

It should also work to connect different geographical scales, by managing ex ante analysis (status quo) and evaluation (impact assessment) by dedicated GIS and database (Inspire Directive 2011), and by looking at the maps as a form of control and communication.

Scientific approaches relative to the Territorial Impact Assessment (TIA) and the Strategy Environmental Assessment (SEA) of regional policy making (ESPO TIPTAP, ARTS and EIATIA projects) seems useful for obtaining a shared compliance and move towards full sustainability in different target - statistical and administrative – areas, even *if they no longer have a place* in the financial debate.

The offer of solutions for several policies now included in the 2020 Strategy (Energy, Climate Change, Demography, Global Economic Competition, Accessibility, Health, Social inclusion, Urban trends, CO2 reduction, Social inclusion, City renewal, etc.) and their integration into a plan should be considered as a fundamental basis of competitiveness.

Of course, the few indicators that are generally taken into consideration to assess the national and the regional ability to invest in growth, but also to measure the distance of those regions which are lagging behind the target-goals, are not sufficient.

ESPO Programme 2013 is supporting these scopes, i.e. studying urban mega-phenomena (ESPO FOCI 2010) and the role of medium-small cities (ESPO SGPTD 2012) and looking at their positive reaction when faced with the economic and financial crisis. Nevertheless its approach necessarily remains generalist and top-down, because the adopted methodologies are functional and are consistent for developing thematic objectives.

If we are to encourage the planning policy paradigm to progress through and towards cohesion and integration of Europe, new and more complex quali-quantitative measures are also needed. They should be able to take into account both the specific characteristics of EU member states (social, environmental cultural, economic, technological, and so on); and also the heritage and value (territorial capital) for the EU globally; by researching how they have to be harmonious – specially when referring to the development of the cohesion policy – and by testing them from the territorial point of view.

In order to build an alternative cohesion strategy, a different methodological approach must be adopted to provide the plan. This should be done by initially taking into account the localized measures of cohesion and its influence on the reactive behaviour of the territory to the planning offer.

Beyond the mere scientific conceptualization and theoretical suggestions, the main message that this methodology challenge would send to policy makers is that the study of the territorial system for planning begins (now!). It represents the initial balanced situation (historical synthesis of processes that the territory had before) and *the initial territorial sensitivity* that the responsible policy maker will

be able to have knowledge of and measure. It is the *Beginning Territorial Value* (BTV) for building the territorial competitiveness by planning.

As policy makers do not often know, actions of planning produce impacts and each territorial system receives them as external inputs to change. The system changes and reaches a new equilibrium position within the limits of its reproductive resources. If the changes go over these limits, the system changes itself into another and different system. The limits of system reproduction represent the territorial sustainability limit-value (*Final Territorial Value* - FTV).

The territorial carrying capability or the balanced match between cohesive demand and offer by the plan is the difference between two values (δ). As a result of this, the development paradox could emerge: the planning offer that would like to use more resources than those available does not produce development.

Economists, stakeholders, opinion leaders and European policy makers should adapt to this vision by looking at suitable solutions principally from a national and local point of view, without omitting to clarify the impact that choices on growth generate (even if they are smart) in the medium/long-term on European territorial dimensions.

From this point of view, we understand some difficulties both in suggesting recommendations and in formulating scenarios which could be immediately feasible at territorial level and in overcoming the “religion of numbers” (Stiglitz, Sen, Fitoussi 2009), which bring into discussion that part of the European Institutions – regions - that analyse social, environmental and economic trends in a strongly territorial way.

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4.1.3 A conceptual device for spreading (good) territorial governance in Europe

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I. INTRODUCTION

Is it possible to spread good territorial governance in Europe and, if so, in which ways can such aim be achieved? This paper presents a conceptual device, developed within the ESPON project TANGO (Territorial Approaches for New Governance), usable to manage the spread of examples or “features” of good territorial governance in Europe. It is worth clarifying that this paper does not face the issues of defining what is “good” in territorial governance, nor of what can or should be transferred in this complex domain; problems that the aforementioned research project has also met. It focuses rather on modalities of transfer, particularly on “paths and means” through which (good) territorial governance might pass from one place to another or others, and on their major strengths and weaknesses.

In order to achieve this aim *vis-à-vis* the well-known complexities of policy transfer (see, amongst others: Dolowitz & Marsh 1996, 2000; James & Lodge 2003), the proposed framework builds on the authors’ previous reflections about Europeanization of territorial governance (Cotella & Janin Rivolin 2010). This approach welcomes the assumption that, for institutional matters, policy transfer in the European Union (EU) and Europeanization are arguably two sides of the same coin (Wishlade et al. 2003). The EU is indeed an institutional context in which «the apparatus of policy diffusion and development has transnationalised in such a profound and irreversible way as to render anachronistic the notion of independent, “domestic” decision-making» (Peck 2011: 774). The institutional nature of territorial governance and of its changing is thus a fixed point of the proposed conceptual device: therefore, whereas potentially generalisable and adaptable to other institutional contexts, its application is here tailored on the EU’s context.

Overall, this proposal may cast further light on European territorial governance as an evolutionary process based on articulated forms of policy transfer between the EU and the Member States. It is relevant for policymaking insofar as it distinguishes various opportunities to spread good territorial governance in Europe, in-so-doing relating to the thematic objective “Enhancing institutional capacity” (11) within the EU Structural and Investment Funds (ESIF).

The following section (II) exposes the theoretical foundations of the conceptual device. Three further sections illustrate how this allows identifying respectively a *dialogic mode* (III), an *operational mode* (IV) and an *institutional mode* (V) for the spread of (good) territorial governance in Europe. A final section (VI) provides a short synopsis and some concluding remarks.

II. THEORETICAL FOUNDATIONS

There exist several definitions of territorial governance, supporting in general that it concerns the policy process driving the spatial organisation of social life. Belonging in nature to the domain of those artificial phenomena known as “institutions”, the genesis and development of territorial governance can be imagined – as for any institution – as a cyclical process of human trial and error based on «(i) first, the generation of variety (in particular, a variety of practices and rules); (ii) second, competition and reduction of the variety (of rules) via selection; (iii) third, propagation and some persistence of the solution (the system of rules) selected» (Moroni 2010: 279).

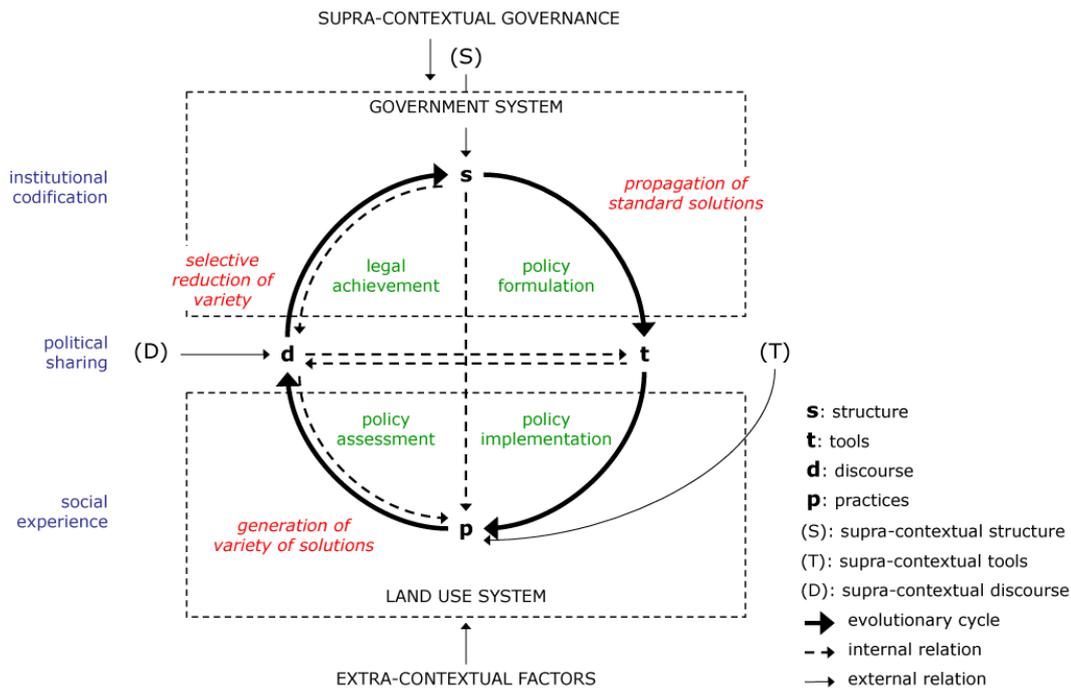
Applied in comparative spatial planning research, these concepts have led to the representation of a cyclical process that connects the “government system” with the “land use system” through the activity of *practices, discourse, structure* and *tools* of territorial governance in each institutional context (Figure 4.3). This “evolutionary cycle” of territorial governance, composed by recurring phases of policy formulation, implementation, assessment and possible legal achievement, appears

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to be intertwined with further internal and external relations, equally influent. There are thus different points of entry that may influence positively or negatively the process (either from top-down or bottom-up initiatives), which however remains in nature a process based on the “human trial and error” and on its collective elaboration, because it concerns institutionalisation.

Figure 4.3 Evolutionary cycle of territorial governance

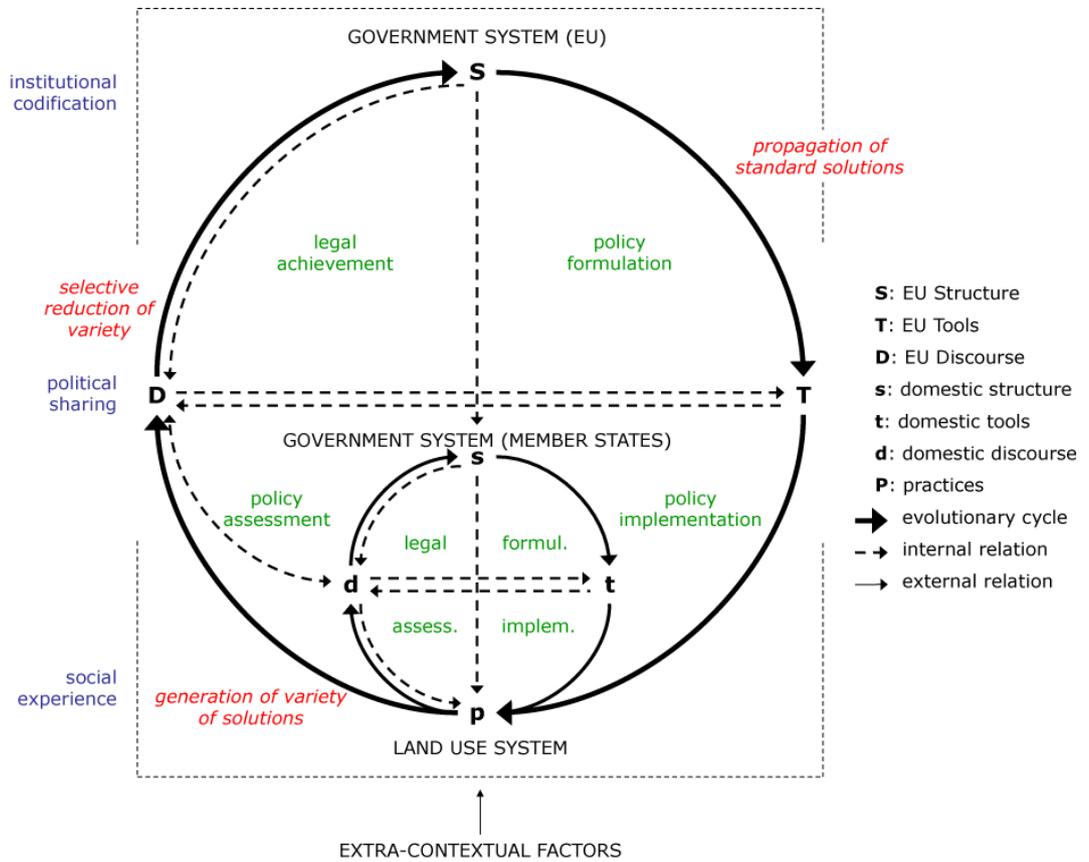


Source: Janin Rivolin, 2012 (adapted)

The EU institutional context is notoriously characterised by the simultaneous activity of one supra-national cycle (the EU) and various domestic cycles (as many as the EU Member States). European territorial governance should therefore be represented as simultaneously driven by: (a) territorial governance as it occurs in domestic domains; (b) EU-level territorial governance taking a similar form and “enveloping” all domestic domains; and (c) crucial relations between the two (Figure 4.4).

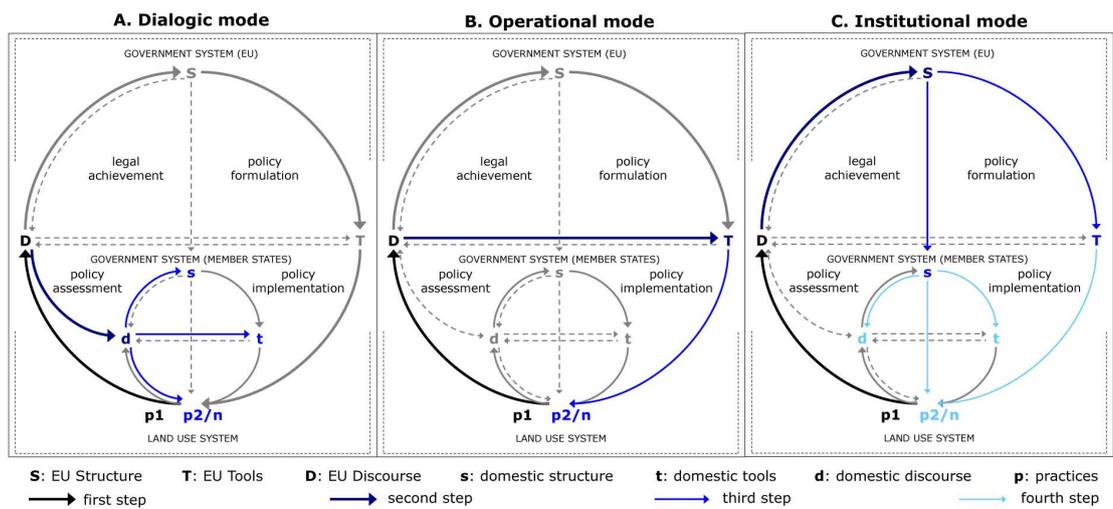
If the descriptive capacity of this diagram is accepted as reliable, the identification of modes for spreading examples or features of good territorial governance in Europe can be derived from the various “paths” that policy transfer is expected to take from a given “good practice” (p1, in a certain domestic context) to a new one replicated somewhere else (p2/n, in another or other domestic contexts). A first observation in this respect is that the initial step of these possible paths is anyhow directed from p(1) to D, that is from the supposed good practice to the “EU discourse”, i.e. the virtual place in which single social experiences are filtered and shared, via selection by policy assessment, in the form of ideas and proposals for good territorial governance at the EU level (e.g. the ESPON platform). This means that possible modes for spreading territorial governance in Europe are all pivoted on the activity of a EU discourse on territorial governance, more or less structured and coherent, and are distinguishable for the different paths that ideas and proposals can take from here in order to reach and influence other social experiences (p2/n). In particular, three distinct modes of spread are identifiable (Figure 4.5), as described in the following sections.

Figure 4.4 Evolutionary cycle of European territorial governance



Source: Cotella & Janin Rivolin, 2010 (adapted)

Figure 4.5 Modes for the spread of (good) territorial governance in Europe



III. DIALOGIC MODE OF TRANSFER

A *dialogic mode* for spreading good territorial governance initiates with the capacity of the EU discourse to influence one or more domestic discourses ($D \rightarrow d2/n$) and, from here, relevant practices in direct or indirect ways (i.e. via domestic tools or structure). This occurs when «in its “weakest” form, European policy [...] affects domestic arrangements [...] indirectly, namely by *altering the beliefs and expectations* of domestic actors. [...] Hence, the domestic impact of European policies is primarily based on a cognitive logic» (Knill & Lehmkuhl 1999: 2). This kind of “discursive integration” «can be successful when there are strong policy communities active at European and national levels and direct links between them» (Böhme 2002: III). Potential borrowers can therefore exploit this opportunity of importing new “components of exchange” (e.g. ideas, principles, philosophy; OECD 2001) depending on the actual level of integration of a domestic discourse ($d2/n$) with the EU discourse (D).

A direct declination of the dialogic mode concerns the transfer of features of good territorial governance from the discursive arenas into practices ($p2/n$). The plethora of bilateral or multilateral projects and mutual learning exchanges resulting from European territorial cooperation (cross-border, transnational and interregional programmes) are clear examples of this process. Domestic practices may be influenced also indirectly in a longer period, if domestic discourse is able to have an effect on domestic structure ($s2/n$) or tools ($t2/n$).

IV. OPERATIONAL MODE OF TRANSFER

An *operational mode* for spreading good territorial governance concerns the transfer of insights gained in the EU discourse into EU tools ($D \rightarrow T$), which are then capable of influencing practices in various domestic contexts. This mode is effective insofar as «European influence is confined to *altering domestic opportunity structures*, and hence the distribution of power and resources between domestic actors» (Knill & Lehmkuhl 1999: 1). In practice, features of good territorial governance can be translated into other kinds of components (e.g. methods, techniques, know-how), which are transferred rather “directly” to new potential experiences in various domestic contexts ($p2/n$) via economic conditionality.

One example is the EU establishment of Territorial Employment Pacts in 1997, based on the Italian experience of “Territorial Pacts” (Law 662/1996) that was developed since the early 1990s as a new means for the development of depressed areas. This led to the launch of 89 pilot actions in various EU countries, and later to a transfer of the approach into the mainstream of Structural Funds in 2000-06, with an influence on domestic practices in all EU countries. A similar example concerns the well-known initiative of Urban Pilot Projects (and later of the Urban Community Initiative), based on the French experience.

V. INSTITUTIONAL MODE OF TRANSFER

An *institutional mode* for spreading good territorial governance occurs when the EU discourse is codified within the EU structure ($D \rightarrow S$), inducing changes into domestic structures and, from here, to respective practices, or into EU tools with effects described in section IV. In this case, «European policy-making may trigger domestic change by prescribing concrete institutional requirements with which member states must comply; that is, EU policy “positively” prescribes an *institutional model* to which domestic arrangements have to be adjusted» (Knill & Lehmkuhl 1999: 1). This mode implies that features of good territorial governance are translated into further kinds of components (e.g. rules, codes and laws). Many local experiences may be reached this way through a longer but “enveloping” process of policy transfer, regarding an influence in terms of legal conditionality filtered by domestic structures ($s2/n$) plus a possible economic conditionality induced by EU tools (T).

An example of this may be the increasingly widespread adoption of the principle of “sustainable development” in territorial governance practices in Europe after the establishment of a series of EU directives (e.g. Habitat 92/43/CE, SEA 2001/42/CE). These have progressively transferred this principle via domestic structures, as well as EU Tools (Structural Funds programmes, Agenda 21 etc.).

VI. SYNOPSIS AND CONCLUSION

A comparison of the presented modes of transfer generally suggests that the *dialogic mode* occurs more “easily” than the others, because it tends to take shape in a voluntary way through processes of lesson drawing. This means also that it may be less “secure”, because its only constraints depend on the willingness to adopt the solution to borrow in the context in which it should be adopted. On the contrary, the *institutional mode* has the potential to produce the deepest and widest impact through rather coercive processes of policy transfer based both on legal and economic conditionality. Its occurrence is however very difficult, because the making of rules or codes with a universal value poses higher transaction costs (Alexander, 1992). Finally, the *operational mode* is relatively complex, but apparently the most direct in stimulating the emergence of new practices in several domestic contexts.

In the framework of the ESPON TANGO research project, the conceptual device here presented was helpful to structure a handbook for stakeholders (still in draft), insofar as it enabled – after some simplification – the successful distribution of messages to practitioners, policy makers and decision makers respectively. However, a deeper analysis of relationships between policies/actions and their specific place-based characteristics might improve the understanding of processes of “filtering out” and “in”, assisting in how the features of good territorial governance can be extrapolated from one context and taken on board in another.

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4.2 Approaches to support participatory processes

4.2.1 Strengthen the capacity of citizen participation in urban projects

*Dominique Lancrenon**, *Bruno Clerbaux#*, and *Ignacio Peman‡*

I. INTRODUCTION

The concept of quality of life in European cities and regions is essential for the future of Europe. Territorial cohesion is achieved when there is consent amongst the citizens over the development of their living environment. Planners of the ECTP-CEU (2013) have committed to this ideal and expressed it in the publication of the Charter of European Planning.

Participation requires practical tools that can command popular support. Today, the citizen's real-life experience is often ignored by politicians who are meant to represent the "public interest". Too often, the public interest appears to be imposed from the top, and at odds with the will of the people. This gap is a source of exasperation and suspicion about the honesty of politicians in their role as public representatives, and causes disaffection about the value of participation in democratic elections, whether at local or national level.

In urban morphology, this shift is evident in the choice of urban projects that meet so-called "sustainable development" criteria, yet in fact do not seem to really respond to people's expectations. Sometimes such projects are directly opposed by members of the community, who denounce the notions of "density" and "concrete" and reject modern architectural forms, which are considered too "cubic", while more "neo-classical" architectural forms appear more acceptable.

René Schoonbrodt wrote *"Rebuilding urbanity is essentially to fashion or recreate a form of urban governance able to produce and manage, with the greatest possible autonomy, forms of the city and its social, economic, cultural functions, so that its residents enjoy the freedom that makes the city."* In French: "Reconstruire l'urbanité est essentiellement mettre ou remettre en place un pouvoir urbain capable de produire ou de gérer, avec le plus d'autonomie possible, les formes de la ville et ses fonctions sociales, culturelles, économiques, afin que ses habitants jouissent de la liberté que donne la ville."

This search for freedom in the city is an essential point for sustainable development, and the way it is built in cooperation with residents. This quest for freedom and sustainable development asks questions of planners. Within the framework of the Charter of European Planning, participation is seen as a fundamental part of the development project to which planners are committed. Planners need to develop tools that enable a collaborative approach to make citizen participation a highlight of local democracy. This requires a redefinition of the concept of "common goods" compared to the "public interest" for today's world where citizens using internet technologies can form more independent networks to meet their needs outside of the traditional institutional and commercial channels.

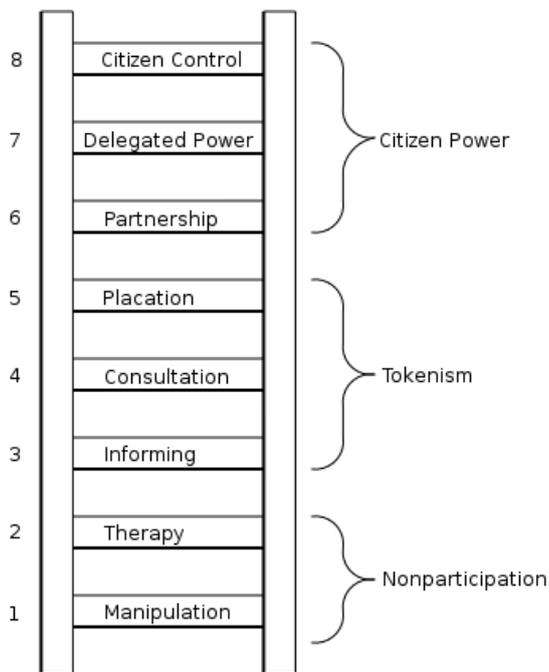
The habitat of people is the most critical topic for all, both in terms of the economic resources required to provide and maintain it, and in terms of development opportunities related to housing conditions. If we can provide the possibility for all to be involved in its definition, there is a tremendous opportunity to improve their living conditions by including it in a collective project. (Jean Viard – *La Grande Métamorphose*).

Arnstein (1969) set out a "ladder" of participation that can still be used to analyse how much power is actually being passed to citizens. This is reproduced as Figure 4.6.

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ECTP-CEU Secretary General 2005-2013

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Figure 4.6 Typology of eight levels of participation proposed by Sherry Arnstein, 1969

This belief that participation should get beyond tokenism, and become a collaborative process is explored in our research which is based on case studies in three different European countries: Belgium, France and Spain. In Belgium, the case study is the “Tour et Taxis” district, a derelict area along the canal in the north of Brussels with old factories from the XIXth century. The district has been transformed and gentrification is in progress. The City Region of Brussels has a strong policy on gentrification and social mix as well as on participation processes. The district contracts established some 20 years ago have made it possible to avoid social conflict and have helped to develop social heterogeneity and inclusion. The development of sustainable districts is supported by a specific methodology “the Vade Mecum of a sustainable district”. Public participation has been central for 50 years, with a huge network of associations and researchers (ARAU³³, IEB³⁴, Brussels Studies Institute³⁵) that address the current situation of demographic growth and high demand for housing and facilities.

In France, the case study is the renewal of a District in Seine St Denis, east of Paris, in Bondy, where transportation projects will open up new opportunities for development. This area is again along a canal, and an old industrial area. The process of participation here is focused on developing an eco-district, mostly with the population of the city. The project is at an early stage of definition. Initially, the case study chosen for France was the basis for the exploration of ideas that were subject to collective reflection. The characteristics discerned through this case study then needed to be reconsidered to take account of the specific cultural and physical contexts of each territory.

In Spain, the case study is about community gardens and participatory planning at neighbourhood scale. In the last six years, community gardens have appeared in most cities of Spain (e.g. Madrid, Barcelona, Valencia), and specifically Vitoria provides a very interesting example. This new use of public spaces in urban and peri-urban areas has been strongly linked to neighbourhood participation. In big cities these kind of initiatives of “micro-urbanism” have not only made it possible to

³³ ARAU: Atelier de Recherche et d'Action Urbaines, Brussels

³⁴ IEB : Inter Environnement Bruxelles : fédération of 80 neighboured associations

³⁵ Brussels Studies Institute: The mission of the BSI is to nurture and facilitate research on Brussels by fostering the cross pollination of ideas and research interests and by developing integrated (inter-university & interdisciplinary) research projects.

recover derelict spaces and abandoned peri-urban spaces, but have also been a catalyst for residents' participation in the future of these areas.

II. THE CONCEPT OF THE COMMON GOOD IN TERMS OF THE SCALE OF THE PROJECT

Before discussing the case studies we need to recognise that the characteristics and qualities of any urban project can be analysed at different scales. Alternatives for development need to be subject to debate and participation that must also take account of different scales. What are the common properties shared by: 3,000 inhabitants in my neighbourhood of whom 1000 are active; the 500 inhabitants and 200 activists who live within 5 minutes walk from my house; the 200 inhabitants and 70 active people within my district; and the 50 people of whom 20 are active from my immediate vicinity?

Thus we adopt a first distinction between four scales of the project, and all are relevant for any participation process:

- a. The sustainable neighbourhood is an area of mixed uses, a location of employment as well as housing. Its size might be between 800 and 1000 houses, to which are added between 800 and 1,000 jobs. The neighbourhood may be inhabited by 2,000-3,000 people and grow from 150,000 to 200,000 m² of space.
- b. The macro district lies within the neighbourhood, and is an area that is accessible within 5 minutes walking distance from any point, or a distance of about 300 to 350 meters.
- c. The district is defined with respect to private property and its plot is surrounded by public routes in which access to urban services is organized: circulation networks and water supply, electricity distribution, sanitation, communication, and energy supply
- d. The neighbourhood or hyper-proximity is the area 20 to 40 meters from the house, which particularly provides access to bicycle parking, waste sorting, and mail distribution.

An urban project embodies these different levels. Participation is more likely to succeed if the different levels can be understood and discussed by the inhabitants of the city and territory concerned, and more broadly by all potential users who arrive there to use the living environment, jobs, services and activities. The scale of the two cases studies of "Tours et Taxis" and of Eco-quartier of Canal de Bondy are similar to that of the sustainable neighbourhood.

The Spanish case study of participatory planning in community gardens is at a different scale, from hyper-proximity to the neighbourhood. It is a more bottom-up process: rather than a reaction to consultation initiated from above, it is driven by real local demand.

III. EXPLORATION OF THE PROCESS OF PARTICIPATION IN THE 3 CASE STUDIES: WHICH SCALE AND WHICH COMMON GOODS ASSIST IN THE PARTICIPATORY PROCESS?

Through the three case studies, we review the interest of stakeholders in the co-construction of urban projects, as citizen engagement enhances the possibilities for collaboration in economic, social and cultural terms. We discuss whether the common goods are related to urban morphologies, and analyse how the contributions of the future stakeholders of the project are able to influence the choice of urban morphology. The main challenge for local governance is to build working groups with the people who will be living in the project's district. Often stakeholder associations need to play an intermediary role before the future inhabitants can really be involved in the process.

In Brussels "Yota!" with Caroline Claus³⁶ organised the participatory process with young people and children who make up 30 % of the population of the neighbouring districts. Sports fields and games,

³⁶ Member of YOTA association for participatory process with young people.

as well as green spaces, are essential to the quality of life in a densely populated city. But this is precisely what is missing in the neighbouring districts of “Tours et Taxis”, and indeed in all central areas of the Canal Zone. However, this part of Brussels houses a large number of young people, and the population density is very high, while private green spaces are scarce or non-existent. Moreover, the through traffic and parked cars further reduce the space that could serve for areas for informal games. Is it therefore surprising that a large proportion of the inhabitants of these areas place high expectations on securing such amenities in the neighbouring site of “Tours et Taxis”?

The manifesto “Tours et Taxis: TouT Publiek” published in 2006 put forward for the first time, and in a loud voice, the demand for parks and playgrounds on this site. This “manifesto” – a priority list drafted by the residents of “Tours et Taxis” – was the result of a consultation process coordinated by Bral³⁷ which aimed to involve as many people as possible in the blueprint that the region was developing.

A very explicit proposal was issued in the manifesto: “Give us a park of 10 hectares which will serve as a structural axis for development of subsequent sites.” The primary demand was for a park, then buildings. To the greatest joy of all, this request was included in the master plan.

Today the first phase of development of the park has started, and it greatly benefits from the strong participation of residents. The residents and Brussels as a whole have been waiting for more than five years for the entire site to be opened with the completion of the park.

Figure 4.7 The site of the case study “Tours et Taxis”, Brussels, and designs for the urban project



³⁸ BRAL Brusselse Raad voor het Leefmilieu.

In Bondy, the associations involved in the participation process are “Ville et Avenir” and “le Lien”. The objectives of the project are:

- The opening up of the area through a network of “soft” internal transport links;
- Economic regeneration;
- A quality of life for all, supported by an urban project that is environmentally responsible;
- The creation of a mixed-use neighbourhood with shops, good houses and social infrastructure;
- The opening of the city to the canal, and the creation of shared public space which will be located near a public facility.

The main proposals arising from consultations were about

1. the improvement of the transportation system;
2. the opening of a green area along the canal, with concerns to ensure security and a good pedestrian environment;
3. the reduction of pollution in the area, where gas and noise have been problems.

Figure 4.8 The case study Bondy, France: Site, designs and process



In Spain, urban gardens began to emerge about six years ago, but they have really bloomed in the period since 2011. In the Madrid region alone there are more than twenty, managed by neighbourhood associations, universities, environmental groups and the Madrid city government. Many neighbourhood assemblies, derived from the 15M movement which has been pressing for more participative democracy since major protests erupted on May 15, 2011, are joining forces with community associations to multiply the number of vegetable gardens.

“The main thing is that we have autonomy to manage the garden. It is pure participative democracy,” is the claim made by people involved. Some 15 people around the age of 30 participate directly in the work and assemblies of El Caminito³⁸, but more people are linked to it, including children and elderly people. Fernández of FRAVM³⁹ said that they are trying to put the community gardens on a legal footing, as 85 percent of them are outside the law. In these cases vacant lots, usually unused public spaces, have been occupied, or the plots are loaned on a “very precarious, tenuous” footing. He called for public institutions to organise a legal framework for the vegetable gardens, and said urban planners should take them into account in the same way as green areas and other city spaces.

“Urban gardens not only recover unused spaces, but are also meeting places and open air social centres that promote values,” he said. In his view, city authorities are not opposed to community gardens, but “lack political will” and “are afraid” that the citizens’ movement may be strengthened in the process. The vegetable gardens seem to catalyse the creation of self-managed neighbourhood cooperatives and consumer groups.

IV. CONCLUSION

The comparison between the three case studies shows the importance and priority of collective participation in public spaces, whether the evolutionary Metamorphose park in “Tours et Taxis”, the opening of the canal walks in Bondy or the community gardens in Spain. What level does each of the three examples reach in Arnstein’s ladder of participation?

The Spanish community gardens are spontaneous and inherently collaborative, a form of direct action that amounts to “Citizen control”. However, the lack of a legal basis for many of the gardens makes the degree of control fragile, and maybe temporary.

In contrast, the Brussels case is more a form of “partnership”. The residents do not control the development process; rather their involvement is mediated by local associations. “Co-production” was not a priority focus for this urban project, but the involvement of residents has a long history (and so some legitimacy) and there are well established support organisations. Though not reaching as high on Arnstein’s ladder as the community gardens examples, this may prove to be a more durable form of participation with more sustainable outcomes.

The Bondy example is similar to the one in Brussels, though arguably at an earlier stage, making it more difficult to place on the rungs of Arnstein’s ladder. It could become “partnership”, but might remain only as “consultation”.

We propose to develop the analysis and report further. At this stage we have three findings. First, that Arnstein’s ladder remains useful as a way of distinguishing approaches to public involvement. However, it needs to be used with caution. “Citizen control” may be more achievable in smaller scale developments than in neighbourhood scale projects. It may also be more difficult to sustain than “partnership”, unless legislative support is provided. To imply that “partnership” is less desirable than “citizen control”, as the ladder analogy does, may need rethinking.

Second, and linked to this first point, the form of citizen involvement in any situation is shaped by local history, culture and development conditions. The Spanish actions were triggered by the crisis

³⁸ Name of the community garden.

³⁹ Member of Federación Regional de Asociaciones Vecinales de Madrid.

and the 15 May 2011 calls for change. In contrast, the Brussels practices build on much longer traditions and established local organisational networks. Arnstein's ladder does not address such specificities.

Finally, we note the importance of urban public space as the uniting focus for actions in all three case studies. By recognising the centrality of space to everyday lives and sustainable development, and then the ways in which local residents seek to influence and control such spaces, we hope to enable people and stakeholders in an area to discuss the common public space and to share services and pool potential ideas. In this way we aim to share ownership of the project and its evolution at different scales and in time, for its implementation and development. The use of the 4 scales, sustainable neighbourhood, macro districts, district and hyper proximity crossed with the scale of Arnstein's ladder of participation and the insights from our research may be a way to develop contested places through a participatory process.

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4.2.2 The Delphi method in ESPON: State of the art, innovations and thoughts for future developments

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I. INTRODUCTION

The second ESPON programme puts emphasis on the usability of “territorial evidence” by practitioners (Dürr et al. 2010: 248). The Priority 2 “Targeted analysis based on user demand” is par excellence the institutionalised form of exchange between researchers and practitioners (Hague 2008). This shift towards the users’ needs (“stakeholders”) may give them different positions concomitantly. In the framework of the Priority 2, users may be involved in a project’s specification, implementation and follow-up. Researchers can also solicit them as sources of information for data collection, investigation of policy discourses and concepts or also for strategy building. Dissemination and capitalization strategies are also designed for their benefit. This multi-faceted exchange should give benefits to both sides. Policy makers can receive answers to some of their questions. At the same time, researchers can investigate key concepts thanks to the stakeholders’ availability. Yet, the close interaction between stakeholders and researchers raises crucial conceptual questions that would need more than one contribution to be elucidated. They also raise important methodological questions and especially how to frame this continuous dialogue. Over the last years, the Delphi method proved to be a useful tool both to frame exchanges with stakeholders solicited as experts in specific policy fields and to support dissemination strategies. The Delphi method has been used either to operationalise the analysis of a concept (territorial governance in TANGO) or to feed a strategy-building process (Metroborder) or even to investigate policy options (USESAPON). This paper will briefly sketch how the method has been operationalised in the ESPON context so far. Drawing on the experience gathered in the Metroborder and USESAPON projects, the paper will then investigate some methodological innovations introduced through the Delphi method into the ESPON context. Finally, it will delineate some paths for future implementations especially in the ESPON context.

II. STATE OF THE ART

The Delphi method is more than 50 years old. It has been used so often in so many ways that some scholars speak about “Delphi techniques” (Rowe & Wright 2011). Before focusing on its applications in the ESPON context, we shall summarise some of the main characteristics of this method. This method was originally used to improve the understanding of a problem when limited knowledge and data is available. Very schematically, the method has been developed for three purposes: to forecast, to facilitate decision-making (“policy Delphi”) or to reach a consensus among stakeholders. How does it work? A group of experts is consulted through an iterative process through questionnaires. Responses are analysed and filtered throughout the process by a research team acting as a “neutral facilitator” (Linstone & Turoff, 1975). Based on the filtered results of the previous round, experts then have the opportunity to reconsider, deepen and/or to explain more fully their assessments. Anonymity is a crucial element allowing exchange between stakeholders without bias such as can come from the dominance of some experts (Cuhls). This technique is particularly flexible and can be combined with numerous other methods (e.g. scenario planning, focus group, interviews; Landetta et al 2011).

In the ESPON context, four Delphi studies answered diverse research questions (Table 4.1). The 1.3.1 project conducted in the framework of the first ESPON programme (2002-2006) has been the most quantitative survey until now. It was used to investigate how natural and technological hazards affect European climate (ESPON 1.3.1 2006). A policy Delphi has investigated cross-border governance in two case studies at sub-national level (ESPON Metroborder 2010). In the USESAPON capitalization project, priorities for future structural funds programmes in the field of research and innovation have been investigated. The definition and measurement of territorial governance has also been refined through a Delphi study (ESPON/TANGO 2013).

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Table 4.1 Implementation of the Delphi method in ESPON projects

	1.3.1 project <i>Natural and technological hazards in Europe</i>	METROBORDER <i>Cross-border polycentric metropolitan regions</i>	USESPOON <i>Use of ESPON</i>	TANGO <i>Territorial governance</i>
Frame	Thematic project (ESPON 2006), released in 2006	Priority 2, released in 2010	Priority 4, to be released in March 2014	Priority 1, to be released in Dec. 2013
Objective	Develop an integrated picture of hazards in Europe: “Consensus driven” Delphi	Define possible paths for the future of cross-border governance in the Greater Region and in the Upper Rhine: “Policy Delphi”	Develop priorities for the implementation of structural funds in the field of research and innovation in Luxembourg: “Consensus driven”	Deepen and concretise definition and indicators to the territorial governance concept: “Consensus driven”
Main features	– 3 rounds – Mainly quantitative	– 2 rounds conducted in 2 case studies – Quantitative and qualitative	– 2 rounds (1 group discussion & 1 questionnaire) – Qualitative	– 2 questionnaires – Quantitative and qualitative
Expert	16 climate change experts having a European perspective	119 experts in the Greater Region 89 in the Upper Rhine (mix of elected representatives, civil servants and civil society)	11 experts (mix of structural funds experts, civil servants involved in innovation sector and researchers)	Wide range of European experts (“ESPON community”)
Research added-value	Integrated map on natural hazards	Governance analysis of two cross-border regions	–	Definition & indicators of territorial governance
Outreach added-value	Final report comprising an integrated hazard map	Final report proposing strategies for building a “cross-border polycentric metropolitan region” (accepted and currently partially implemented in the Greater Region).	<i>Currently in development (expectation: use ESPON results in setting-up priorities for 2014-2020 operational programmes)</i>	<i>Currently in development (expectation: use of the definition and indicators to measure territorial governance at EU level)</i>

The Delphi method has been operationalized for multiple purposes. When the method is mainly used for research purposes (Metroborder and TANGO), results can also assist the dissemination process by making it seem less abstract to the practitioners. The user-oriented approach put into question both the ability to frame stakeholders’ inputs with a methodology and the capacity to set-up channels for disseminating activities. Based on the experience gathered in the Metroborder and USESPON projects, we shall focus in the next section on examples dealing with these challenges.

III. METHODOLOGICAL INNOVATIONS INTRODUCED BY THE DELPHI METHOD IN THE ESPON CONTEXT

Investigating the cross-border space with a Delphi study

Maps are powerful tools to grasp some facets of reality. One of ESPON’s achievements is undoubtedly the cartography of spatial trends affecting the “ESPON space”. In the ESPON context, maps have been used essentially to represent quantitative information for descriptive or analytical purposes. In light of

the user-oriented approach, the Delphi method can both give an input to stakeholders' decision-making processes and facilitate the investigation of the construction of space. The participative approach and the iterative process of the Delphi are coupled with a GIS to support the delimitation of an area (so-called "Collaborative Spatial Delphi" or "spatial Delphi", Vargas-Moreno 2008). In the Metroborder project, experts in two border regions were invited to tick check boxes to indicate on which area the cross-border cooperation should be emphasised (ESPON/Metroborder 2010). Following the logic of "pooled territory", cross-border space is usually defined and represented as the sum of each institutional partner's "territory" (Mamadouh 2001; Chilla 2013; Chilla et al. 2012). As a result of this very preliminary spatial Delphi, another cross-border space appears next to the institutional perimeter. For researchers, this allows a conceptualization on the construction of space (ESPON/Metroborder 2010; Evrard 2013). It also illustrates how cross-border space is perceived and defined by individual policy makers. For policy makers, this result puts into question if and how common projects should focus on this space. This result, which was simply a synthesis of policy makers' individual representations, provided another picture than the cross-border perimeter they were used to. The individual representation of space is confronted by a common aggregated representation. The main output of this question was to help policy makers visualise the cross-border cooperation area through another angle that the usual institutional perimeter would have allowed. It establishes a direct and visual link between discourses describing a perceived reality and the strategy policy makers tend to embed in space. The results of this map, as well as the other results of the project, have been gathered into a synthesis map (ESPON/Metroborder 2010: 13) that now serves as a reference in the negotiation undertaken for a common cross-border strategy in the Greater Region (Evrard 2013; Sommet de la Grande Région 2013).

In the ESPON context, the spatial Delphi might be a useful tool. It allows embedding of "spatial thinking and discursive strategies into participatory processes" (Balram et al, 2003). As a result, it may feed both researchers' investigation of the construction processes of space and policy makers' strategy building. At the same time, this methodological framework tends to bring stakeholders and researchers together. This proximity can mainly be mediated through the transparency of the research process. It is crucial that both sides are aware of the research protocol and aim, as well as of the expected results. The objectivity of the research team is another crucial aspect.

Working up priorities for future operational programmes in the field of research and innovation

"Capitalisation", a new priority under the ESPON 2007-2014 programme, is a consequence of the user-oriented approach. The ESPON Coordination Unit and the ESPON contact points (ECPs) are the main institutions undertaking it. It differs from dissemination insofar as the aim is to meet the audience's needs, rather than to deliver facts and trends. It reflects the intention to communicate ESPON results by a bottom-up approach. ECPs face the challenge to "bridge the gap" between information delivered at European level and local, regional, national concerns. If most of the stakeholders show interest in ESPON results, very few of them use the results in their daily work. The Delphi method can offer some support to bridge this gap and help develop a sense of ownership on the practitioners' side.

The negotiation of priorities for the future operational programmes (OPs) has arrived at a key moment: EU2020 goals are being made more specific through priorities. The ECP Luxembourg launched a reflection process with experts involved in setting-up operational programmes. Focusing on research and innovation, this process involved experts from this field and followed a Delphi technique. To fit with the objectives of the initiative, some methodological adaptations were made to the Delphi. First of all, the rounds were designed with a twofold aim. ESPON information was provided to the experts beforehand, to give them time to reflect on its usability and relevance. Second, the participants' expertise was complementary. This initiative was also taken as an opportunity to set up a platform for common reflection and networking outside of pre-existing working groups. In a preliminary step, stakeholders received a six page document ("support material") presenting the main outcomes of ESPON results for Luxembourg (available at usespon.eu). No feedback was sought, so this stage cannot be considered as a "round". The first round took the form of a 4-hour workshop during which experts were invited firstly to evaluate the relevance of the results according to their own experience, and if necessary to complement them with supplementary sources. On this basis, they secondly sketched out priorities on which the structural funds could be operationalized. After the workshop, a synthesis and first reflection on the results was undertaken and sent out with further questions inviting the experts to deepen and develop their approach (second round). The results of the process

were processed, analyzed and sent out for final input into the operationalization of the structural funds programmes. Two main adaptations to the original Delphi method have been implemented: the process was only partially anonymous. The interactions made it possible to generate and share a lot of information. Experts could learn from each other. At the same time, the second round in form of a questionnaire was crucial, as new elements came out in particular thanks to the anonymity. Second, in contrast to most of the Delphi studies, ESPON results were used to feed the process from the beginning until the end. Usually, the Delphi is mainly based upon the experts' own knowledge.

This method proved to be an interesting way to create a sense of ownership of the results among stakeholders. It made it possible to bridge the gap between results that might seem abstract and the practitioners' concrete needs. This was achieved because this process was conceived as a platform for the exchange of information and experience. From a researcher's point of view, allowing for the methodological adaptations, this type of capitalization activity might be relevant to investigate how policy is being shaped between stakeholders. More than for the operationalization presented earlier, this application of the Delphi method faced the particular challenge of being time consuming not only for the research team but also for the experts. This element makes the choice of the panel of experts even more difficult than in other Delphi studies. Experts can mainly be technicians and civil servants specialized in a specific field and interested in widening their knowledge.

IV. THOUGHTS FOR FUTURE DEVELOPMENTS

Based on the previous experience, one can summarise the added value of this technique in the context of ESPON and draw some thoughts for future developments.

Table 4.2 Thoughts for further implementation of the Delphi method in the ESPON programme

Main added-value of the Delphi method	Specificities of the ESPON framework	Thoughts for future applications
Support the development of future-oriented options	Work on scenarios mainly with macro-economic models	The Delphi method could be used to bring a qualitative dimension into forecasting projects
Participatory approach, creates a sense of ownership of the results	User-oriented approach for research projects & dissemination strategies	Could be used in "targeted analysis projects" to deal with lack of data at local level Capitalization strategies
Based on experts' assumptions	Mainly quantitative projects	Could counterbalance the quantitative methods usually implemented in ESPON and investigate other fields of research (e.g. governance, societal issues). In this context, it could facilitate interdisciplinary research projects.
"Collaborative spatial Delphi" (CSD)	Mainly quantitative research providing spatialised information	At local/regional level, developing CSD could be of interest for stakeholders

V. CONCLUSION

The Delphi method has proved to be very useful to investigate contexts where uncertainty plays a major role. In the ESPON context, it is especially useful as it can create a bridge between stakeholders and researchers. From the researchers' side, it offers a framework to confront an analysis with practitioners' assumptions. From the practitioners' point of view, it provides a framework for feedback and thus creates a sense of ownership of the results, which may facilitate the dissemination of the results. At the same

time, it could support the development of new research avenues for the ESPON programme, particularly taking into account a more qualitative approach or reinforcing a spatialised approach through the CSD.

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4.2.3 Qualitative method and territorial performance monitoring of macro-challenges: an integrated perspective

*Loris Servillo**

I. INTRODUCTION: SPATIAL CHALLENGES, RESILIENCE, AN INTEGRATED PERSPECTIVE AND TRANS-DISCIPLINARITY

Some ESPON projects (ESPON 2006; Lennert et al., 2012) have provided evidence about the complex interdependencies between regional dynamics and world-wide challenges, in particular climate change, energy provision, demographic trends and globalization which were considered as prominent issues with potential effects on spatial structures and dynamics. However, what emerges is that, even if there is a growing agreement that these challenges are important, it is not always clear in which ways macro-dynamics impact at the regional level and what regions can do about them. The ESPON project “Territorial Performance Monitoring” (TPM) (Lennert et al., 2011; 2012) has shown that the competences necessary to act directly – and coherently – through an integrated perspective on spatial dynamics are lacking.

The challenge seems to be the capacity to understand and to monitor the different consequences at regional level and so to adopt proper policy measures. This implies a reconsideration of mainstream approaches in regional policy making. Territorial governance processes should use general aims (sustainability, territorial cohesion) to frame spatial changes in an integrated manner, in order to cope coherently with the complexity of internal and external driving forces.

Resilience of territories refers to the ability of cities and regions to recover from shock events and disturbance in general, e.g. dealing with climate change or flood risks. There are several interpretations and approaches to “resilience”: The term is even at risk of becoming a ‘vacuous buzzword’. Recent overviews (Davoudi, 2012; 2013) however have highlighted three distinct perspectives on resilience (engineering, ecological, and evolutionary). In particular the latter indicates the idea that fostering resilience involves planning for not only recovery from shocks, but also cultivating preparedness, and seeking potential transformative opportunities which emerge from change, involving society and activating bottom-up processes (Servillo & Reimer 2013).

There are two important requirements in order to use the resilience concept to address spatial changes and challenges in a dynamic and evolutionary way. First, a spatial perspective that allows an integrated approach to complex phenomena is necessary. Macro-dynamics such as demography, energy, climate change, globalization processes and other complex phenomena often fall in the sectorial domains of policy decision making without a clear focus on their spatial patterns.

Second, a trans-disciplinary approach (Moulaert et al., 2010; 2011) is crucial in order to guarantee learning and participatory processes. There are gaps between those engaged in analysis, monitoring and research on the one hand, and on the other hand stakeholders and policy makers. The situation seems rather static and compartmentalised: researchers and experts provide evidence on specific (often sectorial) dynamics; stakeholders and policy makers are expected to read, understand and react according to the flows of information they receive. This traditional approach is far from being a learning process based on (social) innovation and shared endeavours, as recommended in the resilience debate and in its evolutionary stream. Forms of interactions and mutual learning among different actors are needed to bridge this gap.

These two goals are not easy to achieve. They require commitments and stable relationships and the acceptance that time and human resources are necessary and that they have to be allocated in a coherent manner. Inter- and trans-disciplinary research, with strong stakeholder involvement in the definition of the agenda and the exploration of fields of investigation is required.

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The experience in the TPM project went in that direction. Despite some limitations, the project offered the possibility to experiment with forms of cooperation and to explore the complexity of applying such a normative methodological approach.

II. REGIONAL CONTEXTS AND MONITORING TOOLS

The macro-challenges outlined above show interdependencies among scales and to a certain extent also among challenges (e.g. between climate change and migration or between globalization and energy dependency). However, they manifest themselves in particular at a regional scale, with different characteristics and varying intensities. There are numerous examples of how macro-trends have place-specific configurations: e.g. the variety of changes in agriculture and in the biotopes in regions across Europe, the particular dynamics that global flows of investments trigger in regional markets and their labour systems, the different demographic patterns (from aging to gender issues) in different areas and their impacts on the labour market, etc. These effects are even more pronounced in densely populated territories where available space is very limited and claims are often in competition, such as areas in which investments in different forms of energy, changes in consumption and production, different forms of mobility and international investments are in conflict.

The regional level of policymaking – and spatial planning in particular – seems only partially suitable to cope with these issues and so to synthesise EU policy objectives and a place-based approach (Barca, 2007). Macro-trends can rarely be confined within formal administrative boundaries. As a consequence, regions need to adjust to new global rationales, i.e. to define new spaces of engagement (Cox 1998) which are a result of the complex processes of rescaling (Brenner 2004). Thus regionalism (Gualini 2004) needs to try to define effective and coherent spaces for policy going beyond formal administrative competences.

However, knowledge of the specific regional consequences of macro-challenges is limited and appropriate regional planning tools are rare. This explains the growing interest of regional governments to generate evidence-based information about these consequences, but also about the position and assessment of the region in relation to these challenges and their impacts on space and policy.

Following these considerations, the ESPON TPM project (Lennert et al., 2011; 2012) dealt with the assessment of regional capacities to deal with global spatial challenges in five European macro-regions: the Greater Dublin Area (GDA), Flanders, North Rhine-Westphalia (NRW), Navarre and Catalonia. The aim of the project was not to provide a sort of “guide to monitoring for dummies”, but rather to reflect on how European challenges translate into regional realities, and to assess the current monitoring practices in the 5 regions and to exchange best practices between stakeholder regions based on their monitoring experience in order to elaborate and test different techniques and tools for monitoring.

The idea was that a combination of qualitative and quantitative methods of analysis was necessary. On the one hand quantification of trends in an indicator set supports benchmarking initiatives and comparisons of specific aspects in time; on the other hand qualitative analysis (Creswell, 2007) is needed to contextualize evidence and to address wicked and complex dynamics. A summary of the complementary characteristics of the two different methods is presented in Table 4.3.

The explicit philosophy was that, in principle, monitoring regional performance should be more than the quantification of phenomena in a statistical way for a comparative exercise. Methods of qualitative enquiry can provide alternative ways to “measure” aspects that are not quantifiable (by their nature or because of lack of data) but can also interpret the data in their regional context, and reflect on the governance structures.

Table 4.3 Comparison between qualitative and quantitative methods

	QUANTITATIVE ANALYSIS	QUALITATIVE ANALYSIS
Aim	<ul style="list-style-type: none"> • Identification of major differences through statistical relationships • Generalizable results and identification of trends • Benchmarking 	<ul style="list-style-type: none"> • In-depth examination of wicked problems • Analysis of the peculiar aspects of the case study • Exploration of complex interrelationships
Techniques	<ul style="list-style-type: none"> • Limited number of questions • Statistical sound methods numeric data sets 	<ul style="list-style-type: none"> • From informal to more structured inquiries • Narratives and biographies • Involvement of relatively small group of actors
Characteristics	<ul style="list-style-type: none"> • Objectivity • Possibility to identify correlations between trends • Risk of over-simplifications 	<ul style="list-style-type: none"> • Knowledge based on interpretative processes • Holistic approach • Risk of being “just a bit more than organised common sense”

Source: author

Therefore, the project set up a general scheme based on a mix of quantitative and qualitative research methods and techniques (Lennert et al., 2011). Afterwards, the scheme was tailored in each region according to the specific institutional context and existing tools, and on the base of the different stakeholders' interests.

III. FRAMEWORK FOR QUALITATIVE ANALYSIS

The project proposed specific guidelines (Servillo, 2012) for qualitative assessment of the regional capacity in dealing with the four macro-challenges to be integrated with the definition of indicator sets for quantitative benchmarking.

It envisaged a wider involvement of stakeholders and key experts, since a trans-disciplinary approach that brings together researchers and stakeholders can address in a comprehensive way the complexity of spatial dynamics. Moreover, it increases the challenge of setting up the process and of getting it institutionalized within a regional context and its policy systems (spatial planning, regional development, and other sectorial areas).

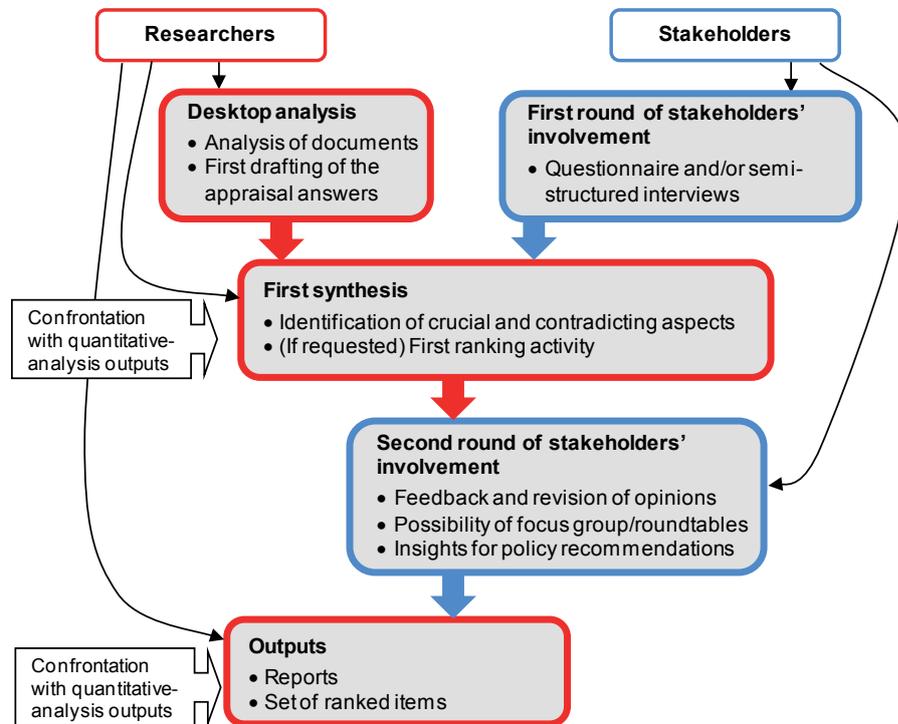
The scheme in Figure 4.9 describes the structure of the monitoring process and the stakeholder involvement that was proposed for the project. It was based on the concept of an “Adaptive Monitoring” framework (Lindenmayer and Likens, 2009) in which question-setting, study design, data collection, data analysis, and data interpretation are iterative steps (Lievois & Servillo, 2012) which can then evolve and develop in response to new information or new questions.

The goal of the case study analyses was to assess the transferability of a generally proposed “mind map of awareness” (see Figure 2 in Lennert et al. 2011:10) related to the global challenges and related themes, but also to assess the effectiveness of regional policy to respond to those challenges.

Therefore the project focused on the following issues:

- Planning systems and governance structures;
- Strategies and planning documents.

Figure 4.9 Structure of the monitoring process



Source: Author, based on Servillo 2012

In line with this, the guideline was accompanied by an extensive set of appraisal questions based on four research aims which corresponded to four appraisal sections. The first one focused on the awareness of the (spatial) policy domain about these macro-challenges and about how the region is framed in a wider (EU) context. It referred, for instance, to the capacity to have updated, and constant use of, ESPON analyses and benchmarking tools.

The second section focused on the institutional resilience (Servillo & Reimer 2013) of the planning system and its capacity to react/take into account these challenges in a strategic and integrated manner.

The third section was dedicated to the effectiveness and the coherence of the actual measures contained in a so-called “policy bundle”, which represents the sum of the existing documents/strategies and tools that address eventual answers to the challenges.

Finally, the fourth section aimed at giving an indication of possible future threats/opportunities that the macro-challenges could represent in coming decades (for a full overview of the appraisal scheme and questions see Servillo 2012).

Feedback on the two-step analysis

The general assessment of all the teams indicates that the two-step articulation was very fruitful, in particular for the capacity to integrate the different stakeholders’ knowledge (e.g. public administration, sectoral experts, etc.) and different scales (in NRW, both State and Regional stakeholders were involved).

Positive feedback was given about the use of workshops and expert seminars, both in terms of information gathering and consensus building. Information gathering enabled a lot of information and different data to be compared, leading the teams to fine-tune their draft assessments. Evidence from existing documents or programmes not originally included in the analysis was unearthed.

Consensus was built in a number of ways. In most of the workshops the qualitative assessments deriving from the main sessions of the questionnaire led to an agreement. In some cases the seminars were characterized by high levels of stakeholder involvement, which created intense interchange of ideas and stimulated the confrontation of different opinions. In some cases there were strong contradictions among experts and policy makers and the interaction was more difficult, and the workshop could not reach a shared view. Another problem experienced in some workshop sessions was that the debate focused on very concrete concerns, so that it became difficult to bring back the discussion to a broader level. Despite such difficulties, the workshop session was seen as a crucial and enriching event.

However, when the aim was to list and rank priority items, workshops proved less helpful than Delphi-rounds or focus group discussions.

The role of stakeholders

The cooperation with the stakeholders was assessed as very useful. It helped especially to scrutinize the state of the art and the different policy needs/perceptions at various levels. The interviews proved to be an excellent validation to the desktop analysis, while providing more detailed insights. They also proved to be necessary since the broadness of the themes, the scattering of policy domains and the way in which policy domains interact can lead to a “loss of the overview”, both amongst the researchers and amongst the stakeholders (as some admitted).

However, the interaction between scientists and stakeholders (especially where stakeholders represent different levels) proved to be complex, and opinions among them often diverged. Therefore good preparation and facilitation skills are needed to manage successfully seminars and workshops that bring these groups together. One team even experienced reluctance from some stakeholders and experts to discuss some topics, and in one case there was an explicit request not to record the interview. This highlights how a monitoring exercise can be politically sensitive.

IV. CONCLUSION

TPM has been an occasion for reflecting on wider and complex socio-ecological dynamics and to experiment with some methodological innovations. Its approach was based on the integration of qualitative and quantitative methods in a trans-disciplinary manner. Such integration boosts the capacity to understand spatial dynamics and the complex interrelationships between macro-challenges, and between factors across scales. Consequently, it supports the activation of integrated policy measures and fosters adaptability and learning capacity, improving the resilience of regions.

However, one of the crucial aspects of a monitoring system is its cyclical round of analyses. The integrity of a long-term perspective guarantees a stable monitoring of spatial changes, based on a constant interaction among experts and stakeholders. In order to support such a resource-demanding process, a shared ownership between the administration and the researchers is required, but this should not affect its political ‘neutrality’.

On the contrary, the ESPON TPM was an *ex-tempore* exercise. Despite being based on the idea that it could have been tailored and integrated into the existing monitoring processes of each stakeholder’s policy context, the institutional complexity and course of events did not allow simple process of adaptation and learning.

Moreover, and unfortunately, in today’s circumstances things are going in a rather opposite direction, away from strong investment in monitoring processes for evidence-based policy. A stark illustration of this is the fact that one of the TPM research partner institutions has been shut down by its administration as a consequence of the general reorganisation (and cuts) in the public budget. This happened immediately after the end of the project, and provides an unhappy conclusion for the approach we developed.

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4.3 Challenges in communication techniques

4.3.1 New ICT in planning practice: a permanent need to innovate in practice

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I. INTRODUCTION

Technology and urban planning are two areas of human activity that are often wide apart. Traditional planning practice is much more focused on the social and economic aspects of the problems, and practitioners many times give low credit to more technologically intensive approaches. This separation is not new and has often been in the front line of scientific and professional discussions, for example in some issues of the *Journal of the American Planning Association* from 1973, in which Lee published his famous “Requiem for large-scale models” (Lee, 1973), and 1994, with the special issue about the same subject with Batty’s paper about the role of scientific planning (Batty, 1994), or later in 2005 with Klosterman and Petit’s discussion about the topic (Klosterman and Petit, 2005), or Couclelis’ seminal paper on the requirements for useful and representative decision support tools in planning (Couclelis, 2005).

This gap is still a very important issue that is clearly observed in many, if not all, of the countries in Europe, where the professional practice, especially at the local level, still struggles to incorporate new approaches based on ICT. Very few studies tried to analyse the problem in depth by assessing the usability and the acceptability of the use of ICT in practice. Vonk and colleagues produced an extensive inquiry to a large sample of practitioners (but also academics) around the world and identified several aspects of what they call the bottlenecks blocking the use of planning support systems (Vonk et al., 2005; 2007). Brömmelstroet produced a similar analysis based on a survey on the reasons to (and not to) use land use and transport models among a wide variety of practitioners in the Netherlands (Brommelstroet, 2010), a country with a long tradition in planning. The question was recently generalized in a special issue of *Transport Reviews* dedicated to the use of models with several illustrative cases in Europe presented by some of the leading researchers in modelling (Brommelstroet and Bertolini, 2011). Van Lammaren and colleagues also tried to shed some light on the use of 3D as a means to involve stakeholders in participatory processes in the Netherlands (van Lammaren et al., 2010).

This gap often mainly occurs due to the lack of technical skills, which leads to a lack of interest, and/or proper financial resources on the planning agencies’ side, which leads to the lack of access to ICT, especially at the local level. This situation started to change with the mass use of affordable computation and database management in the 1980s, which led to dissemination of GIS in the 1990s, and in the last decade with the use of 3D technologies to envision future planning and design options, and of complex modelling tools to create increasingly powerful simulators that give more support to the planning processes. Nonetheless, it is generally accepted among both ICT researchers and developers, and planning practitioners that the use of ICT in planning is still far from realising its intrinsic potential, and this has stimulated a few, but still not enough, studies that seek to understand the reasons for this gap.

The paper intends to give a contribution to the discussion based on an initial reflection over the two main vectors of this issue: the research and development of ICT for planning uses, and the relationship of research on ICT and planning practice. This discussion is part of a new agenda for promoting the use of ICT among planning practitioners that is being developed within the European Council of Spatial Planners (ECTP), the European association of institutes of professional planners.

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II. ICT IN PLANNING RESEARCH AND DEVELOPMENT

The research and development of new ICT-based approaches as a means to support planning in general is not new; in fact it is contemporary with the development of computers themselves. Investment in research on urban models was very intense in the 1950s and 1960s, with some important models being formulated and applied for the first time to real world case studies, for example the Lowry model (Lowry, 1964). These large scale, aggregated models were aimed not only to research but also to help some highly capacitated public agencies to start understanding urban and regional areas as systems that could be controlled like machines, in what was the era of systems planning. Nonetheless, the weak computational capacities, the lack of technology to effectively deal with large datasets, and the extremely high costs of funding this research made it very difficult for the large majority of planning agencies to even think about using them. During the 1970s, computers became more accessible (despite still remaining in the academic arena) and the novel database technology based on Chen's relational model (Chen, 1976) and on the development of SQL database language opened new and bright perspectives, both on the development of models but also on their use on planning. Nonetheless, due to a shift in the scale of planning, from large scale systems to local scale, neighbourhood and community planning, and to the slow pace of development of modelling tools that could be attractive to practice, practitioners become less and less inclined to use them, a movement influenced by Lee's paper on the serious problems that models constituted by then (Lee, 1973). The 1980s brought to the research three instrumental features that were decisive in rekindling the interest of planners in new tools, that from then on were starting to be named as ICT: (1) microcomputers, which made the use of powerful computational and visualisation resources cheap and available to everyone; (2) more capable database technology, allowing the use of larger and better datasets; and (3) the development of GIS as the first powerful tool to deal with data and cartography, in an explicit visual manner. The 1990s and the 2000s were decades when development of new ICT in planning came of age. After the rapid diffusion of the use of GIS among all levels of planning agencies, researchers understood that they could take the next step towards exploring new tools and new approaches that would not only make use of GIS, but also benefit from their popularity to interest the practitioners. A wide set of new tools and decision support systems were developed. These were based on many different concepts, coming from all areas of knowledge, from physics to mathematics, from life sciences to economic theory. At the same time, computation became increasingly more visual, and brand new technology was used to create the first feasible virtual environments.

During these years, spatial and urban systems came to be regarded as complex ones, new disciplines were summoned, with researchers from all backgrounds becoming involved in the study of urban matters, bringing an entirely new perspective to the field. Complexity became a central perspective in urban research, spanning from the more perceivable social, institutional and governance perspectives (closer to planning practitioners) to the mathematical and geographical perspectives (closer to researchers). This brand new research gave birth to a wide set of ICT tools that are currently available for planning and policy design. They range from the use of advanced GIS, with new and more sophisticated methods of spatial analysis, to the enhanced capacity of providing valuable visualisation, both on 2D and on 3D, to the development of new modelling tools based on several approaches, from cellular automata (Pinto and Antunes, 2010) and agent-based simulation (Wise and Crooks, 2012), to discrete choice based models (Kakaraparthi and Kockelman, 2011), to simulations based on optimization (Koomen et al., 2011). The development of 3D environments is also experiencing a significant increase based on the LIDAR technology (Yu et al., 2010) but mainly driven by the industry, from which many platforms emerged allowing the creation of highly realistic virtual environments, (for example the ESRI CityEngine and the widely used GoogleEarth).

However, all this continuous research and development of ICT, which happened within universities and industry research centres around the world, was not sufficient to promote the effective and widespread knowledge transfer to practice. Despite a new common understanding that spatial and urban systems are complex entities that need to be addressed with an arsenal of different approaches and tools, the underlying complexity of problems has a two-fold influence over planning: on the one hand, there are brand new concepts and ICT tools to deal with it, opening new possibilities for planning practice; on the other hand, the difficulty to demonstrate a robust theoretical background to all these ICT-based approaches (which already exists to a great extent, but too often is poorly demonstrated by researchers) helps to maintain some degree of suspicion from the practitioners' side.

III. THE USE OF ICT IN PLANNING PRACTICE

The gap is particularly well identified by Helen Couclelis: “Models are based on science; planning is about policy. Models are much better (...) at dealing with natural science problems; planning is mired in difficulties most often due to issues in the purview of social sciences. Models are usually developed from within particular disciplinary perspectives; planning must integrate across all domains. Models are about information and facts; planning is about interpretation and values. (...) Models codify uncertain knowledge; planning must lead to certain action. (...)” (Couclelis, 2005, p. 1359). It was always clear that interaction between planners and researchers is necessary to make real a “science of ICT” applied to the planning practice. But this interaction was, and still is, far from being satisfactory to both sides of the problem. Vonk and colleagues have identified three main categories of constraints to the use of planning support systems (PSS) in planning, which can be easily generalised to ICT in a broader scope: (1) the lack of awareness of practitioners about ICT tools; (2) the lack of experience in using ICT; and (3) a low intention of using ICT-based approaches in their practice (Vonk et al., 2005). Brömmelstroet identified the notion that practitioners have that ICT developers should find a balance between the scientific drive of their research and the needs of their planning subjects, meeting the state-of-the-art with the state-of-the-practice (Brömmelstroet, 2010). Van Lammeren showed that the use of simple 3D elements allow a more pleasant visualisation process able to better engage already significant users with a simple 3D engine tool built on top of GoogleEarth (van Lammeren et al., 2010).

Planners seek to find feasible, robust, and perceivable tools that can help their task of developing informed solutions that can be used by a wide group of agents with varying capacities. These agents, from elected officials to their constituents, from other planning officers (such as transport planners or economists, for example) to social and economic agents, have their own social and technical discourses. Planners have then the hard (many times too hard) task of coming up with a cross-cutting discourse that can meet all those specific demands. ICT researchers and developers, on the other hand, often focus on their own outputs, rather than on their outcomes. All ICT tools imply some degree of conceptualisation of reality, a compromise between what is observed, how detailed this observation is, and what is feasible and even possible to be represented by the ICT tools. This level of conceptualisation and even abstraction is often the first barrier that needs to be crossed. Although planners may be seen as clients that want to have a certain problem solved by the use of these tools, they can easily become dissatisfied once they realise that conceptualising the problems implies too much simplification, especially when social issues are at stake. It is also clear that decision makers and the general public are very keen on participating in planning processes based on outputs generated by ICT tools. Public participation and technical discussion over planning options using open workshops or focus groups usually benefit from the use of support tools based on indicators, maps or scenario stories that often are outputs from ICT tools.

Another decisive factor relates to the financial and technical capacities of planning agencies to acquire and use these tools in effective ways. The creation of virtual environments or the development of complex modelling tools, despite all the advances, is still expensive. This cost comes from the high degree of expertise that is involved, both in the academic and in the consultancy arenas. Nonetheless, there is already a series of technologies and methods, both on the hardware and on the software sides, that provide affordable or even free solutions that can be easily become available as feasible and accessible tools that can be used in a wide set of institutional and technical contexts.

Already there are many good examples of the use of these ICT tools to assist planning in many different contexts. The European Commission have been using models to assist the evaluation of land use in Europe, in order to help future policy design and environmental monitoring for transnational planning processes (Petrov et al., 2009). The Urbansim platform is also in use in some North American regions to model land use and transport planning and to assist planning (Waddell and Ulfarson, 2004). The Toronto metropolitan authority has a very complex land use and transport model in use to support policy design and analysis (Miller et al., 2004). One of the most striking examples comes recently from Belgium, where the biodiversity policy of the Flemish regional government was designed with the help of a complex planning process that involved a wide set of stakeholders supported by the Flemish Technology Institute VITO. The whole process from design, modelling, discussion to transformation into legally binding regulation took less than one year, in 2013 (Poelmans et

al., 2013). Many other examples could be pointed out illustrating the potential of the use of these ICT based approaches.

IV. CONCLUDING REMARKS

The use of ICT in planning and in policy design and evaluation at all scales has great potential that is becoming widely acknowledged by all the agents involved, from decision makers to practitioners to the general public. Nonetheless, the gap between the development and the application of ICT tools and methods is recognised by both sides of the discussion (both developers and users) and has contributed to the misuse of new and helpful tools to assist everyday processes. Developers and users must intensify their joint efforts to bring together their common interests in improving decision making in planning and policy design and evaluation. They need to work together in the design, testing, implementation and dissemination of new ICT tools and methods.

The emergence of new concepts such as ‘intelligent’ and ‘smart’ cities, and the existence of several research funds dedicated to research on the interactions between developers of ICT and their users (COST, 2010) are good examples of the shift in mentalities. There are also good examples of a new level of acceptability of ICT. At the European level, the use of spatial analysis heavily supported by data processing and visualization shows that the gap is being reduced. ESPON is one of the most proficient agencies here (ESPON, 2012), along with the application of simulation tools to forecast holistic scenarios of future Europe (see the work of the Institute for Environment and Sustainability of the EU’s Joint Research Centre). There are also examples at the national/regional level, such as the recent case of the biodiversity policy design process in Flanders (Poelmans et al., 2013). And at the local level, there are already many planning bodies that are making use of extensive databases and advanced GIS to implement some of their local policies, as well as to interact with their citizens in participatory processes.

One of the most important causes of the gap in the use of these tools is the education and training of future planning practitioners. Many of the programmes on urban and spatial planning and urban design in many universities across Europe do not provide modules that focus on the use of ICT-based approaches in practice other than the GIS-based ones. On the one hand, this lack of technical skills for the full use of ICT poses an economic problem regarding the value-for-money of the investment that many agencies make in GIS systems that then are not efficiently used. On the other hand, if students become familiar with planning processes based on ICT tools, they will be more aware, as practitioners, of the immense potential for their use. They will become alert both to the potential offered by proprietary software, but also to the wide scope of emerging open source tools that are now being developed. This will open new opportunities to enhance the practice of planning, a key issue especially for developing regions.

Our paper has sought to make an initial reflection that will support the programme of a new working group in ECTP focusing on bridging this important gap. The relationship between researchers on ICT and practitioners has always been stained by this gap that is founded, to some extent, on mutual mistrust of each other’s needs and goals. Closing this gap by fostering closer interaction is crucial and must be based on two premises: (1) there is a common goal of developing the science of planning by exploring the capacity to effectively understand the underlying complexity of this field, making use of the ICT tools already available; and (2) there is an immense and increasing potential for two-way knowledge transfer, as a significant part of the professional and technical discourses are now showing good signs of overlapping and convergence to a common agenda.

We believe that much progress has already been made and that today the gap has narrowed with both sides sharing many common interests and goals. The advent of the so-called information society provides a common mind-set for both sides to envision new theories, new methods, and new ways to apply the huge knowledge acquired in an increasingly more integrated way, opening new possibilities for both the research and the real world application sides.

However, there is still a significant effort required both by ICT developers (in academia but also in the industry) and by practitioners to promote effective use of ICT as common tools to support decision making in planning and policy design and evaluation at all levels. And if this is clear in the context

of developed countries where planning practice has been using ICT for two decades (in the case of GIS), it is critical in developing countries which lack a structured planning system and intrinsic capacities to develop one, especially taking into consideration their complex challenges due to fast demographic growth and rapid urbanisation.

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4.3.2 Are maps sufficient? Using traffic lights and box plots for a better understanding of ESPON⁴⁰

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I. INTRODUCTION

Graphs are for consultants or scientists a means to understand and to make their ideas, data or research results understood (Zelazny 1989). Their importance is tremendous, and the great diversity of the solutions requires a careful choice of methods, so that the communication is as efficient and effective as possible. There is increasing emphasis on the value of a qualitative perspective (see, for example, Brasseur 2003), but without abandoning the quantitative paradigm, which is considered important due to the added alleged objectivity that it offers. Others argue that exclusive reliance on either qualitative or quantitative approaches, carries risks (Hiles 1999) and that methodologies to exploit the advantages of both perspectives are needed (de Roo et al. 2012).

The purpose of this paper is twofold. On the one hand it aims at presenting the results of the research led by the Transnational Project Group (TPG) within the TerrEvi Project, and on the other hand it will highlight the importance which the two graphical tools used (traffic lights and box plots) have in increasing the efficiency of scientific communication, especially when used in tandem with conventional maps. The synthesis papers published by ESPON and submitted to political actors almost exclusively use cartographic material or bar type chart (e.g. ESPON Evidence Brief Nos. 1-2, series of Territorial Observations reports nos. 1-8): box plots and traffic lights are almost completely absent. This paper assumes that the effectiveness of scientific communication can be improved by using the traffic light and box plot graphics, which may offset some of the shortcomings of traditional maps.

II. WHAT ARE MAPS MISSING?

The maps used within ESPON generally are graphical representations of cartograms and carto-diagrams type, their presence in each report being explained by the fact that they are the most effective means of visual expression of territorial structures. The reports published in the Territorial Observation series fully prove this fact: the documents contain on average of one map per 2.6 pages and over 80 % of the graphic representations are maps. The advantage of cartographic materials is indisputable in terms of highlighting the territorial structures; indeed they are irreplaceable from this perspective. But, although effective as visual impact, maps present several often forgotten risks and disadvantages.

The first risk is that the interpreter can be misled by the masking of the statistical distribution of the mapped values. They indicate where it is “good” or where it is “bad”, but do not usually say where “it is best” and “how good”, nor where “is the worst” and “how bad”. Cartographic materials do not mention which of the two types of regions we are dealing with, and non-specialists cannot deduce by themselves “the seriousness” of deviations. Of course, these indicators can be separately calculated and then mapped, but the process involves several disadvantages: it renounces its own measurement unit, it loses the known reference values, and the graphic material becomes more difficult to decipher for those who do not have an educational background in Statistics.

The maps allow multi-scale comparisons only when using complex geo-statistical methods, which are hard to “digest” without previous training. A cartogram cannot represent, in a simple manner, the position of a specific region compared to two or more upper spatial levels (it is impossible to

⁴⁰ The research described in this paper was not conducted only by the authors themselves, but rather by different partners of the ESPON TerrEvi project: Metis GmbH, T33 and the Faculty of Geography and Geology Iasi.

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represent on the same NUTS 2 map the value of the region itself along with the average values for national, transnational or continental levels).

Maps are typical examples of unintentional manipulation of the submitted information. The same indicator, mapped in two different ways, both statistically correct, can suggest to a non-specialist two distinct situations though the reality represented is the same. How can the cartographer be sure that the chosen option is the most realistic in terms of presented message? She/he must recognise that mapping involves a high degree of subjectivity. The causes are multiple and often cannot be avoided. For example, the choice of method for creating discrete categories on the map, and the setting of semiotic properties such as the intensity differences in the colour of the different classes shown, will influence perceptions of the cartographic message.

Three categories of issues have been identified. As a solution, the TPG within the ESPON TerrEvi Project suggests the use of maps in tandem with traffic-light and box plots as follows:

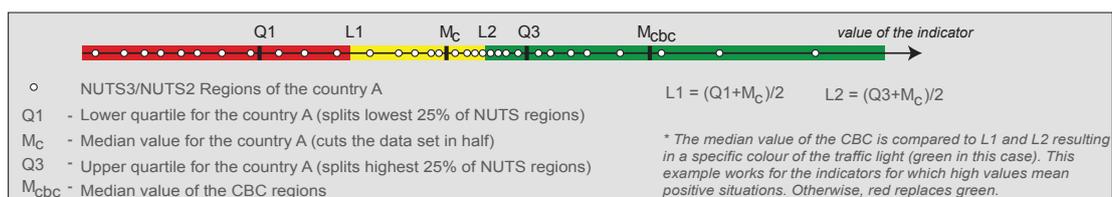
1. to present multi-scale comparisons - the use of traffic-lights for summary reports or box plots for more complex reports;
2. to highlight regions with extreme statistical behaviour - the use of box plots;
3. to compensate for the subjectivism from the mapping process and to reveal the statistical distribution of the variable - the use of box plots.

III. TRAFFIC LIGHTS AS INTRODUCTORY GRAPHICAL ELEMENTS

The simplest additional graph that we used is the traffic light, an element easily done, with an accessible interpretation and with a high visual impact to the public. Statistically, the traffic light is a classification system in three classes and it can be very effective when presenting a geographical entity in its regional, national or European territorial context. Thus, it can be a useful element in introductory presentations or in synthesis documents.

The TerrEvi Project used traffic lights to present the situation of the cross-border and the trans-national co-operation programmes regarding the Europe 2020's objectives. The graphs were created by representing *the situation of each analysed cross-border co-operation area (CBC) and comparing it to the EU-27+4 space, to the rest of the CBC programme areas, and finally, to each country participating to the CBC Area* (ESPON TerrEvi Interim Report). For the CBC Area Romania – Bulgaria, the median was chosen as a central value and it was calculated depending on the values registered for every NUTS 3 region in the programme. In the next step, *the median of the programme area was compared successively to the ones computed for EU-27+4 territories, for the rest of the CBC areas and, ultimately, with those for the countries involved in the CBC Programme.*

Figure 4.10 Hypothetical example: a CBC compared to a country



In the example below, the focus is set on a comparative multi-scale presentation of the Romania – Bulgaria CBC Area from the perspective of three suggestive indicators for the Smart Growth priority. For *Total intramural R&D expenditure as percentage of GDP* indicator, the first two red signals show that the CBC Programme is much below EU-27+4's level and that of the rest of the CBC areas. The next two traffic lights displaying also red signals denote growth that is below the median value

registered in Romania and Bulgaria. Moreover, these two red signals prove that the NUTS 3 regions situated along the Romania – Bulgaria border and included in the CBC programme are one of the less developed regions of Romania and Bulgaria. In the case of the *Percentage of individuals using Internet* indicator, a green light can be observed due to the simple fact that the regions included in Romania – Bulgaria CBC Area register a higher value than Romania's median one.

Figure 4.11 Romania – Bulgaria CBC compared to successively to EU-27+4, all CBC Areas, Romania and Bulgaria

	disparities in the CBC Area	median value of the CBC Area	EU-27+4	All CBC Areas	Romania	Bulgaria
Total Intramural R&D Expenditure (GERD) Percentage of the GDP (2009)	high	0,2	1,2	1,2	0,3	0,2
Employment in knowledge-intensive services as percentage of total employment (2010)	medium	22,6	39,0	38,2	19,0	26,6
Percentage of individuals regularly using internet (2011)	low	36,5	71,0	71,0	35,5	42,0

The value in front of each traffic-light represents the median value of the EU-27+4 space, of All CBC Areas, etc.
Thresholds for detecting disparities using the variation coefficient: low < 15%, medium 15 - 30%, high > 30%
Regional level of analysis: NUTS 2
Origin of data: EUROSTAT 2012

Source: ESPON TerrEvi Interim Report

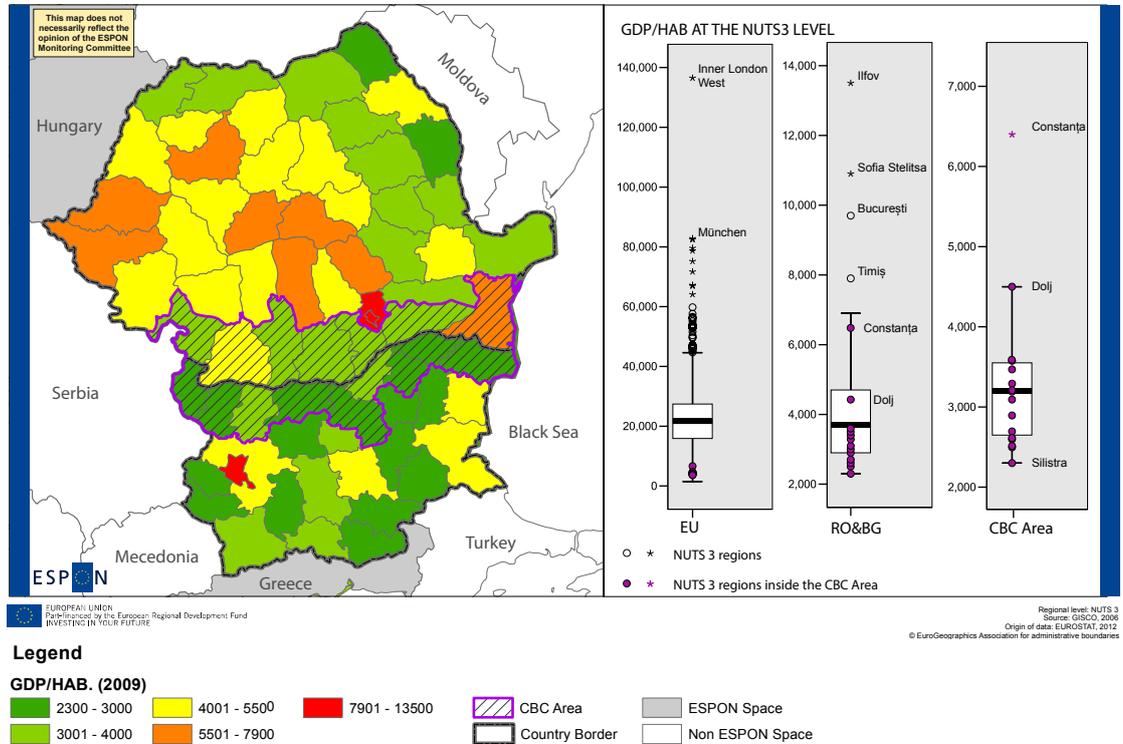
Although using traffic lights for this type of representation makes possible a comparison with the higher territorial levels, their realization remains dependent by the characteristics of the statistical distribution because of the percentiles used in obtaining the thresholds. Furthermore, choosing the median as the central value requires special attention in analysing the traffic lights when the number of NUTS regions is below 7, or when the disparities in the CBC Area are high (as in the case of the first indicator illustrated). This should be considered also when establishing the relative situation of a CBC Area compared to a specific country (ESPON TerrEvi Interim Report).

IV. BOX PLOTS AS AUXILIARY ELEMENTS FOR MAPS

An attenuation of many disadvantages of using maps can be obtained by including box plots. Their purpose is to allow the reader a quick overview on the situation of a programme area as compared to Europe (EU-27+4) and to the national situation in general. The creation of box plots followed three major objectives that were intended to highlight the behaviour of the European regions participating in a specific programme area by comparing it to (1) the rest of the NUTS 3 regions from the EU-27+4 territory and (2) to all regions from the countries participating to the Programme (TerrEvi Interim Report).

This set of box plots will allow the reader to see the variation within the programming area, and compare it to the variation within the ESPON space and the variation of the countries involved in the programme (TerrEvi Inception Report). Furthermore, the regions participating to a co-operation programme are chromatically highlighted (Figure 4.12, mauve colour) in order to mark the difference between them and the other NUTS 3 regions not participating to this cooperation programme. In creating the graphic elements, a classical model has been followed in which the median value represents the central value indicator and the box encompasses half of the cases (values that are in the range defined by the percentile of 25 % and 75 %).

Figure 4.12 Example of box plots annexed to a map. GDP/hab. at the NUTS3 level in Romania – Bulgaria CBC Area



Used in complementing the visual information offered by maps, the box plots present several advantages. First of all, it is an instrument that allows the dissection of local structures in a multi-scalar context, producing relevant results for defining European Structural and Investment Funds for 2014-2020. Results applied on an income indicator (GDP / per capita) highlight the contribution which the capital cities make to the situation for Romania and Bulgaria. The dominance of territorial structures behaving in this way can draw attention to the need to implement policies that prioritise territorial cohesion and limit / mitigate capital agglomeration mechanisms that created the gap between large cities, integrated into inter-metropolitan networks, and the rest of the territory. By changing the scale at regional level, it appears that the same mechanisms outlined are transferred to regional cities, but with a more pronounced gap than in the first case (the NUTS3 of Constanța in comparison with the rest of CBC Departments). An analysis at LAU2 level would highlight a continuation of the model, this time the differences being more striking – the positive outlier becomes Constanța City, which stands apart from the rest of the administrative units that will be crowded near the median value.

Even though it reflects territorial facts relevant for policy makers and stakeholders, it is important not to forget that box-plots represent a purely quantitative method. Therefore, to avoid the "objectivity trap", box-plots and traffic-lights can sometimes be replaced by, or be used along with, alternative visual methods that take into consideration the qualitative aspects of the territory. A good example is provided by the Utrecht Bandwidth Method (see de Roo et al. 2012 for an overview), which was initially developed for use in planning at the local level, but which could be adapted for regional planning.

V. LIMITS AND RECOMMENDATIONS IN USING TRAFFIC LIGHTS AND BOX PLOTS

The aim of this paper was to show that different and complementary methods should be used to present the information required for understanding and interpretation of the territorial development of the European space. Our experience in ESPON projects revealed the necessity of adapting the representation methods to the different target viewers: the scientific community and policy makers. We think that along with the traditional method of mapping, two other instruments can provide greater

insights: box-plots and traffic-lights. This approach was able to highlight an important reality of a territory, such as the discrepancies between the studied area and the rest of the European territory.

Furthermore, combining different visual methods could improve communication of territorial facts between the scientific community and the representatives of countries taking part in The Network of Territorial Cohesion Contact Points and could also strengthen the place-based approach in collecting and disseminating territorial data (see Zaucha and Świątek 2013 for an overview on the current necessities of the place-based approach in the EU).

Although we can obtain a quick general view of a specific situation through maps, for the analysis of a specific area it is recommended to use the box-plot as a benchmarking method. Being a more precise instrument, it allows a quick overview on the situation of a specific region as compared with other territories (e.g. CBC vs. EU, TNC vs. EU). Its readability and understanding require some statistical knowledge so this method is better addressed to the scientific community. Box-plots can be useful for printed territorial reports, but they also may seem superfluous as Geographic Hypermedia Systems develop (see Stefanakis et al. 2006 for an overview of the concept). One good example is the ESPON HyperAtlas, which allows the interpreter a great amount of flexibility in visualising multi-scale territorial data.

The traffic-light representation of the data uses a standardized and accepted symbol that is present in everybody's daily existence. Its correct interpretation does not require the viewer to have a specific academic background and, as it is providing a comparative view on a specific situation at different scales, it can replace the box-plots in the reports destined for the policy makers.

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4.3.3 An innovative educational tool in disseminating the ESPON knowledge widely: Evaluation and perspectives

*Stella Kyvelou, Nektaria Marava, Simos Retalis and Ioanna Pothitaki**

I. INTRODUCTION

The ESPON findings and ESPON related knowledge remain the “property” of a relatively restricted academic and professional community in Europe. This is due to the significant volume of the knowledge already produced within ESPON and its complexity. Furthermore, ESPON is perceived differently amongst the different disciplines (geography, spatial and urban planning, environmental science, regional science and economics, environmental economics etc.) and spatial levels (European, national and regional).

Thus ESPON penetration is very diverse in terms of acquired knowledge, comprehension and integration into research and policy making. Despite the significant and intensive efforts of the ESPON network for its dissemination, stakeholders at national/regional/local level are still not sufficiently familiarized with the ESPON findings. The ESPONTrain project (2010-2013) was the first project that endeavored to meet this gap through the development of a Virtual Learning Environment (VLE) for a targeted public. The operational phase of the project has been completed and the experience gained is currently being evaluated. This paper reviews this innovative learning approach by presenting a) the educational model and the course design, and b) the evaluation of the implementation phase focusing on the Mediterranean and Balkan countries and based on participants’ responses to an on-line questionnaire. Their opinions revealed specific needs in the selected area that could be taken into account in the future dissemination priorities of ESPON.

II. GEOGRAPHY, SPATIAL PLANNING AND E-LEARNING: FACTS AND TRENDS

In our continuously changing and interdependent world, the importance of geographic characteristics that lead to the territorial attractiveness of a place is evident (ATTREG 2013, Final Report). Education in spatial planning and geography provides the necessary feedback to allow policy-makers and practitioners to develop integrated territorial strategies that guarantee territorial sustainability. As cited in Bednarz, et al., (2013), “*In the modern world, every member of society increasingly is called on to make decisions that have far-reaching consequences*”. This is accentuated for EU policy-makers and practitioners who should espouse the aims of territorial cohesion through their strategies. Existing education provision (in geography, urban planning, spatial economics...) does not help them in this regard. Apart from a few good cases and related efforts, the acquired knowledge is in general inadequate for the current demands of territorial development and cohesion policies. This educational gap has been identified by several territorial authorities, practitioners and academics (cf. ESPONTrain project’s survey 2013, Bednarz, et al. 2013).

According to international literature (Harris P et al. 2009, Poon J. 2013) “blended learning”, meaning a combination of conventional and e-learning methods, is considered to be the most effective way of learning. In contrast, several scientists believe that learning practices, for instance e-learning, used to “transmit knowledge” are never the most crucial factor (Lynch et al., 2008). Rather importance lies in the learning material, course design and trainer’s ability. However, where pure knowledge is the only goal, not just students’ mentality and grades, e-learning can grab trainees’ attention and never lose it.

Generally ESPON, has used conventional methods such as workshops, conferences, seminars and dissemination of reports and other findings to disseminate its work. Despite the great volume of findings and good quality tools, most of them remain unknown and relatively unexploited due to ineffective communication. E-learning obliges learners to engage more deeply than do the other methods. When designed correctly, e-learning is more effective, as long as its disadvantages are addressed. Ideally, trainers should be perfectly prepared; course design should be perfect, technological issues solved and time spent efficiently and intensively. As long as these requirements are fulfilled e-learning could be very effective.

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Several scientists have noted the advantages and disadvantages of VLEs. Our own research and the data gathered through our questionnaires, showed that e-learning can increase potential transnationality in learning and within this framework is much more objective than subjective due to the potential coverage of a wide geographic scale.

III. THE DEVELOPMENT OF AN INNOVATIVE EDUCATIONAL METHOD IN DISSEMINATING ESPON KNOWLEDGE⁴¹: THE “TRAIN” FOR DIFFUSING ESPON KNOWLEDGE

The overall aim of ESPON 2013 is to “*Support policy development in relation to the aim of territorial cohesion*”. That is achieved by carrying out studies and research that produce territorial information and related tools for analysis, mostly through the Priorities 1 and 2 of the Operational Programme. Both the ex-ante evaluation and the mid-term external evaluation acknowledged that ESPON is effective in achieving this goal. However, ESPON has also received strong criticism. Critics focus especially on its inability to disseminate, in the sense of transmit, its findings to policymakers and practitioners. This lack of successful communication can be attributed to a number of reasons such as a) the broad project specifications, *which result in a tremendous amount of collected data and difficulties in translating them into key policy messages*, b) the affiliation of the management mostly to academic institutions and consequently the dominance of academic language and/ or c) *the length of the Scientific Reports: - several are extremely long (e.g. over 800 pages for FOCI) and thus very difficult to distil into clear, concise policy messages* (ADE 2013). ESPON needs a process whereby results will not only be disseminated to policymakers and practitioners, but also understood and used by them (ADE 2013).

The ESPON Train consortium gave birth to an innovative idea for ESPON capitalization activities. As well as national workshops, conferences and seminars to disseminate knowledge, which had been extensively used, a “train” for diffusing ESPON knowledge through the development of a distance learning program was envisaged, developed and implemented. The main aim was to overcome at least some of the identified weaknesses. The lengthy Scientific Reports from a selection of Priority one and two projects⁴¹ were summarised through the development in English of Thematic Teaching Packages (TTPs), covering a range of crucial issues, and containing educational material based on these reports and other related material, and in particular an assignment, quizzes and other on-line course materials, some of which are suitable for both conventional and e-learning methods. These had been validated by an editorial committee and submitted for approval to the ESPON CU and the ESPON Monitoring Committee. These TTPs tried to summarize the projects’ methodology and findings in more simple language for a wider public, and so overcame one key weakness of ESPON projects mentioned in its evaluation reports (Loxley Consultancy 2011 and ADE 2013:28).

The Platform became active in August 2012 at <http://espontrain.eu>. It had 191 registered users – trainers and trainees- and the average log-in frequency per user was 29 entries. However, ESPON-Train was more than a typical distance learning course as it incorporated synchronous communication between the learners & instructors in the form of webinars through WizIQ that were integrated and used through the ESPONTrain VLE. WizIQ is an online tele-conferencing platform which enables learners and instructors to come together online and attend virtual learning sessions in real time (ESPONTrain 2013a:17). Thus, during the learning process of each TTP, that lasted 2 weeks with a requirement of 5 hours learners’ involvement per week, one important activity in each week was the webinar. In these webinars, trainees and trainers from participating countries discussed the on-line material and the case studies. At the same time, they all had the opportunity to exchange ideas, and transfer knowledge or experience through forum activity. In total 1379 questions, answers or other kind of messages were posted at the discussions forum.

⁴¹ Particularly, these web-based courses and tools were created to correspond to seven ESPON related major topics covering the following themes and issues: a)Demography-Migration (based on the DEMIFER project), b)Energy (based on the ReRisk project), c) Climate change (based on the CLIMATE project), d)Urban (based on the FOCI project), e)Rural (based on the EDORA project), f)Specific types of territories (based on the TeDi and EUROISLANDS projects) and g)Territorial cooperation and governance (based on the METROBORDER project).

Moreover, the development of the ESPONTrain-VLE was a targeted dissemination activity to two different, but important “ESPON family” groups:

- The first group were students or senior researchers. Their thematic or disciplinary focus varied (e.g. business managers, economists, environmentalists, next generation policy makers and spatial planners). They were selected in order to enrich the quality of their research by the integration of ESPON findings, and to further disseminate ESPON knowledge and methodological approaches to their academic field (see ADE 2013 which mentioned the need for this in ESPON).
- The second group consisted of policy makers and practitioners coming mostly from the public sector (i.e. ministries, general secretariats, regional and local authorities, municipalities etc.), dealing with territorial cohesion and development issues and strategies. This target group is crucial for the enhancement of the role of the public/private sector in ESPON related strategic planning and territorial development and cohesion policy making (ESPONTrain 2013a:21).

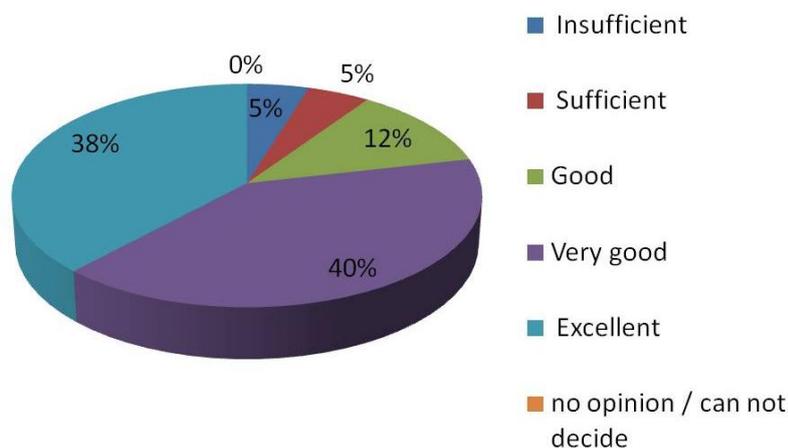
The statistics of the project’s implementation were quite remarkable for such a new idea. In total, 9 countries used the ESPONTrain-VLE, (Bulgaria never used the platform and participants from Cyprus were integrated into the group of Greeks) and 106 courses were created linked to the eight ESPON projects. 49 courses were offered for stakeholders and 56 for students while one on-line course was developed in order to train the trainers for the ESPONTrain VLE. Interactivity was developed through the discussion fora where trainers and trainees had the opportunity to further exchange ideas on related issues. The Platform had a high average usage: 584 viewed flipping books/pdf: 35 per item, 2008 files, 62 linked pages, 4887 Announcement Labels, 416 Quizzes, 36 Chat rooms, 276 discussion fora, 126 Wiziq Live Classes with a total duration for all sessions, from all countries of 5,040 minutes (250 hours) (ESPONTrain 2013:26).

This quantitative analysis of the use of the ESPONTrain-VLE is quite limited. So an evaluation questionnaire (http://www.surveymonkey.com/s/ESPON_Train) was developed for the platform after the end of educational activities in December 2012 and a transnational conference was organized four months after the end of the educational program. Alongside the reports and outcomes of the project in the Balkan and Mediterranean countries, this provided a more qualitative evaluation of the project.

IV. THE EVALUATION OF THE IMPLEMENTATION OF ESPON TRAIN IN THE MEDITERRANEAN AND BALKAN COUNTRIES

62 participants from Mediterranean and Balkan countries (Cyprus, Greece, Italy, Malta, Romania and Slovenia) have responded to this online questionnaire. Half of them were stakeholders while students or senior researchers made up the other half.

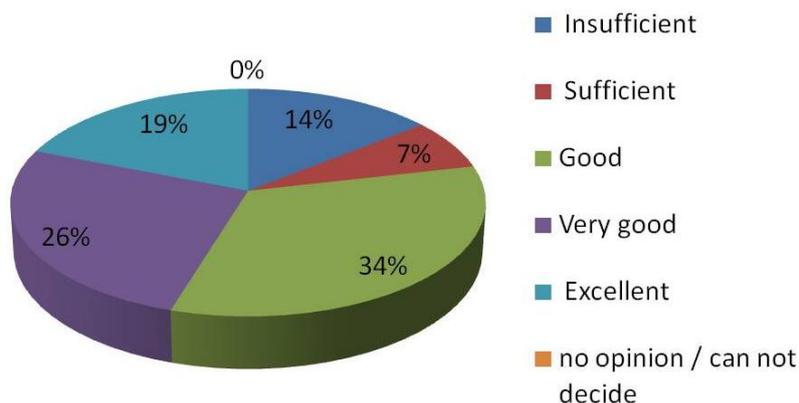
Figure 4.13 Overall idea of the educational programme



Source: Survey conducted in the framework of the ESPONTrain project

The fact that 78 % of them truly welcomed the overall idea of this educative formula while just 5 % had a negative opinion (Figure 4.13) is very encouraging. Positive opinions were also expressed about experience of participation in the ESPONTrain, with 79 % recording from excellent to good. To be more specific 19 % considered this experience excellent, 26 % very good, 34 % good, 7 % sufficient while 14 % found it insufficient (this question was answered by 42 users – representing 67 % of the users who have answered the questionnaire). See Figure 4.14.

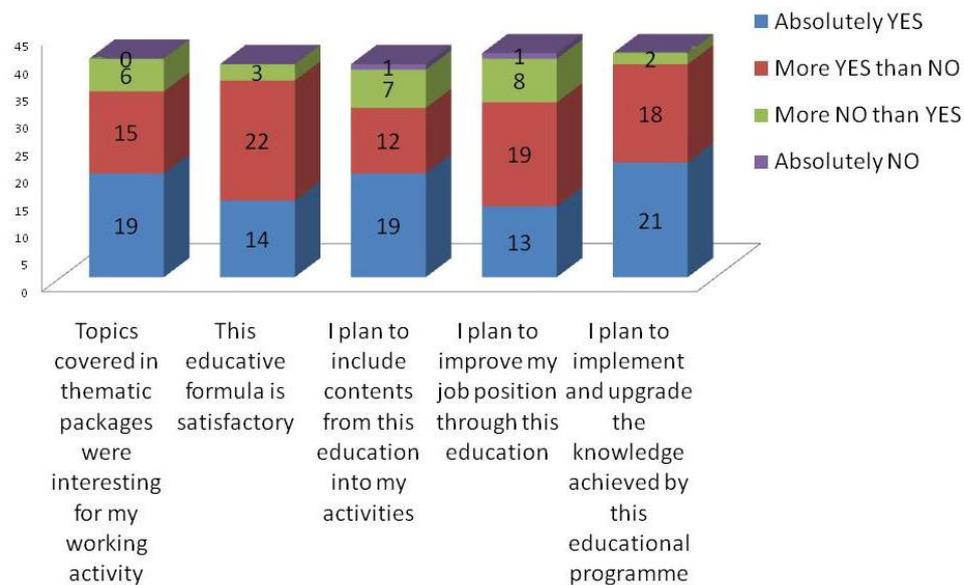
Figure 4.14 Overall experience within the ESPONTrain Virtual Learning Environment



Source: Survey conducted in the framework of the ESPONTrain project

Trying to capture the limitations of this educational approach, participants were asked to state “what should stay in the programme” or “what should change?”. It was obvious that all the participants enjoyed the selection of TTPs and the material used. Italian participants even suggested a wider use of the synthetic reports produced by ESPONTrain in order to disseminate the ESPON results and tools to a wide public. In general, participants found the content rich, comprehensive and coherent. Concerning the question of whether the topics covered by the thematic packages were interesting for participants’ working activity, 47 % (19 people) responded “absolutely YES”, 38 % “more YES than NO”, 15 % “more NO than YES” and no one “absolutely NO”.

Furthermore, the majority of students planned to use and upgrade the knowledge achieved from this educational programme (51 % “absolutely YES” and 44 % “more YES than NO”) and only 5 % were relatively negative (“more NO than YES”) and no one was completely negative on this question, while 78 % planned to improve their job position through this educative formula (32 % absolutely YES, 46 % more YES than NO) in contrast to the remaining 22 % that were more negative (20 % more NO than YES and 2 % absolutely NO) (Figure 4.15).

Figure 4.15 Evaluation of the ESPONTrain project mainly related to professional and academic criteria

Source: Survey conducted in the framework of the ESPONTrain project

Participants' expectations varied. Some wanted a more intense programme with more assignments, but others preferred a more loose one, with no deadlines for the submission of assignments. A few participants also noted the importance of having face-to-face meetings. This expectation was partially fulfilled through the ESPONTrain final transnational conference, held on April 3-4, 2013, where a number of trainers and trainees were involved and exchanged experiences, thus broadening their European spatial perspectives.

V. MAIN LESSONS LEARNED FROM THE ESPON TRAIN VLE AND THE NEW HORIZON FOR APPLYING DISTANCE LEARNING ACTIVITIES IN DISSEMINATING ESPON KNOWLEDGE

The qualitative evaluation of the project revealed that the development of the ESPONTrain VLE had been acknowledged as a transnational tool for communication and education of ESPON knowledge. For the first time, an advanced information and communications technology educational method (e-learning) was used as a multiplier of ESPON dissemination and ESPON's usefulness for territorial cohesion and development in Europe. E-learning procedures proved capable of providing a large group of people with the ability to connect and follow ESPON's knowledge regardless of their own availability, family or work constraints. The educational materials produced were the other positive outcome of the project. By being simple and understandable they succeeded in transferring ESPON knowledge and increasing awareness of ESPON objectives to a wider public.

The impact of the ESPONTrain project however, is not necessarily measurable in terms of how much information was absorbed by the trainees or transmitted by the trainers. It is more than that! Firstly, it demonstrated the gaps related to ESPON knowledge between territorial development related disciplines (human and economic geography, regional and economic planning, social science, political science, territorial and place marketing, environmental management, GIS science etc.) in the academic field of the ESPON territory and others in the participating countries. Secondly, it highlighted, in cooperation with experts in the field who confirmed the importance of this training for their job activities and career development, the lack of such a tool. Further, as the Romanian/Greek participants claimed, the best part of the teaching/learning experience was the fact that ESPONTrain largely overcame the skepticism surrounding ESPON projects, clearly marked their limits and highlighted their benefits. But even more, the idea of a VLE gained ground amongst other ESPON transnational activities. USESPON is one example of this. The ESPONTrain VLE will be used again in USESPON to disseminate ESPON methods to a wider public (Kyvelou 2013).

Moreover, the ESPON family now recognises both the benefits of on-line ESPON education and the difficulties and constraints encountered through this experience. For example, the timeframe was too limited; this was mentioned both by trainers and trainees. There is real potential for ESPON-related education, for example a distance learning postgraduate programme or a series of distance learning seminars for the ESPON Monitoring Committee members. Since 70 % of the countries involved in the ESPONTrain Project were Mediterranean and Balkan (Greece, Italy, Slovenia, Cyprus, Malta, Romania, Bulgaria), and due to the positive response of the trainees and trainers in this region, an educational ESPON “pole of competence” in this region could be considered. This idea was warmly welcomed by invited politicians and participants during the final transnational ESPONTrain conference in Athens (ESPON 2013 b). This could help to take ESPON towards neighbouring countries, which is *a strategic goal of ESPON* (ESPON 2012).

Summing up, we can say that the ESPONTrain project helped to make some important target groups familiar with ESPON results and vocabulary. *It has also been a major input to achieving the strategic goals of ESPON: on the one hand introducing the next academic generation to ESPON-related research, and on the other hand contributing to the “European territory of tomorrow” by developing learning efforts directed towards higher education institutions* (ESPON 2013 b).

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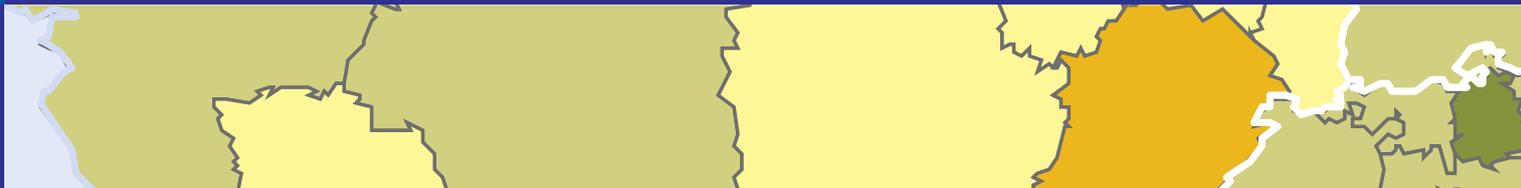
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Note:

All graphs derive from data collected through a questionnaire prepared by the ESPONTrain consortium for the needs of the educational programme’s evaluation and answered by ESPONTrain VLE users after the completion of the e-learning cycles.



www.espon.eu

The ESPON 2013 Programme supports policy development in relation to the aim of territorial cohesion and harmonious development of the European territory. It provides comparable information, evidence, analysis, and scenarios on territorial dynamics, which reveal territorial capitals and development potentials of regions and larger territories contributing.

This Scientific Report publishes 34 papers on understanding territorial realities, measuring territorial outcomes and revising science-policy translation. The papers have been prepared by researchers involved in ESPON projects and by authors from the European professional and academic organisations AESOP, ECTP-CEU, ERSA, EUGEO and RSA.

The ESPON Scientific Conference “Science in support of European Territorial Development and Cohesion” held on 12-13 September 2013 in Luxembourg has been used to present, discuss and reflect upon the papers.

The close cooperation with the European professional and academic organisations mentioned ensured an exchange of experiences with other scientific researchers in the same field and enabled all authors to sharpen the methodologies used and presented.

The purpose of this report is to communicate and discuss scientific elements such as concepts, methodologies, indicators, typologies, tools, maps and models developed and/or used within the ESPON projects and the European scientific research community in the field of territorial development and cohesion. As part of the dialogue on territorial development and cohesion you are welcome to engage with ESPON via www.espon.eu.

ISBN 978-2-919777-53-2