ETMS – Draft Final Report

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List of authors

Andreu Ulied (Mcrit)
Oriol Biosca (Mcrit)
Rafael Rodrigo (Mcrit)
Marta Calvet (Mcrit)
Berta Carreras (Mcrit)

Roger Milego (Universitat Autònoma de Barcelona, UAB)
Maria José Ramos (Universitat Autònoma de Barcelona, UAB)
César Martínez (Universitat Autònoma de Barcelona, UAB)

Erik Gløersen (Université de Genève, UNIGE)
Jacques Michelet (Université de Genève, UNIGE)

Alexandre Dubois (Nordregio)
Johanna Roto (Nordregio)
Linus Rispling (Nordregio)
Gunnar Lindberg (Nordregio)
Gustav Norlén (Nordregio)

Tomas Soukup (Gisat)
Ondrej Nalevka (Gisat)
Katerina Jupova (Gisat)

Kai Böhme (Spatial Foresight)
Sofie Jaeger (Spatial Foresight)
Nuno Madeira (Spatial Foresight)

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1 Introduction

1.1 Contents of the Draft Final Report

The Draft Final Report is submitted in June 2014, eighteen months after the beginning of the ESPON ETMS project (December 2012).

This report presents a detailed description of the design of the ETMS system and its products, including:

- ETMS System of indicators, associated to differentiated territorial structures and policy dimensions, and monitored along time
- ETMS Website, containing all current products of the ETMS and documentation, and reporting on project activities and deliverables
- ETMS Online Monitoring Tools:
    - Data Analysis in Maps
    - Data Analysis in Timelines
- ETMS Monitoring Reports:
    - Facts & Figures leaflet
    - State of the Territory report

This report is delivered together with all produced ETMS products, including 2 reports and 2 data analysis tools.

All materials available from the project website http://81.47.175.201/etms-project/.

1.2 Tasks accomplished by the delivery of DFR (June 2014)

By the time of the delivery of this DRF, the following task have been accomplished:

State of the Art

- Benchmark of monitoring resources available from reference providers (online platforms, mapping tools, monitoring reports and indicator factsheets). All references made available for ETMS users online from the project website (Virtual Library).
- Analysis of existing ESPON Tools, for consideration in the design of ETMS tools
- Stakeholder interviews, mostly responsible parties for existing reference monitoring systems, to gain knowledge for the design of ETMS tools

ETMS Design

- Definition of a set of core indicators for territorial monitoring (Compass Indicators)
- Definition of the temporal dimensions of the ETMS
    - 2000-2011 for indicators at regional level in Europe
    - 1960/2000-2011 for indicators at national level for Europe and the World
- Definition of the territorial dimensions of the ETMS (3 regional typologies at NUTS level, 5 typologies for regions with geographical specificities, European areas of regional cooperation and cities)
- Design of a user-friendly interface to access tools, documentation and reports. Several mock-ups generated.
- Bilateral discussion with ESPON service provider on technical solutions for the ETMS

ETMS Implementation

- User Interface module: Implementation of an online platform as a user friendly container for all project tools and reports, system documentation. (http://81.47.175.201/etms-project/). The user interface also provides proof of project activities and achievements.
- Datasets module: data at regional level (ESPON Area territorial monitoring) and at global level (Europe in the World) identified, gathered, harmonised and documented for the use in ETMS. All datasets documented according to ESPON DB formats.
- Indicators module, mathematic formulations programmed on the top of datasets defining
    - calculation protocols for Compass Indicators from datasets available in the DB,
    - aggregation rules for data at different territorial levels (NUTS)
    - aggregation rules to calculate typological averages
- Data Analysis modules, including:

- An *online mapping module* to generate maps of indicators by different kinds of territorial structures and typologies, with complementary and added-value functionalities in relation to already existing tools.
- An *online timelines module* to analyse and compare analytically average indicator values per different territorial typologies (e.g. urban-rural, transnational cooperation areas) and aggregates (e.g. ESPON, neighbourhood)

- Complementary information, relevant for users to contrast the direct outputs of the European Monitoring System with other sources.
  - A selection of *External Monitoring resources* is available at the ETMS Virtual Library. All resources are classified by Institution, Topic and Document type (e.g. report, indicators, factsheet, ranking).
  - *Qualitative Monitoring* was considered with the creation of an online repository of news in the Press directly related to each of the ETMS indicators and with a balanced distribution across Europe *(this resource is at the moment not included in the platform).*

ETMS Documentation

- All datasets used for the calculation of ETMS indicators are documented using ESPON DB metadata templates. This is intended to allow system maintenance, update and sustainability in the future.
- Design and Implementation of an online content manager (Alfresco account) to store all metadata, allowing the documentation of future updates.

ETMS Reports

- Facts and Figures leaflet, with syntheses of territorial developments in Europe using key maps and figures for 5 themes, namely economic competitiveness, human capital, social inclusion, accessibility and environmental sustainability.
- State of the Territory report, presenting key territorial developments in Europe in relation to the thematic objectives of the Territorial Agenda and goals of the EU2020 Strategy.

1.3 Activities towards the Final Report (September 2014) and Final Delivery (October 2014)

After the delivery of this Draft Final Report, the following tasks are foreseen, with indicative schedules:

ETMS Implementation

- Incorporation of pending indicators (e.g. soil sealing, accessibility, landscape fragmentation) (until August 2014)

- Consolidation of Data Analysis Modules, incorporating upgrades identified during the testing phase (task performed during September and October 2014)

Quality Control

- Validation of ETMS User Interface. The user interface will tested by a TPG team not directly involved on its design and implementation, aiming at identifying errors, leaks, and areas where improvement is needed for the functionality and user friendliness of the ETMS (task performed during July and August 2014)
- Validation of ETMS Tools, from two different dimensions:
    - Technology point of view. The aim of this activity is to identify areas of the tools not properly working or difficult to manage.
    - Thematic point of view. The indicators within the ETMS should be quality-checked, based on the results displayed by the tools (data consistency, data completeness, data documentation).
- Validation of Metadata. To ensure that all metadata is sufficiently clear and that the calculations of indicators can be performed by third parties in the future.
- Maintenance Report. A comprehensive manual which will include testing, quality control and maintenance of the whole system.
- Business Plan estimating the level of financial support needed to maintain alive the ETMS system after its delivery to ESPON CU

Reports

- From Drafts to Final versions of Facts&Figures and State of the Territory, based on the feed-back obtained from the ESPON MC and the ESPON CU.

2 Conceptualisation

2.1 Aim of the ETMS

The Project Specifications describes the objective as providing “a continuous monitoring of territorial trends and structures able to provide policy relevant information to target groups on key trends occurring for European regions, specific type of territories, metropolitan regions, cities and towns in relation to the policy aims and priorities of the Europe 2020 Strategy, EU Cohesion Policy and the TA 2020”.

ETMS covers the entire ESPON space, and is capable of continuous interpretation, assessment and communication of territorial development trends in relation to policy objectives related to Territorial Cohesion (in particular the Territorial Agenda 2020 and the EUROPE 2020 Strategy).

The work is to be understood as a practical and statistical exercise, a first step towards an operational Monitoring System at European for policy makers and policy analysts.

The ETMS is a system allowing the monitoring of the most important development trends for different types of regions, cities and territories, along time.

The ETMS has a thematic dimension (indicators), a policy dimension (policy questions) and a dimension directly related to the EUROPE2020 Strategy. In particular, the monitoring includes as far as possible headline indicators at regional levels.

2.2 Seven Steering Principles

1. **A fully working ETMS system**. The goal of the ETMS is to deliver a fully working monitoring system by October 2014 based on data available today in ESPON, EURSTAT, and other reference data providers (e.g. EEA, World Bank…). All necessary actions are being taken to accomplish this objective.

2. **Inheriting the experience of previous ESPON research**. The ETMS has considered the themes and sets of monitoring indicators developed in past research projects to draw its own monitoring architecture: INTERCO and SIESTA are at the beginning of this process, taking advantage of their intense work with stakeholders, and in order to include the EU2020 dimension.

3. **Drawing synergies with ESPON Monitors under development**. Themes and Indicators in ETMS are defined based on the findings and the experience of the BSR-TEMO project. CityBench is used as a reference for the inclusion of indicators at LUZ/MR levels.

4. **Assembling a robust database**. ETMS does not generate new data. Data in ETMS is obtained from reference data providers like ESPON DB, Eurostat and the World Bank.

5. **Making ETMS Indicators fully sustainable along time**. Indicators are computed on-house by the ETMS based on datasets imported from external data providers. In doing so, the system ensures sustainability (i.e. indicators are available) and consistency (i.e. indicators are computed always with the same methodology), as long as basic datasets remain available from providers (e.g. population, GDP…)

6. **A fully ESPON DB compliant ETMS database**. The ETMS database is ESPON DB compliant, meaning that if API interfaces became sufficiently mature it would be possible to import basic datasets into the ETMS database “on-the-fly” from ESPON DB.

7. **An adaptive ETMS system to new policy debates**. ETMS will discuss in-depth in its Sustainability Plan the necessary steps to allow adaptive monitoring activities in ESPON to ever evolving policy debates in Europe.

2.3 Conceptual development

Departing from the analysis of key policy concepts and priorities, based on the critical reading of official policy documents and past ESPON projects, a limited number of indicators is proposed to streamline the monitoring of most relevant trends in Europe in relation to today's basic territorial uncertainties, the so-called Compass Indicators.

The 28 Compass Indicators cover the following basic dimensions:

- **Economic competitiveness** (innovative, effective, resilient and open economies)
- **Environmental qualities** (energy efficiency, managing environmental quality, land and resource potentials)
- **Human capital** (people on move, ageing society, skills and education)
- **Social inclusion** (creating new jobs for all, living standards / territorial attractivity, promoting social and spatial inclusion, efficient modes of service provision)
- **Access to territory and services** (functional integration and accessibility, denser cooperation patterns, completing the digital infrastructure)

The ETMS has produced 4 products aimed at monitoring the evolution of these indicators in different territorial dimensions. The basic products and services provided by the ETMS are the following:

- **Facts&Figures booklet**. Intended for (a relatively frequent) publication in a standardised format integrating key figures and tables, and brief policy messages. It is based on the 5 Indictor Themes.

- **State of the Territory report**. Intended for (less frequent) publication as a longer in-depth analysis of territorial evolutions in Europe, from the different perspectives of the Territorial Agenda and in the framework of the EU2020 Strategy.

- **Data Analysis in Maps**. It allows interactively generating maps for the indicators in ETMS, and graphically exploring and benchmarking data online based on different territorial typologies defined at NUTS level and for territories with specificities.

- **Data Analysis in Timelines**. It allows quickly exploring trends for ETMS indicators based on analytic timelines calculated as averages of indicators for different territorial typologies (e.g. mountains, rural regions, regions within the BSR).

  This module also includes a set of Europe in the World indicators, where ESPON averages are compared to other world aggregates, like the Neighbourhood, the BRICs or non-European economies in the G7.

All these products are integrated in the ETMS online web platform (http://81.47.175.201/etms-project/)

3 An Indicator System for ETMS

3.1 Introduction

- In section 3.2 of these chapter the list of Compass indicators is presented
- The geographic dimension of Compass indicators is shown in section 3.2.2, mostly which indicators can be expected to be available at which territorial scale.
- The policy dimension of Compass indicators is shown in section 3.4, mostly how they relate to the main policy debates currently ongoing
- The EU2020 dimension of Compass indicators is shown in section 3.5, mostly indicators fit in the framework of the strategy (pillars & headline indicators)
- In section 3.6, the choice of Compass indicators in ETMS is contrasted to past and ongoing research projects in ESPON

3.2 ETMS Compass indicators

3.2.1 Overview

The ETMS Compass Indicators incorporate in the ETMS are presented in the next table.

Table 1. COMPASS Indicators for Territorial Monitoring

Theme	Indicator
Economic Competitiveness	Central Government Debt
	Public cash surplus/deficit
	Domestic credit to private sector
	Balance of Accounts
	Foreign Direct Investment
	Total R&D expenditure
	GDP per capita in PPS
	GDP-PPS per person employed
	Employment in primary sector
	Employment in secondary sector
	Employment in tertiary sector
Environmental Qualities	Share of Renewable Energy in Final Energy Consumption
	Air pollution: PM10
	Degree of soil sealing
	Landscape fragmentation
Human Capital	Net migration rate
	Total population change
	Birth rate
	Old age dependency ratio (ODR)
	Persons aged 30-34 with tertiary education attainment
Social Inclusion	Employment rate 20-64 years
	Elderly employment rate (55-64 years)
	Difference between female and male employment rates
	Young unemployment rate (15-24 years)
	Disposable household income per capita
	At-risk-of-poverty rate

Access to territory and services	Population potential within 45 minutes
	Access to MUAs
	Air connectivity with 45 minutes drives
	Accessibility to airport hubs (intercontinental flights)
	Accessibility to ports (extra EU containers)
	Air traffic at major airports
	Container traffic at major ports
	Households with broadband access
	Cooperation intensity (ETC)

3.2.2 Indicator descriptions

Economic Competitiveness

Central government debt: Central government debt is defined as total amount of public debt as percentage of Gross Domestic Product (GDP). The unit of the indicator is percentage (%) and metadata are from Eurostat and World Bank.

Public cash surplus/deficit: Public deficit / surplus refer to difference between government receipts and government spending in a single year, defined as percentage of Gross Domestic Product (GDP). The term deficit is used when the government spending exceeds revenues over a period of time defined. The terms surplus is used then the government revenues overcome spending, during the same period of time. The unit of the indicator is percentage (%) and metadata are from World Bank.

Domestic credit to private sector: Domestic credit provided by the banking sector includes all credit to various sectors on a gross basis, with the exception of credit to the central government. The unit of the indicator is defined as percentage of GDP (%) and metadata are from World Bank.

Balance of Accounts: Current account balance is the sum of net exports of goods and services, net primary income, and net secondary income. The unit of the indicator is defined as percentage of GDP (%) and metadata are from Eurostat and World Bank.

Foreign Direct Investment: this indicator is defined as investment into production or business in a country by an individual or company of another country, either by buying a company in the target country or by expanding operations of an existing business in that country. The unit of the indicator is defined as percentage of GDP (%) and metadata are from World Bank.

Total R&D expenditure: this indicator is defined as total amount of investment (booth public and private investment) in research and experimental development (R&D). The unit of the indicator is defined as percentage (%) of Gross Domestic Product (GDP) and metadata are from Eurostat and World Bank.

GDP per capita in PPS: it is the ratio between the level of gross domestic product (GDP), expressed in purchasing power standards, and total population. The unit of the indicator is euros per capita and metadata are from Eurostat, Swiss Statistics, OECD Regional Database, ESPON M4D, institute of Statistics of Albania, Statistical Office of the Republic of Serbia and World Bank.

GDP-PPS per person employed: it is the ratio between the level of gross domestic product, expressed in purchasing power standards, and persons employed. The unit of the indicator is euros per person employed and metadata are from World Bank.

Employment in primary sector: this indicator is defined as employed persons aged 15 and over who works in the primary sector. The unit of the indicator is percentage (%) and metadata are from Eurostat, Landesverwaltung Fürstentum Liechtenstein, Statistical Office of the Republic of Serbia and Albanian Statistics,

Employment in secondary sector: this indicator is defined as employed persons aged 15 and over who works in the secondary sector. The unit of the indicator is percentage (%) and metadata are from Eurostat, Landesverwaltung Fürstentum Liechtenstein, Statistical Office of the Republic of Serbia and Albanian Statistics.

Employment in tertiary sector: this indicator is defined as employed persons aged 15 and over who works in the tertiary sector. The unit of the indicator is percentage (%) and metadata are from Eurostat, Landesverwaltung Fürstentum Liechtenstein, Statistical Office of the Republic of Serbia and Albanian Statistics.

Environmental Qualities

Share of Renewable Energy in Final Energy Consumption: This indicator is calculated on the basis of energy statistics covered by the Energy Statistics Regulation. It may be considered an estimate of the indicator described in Directive 2009/28/EC, as the statistical system for some renewable energy technologies is not yet fully developed to meet the requirements of this Directive. However, the contribution of these technologies is rather marginal for the time being. The unit of the indicator is percentages and metadata are from Eurostat and Swiss Statistics.

Air pollution: PM10*:* Average number of days in the year where pollutants concentrations exceed limit/target values, figures are shown at city level (time serie). Pollutants that have been taken into account are PM10, SO_2 and O_3. Indicators included are: Number of average days where PM10 concentrations exceeds 50 µg/m^3, Number of average days where SO_2concentrations exceeds 125 µg/m^3 and Number of average days where O_3 concentrations exceeds 120 µg/m^3.

Degree of soil sealing*:* Soil sealing (imperviousness) area and percentage for the years 2006 and 2009, plus soil sealing change by municipalities (LAU2). The information comes from the soil sealing data calculated from photointerpretation at 20m resolution and aggregated at 100m. Originally defined in % of sealed surface.

Landscape fragmentation: Level of landscape fragmentation caused by anthropogenic and natural barriers for 2009. Complex calculation using MESH index that gives a precise idea on how the landscape is fragmented. It includes landscape fragmentation caused by major anthropogenic barriers (major roads, urban areas and railways), landscape fragmentation caused by major and minor anthropogenic barriers (major roads and minor roads, urban areas and railways) and landscape fragmentation caused by natural barriers (major lakes and rivers, high mountains) and all anthropogenic barriers (major roads and minor roads, urban areas and railways).

Human Capital

Net migration rate*:* It is a general estimation of the net migration based on the difference between population change and natural change between two dates. The unit of the indicator is the number of persons and metadata are from Eurostat, Turkstat, Statistics Norway, Statistics Netherlands, Kosovo Agency of Statistics and Statistics Iceland.

Total population change*:* It is the amount of total population in both sexes. The unit of the indicator is inhabitants and metadata are from Eurostat and from Kosovo Agency of Statistics.

Birth rate*:* it is the ratio between total numbers of births and thousand of population each year. The unit of the indicator is ‰ and metadata are from Eurostat, ESPON M4D, Statistische Amter

des bundes und der Länder, Statistics Denmark, UK National Statistics, Turkish Statistical Institute, Statistic Office of the Republic of Serbia, Kosovo Agency of Statistics, Institute for Statistics of FB&H, INSTAT, and STATBE.

***Old age dependency ratio (ODR)**:* ODR indicator is defined as share of >64 in relation to total population aged 15-64. The unit of the indicator is % and metadata are from Eurostat, Nordregio and Statistical Office of the Republic of Serbia.

***Persons aged 30-34 with tertiary education attainment**:* The percentage of the population aged 30-34 years who have successfully completed university of university-like (tertiary-level) education with and education level ISCED 5 or 6. The unit of the indicator is percentage (%) and metadata are from Eurostat, Amt für Statistik Fürstentum Liechtenstein, and Statistical Office of the Republic of Serbia.

Social Inclusion

***Employment rate 20-64 years**:* Percentage of people between 20-64 years employed in relation to total population 20-64 years. The unit of the indicator is percentage (%) metadata are from Eurostat, Amt für Statistik Liechtenstein and ESPON ETMS.

Elderly employment rate (55-64 years): Percentage of people between 55-64 years employed in relation to total population 55-64 years. The unit of the indicator is percentage (%) and metadata are from Eurostat, Amt für Statistik Liechtenstein and ESPON ETMS.

***Difference between female and male employment rates**:* Percentage of female employed in relation to total female population and male in relation to total male population. The unit of the indicator is percentage (%) and metadata is from Eurostat, Amt für Statistik Liechtenstein and ESPON ETMS.

Youth unemployment rate (15-24 years): Percentage of unemployed population aged 15-24 years in relation to total labour force aged 15 -24 years old. The unit of the indicator is percentage (%) and metadata are from Eurostat and Amt für Statistik Liechtenstein.

***Disposable household income per capita**:* It is the amount of money left available within the household sector for spending or saving, after expenditure associated with income. The unit of the indicator is euros per capita and metadata is from Eurostat and Swiss Statistics.

***At-risk-of-poverty rate**:* Percentage of population at risk of poverty rate defined asXXX in relation to total population. The unit of the indicator is a percentage (%) of total population and metadata is from Eurostat.

Accessibility

***Population potential within 45 minutes**:* The population potential at one place is the sum of the ratios of population at all other points to the distances from the place in question to those points to less than 45 minutes. The unit of the indicator is population and metadata is from Geospecs.

***Access to MUAs**:* This indicator provides information on the location of very low-income individuals with high health care need even among a sample of Medicaid-insured children with an identified health care provider. The unit of the indicator is population and metadata is from Geospecs.

***Air connectivity with 45 minutes drives**:* It represents the connectivity between each country with their outside during less than 45 minutes through the air. The unit of the indicator is population and metadata is from Geospecs.

***Accessibility to airport hubs (intercontinental flights)**:* Global Passenger Accessibility is an indicator of Potential Accessibility to extra-EU27 air passengers. This indicator is a proxy to the availability of intercontinental air seats reachable from each NUTS2 in Europe. It refers to the possibilities to travel to global destinations from each NUTS2 in Europe. The unit of the indicator is "weighted passengers" and metadata is from ESPON Database.

Accessibility to ports (extra EU containers): Global Freight Accessibility is an indicator of Potential Accessibility to extra-EU27 Standarised Containers (TEU). This indicator is a proxy to the availability of intercontinental maritime transport services reachable from each NUTS2 in Europe. It refers to the possibilities of territories across Europe of having convenient transport services for global exports. The unit of the indicator are “weighted TEUs” and metadata is from ESPON Database.

***Air traffic at major airports**:* This indicator accounts for air passengers at airports are in Europe during one year. Both landing and departing passengers are considered. The unit of the indicator is total passengers and the metadata is from EUROSTAT.

Container traffic at major ports: This indicator accounts for freight container throughput at ports during one year, measured in TEUs (twenty feet equivalent units). The unit of the indicator is thousands of tonnes and metadata is from EUROSTAT.

***Households with broadband access*:** This indicator accounts the number of houses with broadband access. The unit of the indicator is percentage (%) and metadata is from EUROSTAT.

Cooperation intensity (ETC): This indicator refers to the number of common projects within INTERREG IIIC.

3.3 The Geographic Dimension of Compass Indicators

3.3.1 Overview

Compass indicators are calculated based on basic core data sets imported from reference data providers, e.g. ESPON DB, EUROSTAT, World Bank. Indicators are calculated at the lowest territorial scale possible allowed by available core data sets. Higher territorial scales are then calculated from these former, following addition criteria specifically determined for each indicator.

A number of macro-economic indicators are analysed at NUTS0 level for contextualisation of ESPON countries in the Rest of the World. The following groups are considered:

- ESPON countries
- European Neighbourhood (based on the outcomes of ITAN project)
- Advanced economies (non European countries in the G7)
- Emerging economies (the BRICs, Brasil, Russia, India and China)
- Other countries

For indicators at NUTS level the ETMS allows analysis based on existing NUTS-based territorial typologies. The following are currently implemented in the system:

- Urban-rural classifications (according to OECD “predominantly urban, predominantly rural, intermediate”; according to DG Regio “urban, intermediate close to a city, intermediate remote, rural close to a city, rural remote”)
- Metropolitan Regions (according to Eurostat “Capital cities, 2nd Tier Cities, Small metros and other metros”)
- Structural Funds Eligibility (according to 2014-2020 budgetary programme, “less developed, transition and more developed” regions; according to 2007-2013 programme, “convergence, phasing-out, regional competitiveness / employment regions, phasing-in”)
- Transnational Cooperation Areas (according to 2014-2020 budgetary programme, e.g. Baltic, Danube, Alpine space, Adriatic-Ionian; and according to 2007-2013 programme)

For indicators were territorial resolution is available at LAU, the ETMS will also provides figures for other territories with geographical specificities as defined in the GEOSPECS project[1]:

- Mountains, islands, coastal areas and sparsely populated areas

Data at city level is based on data available at LUZ level.

[1] Dijkstra L., Poelman H. (2008); *Remote Rural Regions: how proximity to a city influences the performance of rural regions*, Regional Focus nº01/2008. http://ec.europa.eu/regional_policy/sources/docgener/focus/2008_01_rural.pdf

Table 2. Geographic dimension of Compass Indicators

ETMS Indicator	**Rest of World**	**NUTS0**	**NUTS2**	**NUTS3**	**LAU2**	**Urban-rural based on DG Regio** *(predominantly urban, intermediate close to a city/ remote, predominantly rural etc /remote)*	**Metropolitan Regions based on Eurostat** (Capital city region, second-tier metro, smaller-metro, non-metro)	**Structural Funds Eligibility 2014-2020** *(less developed, transition, more developed)*	**Structural Funds Eligibility 2007-2013** *(convergence regions, phasing-out regions, phasing-in regions, competitiveness and employment regions)*	**Regions with territorial specificities** *(mountains, islands, sparsely populated areas, coastal areas)*	**Cities as defined by Urban Audit**	**Transnational Cooperation Areas 2014-2020** *(Baltic, Danube, Alps, Adriatic-Ionic)*	**Transnational Cooperation Areas** *2007-2013 (Northern Periphery, Baltic Sea, North West Europe, Mediterranean ...)*
Central Government Debt	x	x											
Public cash surplus/deficil	x	x											
Domestic credit to private sector	x	x											
Balance of Accounts	x	x											
Foreign Direct Investment	x	x											
Total R&D expenditure	x	x	x			x	x	x	x			x	x
GDP per capita in PPS	x	x	x	x		x	x	x	x			x	x
GDP-PPS per person employed	x	x	x			x	x	x	x			x	x
Employment in primary sector		x	x		x	x	x	x	x	x	x	x	x
Employment in secondary sector		x	x		x	x	x	x	x	x	x	x	x
Employment in tertiary sector		x	x		x	x	x	x	x	x	x	x	x
Share of Renewable Energy in Final Energy Consumption		x	x			x	x	x	x			x	x
Air pollution: PM10					x						x		
Degree of soil sealing					x					x	x		
Landscape fragmentation					x					x	x		
Net migration rate				x		x	x	x	x			x	x
Total population change	x	x	x	x	x	x	x	x	x	x	x	x	x
Birth rate		x	x	x		x	x	x	x			x	x
Old age dependency ratio (ODR)		x	x	x	x	x	x	x	x	x	x	x	x
Persons aged 30-34 with tertiary education atteinment		x	x			x	x	x	x			x	x
Employment rate 20-64 years		x	x			x	x	x	x			x	x
Elderly employment rate (55-64 years)		x	x			x	x	x	x			x	x
Differences between female to male employment rates		x	x			x	x	x	x			x	x
Young unemployment rate (15-24 years)		x	x			x	x	x	x			x	x
Disposable household income per capita		x	x			x	x	x	x			x	x
At-risk-of-poverty rate		x	x			x	x	x	x			x	x
Population potential within 45 minutes					x					x			
Access to MUAs					x					x			
Air connectivity (with 45 minutes drives)					x					x			
Accessibility to airport hubs (intercontinental flights)			x			x	x	x	x			x	x
Accessibility to ports (extra EU containers)			x			x	x	x	x			x	x
Air traffic at major airports					x						x		
Container traffic at major ports					x						x		
Households with broadband access			x			x	x	x	x			x	x
Cooperation intensity (ETC)			x			x	x	x	x			x	x

3.3.2 Typology Descriptions

3.3.2.1 Urban/rural Regions

Typology entry point: Administrative regions

Typology name: urban/rural

Author: DG Regio

Defined at geographical level: NUTS3

Adoption to other geographical levels: at NUTS 2 by Netherlands Interdisciplinary Demographic Institute (NIDI)

Typology types:

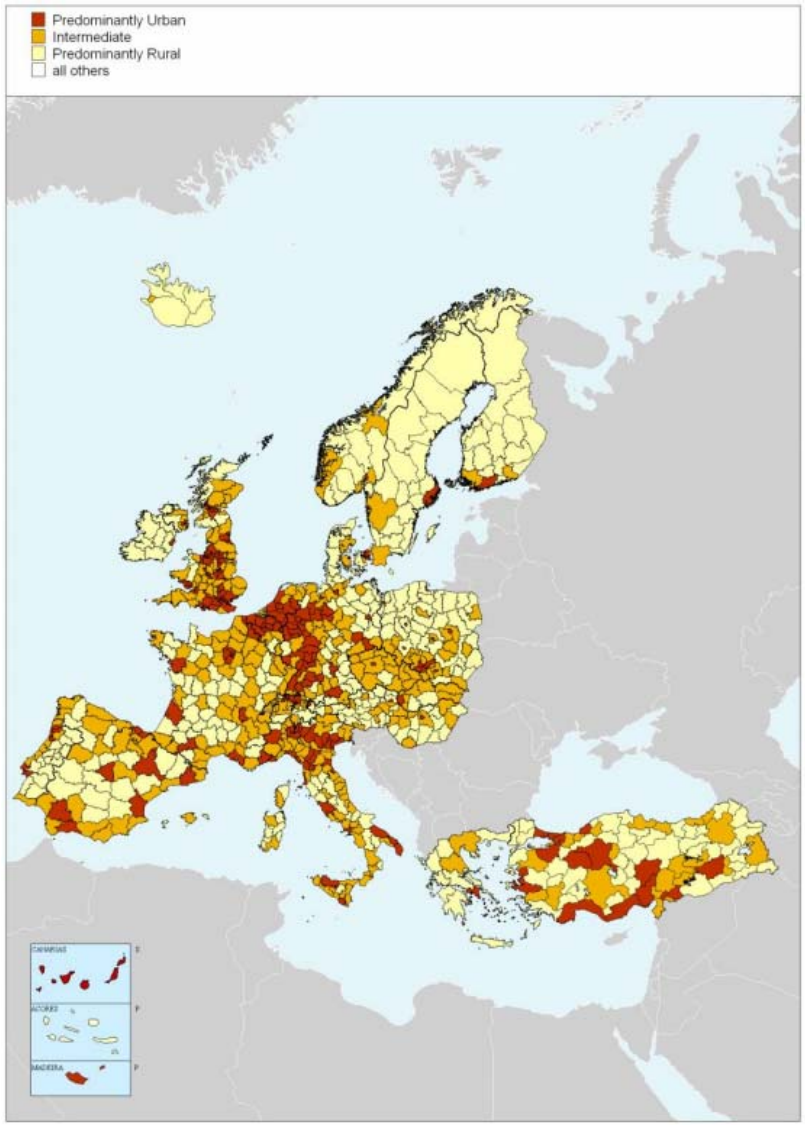
- Urban *(<20% LAU2 are rural)*
- Intermediate close to a city *(between 20% to 50% LAU2 are rural & >50% LAU2 are less than 45 minutes drive from 50.000 inhabitant city)*
- Intermediate, remote regions *(between 20% to 50% LAU2 are rural & <50% LAU2 are less than 45 minutes drive from 50.000 inhabitant city)*
- Rural close to a city *(>50% LAU2 are rural & >50% LAU2 are less than 45 minutes drive from 50.000 inhabitant city)*
- Rural, remote regions *(>50% LAU2 are rural & <50% LAU2 are less than 45 minutes drive from 50.000 inhabitant city)*

References:

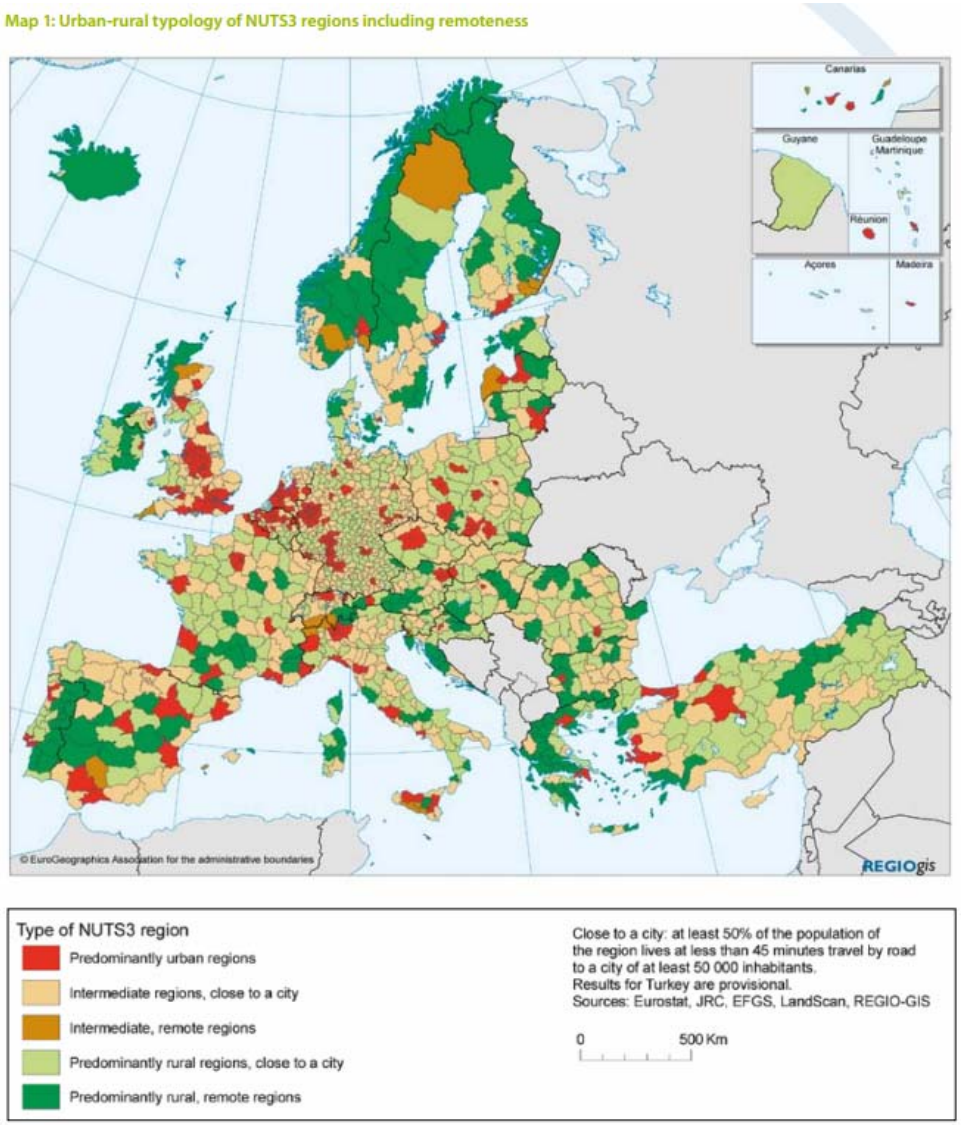
- OECD regional typology
- Regional Focus by Lewis Dijkstra & Hugo Poelman
- Classification of urban/rural NUTS 2 by NIDI

Comments: -

Urban Rural typology by OECD



Urban Rural typology by DG Regio



3.3.2.2 Metropolitan Regions

Typology entry point: Administrative Regions (NUTS)

Typology name: Typology on Metropolitan Regions

Author: DG Regio

Defined at geographical level: NUTS3

Adoption to other geographical levels: ESPON ETMS

Typology types:

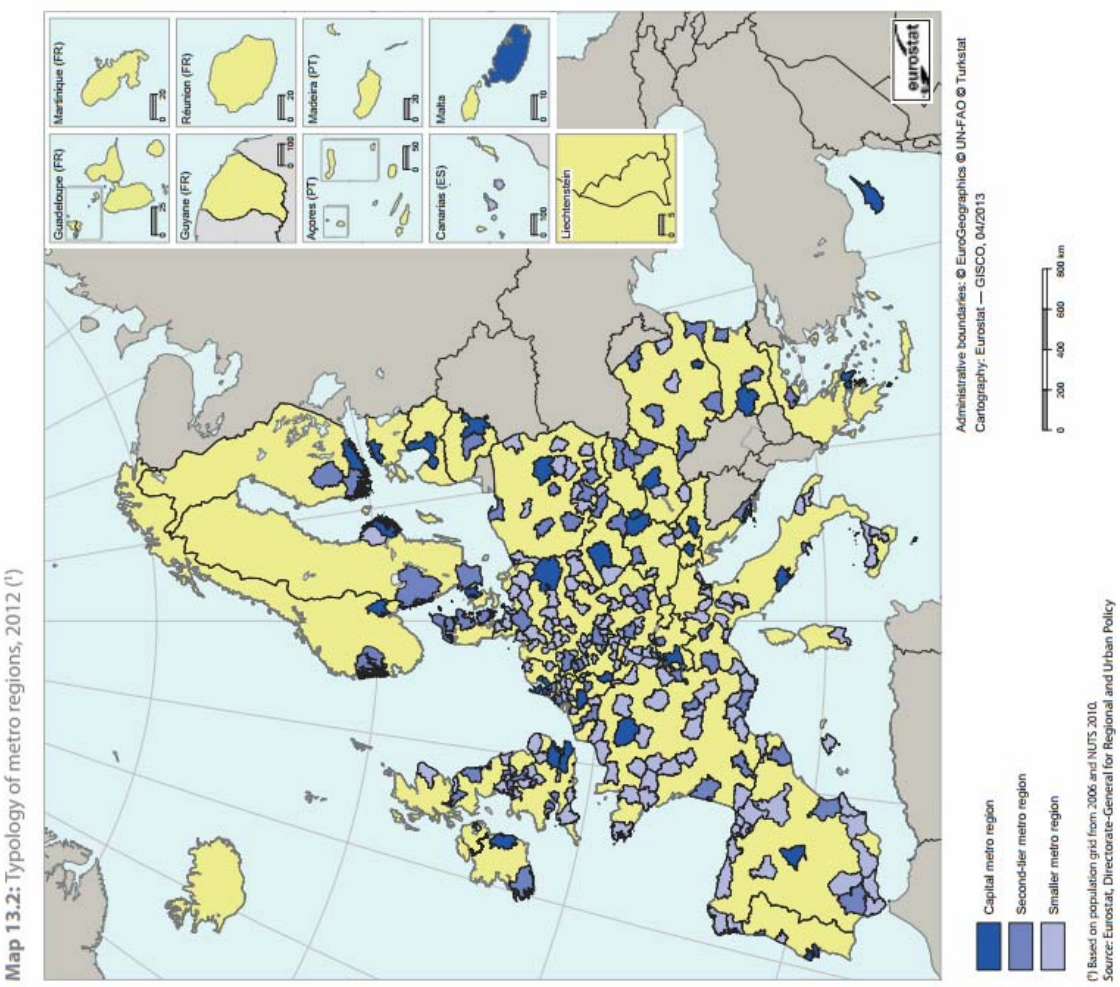
- Capital metro region *(national capital)*
- Second-tier metro region *(group of largest cities in a country, excluding the capital)*
- Smaller metro region *(a natural break served the purpose of distinguishing the second tier from the smaller metro regions)*
- Other metros *(all other not included in one of the previous categories)*

References:

- Focus on cities and metro regions by Eurostat

Comments: Based on population grid from 2006 and NUTS 2010

Metropolitan regions typology by Eurostat



3.3.2.3 Structural Funds

Typology entry point: Administrative regions

Typology name: Structural Funds (ERDF & ESF) eligibility

Author: DG Regio

Defined at geographical level: NUTS 2

Adoption to other geographical levels: -

Typology types:

- Less developed regions *(GDP/head <75% of EU-27 average)*
- Transition regions *(GDP/head between 75% and 90% of EU-27 average)*
- More developed regions *(GDP/head >= 90% of EU-27 average)*

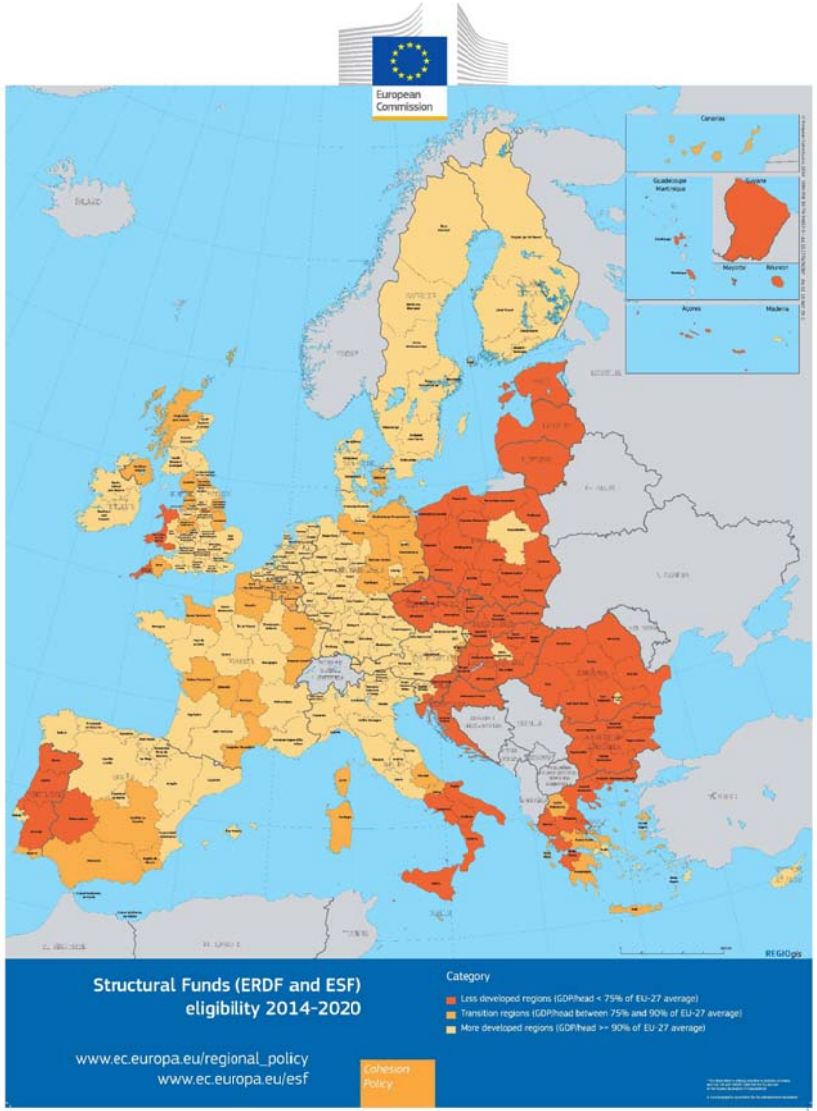
References:

- NSRF (National Strategic Reference Framework)
- ERDF (European Regional Development Fund)
- ESF (European Social Fund)

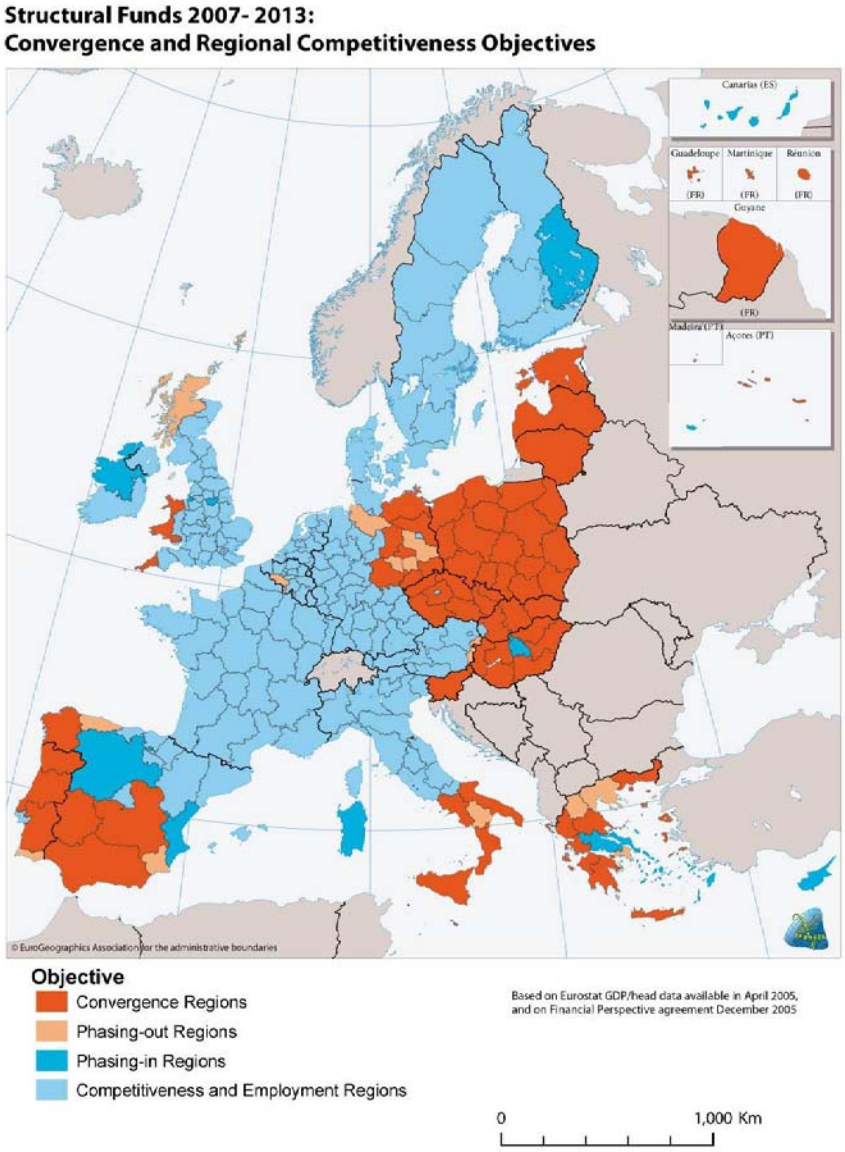
Comments: also included as a reference the eligibility typology of the budgetary period 2007-2013, including the following typology types:

- Convergence Regions
- Phasing-out Regions
- Phasing-in Regions
- Competitiveness and Employment Regions

Structural Funds Eligibility 2013-2020 Programme



Structural Funds Eligibility 2007-2013 Programme



3.3.2.4 Regions with Geographical Specificities

Typology entry point: Geographical Regions

Typology name: ESPON Typology Compilation

Author: ESPON GEOSPECS (University of Geneva) // ESPON Typology Compilation

Defined at geographical level: aggregation of LAU2 (GEOSPECS) // NUTS3 (ESPON Typology Compilation)

Adoption to other geographical levels: to NUTS2, by ESPON ETMS

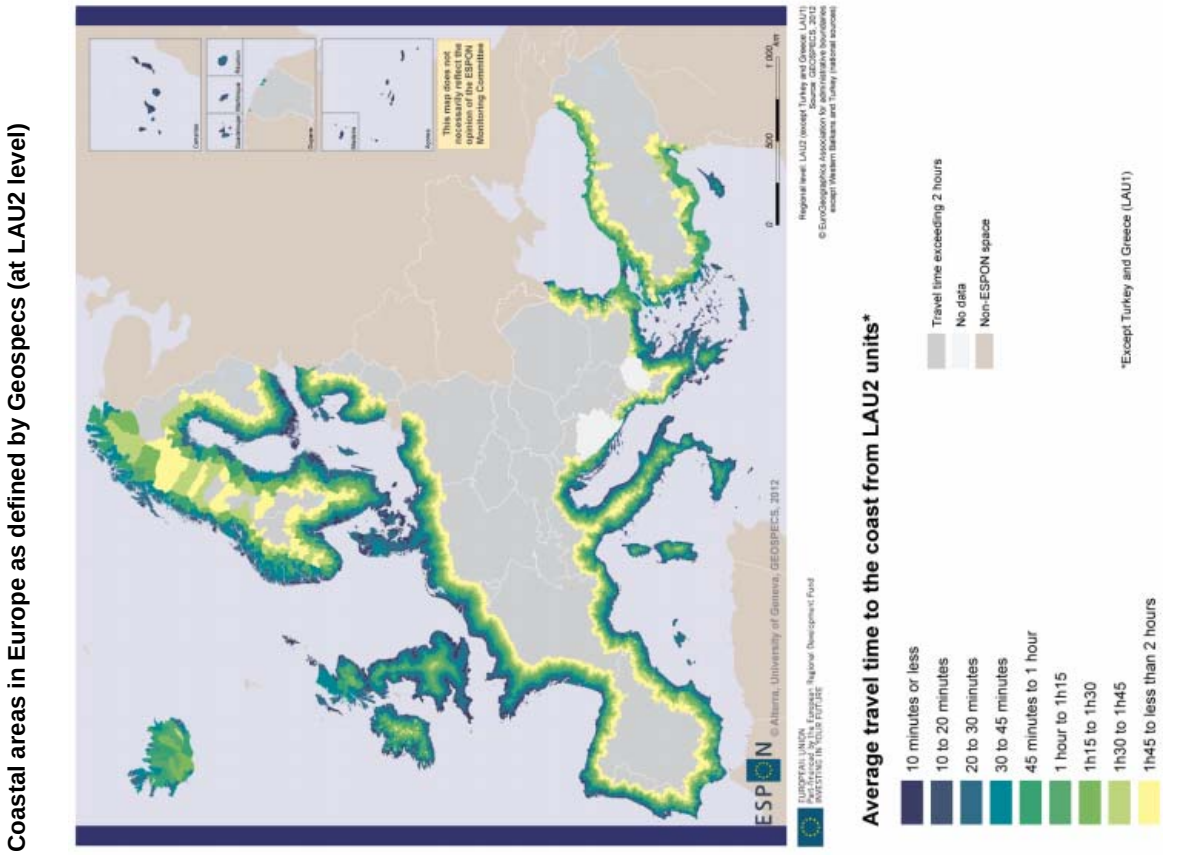
Typology types:

- Mountains
- Islands
- Coastal regions
- Sparsely populated areas (SPA)

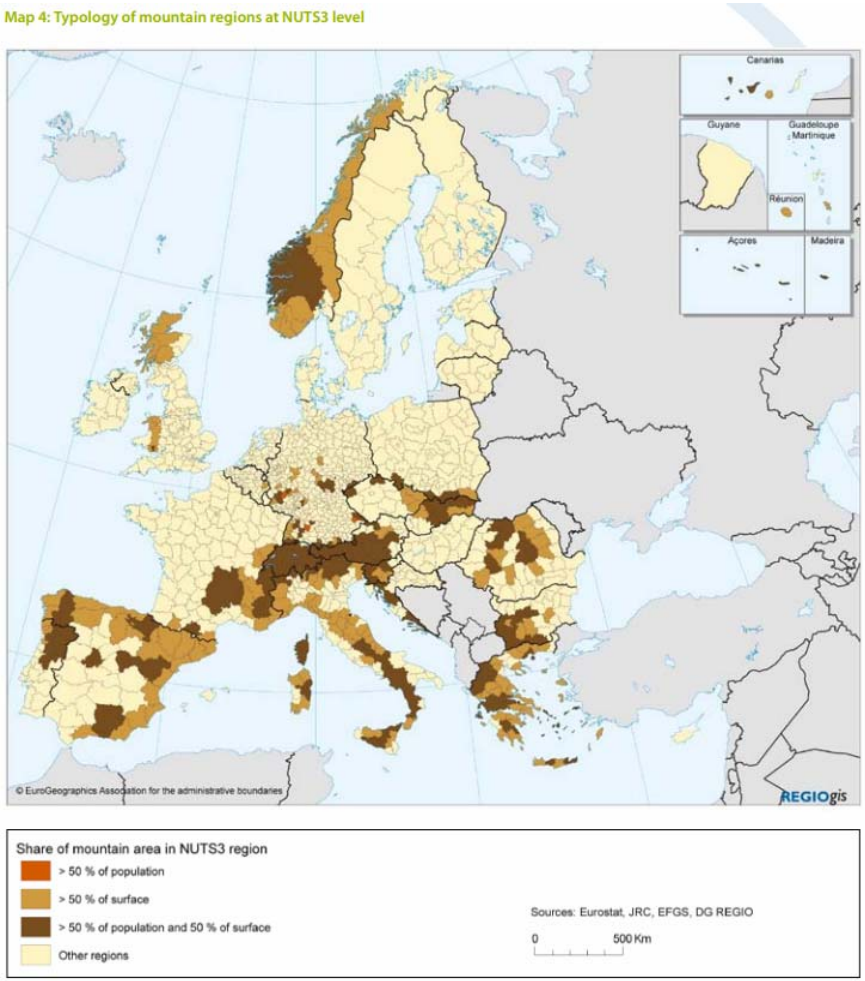
References:

- GEOSPECS (European Perspective on Specific Types of Territories)
- Focus on cities and metro regions by Eurostat

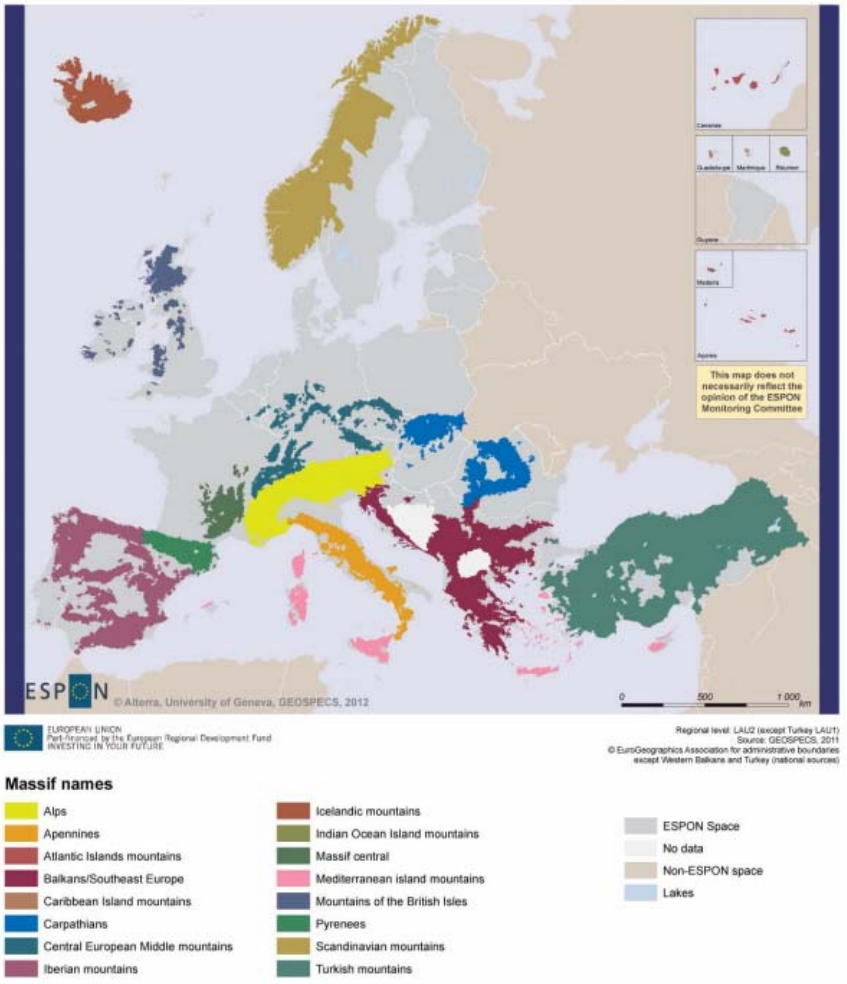
Comments: -



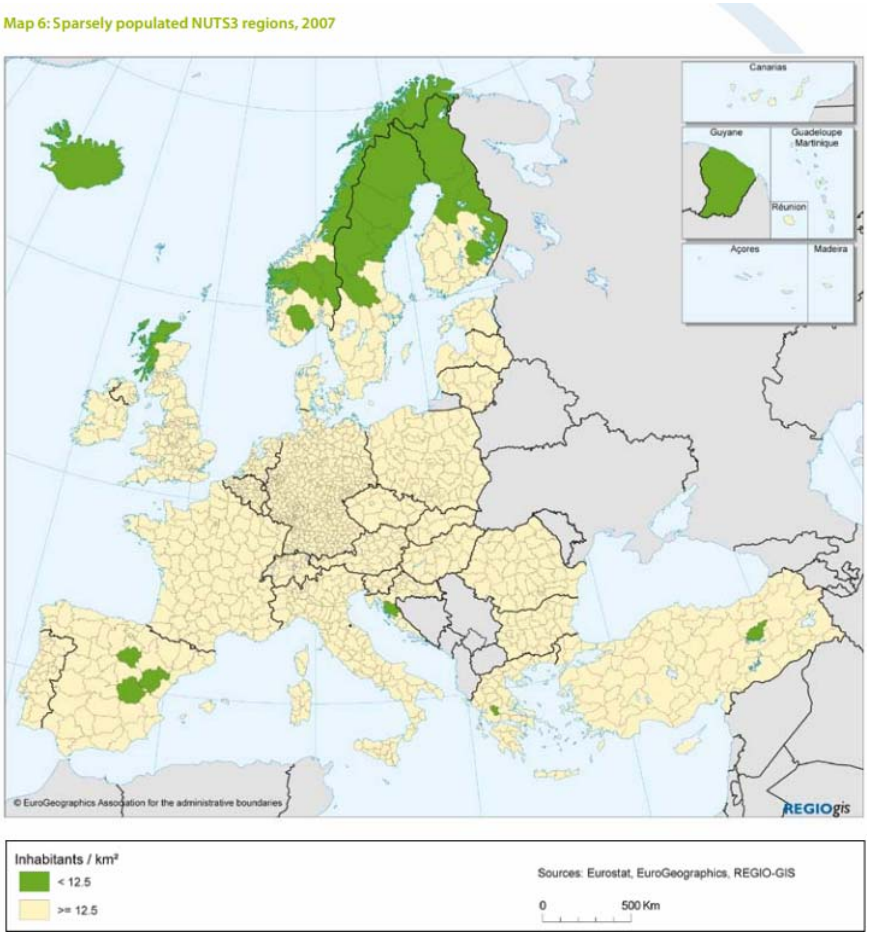
Mountain areas in Europe as defined by the ESPON typology compilation (at NUTS3 level)



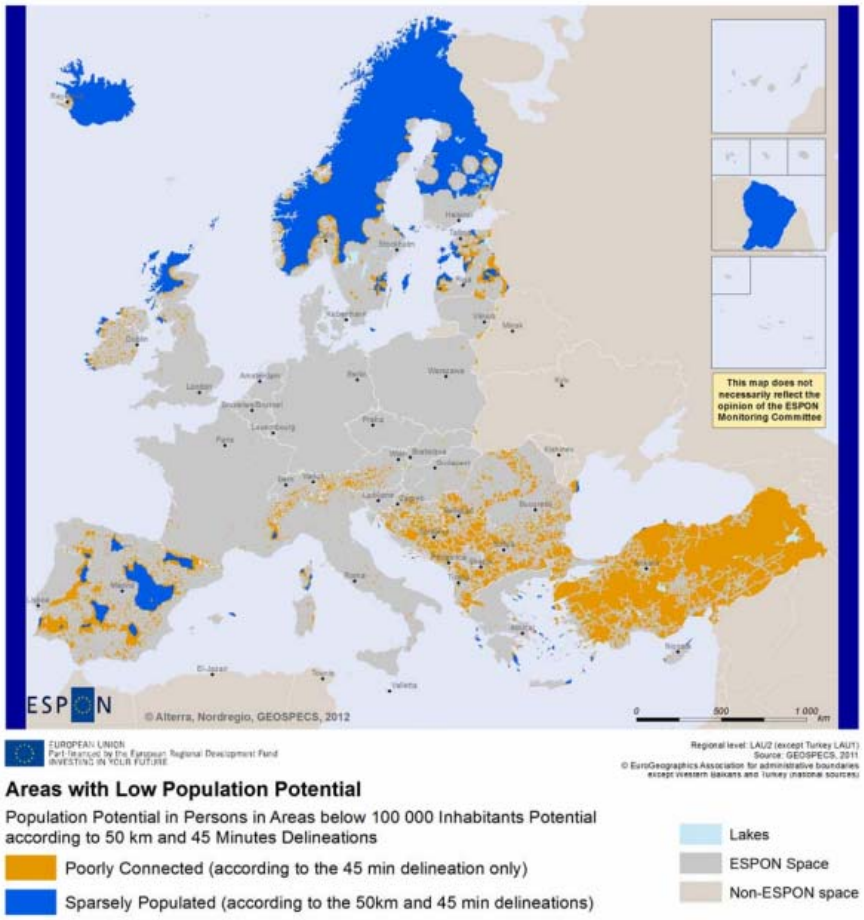
Mountains in Europe as defined by Geospecs (at LAU2 level)



Sparsely Populated areas in Europe as defined by the ESPON typology compilation (at NUTS3 level)

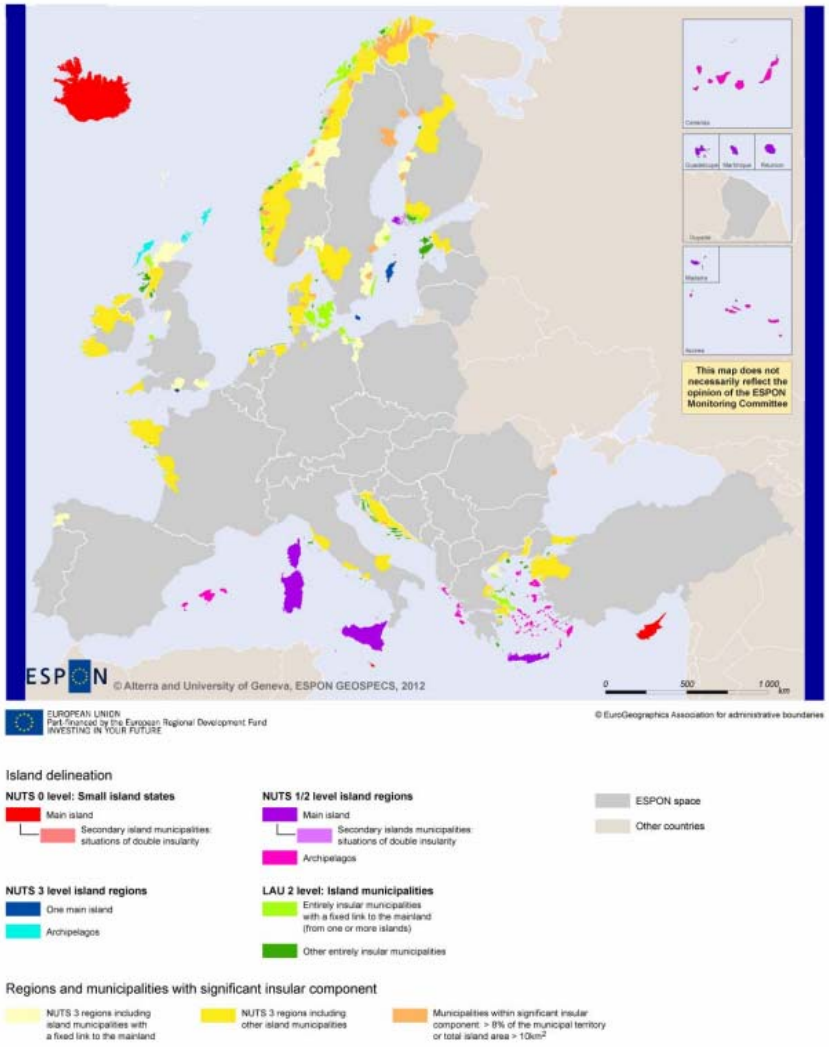


Sparsely Populated areas in Europe as defined by Geospecs (at LAU2 level)



Islands in Europe as defined by the ESPON typology compilation (at NUTS3 level)

Islands in Europe as defined by Geospecs (at LAU2 level)



3.3.2.5 Transnational Cooperation Areas

Typology entry point: Transnational cooperation areas

Typology name: Macro-regions

Author: DG-Regio

Defined at geographical level: NUTS2 and NUTS3

Adoption to other geographical levels: -

Typology types:

- North Sea, Northern Periphery and Arctic, Baltic Sea, North West Europe, Alpine Space, Danube, Atlantic Area, Central Europe, Adriatic-Ionian, South West Europe, Mediterranean, Balkan-Mediterranean, Caribbean Area, Amazonia, Indian Ocean Area

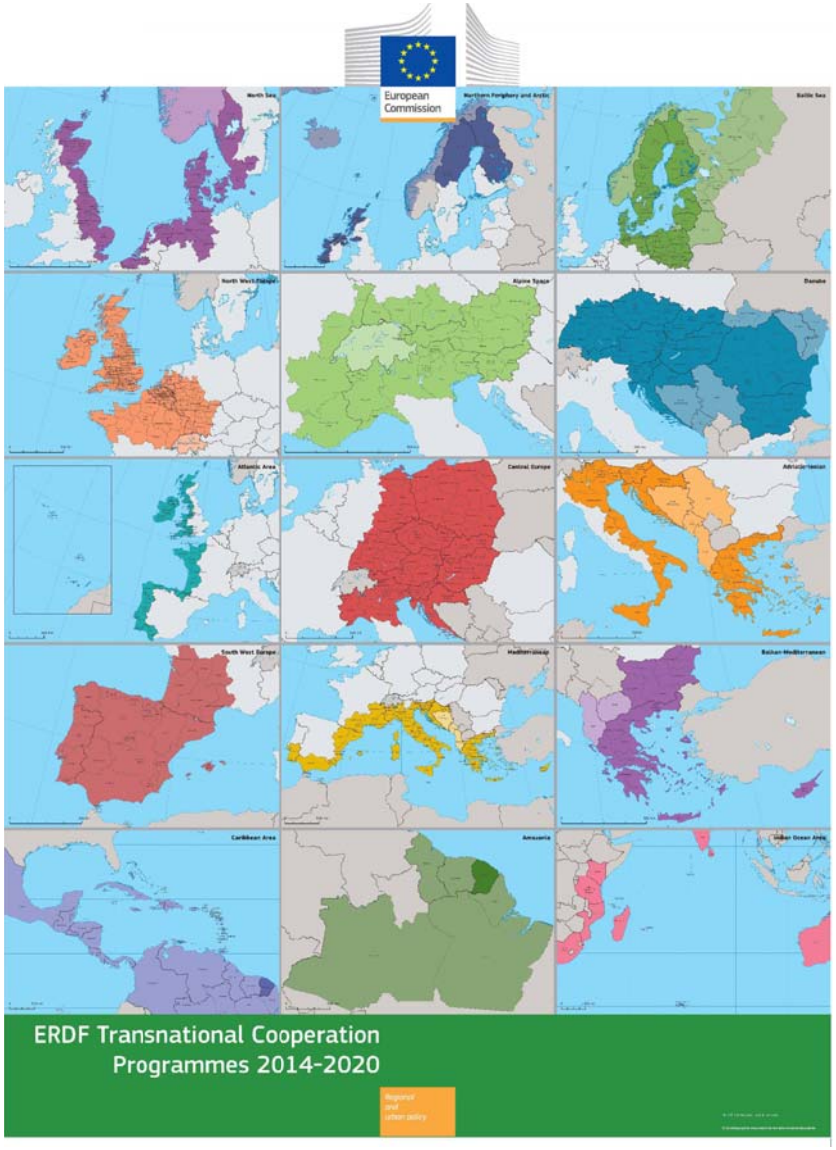
References:

- Baltic Sea Region
- Danube Basin
- Alpine Space Programme
- Adriatic Ionian Macroregion Area

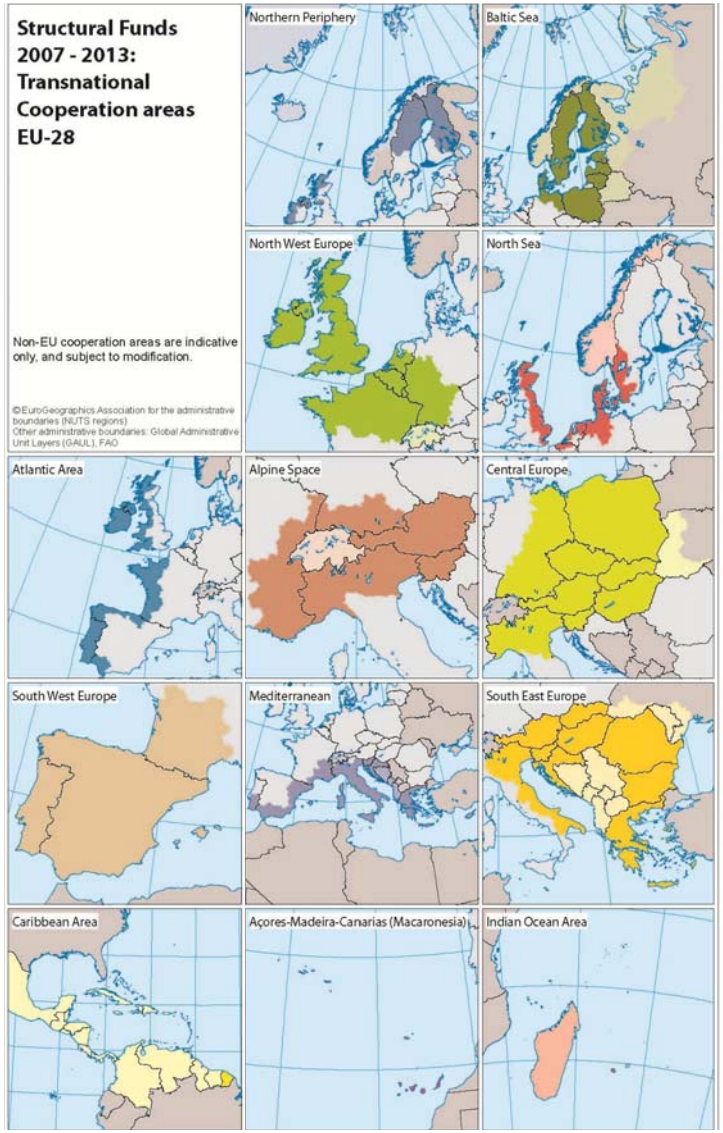
Comments: also included as a reference the eligibility typology of the budgetary period 2007-2013, including the following typology types:

- Northern Periphery, Baltic Sea, North West Europe, North Sea, Atlantic Area, Alpine Space, Central Europe, South West Europe, Mediterranean, South East Europe, Caribbean Area, Açores-Madeira-Canarias (Macaronesia) Indian Ocean Area

Transnational Cooperation Programmes 2014-2020



Transnational Cooperation Programmes 2007-2013



3.3.2.6 Cities (as in LUZ)

Typology entry point: Cities

Typology name: LUZ harmonized delineations

Author: ESPON Data Base

Defined at geographical level: aggregation of LAU2

Adoption to other geographical levels: -

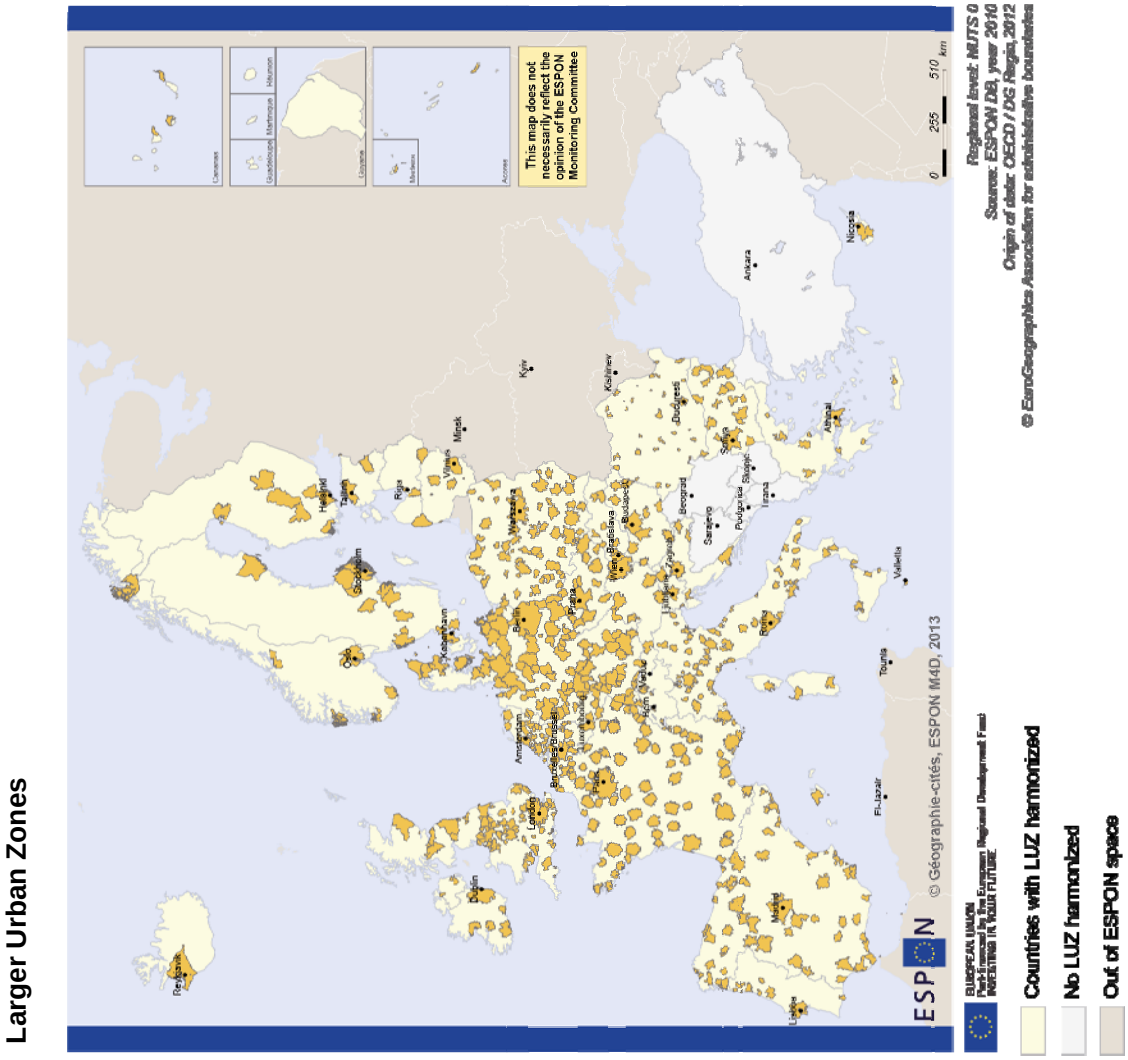
Typology types:

- Countries with LUZ harmonized
- No LUZ harmonized

References:

- ESPON

Comments: -



3.4 The Policy Dimension of Compass Indicators

The list of policy issues to be monitored for each type of regions, cities and territories emerges in ETMS from the review of key European policy documents, in line with the specific requirements made by the ESPON CU in the Inception Report (CSF, Territorial Agenda 2020, or the Green Paper on Cohesion, Cohesion reports, Europe 2020...). Other documents providing pertinent insights on territorial development issues, such as the Barca report or the Report for the Polish Presidency are used as complementary sources of information.

The next six tables provide the Policy Context under which each of the ETMS Compass Indicators is working on. They are organised under the 6 priorities of the Territorial Agenda 2020, and put into relation with the EU2020 Strategy and the Common Strategic Framework (CSF).

- Ensuring global competitiveness of the regions based on strong local economies
- Managing and connecting ecological, landscape and cultural values of regions
- Polycentric and balanced territorial development promotion
- Improving territorial connectivity for individuals, communities and enterprises
- Encouraging integrated development in cities, rural and specific regions
- Territorial integration in cross-border and transnational functional regions

3.4.1 Compass Indicators and TA2020 Global Competitiveness Priority

TA2020 Priority	**Ensuring global competitiveness of the regions based on strong local economies**
Rationale: **What territorial features should be improved?**	- Social capital, territorial assets, and the development of innovation and smart specialisation strategies in a place-based approach playing a key role in ensuring competitiveness, - Integration of local endowments, characteristics and traditions into the global economy, contributing to the reducing of vulnerability to external shocks.
"Storyline" for monitoring	Strong local economies are important from both a growth and resilience perspective. Each region can contribute to the competitiveness of Europe based on regional factors and endowments, and a balanced and territorially diverse growth structure is more resilience to external chocks to the economic as well as environmental systems. Evolving strong local economies are about many factors and the understanding (and measurement) of such a process has to pay attention to many dimensions: economy and businesses, innovation, resources, people and labour markets, interaction or regions, connectedness, and much more. To this end, this is perhaps the most multi-faceted priority of the TA2020 and it relates to many aspects of EU2020; and it is addressed by many objectives of the future cohesion policy. Some of the key identified questions considered relevant for territorial monitoring **of this dimension of policy** (competitiveness of the regions based on strong local economies) are as follows: • How efficiently do territories perform in economic terms? • Is economic convergence of regions progressing in Europe? • What is the knowledge capital of European territories? • How diversified are their territorial labour-markets? • Which territories are most dynamic in demographic terms? • How heavily will the territories be impacted by ageing of population? • What is the skill level of population?

	• What are the land resource potentials? • How accessible are the European territories? • What is the quality of digital infrastructure and services across Europe?
Specific spatial and geographical dimensions	All territories and regions are included in this dimension and are to be considered. Territorial factors are critical. Smart specialisation of regions is as important as the interaction of regions and connectedness both physically and digitally.
ETMS relevant Indicators	**Economic Competitiveness:** Total R&D expenditure as % of GDP; GDP-PPS per person employed **Human Capital:** Net migration rate; Share of Persons aged 30-34 with tertiary education attainment **Social Inclusion:** Employment rate 20-64 years; Total employment rate; Difference between female and male employment rates; Young unemployment rate; Elderly employment rate **Environmental Qualities:** Share of Renewable Energy in Final Energy Consumption; Land use pattern **Availability of Services and Functions:** Access to MUAs; Air connectivity (with 45 minutes drives); Connectivity ICON; Households with broadband access
Associated Europe 2020 targets	- Employment: 75% of the 20-64 year-olds to be employed. - R&D / innovation: 3% of the EU's GDP (public and private combined) to be invested in R&D/innovation. - Education: Reducing school drop-out rates below 10%, at least 40% of 30-34–year-olds completing third level education.
Linking issues between TA2020 and EU2020 relevant for this priority*	- Ensuring and improving global accessibility. - Ensuring and improving European accessibility. - Focus on territorially bound factors for regional development. - Building up and utilising further local innovation systems and networks. - Understanding and utilising territorial characteristics for energy production. - Revitalisation of cities as regional centres and interaction of medium sized cities in a polycentric regional system.
Thematic objective(s) of cohesion policy (according to CSF)	1. Research and innovation. 2. Information and communication technologies (ICT). 3. Competitiveness of Small and Medium-sized Enterprises (SMEs). (4. Shift towards a low-carbon economy.) (5. Climate change adaptation and risk prevention and management.) 6. Environmental protection and resource efficiency. 7. Sustainable transport and removing bottlenecks in the key network. 8. Employment and support to labour mobility. 10. Education, skills and lifelong learning. 11. Institutional capacity building & efficient public administration.

3.4.2 Compass Indicators and TA2020 Regional Ecological and Cultural Values Priority

TA2020 Priority	Managing and connecting ecological, landscape and cultural values of regions
Rationale: **What territorial features should be improved?**	- Well-functioning ecological systems and the protection and enhancement of cultural and natural heritage as important conditions for long-term sustainable development, - Integration of ecological systems and areas protected for their natural values into green infrastructure networks at all levels, - Development of joint risk management, - Special attention – if needed – paid to cultural landscapes in order to make best use of these assets (environment-friendly job creation and strengthening their recreational functions as a complement to conservation), - Improvement of regional and local identity by strengthening awareness and responsibility of local and regional communities towards their environments, landscapes, cultures and other unique values.
"Storyline" for monitoring	Ecosystems, landscapes and cultural values are important both for environmental, social and economic dimensions. Obviously the environment is the basis for all life, and it constitutes the backbone also for quality of life, attractiveness of places (for living and visiting), the wellbeing of humans, and the identity of regions. Also, ecosystems, landscapes (and to some extent culture) also determines much of the economic activities and provides raw materials, flowing resources and absorptive capacity for society. Hence the management of the environment and the integration of green economy in the creation of future growth and jobs is an important dimension, and a merit for monitoring. This amount to understanding both the state of productive resources, the emissions of harmful substances, the quality of nature and place in different regions, and the transition to a more integrated (cradle-to-cradle) production and consumption. Some of the key identified questions considered relevant for territorial monitoring **of this dimension of policy** (ecological, landscape and cultural values of regions)are as follows: • How environmentally-friendly are energy consumption patterns? • What is the quality of the living environment? • What are the land resource potentials?
Specific spatial and geographical dimensions	Both Urban and regional perspectives. Physical planning for adaptation and mitigation. Territorial endowments of resources and energy production. Impact for declining regions based on new green economy potentials.
ETMS relevant Indicators	**Environmental qualities:** - Share of Renewable Energy in Final Energy Consumption - Air pollution: PM10 - Degree of soil sealing - Land use pattern
Associated Europe 2020 targets	- Climate change / energy: greenhouse gas emissions 20% (or even 30%, if the conditions are right) lower than 1990, 20% of energy from renewables, 20% increase in energy efficiency.
Linking issues between TA2020 and EU2020 relevant for this priority.*	- Wise management of cultural and natural assets
Thematic objective(s) of cohesion policy (according to CSF)	4. Shift towards a low-carbon economy. 5. Climate change adaptation and risk prevention and management. 6. Environmental protection and resource efficiency.

3.4.3 Compass Indicators and TA2020 Balanced Territorial Development Priority

TA2020 Priority	Polycentric and balanced territorial development promotion
Rationale: **What territorial features should be improved?**	- Polycentric and balanced territorial development of the EU as the key element of achieving territorial cohesion, - Cities as centres contributing to the development of their wider regions (the aspect of functional regions), - Polycentric territorial development fostering the territorial competitiveness of the EU territory also outside the core 'Pentagon area', - City networking improving performance in European and global competition, - Small and medium-sized towns playing a crucial role at the regional level so that polarization between capitals, metropolitan areas and medium-sized towns on the national scale should be avoided.
"Storyline" for monitoring	Some of the key identified questions considered relevant for territorial monitoring **of this dimension of policy** (Polycentric and balanced territorial development promotion) are as follows: • Which territories are most dynamic in demographic terms? • How accessible are the European territories? • What is the quality of digital infrastructure and services across Europe? • How intensively do territories cooperate?
Specific spatial and geographical dimensions	Urban Centres
ETMS relevant Indicators	**Human Capital:** Population potential within 45 min; Net migration rate; Total population change; Birth rate; Old age dependency ratio; Share of Persons aged 30-34 with tertiary education attainment **Availability of Services and Functions:** Access to MUAs; Air connectivity (with 45 minutes drives); Connectivity ICON; Households with broadband access; Cooperation intensity (ETC)
Associated Europe 2020 targets	- None to be directly related
Linking issues between TA2020 and EU2020 relevant for this priority.*	(- Investing in education) - Interaction between metropolises at the EU scale - Interaction between main national growth poles - Services of general economic interest (specifically in sparsely populated areas)
Thematic objective(s) of cohesion policy (according to CSF)	(2. Information and communication technologies (ICT).) 7. Sustainable transport and removing bottlenecks in the key network. 8. Employment and support to labour mobility.

3.4.4 Compass Indicators and TA2020 Connectivity Priority

TA2020 Priority	Improving territorial connectivity for individuals, communities and enterprises
Rationale: **What territorial features should be improved?**	Fair and affordable accessibility to services of general interests, information, knowledge and mobility are essential for territorial cohesion. Further development of TEN-T linking the main European centres. Development of secondary networks at regional and local scale. Encourage the accessibility of urban centres in peripheries to combat social exclusion. Breaking the territorial barriers for accessing geographically specific territories such as Islands or Outermost areas.
"Storyline" for monitoring	Cities are thought as the centres for the provision of services to persons and businesses. Aiming at improving territorial cohesion is thus related to the substantial improvement of the connectivity of remote places to such service centres. The improvement of connectivity is expected to enhance the capacity of individuals and businesses in those places to contribute to economic development and social progress. Attention should be particularly targeted to the most 'disconnected' of Europe's territories in terms of transport and communication infrastructure, i.e. islands and Outermost Areas.
Specific spatial and geographical dimensions	Urban Centres Islands and Outermost Areas
ETMS relevant Indicators	**Social Inclusion:** Disposable household income; At-risk-of-poverty rate **Availability of Services and Functions:** Access to MUAs; Air Connectivity; Connectivity ICON; Household with broadband access
Associated Europe 2020 Targets	*A target on educational attainment which tackles the problem of early school leavers by reducing the drop out rate to 10% from the current 15%, whilst increasing the share of the population aged 30-34 having completed tertiary education from 31% to at least 40% in 2020* *The number of Europeans living below the national poverty lines should be reduced by 25%, lifting over 20 million people out of poverty*.
Linking issues between TA2020 and EU2020 relevant for this priority *	National and daily accessibility between metropolises Accessibility to the main, and secondary, centres E-connectivity Access to energy networks Renewable and local energy production
Thematic objective(s) of cohesion policy (according to CSF)	2. Enhancing access to, use and quality of ICT 7. Promoting sustainable transport and removing bottlenecks in key network infrastructures 9. Promoting social inclusion and combating poverty 10. Investing in education, skills and lifelong learning

3.4.5 Compass Indicators and TA2020 Integrated Urban-Rural Development Priority

TA2020 Priority	Encouraging integrated development in cities, rural and specific regions
Rationale:	Making cities motors of (smart, sustainable and inclusive) development.
What territorial	Enhance the accessibility of rural, peripheral and sparsely populated territories.

features should be improved?	Safeguarding and sustainable utilization of environmental resources. Territories facing severe depopulation should have long-term solutions to maintain their economic activity by enhancing job creation, attractive living conditions and public services for inhabitants and businesses. Modernization of primary sector in rural areas through resource-efficient investments in new and alternative sectors. Urban-rural interdependence recognised through integrated governance. Accessibility of urban centres from rural territories to ensure the necessary availability of job opportunities and services of general interest. Geographically specific territories are often faced with long-standing demographic challenges.
"Storyline" for monitoring	A cohesion-friendly territorial development necessitates a better functional integration between urban centres and their direct surroundings, from a transport infrastructure, but also with regards to the complementarity of the local labour market. Especially the diversification of activities in Geospecs and rural areas that are traditionally dependent on the primary sector towards more manufacturing and services activities needs to be promoted and monitored. The monitoring of the demographic change in quantitative and qualitative terms is necessary in order to understand the labour market challenges of the future, for instance with regards to access to skilled individuals. The integration and complementarity of local labour markets should be promoted between cities and their surroundings, as well as among localities sharing similar territorial challenges and opportunities (e.g. integration between SPA localities, or between mountain municipalities).
Specific spatial and geographical dimensions	Urban Centres Rural regions and Geospecs areas (SPA, mountain, islands…)
ETMS relevant Indicators	**Economic Competitiveness:** Employment per sector **Human Capital:** Population potential within 45 minutes; Total Population Change; Net migration rate **Availability of Services and Functions:** Access to MUAs **Environmental Qualities:** Share of renewable energy in final consumption
Associated Europe 2020 Targets	*Removing bottlenecks in key network infrastructures, thereby boosting our industrial competitiveness* *Further progress with the integration of the European energy market can add an extra 0.6% to 0.8% GDP. Meeting the EU's objective of 20% of renewable sources of energy alone has the potential to create more than 600 000 jobs in the EU. Adding the 20% target on energy efficiency, it is well over 1 million new jobs that are at stake.*
Linking issues between TA2020 and EU2020 relevant for this priority *	Focus on territorially-bound factors Compact cities Enlargement of local labour markets
Thematic objective(s) of cohesion policy	3. Enhancing the competitiveness of SMEs, the agricultural sector and the fisheries and aquaculture sector 6. Protecting the environment and promoting resource efficiency 7. Promoting sustainable transport and removing bottlenecks in key network infrastructures 8. Promoting employment and supporting labour mobility

3.4.6 Compass Indicators and TA2020 Integrated Cross-Border Regions Priority

TA2020 Priority	Territorial integration in cross-border and transnational functional regions
Rationale: **What territorial features should be improved?**	Integration of territories through territorial cooperation foster global competitiveness. Create a critical mass for development, diminishing economic, social and ecological fragmentation.
"Storyline" for monitoring	The strong disparities that exist across Europe have been identified as a barrier for taking benefits from the economic potential of the continent. Hence, the increased competitiveness of the continent's economy is strongly related to the capacity to foster a larger degree of integration of territorial ensembles across the borders. This means that territorial development should be promoted through the reduction of economic, social and ecological fragmentation in cross-border regions as well as within macro-regions, such as the BSR, the Danube or the Adriatic one. This aim can be attained through a strong integration of cross-border labour markets, made possible by enhanced connectivity and cooperation.
Specific spatial and geographical dimensions	Cross-border regions Macro-regions
ETMS relevant Indicators	**Economic Competitiveness:** GDP per capita in PPS; GDP per person employed **Social Inclusion:** Employment rate 20-64 years; Total employment rate; Young unemployment rate; Disposable household income; At-risk-of-poverty rate **Availability of Services and Functions:** Access to MUAs; Cooperation Intensity (ETC) **Environmental Qualities:** Degree of soil sealing; Land use pattern
Associated Europe 2020 Targets	All three Objectives of Smart, Sustainable and Inclusive growth through cross-border and macro-regional integration.
Linking issues between TA2020 and EU2020 relevant for this priority *	Critical mass of means through territorial cooperation Trans-border accessibility
Thematic objective(s) of cohesion policy	7. Promoting sustainable transport and removing bottlenecks in key network infrastructures 11. Enhancing institutional capacity and ensuring an efficient public administration

* Based on the conclusions of the report for the Polish Presidency: Böhme et al. (2011) How to strengthen the territorial dimension of Europe 2020 and the EU Cohesion policy.

3.5 The EU2020S Dimension of Compass Indicators

The ESPON SIESTA project developed in 2012 a system of indicators to monitor the regional deployment of the EU2020 Strategy. Siesta indicators were based a screening of data availability at regional level, including as 'compulsory indicators' the headline targets set by the EU2020S.

The SIESTA Project suggested a particular understanding of 'Sustainable Growth' dimension by the EU2020S, basically meaning sustainable recovery of the path of economic growth through increasing levels of competitiveness. Although it would be true that the EU2020S conception of 'Sustainable Growth' embraces some of the typically associated notions to sustainable

development (resource efficiency, renewable sources of energy, etc.), in practice it primarily means building an economy which leaves the crisis behind. Thus, SIESTA considered competitiveness and economic growth in the years of the crisis under Sustainable Growth, along with green economies, and more classic environmental elements.

Sustainable Growth headline targets

- *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 energy from renewable sources and a 20% increase in energy efficiency*

For Smart Growth, the SIESTA project included research, innovation, education, development, digital society. It included the Youth on the Move, the Innovation Union and Digital Agenda flagship initiatives, and was linked to the following headline indicators with their corresponding targets.

Smart Growth headline targets

- *3% of the GDP to be invested in R&D*
- *Reducing early school leavers to below 10%*
- *At least 40% of 30-34 year-old population completing third level education*

For Inclusive Growth, Siesta focussed basically on employment, human capital on the one side (Agenda for New Skills and Jobs flagship initiative), and on social well-being and equality, and prevention of exclusion, and poverty (EU Platform Against Poverty flagship initiative), and was linked to the following headline indicators with their corresponding targets.

Inclusive Growth headline targets

- *75% of the 20-64 year-old population to be employed*
- *At least 20 million fewer people in or at-risk-of-poverty and social exclusion*

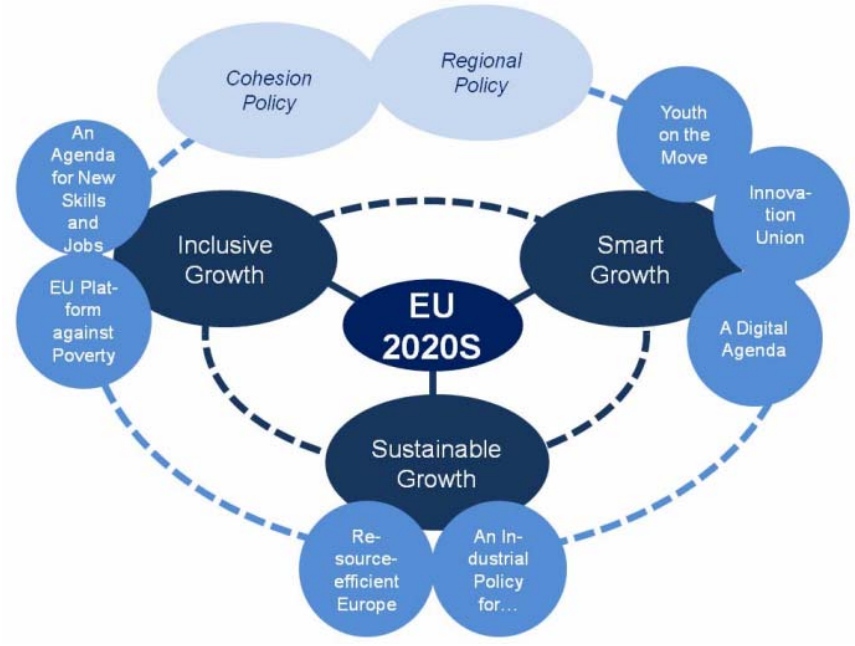


Figure 1. EU2020S Pillars and Flagship Initiatives from the perspective of ESPON SIESTA (2013)

The following table relates the ETMS Compass Indicators and Themes with the EU2020 Priorities, following the proposal by ESPON SIESTA Project. It also indicates (in blue) the incorporation of EU2020 Headline Indicators in the Compass Indicators.

It is currently being analysed the extent to which the 3 missing EU2020S Headline indicators (Energy Efficiency, CO2 Emissions and Early School Drop Offs) can or cannot be incorporated in the ETMS for regional monitoring.

Table 3. Compass Indicators and the EU2020 Strategy Priorities

EU2020 PRIORITIES	ETMS THEMES	ETMS Indicator
Sustainable Growth	Economic Competitiveness	Central Government Debt
		Public cash surplus/deficil
		Domestic credit to private sector
		Balance of Accounts
		Foreign Direct Investment
		Total R&D expenditure
		GDP per capita in PPS
		GDP-PPS per person employed
		Employment in primary sector
		Employment in secondary sector
		Employment in tertiary sector
	Environmental Qualities	Share of Renewable Energy in Final Energy Consumption
		Air pollution: PM10
		Degree of soil sealing
		Landscape fragmentation
Smart Growth	Human Capital	Net migration rate
		Total population change
		Birth rate
		Old age dependency ratio (ODR)
		Persons aged 30-34 with tertiary education atteinment
Inclusive Growth	Social Inclusion	Employment rate 20-64 years
		Elderly employment rate (55-64 years)
		Differences between female to male employment rates
		Young unemployment rate (15-24 years)
		Disposable household income per capita
		At-risk-of-poverty rate
	Access to territory and services	Population potential within 45 minutes
		Access to MUAs
		Air connectivity (with 45 minutes drives)
		Accessibility to airport hubs (intercontinental flights)
		Accessibility to ports (extra EU containers)
		Air traffic at major airports
		Container traffic at major ports
		Households with broadband access
		Cooperation intensity (ETC)

(*) EU2020 target

EU2020 Targets note included in ETMS
Energy Efficiency
CO2 Emissions
Early School Drop Offs

3.6 ETMS compared to past and ongoing monitoring projects in ESPON

The Compass Indicators as well as the thematic categories in which they are distributed inherit the experience of previous ESPON research, mostly the INTERCO project and the SIESTA project, the BSR-TeMo and the City Bench projects.

ETMS defines five thematic domains for grouping its indicators that, like INTERCO and BSR-TeMo, focus on aspects related to Territorial Cohesion and Territorial Capital. SIESTA Project chose a categorisation that was aligned with the headlines of EU2020 Strategy targets and flagship initiatives. The Citybench project has chosen an analytical categorisation of its indicators based on a sectoral approach (i.e. transport, economy…).

The Human Capital in ETMS has been inspired by the TEMO sub-domain of the same name, which can be under the Innovative Territories domain. Hence, the Human Capital category aims as addressing the importance of the 'human factor' for territorial capital

The thematic categories by these projects are presented in the next table. Correspondences between categories are displayed in colour codes.

Table 4. Thematic categories for ETMS Indicators and for other past and on-going ESPON research

ETMS	INTERCO	TEMO	SIESTA	CITYBENCH
Economic competitiveness	Strong local economies ensuring global competitiveness	Economic performance & competitiveness	Economic growth & competeveness	Transport
Human capital	Innovative territories	Access to services, markets & jobs	Green economy, climate change and energy	Economy
Social Inclusion	Fair access to Services, market and jobs	Innovative territories	Research, development and innovation	Quality of life
Environmental Qualities	Inclusion and Quality of Life	Social inclusion & quality of life	Education	Knowledge / smartness
Availability of Services and Functions	Attractive regions of high ecological values and strong territorial capital	Environmental qualities	Digital society	Demography
	Integrated polycentric territorial development	Territorial cooperation and governance	Employment, skills and jobs	Social aspects (employment/ Poverty)
			Poverty, Exclusion and ageing	LUZ morphology

The next table provides an image of which ETMS indicators are also part of the other analysed ESPON Monitoring Systems, with comments whenever relevant. A table with the complete lists of indicators considered by each of these monitoring systems can be found in the following page.

Table 5. ETMS Indicators contrasted to other past and on-going ESPON research

ETMS THEMES	ETMS Indicator	INTERCO	TEMO	SIESTA	CITYBENCH	COMMENTS
Economic Competitiveness	GDP per capita in PPS	x	x	x	x	CITYBENCH: at LUZ level
	GDP-PPS per person employed		x	x		INTERCO/SIESTA: used 'Regional labour productivity' inidcator instead
	Employment per sector*		x		x	TEMO: Focused only on technology and knowledge sectors; SIESTA: used 'Human resources in S&T'; CITYBENCH: at LUZ level
	Total R&D expenditure as % of GDP	x	x	x		Interco: indicator was labelled as 'intramural expenditures on R&D'; TEMO: Separate indicators for GD Expenditure on R&D for businesses AND in total
	Debt					
	Balance of Accounts					
Environmental Qualities	Share of Renewable Energy in Final Energy			x	x	SIESTA: used share of renewal energy at national level;
	Air pollution: PM10	x	x		x	CITYBENCH: residential CO2/PM10
	Degree of soil sealing	x	x			TEMO: used 'soil sealing per capita'
	Land use pattern*		x		x	TEMO: used a 'fragmentation index'; CITYBENCH: calculated green areas ratio at LUZ level
Human Capital	Population potential within 45 min	x	x			Interco/TEMO: used pop. pot within 50km, instead of 45mn
	Net migration rate	x	x			
	Total population change		x			
	Birth rate					INTERCO/TEMO/CITYBENCH: used 'life expectancy at birth rate' indicator
	Old age dependency ratio	x		x		TEMO: Economic ratio i.e. number of persons supported by the nr of persons employed
	Share of Persons aged 30-34 with tertiary education	x	x	x	x	Interco/TEMO: used pop aged 25-64 instead of 30-34; CITYBENCH: residents
Social Inclusion	Employment rate 20-64 years	x	x	x		
	Total employment rate		x		x	CITYBENCH: at LUZ level
	Difference between female and male employment rates	x	x	x		TEMO: used the 'gender imbalances' indicator
	Young unemployment rate		x	x		SIESTA: used as well 'long term unemployment'
	Elderly employment rate					
	Disposable household income	x				
	At-risk-of-poverty rate		x	x	x	SIESTA: used different indicators of 'drop out rate' at urban and regional levels
Availability of services & functions	Access to MUAs		x			TEMO: used Functional areas - Access to cities; CITYBENCH: used road/rail connections and journey to work instead
	Air connectivity (with 45 minutes drives)	x				Interco: used accessibility potential by air ; CITYBENCH: used inbound/outbound flights number instead
	Connectivity ICON					TEMO & CITYBENCH: Used multimodal accessibility instead
	Households with broadband access		x	x	x	TEMO: 'internet access' instead of 'broadband access'
	Cooperation intensity (ETC)	x				Interco: used as well Cooperation degree

Table 6. Indicators by INTERCO, BSR-TEMO, ESPON SIESTA, CITYBENCH and ETMS

INTERCO

Strong local economies ensuring global competitiveness
GDP per capita in PPS NUTS 3
Unemployment rate NUTS 3
Old age dependency ratio NUTS 3
Labour productivity in industry and services (NUTS2
Labour productivity per person employed (NUTS0)

Fair access to services, markets, jobs
Access to compulsory school (NUTS0)
Access to hospitals NUTS 0
Accessibility of grocery services
Access to university (SILC data)
Accessibility potential by road (NUTS3)
Accessibility potential by rail NUTS 3
Accessibility potential by air NUTS 3

Innovative territories
Population aged 25-64 with tertiary education NUTS2
Intramural expenditures on R&D (NUTS2)
Employment rate 20-64 (NUTS2)

Inclusion and quality of life
Disposable household income (NUTS2)
Life expectancy at birth NUTS2
Proportion of early school leavers (NUTS1)
Gender imbalances NUTS3
Difference in female-male unemployment rates (NUTS2)
Ageing index NUTS 3

Attractive regions of high ecological values and strong territorial capital
Potential vulnerability to climate change (NUTS3)
Air pollution: PM10 NUTS 3
Air pollution: Ozone concentrations NUTS3
Soil sealing per capita NUTS 3
Mortality, hazards and risks n.a. n.a.
Biodiversity n.a. n.a.
Renewable energy potential

Integrated polycentric territorial development
Population potential within 50km (NUTS3)
Net migration rate NUTS3
Cooperation intensity NUTS 2
Cooperation degree NUTS 2
Polycentricity index (NA)

BSR TEMO

Economic Performance and competitiveness
GDP per capita (NUTS3)
GDP/person employed (NUTS3)
Total GVA per economic branch (primary, manufacturing, services) (NUTS3)
Total employment per economic branch (primary, manuf., services) NUTS3
Unemployment rate, total (NUTS3)
Employment rate (20-64 years) (NUTS2)
Net migration rate (NUTS3)
Population change (NUTS3)
Demographic dependency ratio(s) (NUTS3)
Economic dependency ratio(s) (NUTS3)

Access to services, markets, jobs
Access to cities (grid, NUTS3)
Accessibility potential road (NUTS3)
Accessibility potential rail (NUT3)
Accessibility potential air (NUTS3)
Multi-mode accessibility
Access to (IC) train stations (NUTS3)
Households with access to internet at home
Population potential within 50km (grid, NUTS3)
Border crossings
Gender imbalances (ratio of male-female aged 25-39) (NUTS3)
Functional areas (LAU2)

Innovative territories
Population aged 25-64 with tertiary education NUTS2
Employment in technology and knowledge-intensive sectors (NUTS2)
Gross domestic exenditure on R&D (NUTS2)
Patent applications filed to the EPO (NUTS3 / NUTS2)

Social Inclusion and quality of life
At-risk-of-poverty rate (NUTS2)
Severe material deprivation rate (NUTS2)
Youth unemployment rate (15-24 years) (NUTS3)
Life expectancy at birth in years (NUTS2)
Self-assessed general health status (NUTS1-3)

Environmental qualities
New soil sealing/capita (NUTS3)
Air pollution (nr of days PM10 exceeds norm value) (NUTS3)
Land consumption by transport (NUTS3)
Eutrophication (Helcom HEAT index) (per sea area)
Fragmentation index (NUTS3)

Territorial cooperation and governance
Cooperation intensity (NUTS2)
Cooperation degree (NUTS2)

ESPON SIESTA

Economic growth and comptitiveness
GDP per head measured as purchasing power standard in percentage of the EU average (EU=100)
Change in regional GDP per head measured as purchasing power standard in percentage of the EU average (EU=100), 2000-2009
Change in national GDP per head measured as percentage of change in pps in the years of the crisis, 2007-2011
Regional labour productivity expressed in relation to the EU27 average (EU27=100), 2008

Green economy, climate change and energy
National share of renewable energy in gross final energy consumption represented as percentage, 2009
National share of renewable energy in gross final energy consumption represented as distance to the 2020 national targets, 2009
Regional potential for electricity production from wind power stations represented in meters/second. 2005
Regional potential for electricity production from photovoltaic panels represented in kWh, 2005
Energy intensity of the national economy represented as gross inland consumption of energy divided by GDP, 2010
Energy intensity of the national economy represented as distance to the 2020 national targets, 2010
Change in energy intensity of the national economy represented as percentage of change, 2000-2010
National GHG emissions, 2009, compared to 1990
Change in national GHG emissions represented as distance to the 2020 national targets, 2005-2009
Estimated regional GHG emissions excluding LULUCF, 2008

Research, development and innovation
General expenditure on R&D as percentage of regional GDP, 2009
General expenditure on R&D as percentage of regional GDP represented as distance to the 2020 national targets
Change in general expenditure on R&D as percentage of regional GDP
Human resources in science and technology as percentage of regional active population
Business expenditure on R&D as percentage of regional GDP, combined years from 2007 to 2009
Patent applications to the EPO per 1,000 inhabitants by inventor's region of residence

Education
Regional early school leavers from education and training as percentage of population aged 18 to 28 (drop-out rate)
Regional drop-out rate represented as distance to the 2020 national targets, 2010
Change in regional drop-out rate, 2000-2010
LUZ drop-out rate, combined years from 2004 to 2008
Regional population aged 30 to 34 with tertiary education, 2010
Regional population aged 30 to 34 with tertiary education represented as distance to the 2020 national targets
Change in regional population aged 30 to 34 with tertiary education, 2000-2010 41

Digital Society
People working in the ICT sector as percentage of total regional employment
Broadband penetration rate as percentage of total regional households, combined years from 2006 to 2009
Individuals (aged 16 to 74) who ordered goods or services over the Internet for private use as percentage of regional population, 20
Individuals who have never used a computer as percentage of regional population, 2011

Employment, skills and jobs
Regional employment rate as percentage of active population aged 20 to 64
Regional employment rate (percentage of active population aged 20 to 64) represented as distance to the 2020 national target, 201
Change in regional employment rate (percentage of active population aged 20 to 64)
Gender balance in regional employment rate (percentage of active population aged 20 to 64)
Regional unemployment rate (percentage of active population aged 15 to 74)
Regional youth unemployment rate as percentage of total labour force aged 15 to 24
Regional long-term unemployment as percentage of the unemployed population
Persons (aged 25 to 64) with low educational attainment (level 1 or 2 ISCED) by regions

Poverty, Exclusion and ageing
Regional/national population at-risk-of-poverty or social exclusion represented as distance to the EU2020 target, 2010
Regional long-term unemployment as percentage of the unemployed population
Regional long-term unemployment as percentage of the unemployed population
Regional long-term unemployment as percentage of the unemployed population
Regional people living in households with very low work intensity as percentage of population aged 0 to 59
Regional long-term unemployment as percentage of the unemployed population

ESPON CITYBENCH

Economy
GDP per inhabitant
Gas/electricity prices for industrial consumers
Ease of doing business

Transport
in-out bound flights
potential accessibility

Quality of life
% of LUZ consisting of green urban areas
Residential PM10

Knowledge / smartness
Photovoltaic energy potential
High-tech (total) patent applications to the EPO per million inhabitants
IP addresses
Share of renewable energy in gross final energy consmption

Demography
Population density
ageing index
old age depency ratio
Combined adaptive capacity to climate change

Social aspects
% persons unemployed
# of items posted as "crisis"/per inhabitant
# of items posted as "unemployed"/per inhabitant
# of items posted as "tourists"/per inhabitant

LUZ Morphology

ESPON ETMS

Economic Competitiveness
Total R&D expenditure as % of GDP
GDP per capita in PPS
GDP-PPS per person employed
Employment per sector*
Jobs potential within commuting distance

Human Capital
Population potential within 45 min
Net migration rate
Total population change
Birth rate
Old age dependency ratio
Persons aged 30-34 with tertiary education attainment

Social Inclusion
Employment rate 20-64 years
Total employment rate
Difference between female and male employment rates
Unemployment rate
Young unemployment rate
Disposable household income
At-risk-of-poverty rate

Environmental Sustainability
Share of Renewable Energy in Final Energy Consumption
Air pollution: PM10
Degree of soil sealing
Land use pattern*

Connectedness
Access to MUAs
Access to Airports
Access to Ports
Households with broadband access
Cooperation intensity (ETC)

4 Data Management and Calculation of Indicators

4.1 Approach

The challenge for the ETMS lies in combining a long term perspective with frequent updates based on the most recent data available data, so as to be able to provide policy-relevant results. This implies that ETMS data will necessarily evolve, as estimated recent data at lower geographical levels will progressively be replaced or corrected as data become available from national and European sources. This is a challenge in terms of communication of results, as they may change over time.

The Interim Report already discussed the multiple challenges and short backs in data collection, data management and indicator calculation in the context of ESPON. Among these,

- The extent to which the ETMS should produce updated results for countries that have published new data even if this implies covering only parts of the ESPON Space
- The extent to which the most recent data may function as a basis for ETMS analyses, considering that estimated figures between census dates or as a preliminary result of surveys furthermore tend to be adjusted at a later stage.
- The investigation of issues that may only be relevant for a limited time should not be done at the expenses of longer-term monitoring
- The compilation of comparable data is third challenge, with statistical methods evolving continuously; Changes in the boundaries of administrative and statistical units further complicate the compilation of comparable data over time.

Based on theses challenges, one might conclude that in many cases there will not be data sufficiently fit for monitoring.

The ETMS, however, has decided to apply a 2 directions strategy in an attempt to reconciliate the need to obtain a first ESPON working monitoring system for the whole of Europe at the end of this research, and the need for a robust monitoring methodology:

- To apply data procurement and processing methodology which allows for the implementation of a fully working territorial monitoring system for Europe within the time frame of the project, based on data being available today in ESPON, Eurostat, and other reference data providers, allowing for a reasonable geographic and temporal resolution. This process may require eventual proxies, which will be in any case documented.
- To envisage future work directions to allow improving the spatial and temporal resolution and accuracy of the ETMS provided that the conditions in the ESPON program become such that these directions are increasingly feasible (e.g. the program systematically produced data with high territorial resolution on a number of territorial indicators). Paths towards these directions will be indicated.

The contents of this section refer exclusively to the first direction. They describe the executive protocols currently being applied in the ETMS to construct its monitoring database.

The analysis of the second direction was initiated in the Interim Report[2] of ETMS (June 2013) and will be further developed in the framework of the System Sustainability in the Final Report of the ETMS (end of 2014).

[2] *"Five principles for dealing with data"; "Data collection and database management" sections in ETMS Interim Report*

4.2 Data Identification and Collection

Once the ETMS project has defined suitable indicators, related dataset and the scale(s) at which they should be calculated, the first step consists in identifying potential providers. Have these data already being collected in ESPON DB? If not, are they available by alternative providers (EU agencies, NSI, others…)? Who can provide the latest release?

The basic steps of the data collection process are the following.

1. To collect data at NUTS level (lowest resolution available)
2. To collect data at LAU2 / raster level.
3. To bridge NUTS 2003-2006-2010 nomenclature issues
4. To integrate Croatian data and non-EU data (Norway, Switzerland, Iceland, Lichtenstein)
5. To document datasets with standardised metadata protocols

Data identification, collection and metadata elaboration has been done simultaneously. Contacts with data providers have been established whenever metadata was not available online or not sufficiently clear.

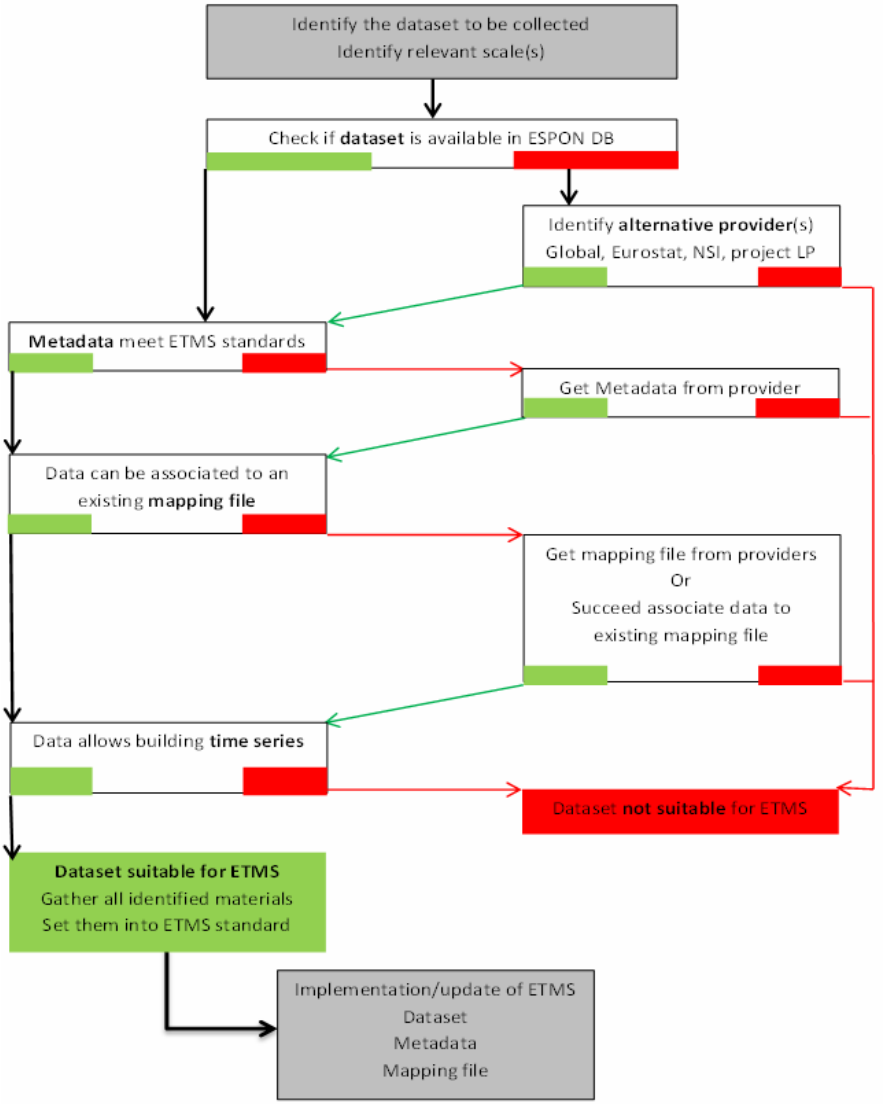


Figure 2. Data collection protocol

4.3 Data Documentation (ESPON DB compliant)

Data in ETMS is documented with ESPON DB+ metadata templates. These templates incorporate the basic ESPON DB metadata requirements, and incorporate an additional sheet organised add-hoc for ETMS.

Next table provides an overview on the compulsory metadata fields related to data collection in ETMS, in addition to those already considered by the ESPON DB.

Table 7. Metadata requirements for the ETMS

(*) Green text corresponds to standard metadata in ESPON database

Field	Information	Details
Background information on data compilation process	Who compiled the data? When was it done?	• Date of compilation • Responsible party
Sources	URL, when available Procedure to obtain data Data from census, register, remote sensing, other sources.	• Provider • Census name • Contact details of responsible NSI section / person in charge of data-set • Details on defini-tions/methodologies • Costs
Characterisation of data	What is measured?	• Data type • Units of measure
Availability (years)	For which years are data available?	
Frequency of updates	Frequency of updates Foreseen next delivery	
Statistical geographical level	From LAU2 to NUTS0 / grid	• Which levels available?
Restriction of use	Licensing conditions	• Rights of redissemination • Confidentiality
Associated mapping files	URL when available	• Provider • Map name • Contact details • Costs
Data harmonisation	Provide full methodology, when relevant Link to original dataset	• Source • Method • Scripts/tables
Spatial transformation (conversion between nomenclatures)	Provide full methodology, if any Link to original dataset	• Source • Method • GIS command used • Scripts/tables • Etc.

The collection of metadata in most cases require personal contacts with the organisation providing the data, as complete metadata for the purpose of the ETMS are seldom provided with the datasets.

In the perspective of future updates - i.e. recalculation needed as result of MAUP (*Modifiable Area Unit Problem*)- it is essential that datasets can be linked with the appropriate mapping file for geo-referencing. These mapping files are therefore collected and stored as a component of the ETMS, even when they are not used for producing ETMS maps as such. When data for previous

years cannot be georeferenced using standard ESPON or Eurogeographics digital maps, one can use mapping files from national sources.

All metadata of ETMS is stored in the Alfresco[3] system implemented on the UAB web server. Alfresco is a shared documentation system based on open source technology, which is a cloud connected content platform that allows secure file sharing, versioning control, access documents on any device, collaborate on content, automation of processes like document format conversions. Each indicator will have a folder on its own, where all the documents related to the selected indicators are stored: metadata, methodologies, related reports.

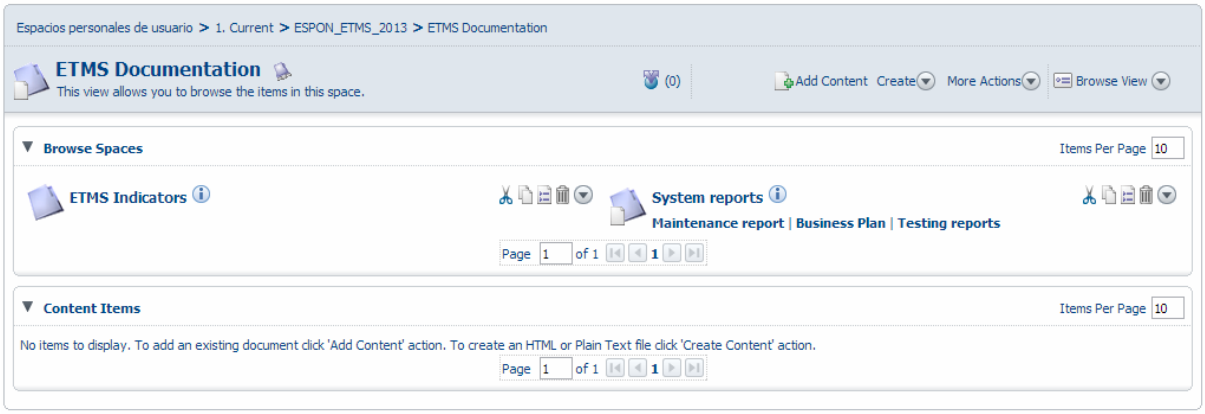


Figure 3. ETMS Documentation System in Alfresco (http://etcsdi.uab.cat/alfresco/)

The sustainability and maintenance reference report will be developed towards the Final Report as a very practical guide to facilitate the work of the ETMS manager. It will include directories and contacts to data providers, and operational procedures to contact providers at due time, obtain or generate the raw data, develop and represent the indicators, produce the policy analysis, publish and disseminate results to a directory of users.

4.4 Calculation of Indicators

The calculation of ETMS indicators needs to overcome combined constrains related to the possibility of:

1. combining datasets corresponding to the indicator designed;
2. calculating the indicator for territorial units that are relevant, in view of producing a meaningful indicator and of answering policy demand;
3. delineating the territorial units at the appropriate geographic level;
4. having access to data at the appropriate geographic level.

Data collection in ETMS has been done for basic data sets likely to be permanently available along time, mostly based on the ESPON DB, Eurostat, and RIATE (e.g. population, GDP…). Statistical data constitute the main “raw material” on the basis of which an ETMS is built. They are the results of measures, which may have been processed by the providers, by other researchers or directly by the ETMS-team so as to improve their coherence.

3 For more references, go to http://www.alfresco.com/

Indicators are then calculated by the ETMS from the basic data sets. This maximises the likelihood of data availability in the future, and ensures that procedures to draw indicators are maintained stable along time following a same methodological approach.

Table 8. Examples of Collected datasets for indicator calculation in ETMS

INDICATOR	COLLECTED DATA SET
Total R&D expenditure as % of GDP	Total intramural R&D expenditure (GERD) in millions of PPS
	GDP in mill. PPS - Current prices
GDP per capita in PPS	GDP in mill. PPS - Current prices
	Total population
GDP-PPS per person employed	GDP in mill. PPS - Current prices
	Total number of employed persons
Net migration rate	Net migration in persons per year
Total population change	Total population
Birth rate	Total number of births per 1000 inhabitants
Old age dependency ratio	Total population in main age groups (-14; 15-64; 65+)
Employment rate 20-64 years	Employed persons aged 20-64 years
	Population aged 20-64 years
Total employment rate	Employed persons aged 15- years
	Population aged 15-64 years
Difference between female and male employment rates	Employed males aged 20-64 years
	Males aged 20-64 years
	Employed females aged 20-64 years
	Females aged 20-64 years
Young unemployment rate	Total number of unemployed persons aged 15-24 years
	Total number of persons in labour force aged 15-24 years
Elderly employment rate	Total number of emplyed persons aged 55-64 years
	Total number of persons in labour force aged 55-64 years
Disposable household income	Income as PPS based on final consumption per inhabitant
….	

Indicators are calculated at the lowest geographical unit possible with available source data sets. Values for higher geographical units will be calculated by the ETMS based on values for lower units and pre-established aggregation rules. This allows to:

- ensure consistency of data being displayed by the ETMS a all geographical units (which could not be granted if data sets were imported many times for different geographical units)
- the ETMS displaying systematically different levels of resolution for each indicator in the European context (e.g. indicators calculated at NUTS3 level become also available for analysis at NUTS2 and NUTS0 levels).

5 The ETMS Platform

5.1 ETMS Portal Website layout

ETMS is designed as a highly practical and user-friendly tool customised to the needs of different policy-makers and stakeholders groups. The design is based on a modular approach, integrating decentralised and interconnected modules easy to be maintained and updated.

The main components for the ETMS are the following:

- Data Analysis on Maps Tool. Made available in the central area of the ETMS Portal front page. It is provided as a link which opens an independent Data Analysis module on a separate window. It allows for searching and displaying indicators for different themes and territorial entry-points. It allows downloading the database behind displayed indicators. The Data Analysis on Maps tool is described in-depth in the next section of this Draft Final Report.

- Data analysis on Timelines Tool. Made available in the central area of the EMTS Portal front page. It provides a direct link which opens the Timelines Module on a separate window. It allows displaying territorial indicators over time for different themes and regional typologies. The Data Analysis on Timelines tool is described in-depth in the next section of this Draft Final Report.

- Publications. This section is available on the right side of the front page. It leads to the latest editions of the two written publications periodically produced by the ETMS: the Facts & Figures Leaflet, and the State of the Territory Report (*Monitoring Report*).

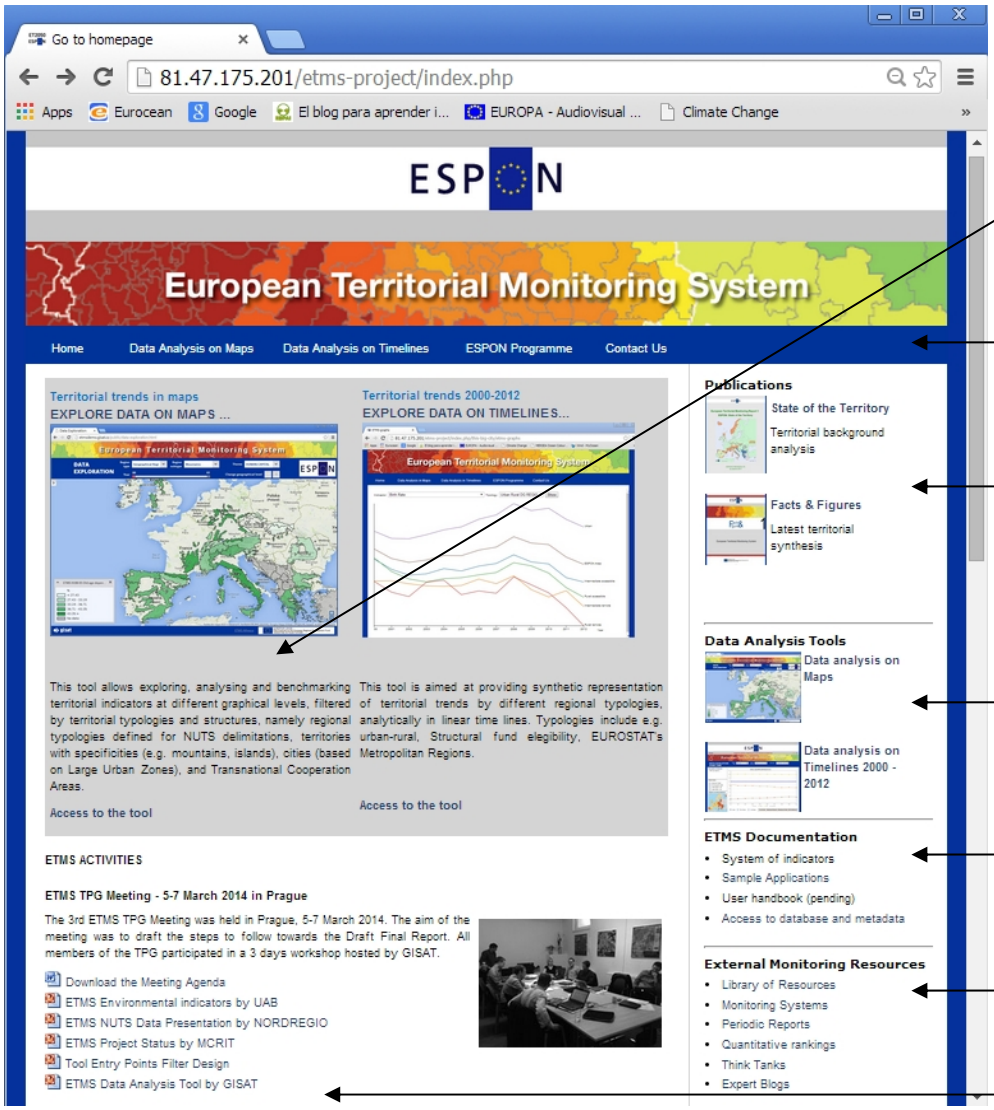
- ETMS Documentation. This section is available on the right side of the homepage. It provides direct links to ETMS system of indicators documentation, ETMS Tools User handbook (pending), ETMS Tools sample applications and ETMS indicators data and metadata.

- External Monitoring Resources. This section, developed add-hoc by the ETMS, contains a database of most relevant monitoring resources. Up to now, the Virtual Library contains more than 350 references, from around 100 global, European and regional institutions. The tool allows browsing resources by monitoring products or by provider institutions. For each resource, basic information and link to the original document is provided.

The ETMS Portal Website stores ETMS project documentation. ETMS Project activities can be viewed on the main page of the website. The aim of the project, the approach, the consortium information, and the main the tasks developed during the project and the reports produced can be downloaded from the right menu,

A quick access to ETMS Tools is provided by a navigation top bar.

All these elements are displayed in the ETMS Portal website layout as proposed in ETMS Portal website under development, available online at http://81.47.175.201/etms-project. This website is the embryo of the future ETMS Portal, and will be constantly updated throughout the development of the project until its final delivery to the ESPON CU towards the end of 2014.



Main access to ETMS Tools

Quick access to tools from all areas of the ETMS platform

Access to ETMS Publications

Access to ETMS Tools

Access to ETMS Documentation

Library of Monitoring Resources

ETMS Project Activities

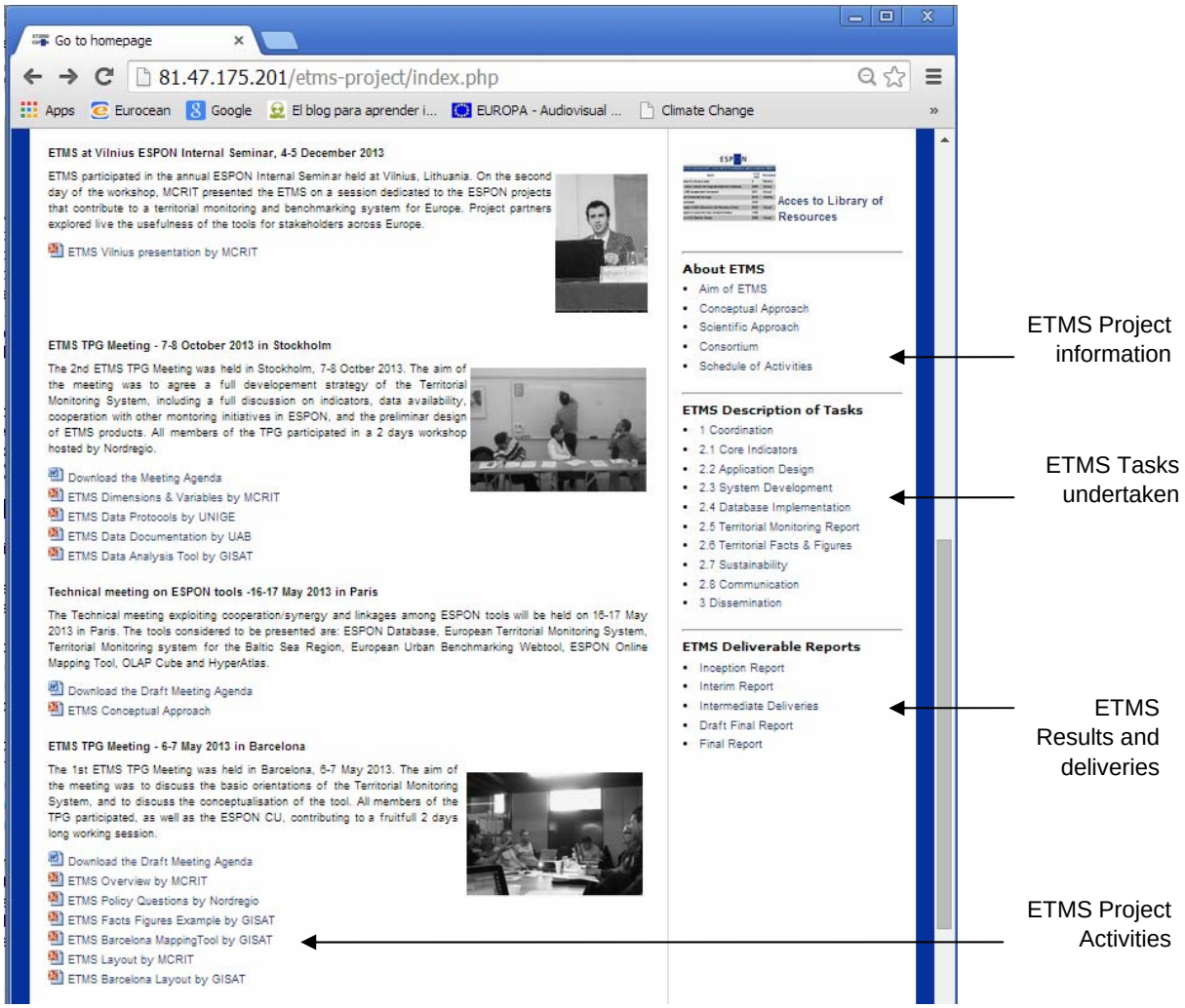


Figure 4. ETMS website

Online available at **http://81.47.175.201/etms-project**

5.2 ETMS Services: Data analysis on Maps

5.2.1 Design and Orientation

A pre-final version of Data Analysis tool is available at the ETMS website (http://81.47.175.201/etms-project/). The tool includes all crucial analytical functionalities developed in accordance with TPG and ESPON CU requirements. A number of ETMS indictors for different types of regions have been incorporated by now.

The main purpose of the interface is to present the geo-based informational content of the ETMS to its users, especially policy makers, in a simple, easy understandable, but also in interesting and attractive way. Based on experiences derived from previous work on other projects that deal with the geo-based information, the way of presentation of the project results is one of the crucial factors which influence the evaluation of the whole work. Compared to static outputs of the project work, presented in Facts and Figures Booklet or State of the Territory Report, the tool provides the user with added value of possibility to explore the data interactively and to focus on regions and analysis of his particular interest.

The tool visualize values of ETMS indicators, including their distribution and development in order to describe structures and dynamics related to Europe, its cities and other types of regions, including neighbouring regions.

The platform also serves for user analysis of indicator values, including comparison of different regions or comparison with datasets averages etc. The platform displays the information using interactive map supplemented by interactive charts or tables.

The technical solution for the platform is based on the open source software and programmed using royalties-free online knowledge. Displaying of both indicator values and vectors of analytical units in the interface is based on communication with the ETMS database and it is possible to add additional analytical units or indicators. Data queries are optimized to allow users efficient interaction. Displaying of additional geo-data layers in the map is realized through OGC standard web services (e.g. WMS).

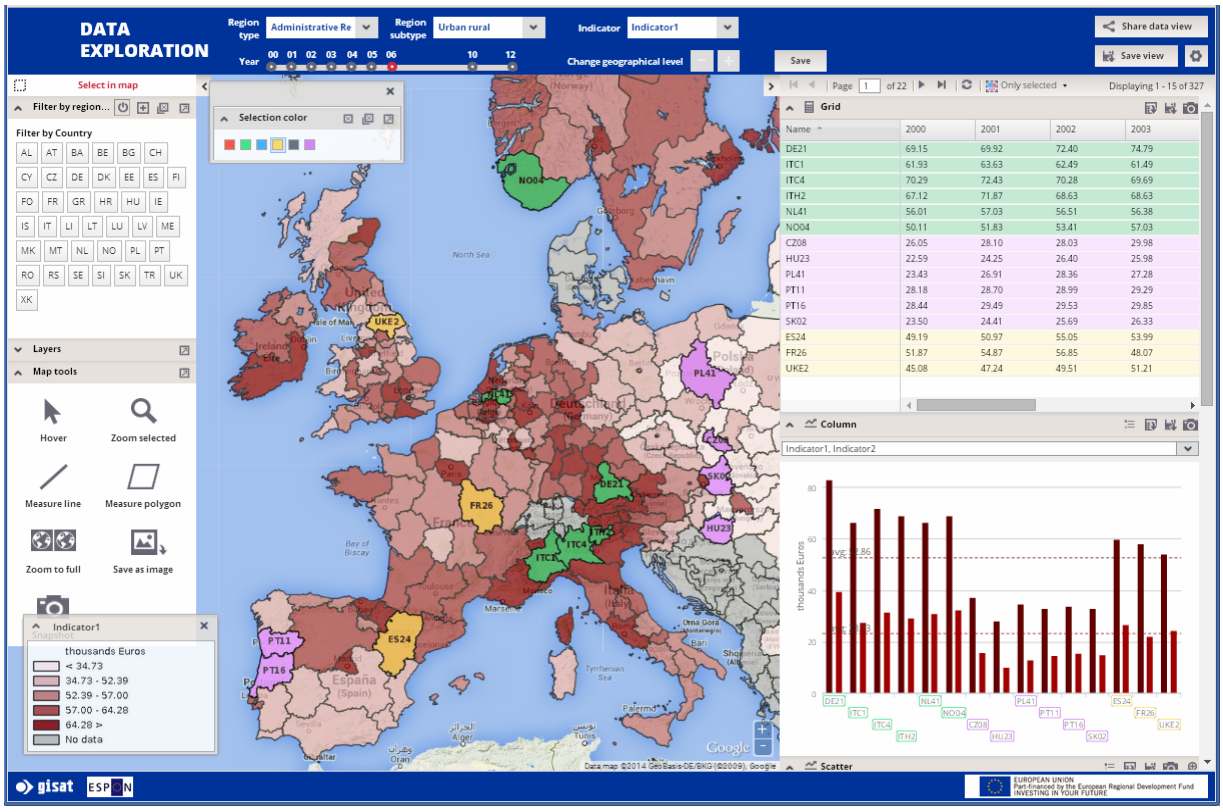


Figure 5. Prototype Data Analysis on Maps Tool.

5.2.2 Specifications

Incorporated components and functionalities provide the user following possibilities:

- access to indicators sets via territorial entry-points, representing different regional typologies
- possibility to switch between displayed indicators interactively
- possibility to filter analytical units according to different regional typologies
- interactive switching between different levels and types of analytical units (e.g. different NUTS levels, different types of territories – e.g. mountain regions, national parts of mountain regions etc.)

- interactive switching between different years of interest
- interactive selection of analytical units of users interest in all map, table or charts
- possibility to compare selected units:
    - between each other
    - with averages of complete datasets or with averages of the set of selected units

Components of application are interconnected and selection in one of them influences the appearance of other components, in sense of units or time specification.

5.2.3 Features of the Data Analysis on Maps

Access via territorial entry-points

A solution for access to the information is based on territorial entry-points approach. These entry-points are representing different regional typologies, defined in frame of the ETMS project. The front site of the application enables the user to select a regional type and subtype of his interest. This selection defines both analytical units to be displayed in the tool as well as a list of available indicators, which is specific for each regional subtype.

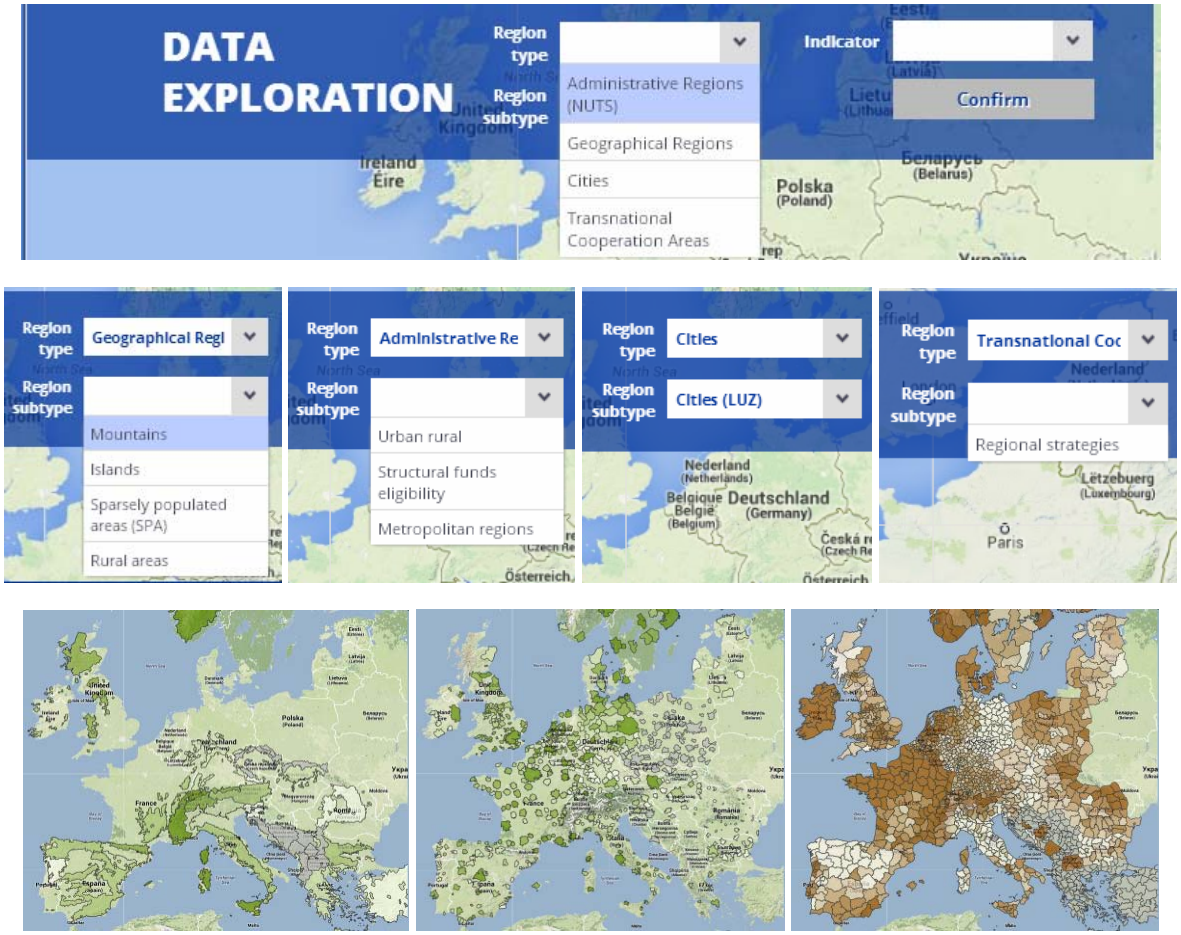


Figure 6. Access via territorial entry points

Selecting indicators of interest

The switcher located in the head panel of the application enables the user to switch between indicators in frame of indicators set specific for particular regional sub-type. Values of selected indicator occur in map and charts panel. Both column and scatter charts provide additional functionality of interactive switching between all indicators in frame of actual indicators set.

Two different types of cartographical visualization are available in the tool. Indicators values can be visualized either as choropleth or via proportional circles in map. For each indicator, the type of cartographical visualization is defined separately.

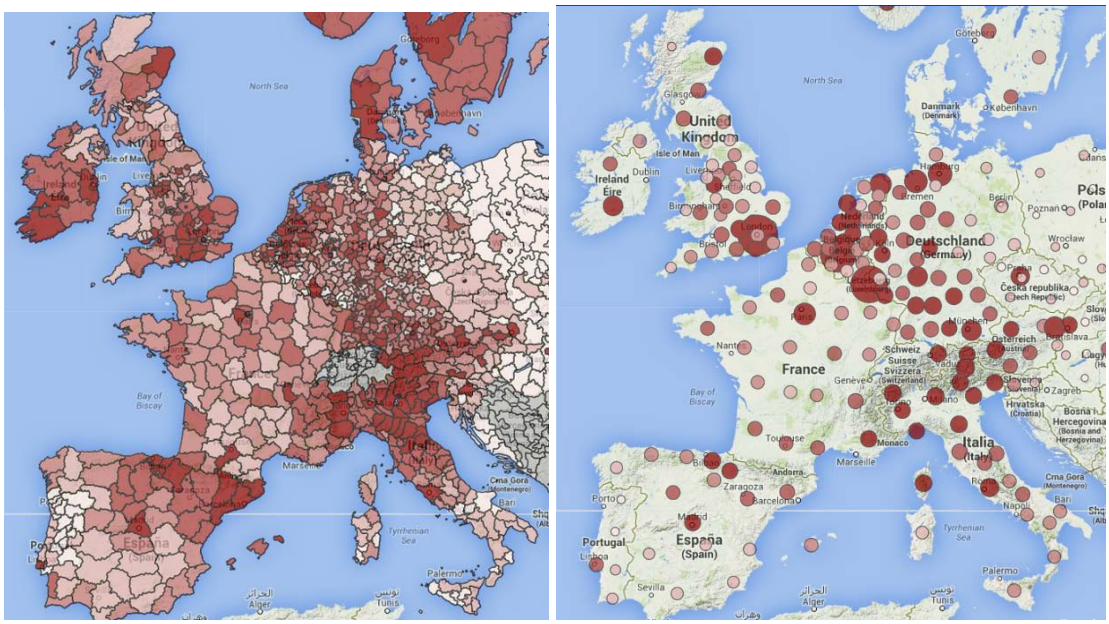
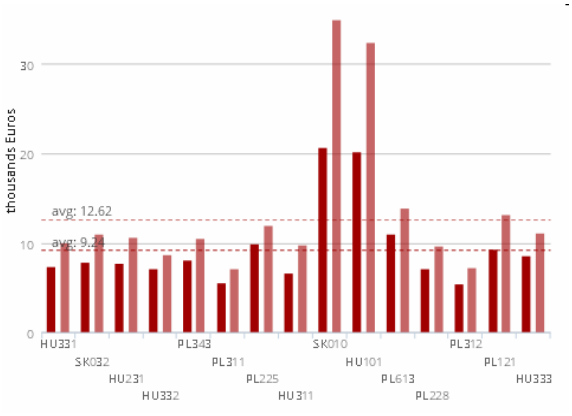


Figure 7. Two types of cartographical visualization available in the tool – choropleths or proportional circles

Multi-temporal analysis

The application provides a possibility to display values for two different years in map and for two or more different years in column charts. Time series for selected indicator are available in the table, which is a part of analytical panel.

Name	2003	2004	2005	2006
AL00			4.99	5.49
AT11	18.17	19.33	19.11	19.86
AT12	21.49	22.90	22.85	24.29
AT13	36.10	36.97	37.48	39.41
AT21	22.10	23.31	23.76	25.17
AT22	22.70	24.12	24.70	25.90
AT31	25.75	26.93	27.74	29.33
AT32	29.76	31.37	31.76	33.87
AT33	27.70	28.71	29.64	31.31
AT34	27.69	29.08	29.57	31.23
BA01				
BA02				
BA03				
BE10	51.50	52.12	53.58	54.13
BE21	29.62	30.71	31.93	32.79



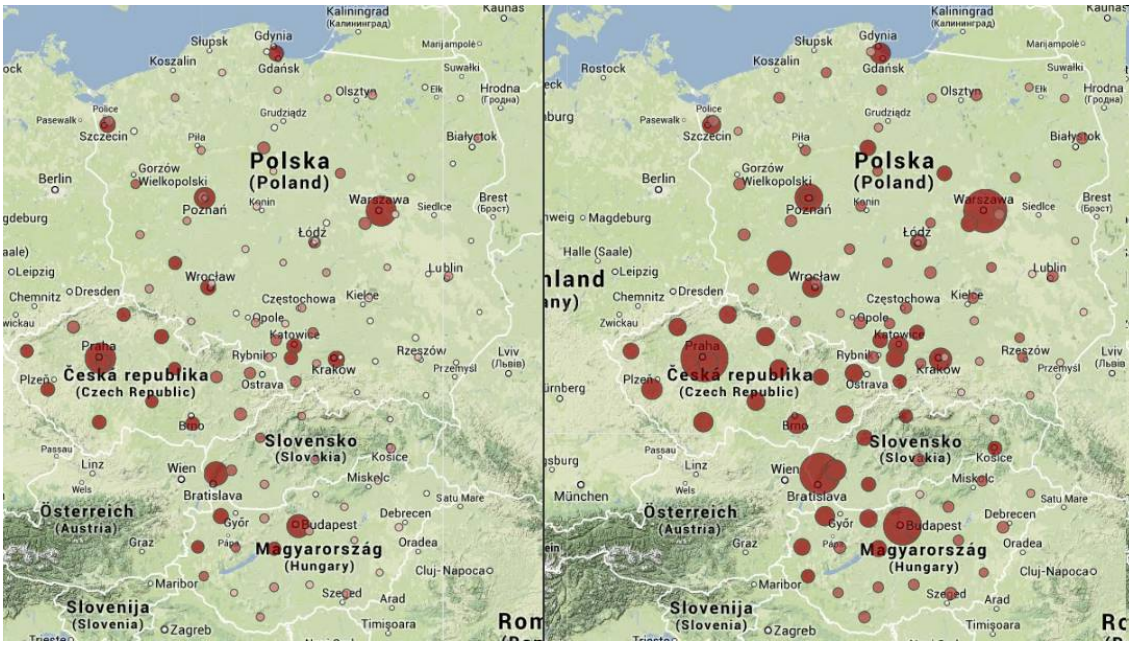


Figure 8. Displaying values for different years in chart, map or in table as time series

Regional filters

A possibility to filter analytical units based on different regional typologies, as well as for example by countries, is incorporated. The user can set multiple filtering conditions, which influence selection of regions displayed in both map and charts.

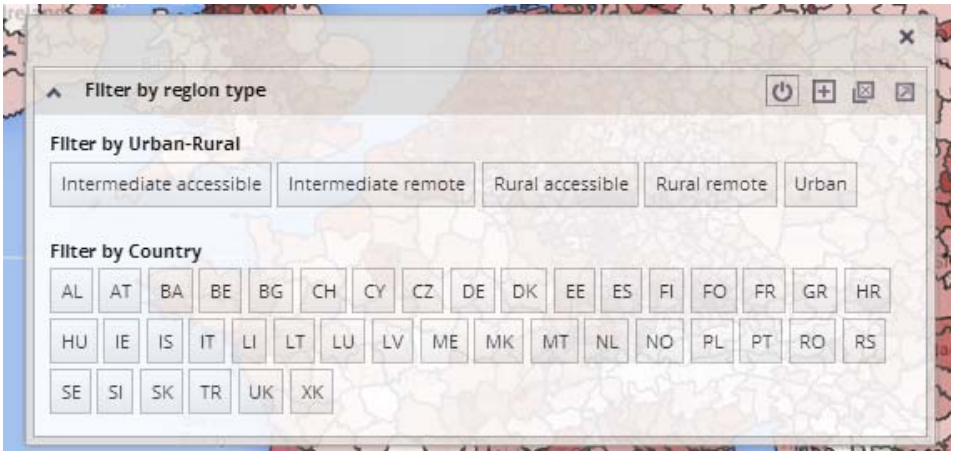


Figure 9. Example of a regional filter

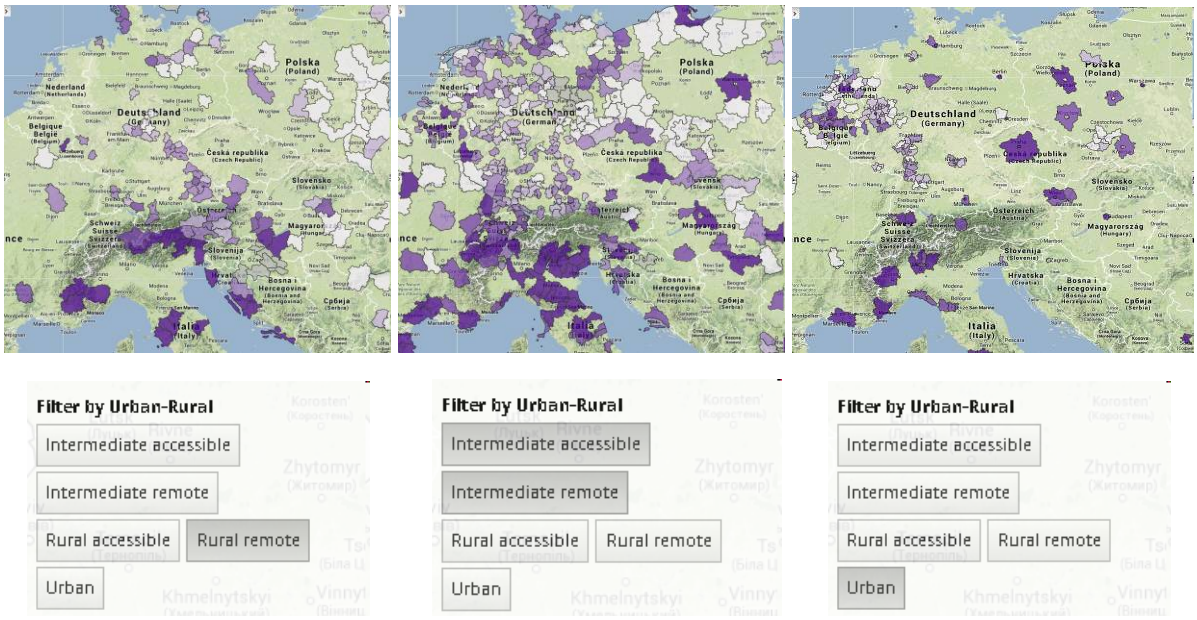


Figure 10. Filtering regions by different regional typologies

Multiple units selection

The application enables the user to define user selection of analytical units of his interest. He can also define more different selections of analytical units - each of them is than highlighted by corresponding colour in map, charts and tables. These units can be zoomed into and compared with each other, as well as with any other unit defined in frame of particular territorial entry point.

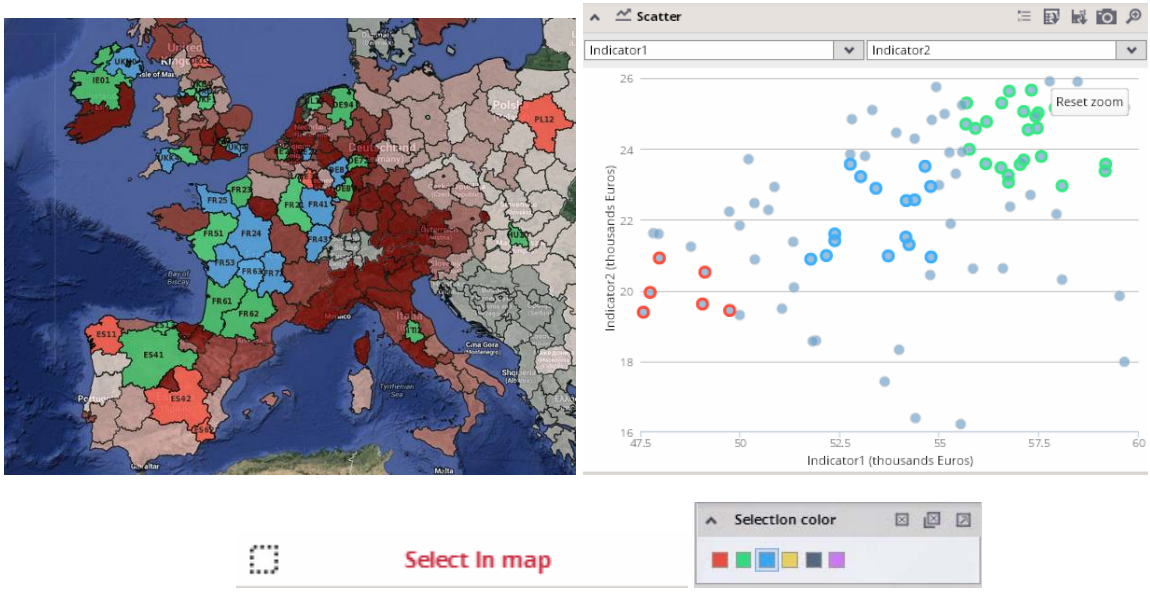


Figure 11. Multiple-selection of user´s units; tools for multiple selections

Analytical panel

The right panel of the application is dedicated to statistical analysis based on analytical units, which are realized via interactive table, column and scatter charts. This panel also displays a map of furthermost regions which belong to the ESPON space.

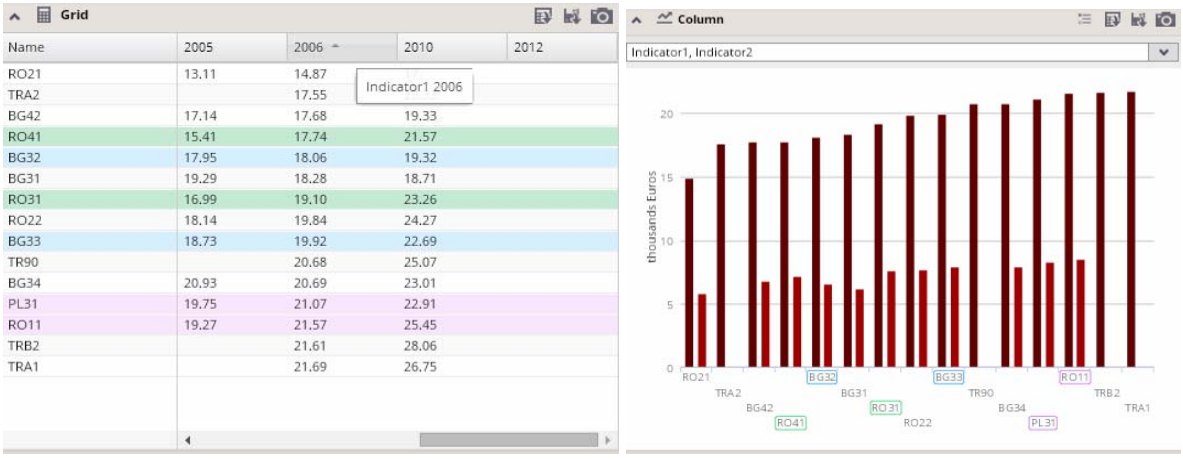


Figure 12. Components of analytical panel

5.3 ETMS Services: Data analysis on Timelines

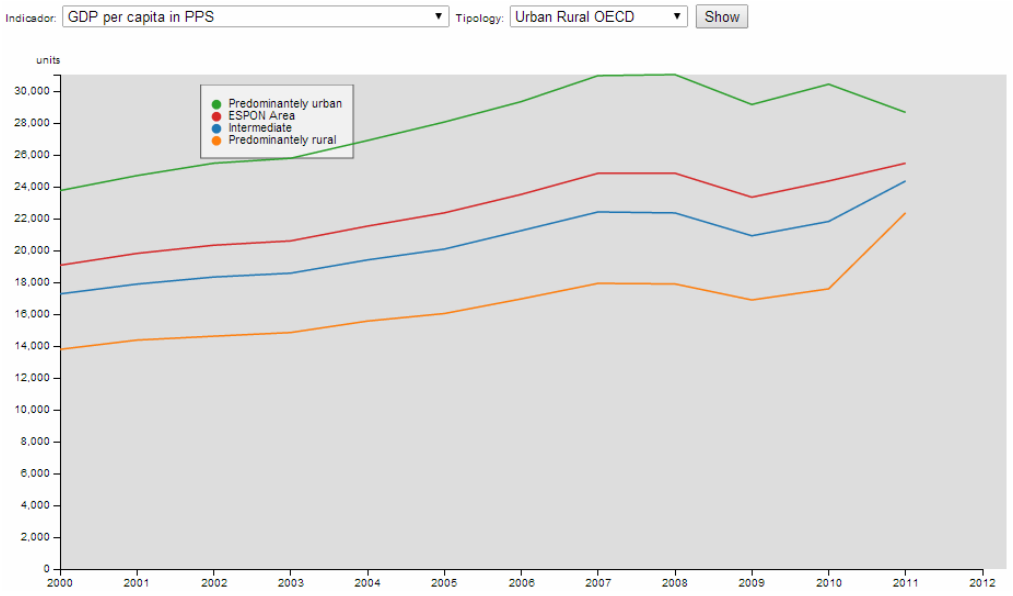
5.3.1 Design and orientation

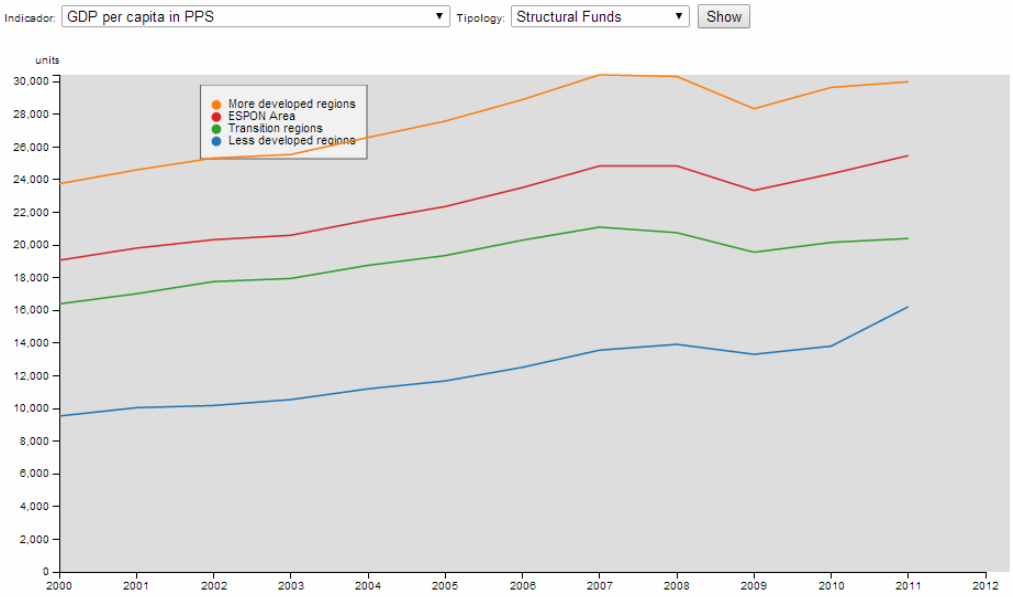
An initial draft of Data Analysis on Timelines Tool is available at the ETMS website (http://81.47.175.201/etms-project/). This tool has been developed during the latest part of the project, and will be further developed towards the end of the project.

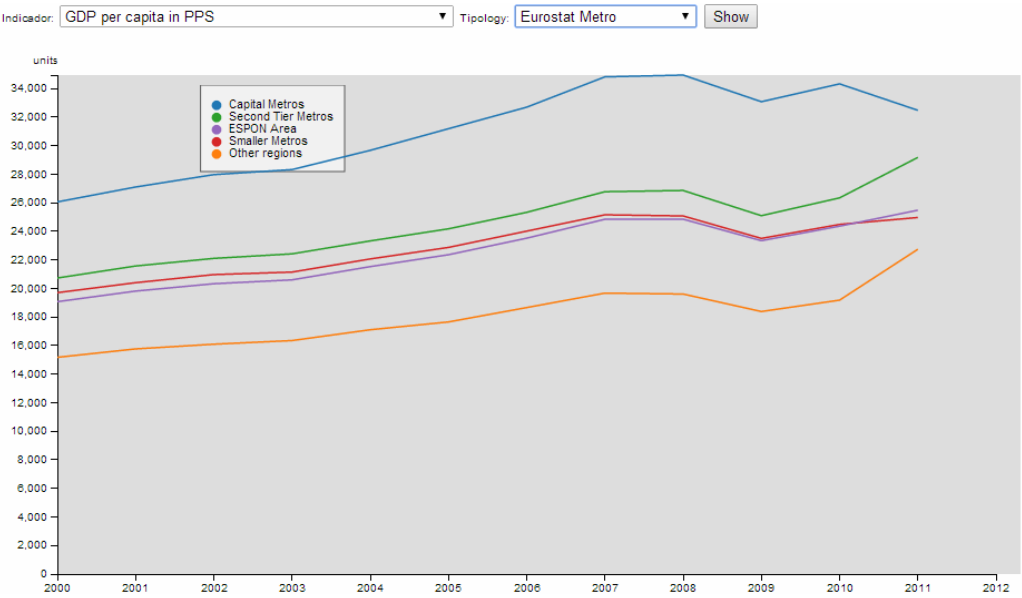
The main propose of the tool is representing analytically over time, and at an aggregated level:

- Territorial trends within Europe by different regional typologies (based on averages) and
- European trends compared with the rest of the World (selected groups)

This tool displays ETMS indicators over time comparing values of different typologies of regions. The platform displays the information using a line graph, where values of regions within the same typology are compared. Data Analysis Timelines also displays ETMS indicators comparing Europe trends with the rest of the world. In this case, the platform displays the information using a line graph, and ESPON area trends are compared with the rest of the world.


Indicador: GDP per capita in PPS
Tipology: Urban Rural OECD
Show
units
Predominantely urban
ESPON Area
Intermediate
Predominantely rural


Indicador: GDP per capita in PPS
Tipology: Structural Funds
Show
units
More developed regions
ESPON Area
Transition regions
Less developed regions


Indicador: GDP per capita in PPS
Tipology: Eurostat Metro
Show
units
Capital Metros
Second Tier Metros
ESPON Area
Smaller Metros
Other regions

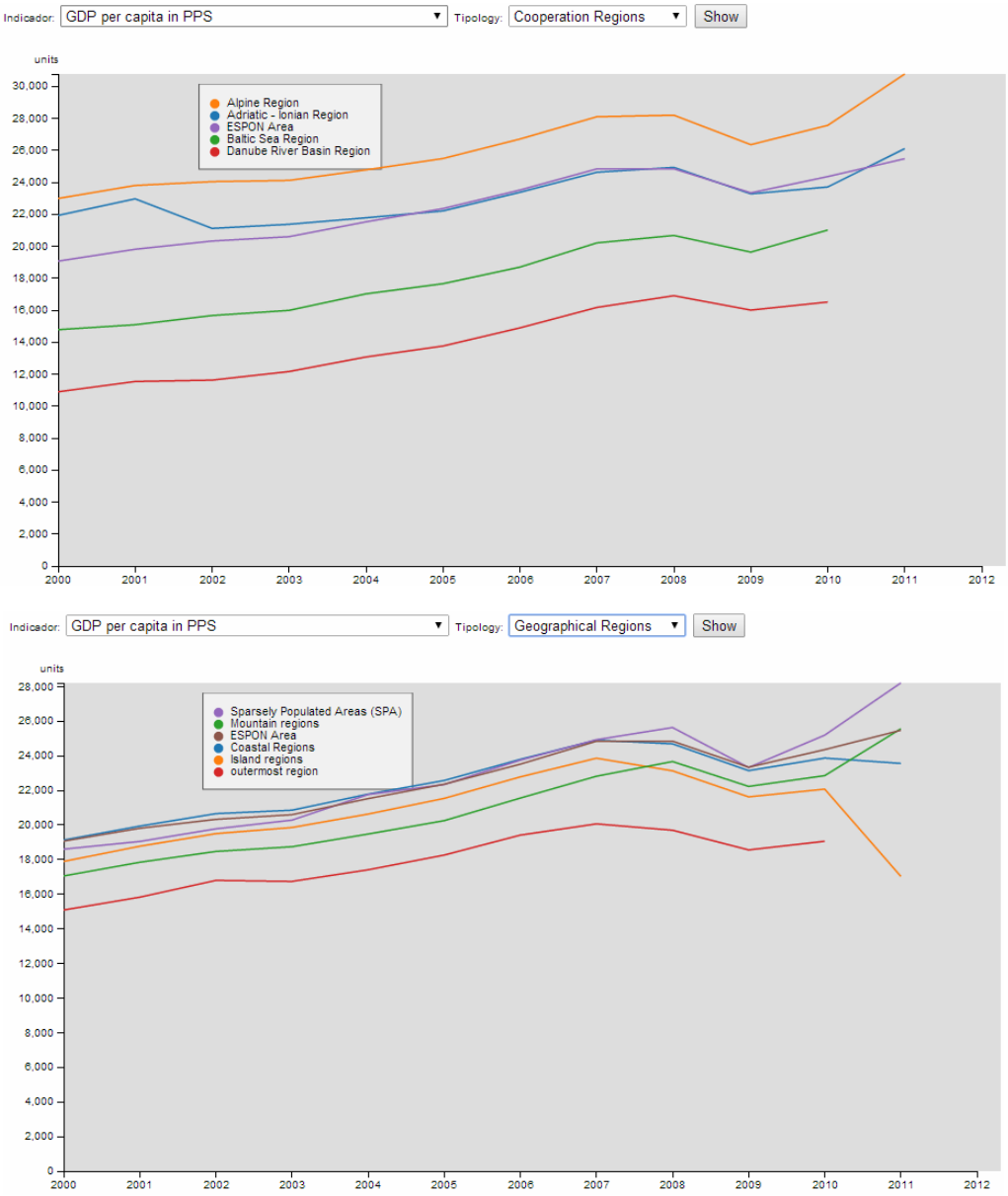


Figure 13. Example of analytic analysis: GDP per Capita evolutions 2000-2012 by Urban-rural typology, Structural Funds eligibility, Metropolitan Regions, a selection of Transnational Cooperation Areas, and regions with geographical specificities.

The technical solution for the platform is based on the open source software (JAVA and Joomla) and programmed using royalties-free online knowledge.

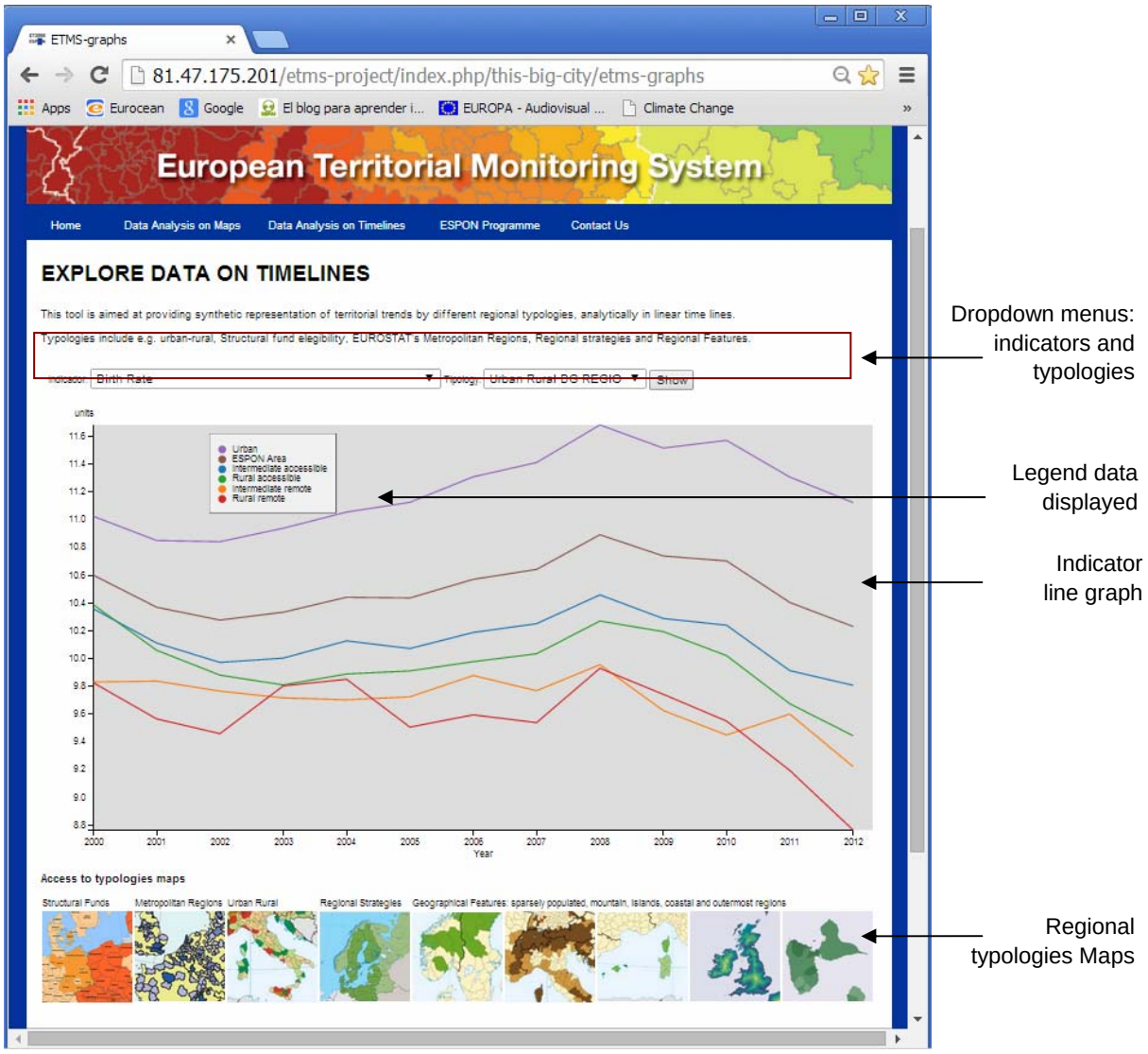


Figure 14. ETMS Data Analysis on Timelines Tool

5.3.2 Specifications

ETMS Data Analysis on Timelines Tool provides the user following possibilities:

- Display ETMS indicators over time, within and outside ESPON area.
- Interactive switching between indicators and different typologies
- Compare ETMS indicators values within regional typologies and with ESPON average value

5.3.3 Features of the Data Analysis on Timelines Tool

The user can interact with the tool through two drop-down menus:

- Indicator dropdown menu: with this menu user can select on of ETMS indicators produced. In case of ESPON territorial trends, nineteen (19) indicators are stored; in case of Europe in the World, nine (9) indicators are stored.

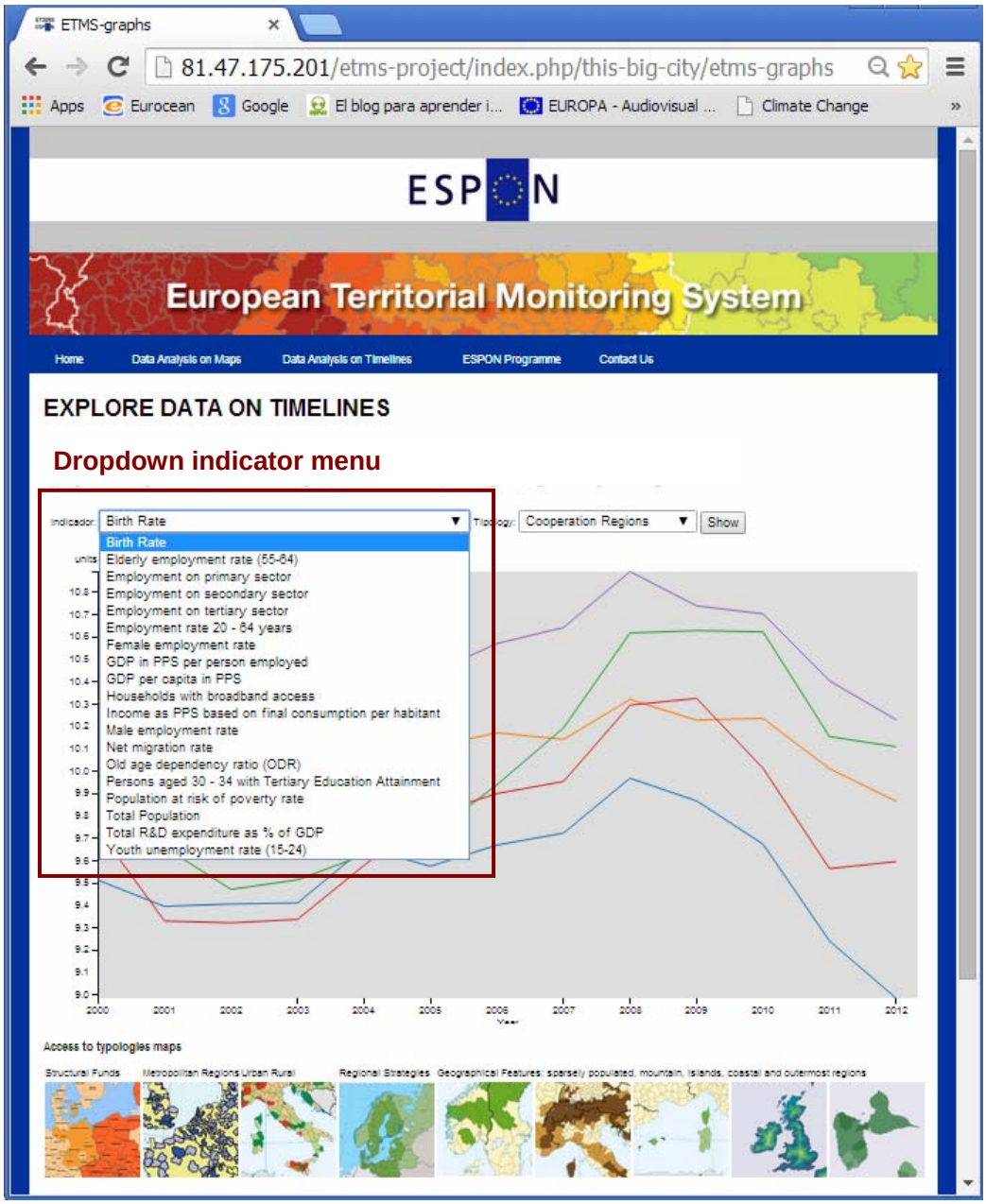


Figure 15. Dropdown ETMS indicator selection menu

- Typology dropdown menu (only available in ESPON territorial trends): with this menu users can select the regional typology. Five typologies can be selected: urban rural typology (booth DG Regio and OECD are available), Metropolitan Regions, Structural Funds typology regions, geographical regions (costal, mountain, islands, outermost and sparsely populated areas) and main cooperation regions (Danube River Basin, Baltic Sea, Alpine Region and Adriatic-Ionic.

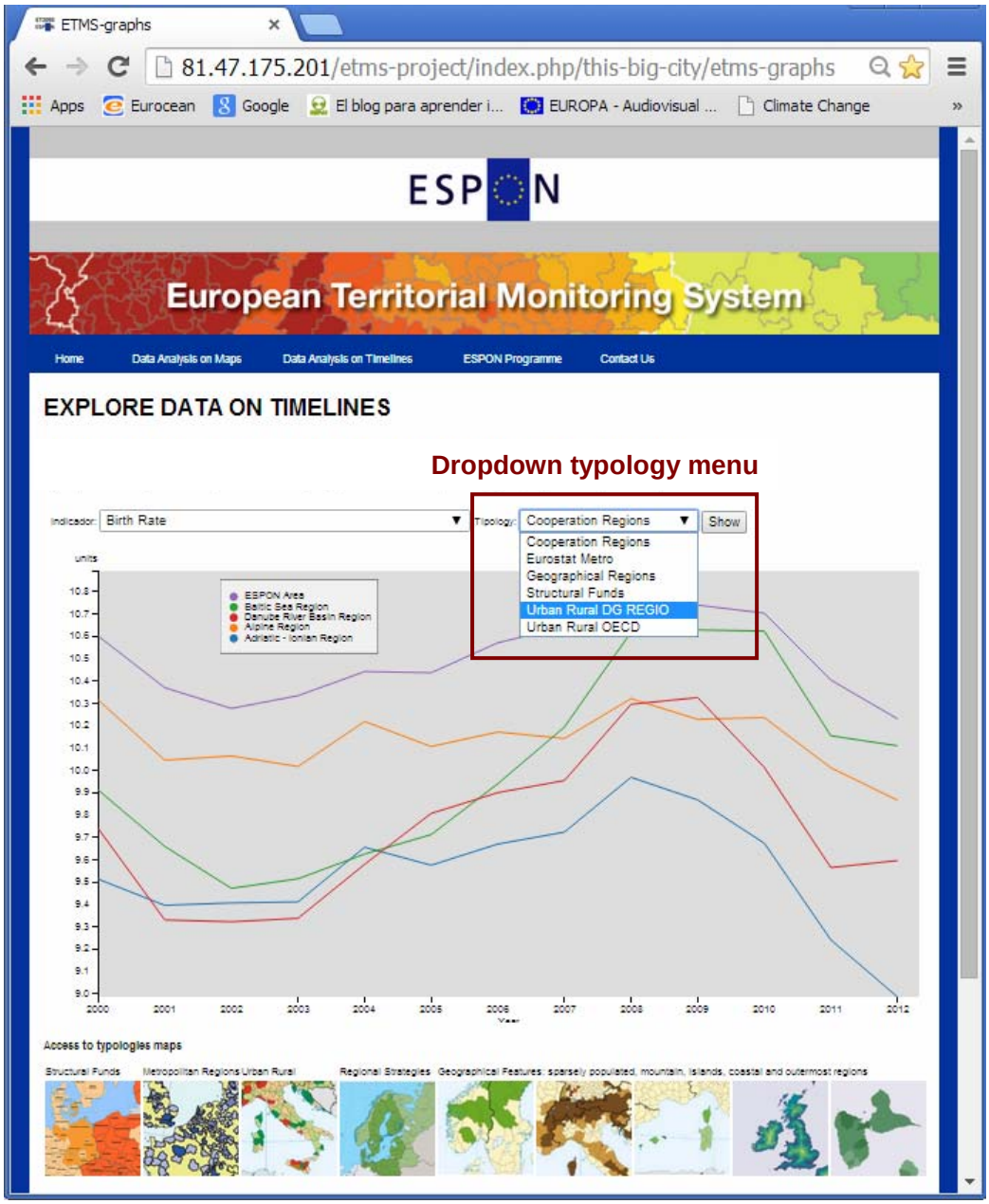


Figure 16. Typology Dropdown Menu

ESPON Territorial trends. Final results are displayed with a line graph that shows data available over time for each region within typology selected, usually from 2000 to 2012. The ESPON average is always displayed. A legend is also shown.

Europe in the World. Final results are displayed with a line graph that shows worldwide indicators over time, grouping countries as follows: ESPON area, neighbourhood, BRIC countries, advanced economies and the rest of the world.

At the bottom, regional maps by typology and world maps are available in order ensure a better data comprehension.

5.4 ETMS Facts and Figures Booklet (F&F)

5.4.1 Approach

The aim of the F&F (Facts and Figures) booklet is to provide a periodic and simple synthesis of the evolution of the Compass Indicators.

The F&F issues will mainly consist of maps and charts. To a lesser extent tables will be included in the F&F Booklet. Texts describing and explaining each figure will generally be short (maximum 4-5 lines for each figure).

The F&F releases are designed to be easily and quickly comprehensible, as they are directed towards policy makers that are looking for information provided at a glance.

Through the usage of automated algorithms charts and other figures in the F&F booklet may be automatically produced from the ETMS Data Analysis tool. An ESPON Analyst would then incorporate comments and brief data interpretations.

Based on previous discussion between the TPG and the ESPON CU, it was conjectured that the F&F Booklet should emphasize visual material illustrating key development trends across Europe, whereas the Monitoring Report would be more focused on the interplay between policy narratives and territoriality of these trends.

In concrete terms, this means that the text included in the F&F booklet should be held to the minimum necessary for explaining to the reader the key findings that are displayed in each visual material chosen and how it may provide relevant input to the policy debate.

The overarching aim of the booklet is not to highlight territorial structures as such, but rather to show how past and current development trends may impact the evolutions of these territorial structures over time.

For in-depth analysis, the more extensive State of the Territory reports will be published every 2 years.

5.4.2 Layout and structure

The layout of the booklet is based on previous ESPON publications and thus it follows the general rules of ESPON communication material. The size of the publication chosen was A4.

The content of the booklet follows a simple structure:

- Table of contents introducing the chapter structure of the publication, as well as some information about the ETMS project rationale.
- Five double-page (i.e. facing each other) chapters, following the five domains chosen by the project team to compile the ETMS database: Economic Competitiveness, Environmental Qualities, Social Inclusion, Human Capital and Access to Territory and Services.
- Each page contains at least one European map that gives the reader a quick insight on the key territorial dynamic for this topic. Further graphic material has been developed in order to give a sharper territorial focus on the issue (especially focusing on urban-rural differences, or a specific outlook at one macro-region) and also to give some insights on differences among European countries.

- For each double-page, a top 10 ranking has been developed in order to highlight the good level of performance (or poor level in some cases) of European cities or regions on a specific issue often related to EU2020 strategy objective.

The layout of the F&F publication is attached and fully documented to this report as a separate document "***ETMS_DFR_Facts&Figures_(300614)_v1.0.pdf***".

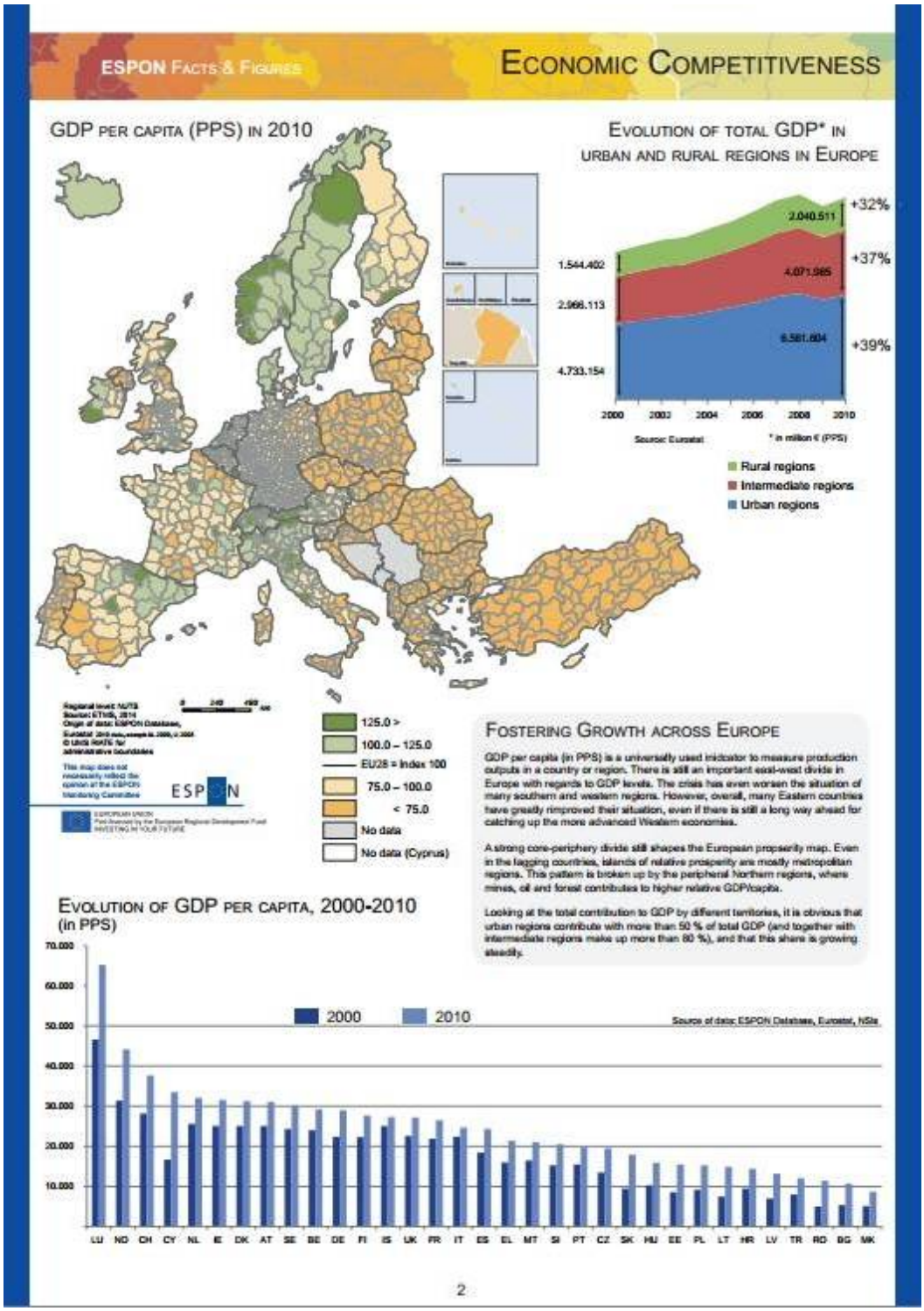


Figure 17. Example of a Facts and Figures Leaflet page

5.5 State of the Territory Report

5.5.1 Approach

The following main principles for the ESPON ETMS State of the Territory report are proposed, based on the review of reference Monitoring Reports available at the Interim Report (June 2013) and interviews carried out with Stakeholders thereafter.

A. **Outspoken Policy Links.** The narrative of the report will have a clear link to the policies monitored in ETMS, in a language that is appealing both to specialised readers and to people from other policy fields.

B. **Targeted groups.** A clear definition of a target group is important in order to be able to focus the themes, language and level of detail to the end user of the Monitoring report. In the ESPON ETMS State of the Territory the main target group is national and European policy makers. Regional and local authorities as well as scientists, which could also make use of the State of the Territory report, are seen as secondary target groups.

C. **Scope.** The scope of the State of the Territory report highly depends on the plans ESPON has for the future maintenance of the system in terms of human resources and budget. The volume and type of data that will be collected on a continuous basis are also decisive for the scope of the State of the Territory report.

D. **Permanent and flexible sections.** The report will have a permanent section that is updated on every edition and a flexible section that allows for a specific thematic focus on each report.

E. **Stand alone sections.** The State of the Territory report is available as a full monitoring report but can also be downloaded as a collection of freestanding sections or chapters.

F. **Website publication**. State of the territory can be presented both as a paper report and a webpage presentation.

G. **Technical approach.** A focus on technical information including methodologies, data sources and perhaps even the inclusion of entire data sets if necessary.

H. **Graphic language.** Coherent and comprehensible use of colours in graphics. Design of graphics will follow a common template to establish clear identity.

I. **Maps, graphs & tables.** The report will include qualitative policy discussions along with maps, graphics and tables. Maps, graphics and tables will be produced with the ETMS Data Analysis tool.

J. **Reader friendly format.** This includes layout issues (e.g. pages not heavily loaded with text), language (e.g. easy communication language) and structure (e.g. easy to navigate).

5.5.2 Publication cycle

The aim is to publish a new State of the Territory issue every 2 years. The magnitude of the report is envisioned on around 50 pages.

5.5.3 Layout and Structure

A draft of the State of the Territory publication is attached and fully documented to this report as a separate document "***ETMS_DFR_StateofTerritory_(300614)_v1.0.pdf***".

The basic idea is to give the report a fixed structure of six chapters linked by a logical narrative path, but than can be dealt with as stand-alone documents. In doing so, the report becomes both a comprehensive linear review on the State of the Territory, and a reference consultation tool for analysis of particular policy issues.

- **Chapter 1: Introduction and policy context.** The introduction chapter introduces the aim and specific topic of the report, but also ESPON, and the general policy context. ***(4 pages)***

- **Chapter 2: Highlights/Summary.** The summary chapter presents the main highlights of the report, rather than providing a full summary. ***(4 pages)***

- **Chapters 3 to 8: Policy Development.** The six following chapters present the main evidence of the ETMS. There is one chapter for of each of the six priorities of the Territorial Agenda 2020.

  Each of the chapters starts with a short section on the understanding of the policy priority.

  Following this understanding latest territorial information is presented to discuss to what degree Europe moves towards achieving the objective. A range of maps and graphics accompanies the text. In many cases developments are discussed in different time perspectives, e.g. until the financial crisis and since the entrance of the crisis.

  The final section of each chapter sums up the territorial observations both in light of the policy objectives of the Territorial Agenda 2020 and the Europe 2020 Strategy. . ***(44 pages)***

5.5.4 Synthesis of the Report

This first ESPON Monitoring Report shows what progress Europe has made on its way towards achieving the objectives set out in the Territorial Agenda 2020. It furthermore reflects on what that progress means in relation to achieving the objectives of the Europe 2020 Strategy.

Overall, Europe has made some progress in relation to the various objectives of the Territorial Agenda 2020. However, the economic crisis brought an increasing focus on economic growth building on the strengths of the strongest poses some challenges to cohesion-oriented objectives.

Promote polycentric and balanced territorial development

Polycentric and balanced development has many facets. Recent European demographic trends point towards polarising trends between metropolitan and non-metropolitan area, rather than reflecting a core-periphery pattern opposing the "Pentagon" and the rest of Europe.

Recent European economic development trends show that in general terms European cities and regions were moving towards more cohesion until the beginning of the crisis. The economic crisis brought this convergence process to a halt.

Considering the limited perspectives of getting back to the high pre-crisis economic growth levels during coming years, the pursuit of polycentric and balanced development as promoted by the Territorial Agenda 2020 will need to be based on other levers. A better functional division of labour between regions and smart specialisation could be a way forward.

Encouraging integrated development in cities, rural and specific regions

Integrated development in cities, rural areas and areas with geographical specificities is important for a balanced territorial development.

Looking at the increasing population disparities between urban and rural areas, it appears that large parts of Europe are currently moving in the opposite direction of this target.

For more than one decade, major metropolitan areas and larger cities concentrate an increasing share of population in many countries, but there are also significant exceptions. The biggest differences in growth rates between urban and rural areas can be found in the Nordic countries, Estonia and Bulgaria. At the other end of the scale, Italy, France, Luxembourg, Poland, Switzerland and the United Kingdom experience no significant urban-rural polarisation, while Cyprus and Latvia have higher demographic growth in rural areas.

Focusing on mountain regions as one example for areas with geographical specificities, in many mountain areas there is a rapid polarisation between urban and rural areas. More concretely, e.g. in the Alps and the Pyrenees, rural areas taken as a whole have a growing population. However, growth in urban parts is considerably higher, particularly in the Pyrenees. The Carpathians and Balkans experience limited population growth in urban areas, and a significant to strong population decline in rural areas.

Overall, this argues for a more place-based approach of a policy mix bringing together regional development policies and relevant sector policies.

Territorial integration in cross-border and transnational functional regions

The development of cross-border and transnational functional regions aims at helping overcoming negative border effects and make better use of potential synergies and joint solutions across national borders.

The evolution of economic border discontinuities within and outside the EU is characterised by the existence of distinct patterns that relate to economic wealth and performance. Within Europe, the main economic cross-border discontinuities between countries have been increasing over the past decade. At the same time disparities between Italy in Mediterranean non-EU Member Stats have been declining.

Major and increasing disparities exist between Luxembourg and it neighbours, between Switzerland and France, and Switzerland and Italy, as well as between East and West Europe.

Despite that, countries in the East have had higher growth between 2000 and 2012, the border differential has increased when measured in absolute figures. In other words, the slower growth in the West has on average generated more additional wealth per capita compared to neighbouring countries in Eastern Europe.

The only exception in this respect is the Adriatic Sea, where Italy’s economic decline has contributed to reduce the discontinuity between the Eastern and Western shores. Also the disparities between Italy and Malta have been reduced.

Overall, the observed development does run contrary to the overall cross-border integration objective of the Territorial Agenda. Although, a more nuanced regional picture might provide a somewhat different picture.

Ensuring global competitiveness of the regions based on strong local economies

Local specificities and assets are key elements for unlocking local economies’ potential in developing business opportunities and employment.

Looking at education and employment figures offers some first hints on the strengths and potentials of local economies.

The share of 30 to 34 year olds holding a tertiary education degree has risen from 31% to 35.7% (+4.7%), reflecting a significant progression. The increase is particularly strong in Central and Eastern Europe. The highest growth is observed in the Czech Republic, Poland, Slovenia, Slovakia, and Hungary, as well as in Latvia and Lithuania.

The economic crisis has led to sharp drops in employment rates employment mainly in some parts of southern Europe. At the same time, differences in employment rates between men and women are narrowing in most European regions, notably in Ireland, Spain, Greece, and in the Former Yugoslav Republic of Macedonia, but also in Southern Italy and Western Turkey.

Household income is another factor of importance for people's everyday life. Between 2008 and 2011, household income has become more volatile in countries hit by the economic downturn.

Overall, it appears that in many regions in Europe the local economies got weaker as a consequence of the crisis. At the same time, there are signs that the some regions are more resilient to economic shocks than others. Equally important is the fact that pre-conditions for stronger economies are improving which might facilitate general growth developments after the crisis.

Improving territorial connectivity for individuals, communities and enterprises

In the everyday life of individual citizens the access to workplaces, shops and various types of services of general interest are of importance. Unfortunately, European analysis stays at much more general levels as the access of individuals is shaped by intra-regional differences, as well as issues such as quality and affordability.

Overall multimodal accessibility has been improving in large parts of Europe. The highest relative changes of multimodal accessibility occurred in regions in Eastern Europe. However, also many Spanish regions had high relative increases, a combination of improvements in rail and road accessibility. In that sense Europe is moving in the right direction, improving accessibility.

In terms of accessibility and economic wealth, there is an overall disparity between the core and North of Europe on the one side and the Eastern and Southern regions of Europe on the other side. This poses a considerably cohesion challenge in Europe.

At the same there is an increasing concentration of population in larger cities. This trend risks to challenge connectivity and accessibility in rural areas and smaller cities in the long run.

Managing and connecting ecological, landscape and cultural values of regions

The nature and biodiversity of Europe's cities and regions continues to be under threat form the loss of land to urban development and built infrastructure. Soil sealing is still increasing around most urban areas in Europe. Furthermore fragmentation of environmental sites is increasing.

Both soil sealing and fragmentation vary considerably across Europe, illustrating different patterns of land use, settlement structures and population densities.

Smart, sustainable and inclusive growth

Reviewing the progress made with regard to the objectives of the Territorial Agenda 2020, shows the delicate balance and mutual interdependencies between cohesion and growth objectives.

As a consequences of the economic crisis developments moving towards more balanced development and integration of territories got interrupted.

Overall, territorial polarisation trends got more pronounced over the last years, e.g. between the core and North of Europe on the on side and the East and South of Europe on the other side. Also polarisation trends between major urban areas and rural areas incl. smaller cities got more pronounced in many cases.

The refocusing on strong points and the strengths of the strong players might help Europe to achieve the objectives of the Europe 2020 Strategy.

This may imply a weakening of the objectives of the Territorial Agenda 2020. At the same time once economic growth is catching up, there might also be a stronger strive towards balanced development.

This can only succeed if already the path back to growth is more strongly based on the diversity of regional and local development potentials. There is a need for a place-based approach both for achieving the objectives of the Europe 2020 Strategy and successively also the objectives of the Territorial Agenda 2020.