ESPON

RIMAP

(112_PR3_08_0477)

Design and Development of Rich Internet Online Mapping Tool

Scientific Platform and Tools Project 2013/3/8

Draft Final Report
27/09/2013

EUROPEAN UNION
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This report presents a more detailed overview of the analytical approach to be applied by the project. This “Scientific Platform and Tools” Project is conducted within the framework of the ESPON 2013 Programme, partly financed by the European Regional Development Fund.

The partnership behind the ESPON Programme consists of the EU Commission and the Member States of the EU27, plus Iceland, Liechtenstein, Norway and Switzerland. Each partner is represented in the ESPON Monitoring Committee.

This report does not necessarily reflect the opinion of the members of the Monitoring Committee.

Information on the ESPON Programme and projects can be found on www.espon.eu

The web site provides the possibility to download and examine the most recent documents produced by finalised and ongoing ESPON projects.

This basic report exists only in an electronic version.

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[1] The listing of the elements included here should serve as a reminder of the standard elements that need to be covered by an Inception Report. The concrete content might vary from project to project. The level of detail to which these standard elements need to be addressed also depends on the quality of the project proposal and the level of detail to which some of these elements might already have been addressed there. Therefore the table of content for the report can be devised by the TPG, taking into account the elements that are requested to be dealt with in this report.

Executive Summary

The RIMAP Draft Final Report covers the work done during the thrid period of the RIMAP project, between January and Septiember 2013.
According to Annex III of RIMAP Subsidy Contract (dated on 29th March 2012) the Draft Final Report shall include the following results:

- Draft Final version of the Online Mapping tool.
- Draft Final version of the User guidelines.
- Short reporting of the activities, both planned and realised, resolution of problems and definition of delimitations.

Taking it into account, this report is divided into 4 main sections:

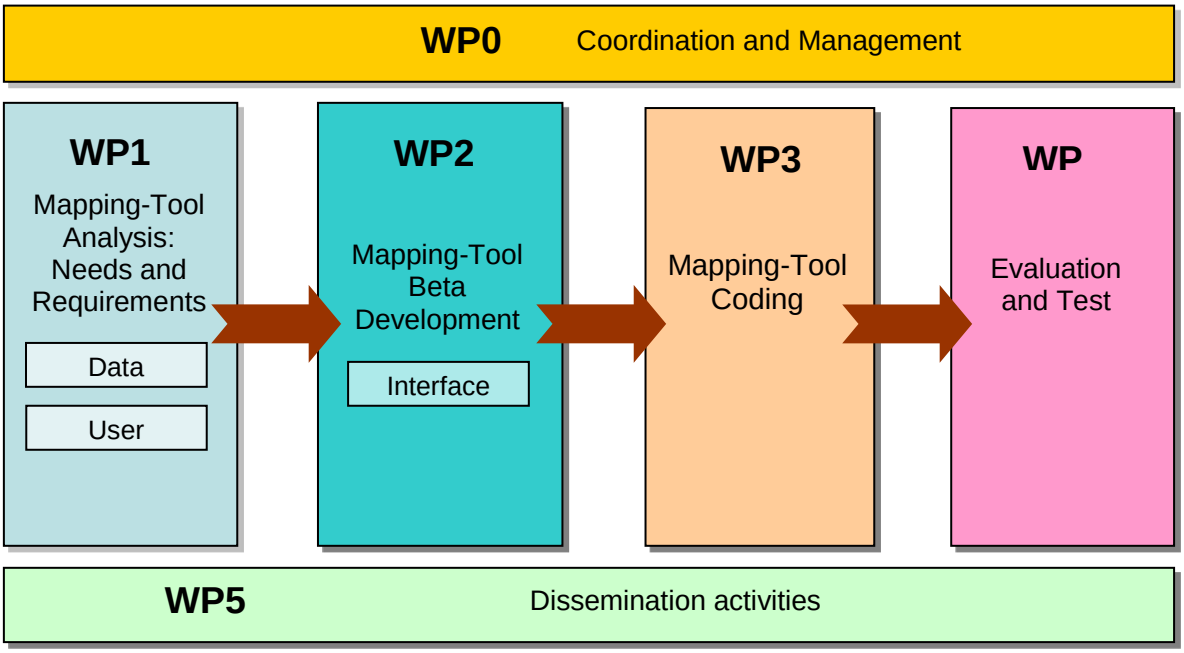
- Overview of the Draft Final Report.
- Results achieved.
- Orientation of the project previewed towards the Final Report.
- Annexes.

1. Overview of the Draft Final Report.

RIMAP (Rich Internet MAPping Tool) is conceived for an On-line tool development upon ESPON 2013 Database. This tool will be online, made available via ESPON website and should provide a toolbox to visualise and analyse data in maps and diagrams. The main target is to fill the gap between disseminating data in tables and disseminating data in fixed and interactive maps.

If during the Inception period the main goal was to define the User and Data Requirements and the Architecture of the platform, and during the Interim period the main goal was to translate these Requirements into a Prototype of the Mapping Tool. In this third period, the main goal has been to code the functionalities and requirements specified obtaining a functional Mapping Tool.

Taking a look the work plan (see figures 1 and 2), in this period RIMAP team has been working mainly in the WP3, though some improvements of the WP1 and WP2 have done too.



Gantt Chart	YEAR 1 quarter				YEAR 2 quarter			
	1	2	3	4	1	2	3	4
WP0 - Coordination and Management								
WP1 – Mapping-Tool Analysis: Needs and Requirements								
WP2 – Mapping-Tool Beta Development								
WP3 – Mapping-Tool Coding								
WP4 – Evaluation and Test								

WP5 – Dissemination and Exploitation activities								

1.1. Work Package 0 – Coordination and Management.

The aim of this WP is to establish an effective coordination and decision structure to adequately address the following objectives:

- Assure the execution of work packages and deliverables in terms of execution time, cost and adequate quality.
- Specify project objectives to be achieved within the estimated time and cost frame.
- Ensure communication between ESPON and external.
- Organization and coordination of project start, meetings and workshops.
- Coordination of networking activities.

Regarding the Progress monitoring of RIMAP, there will be regular content deliveries, which will contain the detailed implementation of the project, the deliverables and the planning for the next reporting period:

- **Inception Report (June 2012).**
- **Interim Report (December 2012).**
- **Draft Final Report (September 2013).**
- **Final Report (December 2013).**

Furthermore, complete financial delivery (progress reports) will be submitted each six months period (according to point 5.3 of Subsidy Contract). These financial reports will be validated by the first level control (appointed by AIDICO in a decentralized system) *(see Annex A-2).*

The second progress report was delivered in January 2013 and the third progress report was delivered past in September 2013.

1.2. Work Package 1 – Mapping-Tool Analysis: Needs and Requirements.

The aim of this WP is to analyze the needs and requirements of the Mapping-Tool since different points of view:

- Data: Indicators and Geographical Info may be analyzed in order to define how must be shown.
- Users: Is very important to define user capacities in order to develop and easy and friendly tool.

This information will be used to design the architecture of the Mapping-Tool through these actions:

- Selection of platforms and language development.
- Architecture design.
- Interface design.

Though this Work Package should be finished, we received some comments from other ESPON projects and we decide to update the interface design.

Deliverables

D1 User and Data Needs and Requirements Report (June 2012).
D3 Architecture Design Report (June 2012).

1.3. Work Package 2 – Mapping-Tool Beta Development.

The aim of this work package is to develop a Mapping Tool prototype which can be used to verify the understanding about user needs and requirements.

It's very important to work closely with database TPG 2013, in order to make a good connection.

Development of a Mapping-Tool functional prototype for each device (computer, tablet) will be done as a limited representation of the final tool will be developed, allowing test real situations and explore the user experience.

Though this Work Package should be finished, we received some comments from other ESPON CU and we decide to update the table of content for the user guidelines.

Deliverables

D6 First beta-version of the Online Mapping tool (December 2012).
D7 Table of Content for the user guidelines (December 2012).

1.4. Work Package 3 – Mapping Tool Coding

The basic objective of this work package is to develop the code that implements the specifications and architecture defined in the previous tasks.

The code should been developed taking account that the data, the logic control and user interface must be well differentiated so that any change in one of these three components will not affect others.

Deliverables

D8 Draft version of the Online Mapping tool (September 2013).
D9 Draft User guidelines (September 2012).

1.5. Work Package 5 – Dissemination Activities.

To carry out activities to disseminate research results and to prepare for their take-up and use, including knowledge management and, activities directly related to the protection of foreground.
A dissemination plan will be made at the beginning of the project (following the indications in Annex III of the Subsidy Contract). RIMAP project Communication and Dissemination Plan are structured in the following elements:

- Objectives and stakeholders.
- Strategy, Activities and tools selected.
- Estimated budget to put into practice these actions.
- Main expected results.
- EC and ESPON Requirements.

2. Results achieved

During the first period of the project, some tasks have been developed related to WP0, WP1, WP2, WP3 and WP5.

2.1. User and Data Needs and Requirements

The developing of a web mapping tool project needs some tasks that are focused specifically on identifying, gathering, communicating, and documenting user requirements. Once identified, the user requirements effectively define the basis for developers, testers, and implementers to begin determining the functionality, responsiveness and interoperability required of that system.

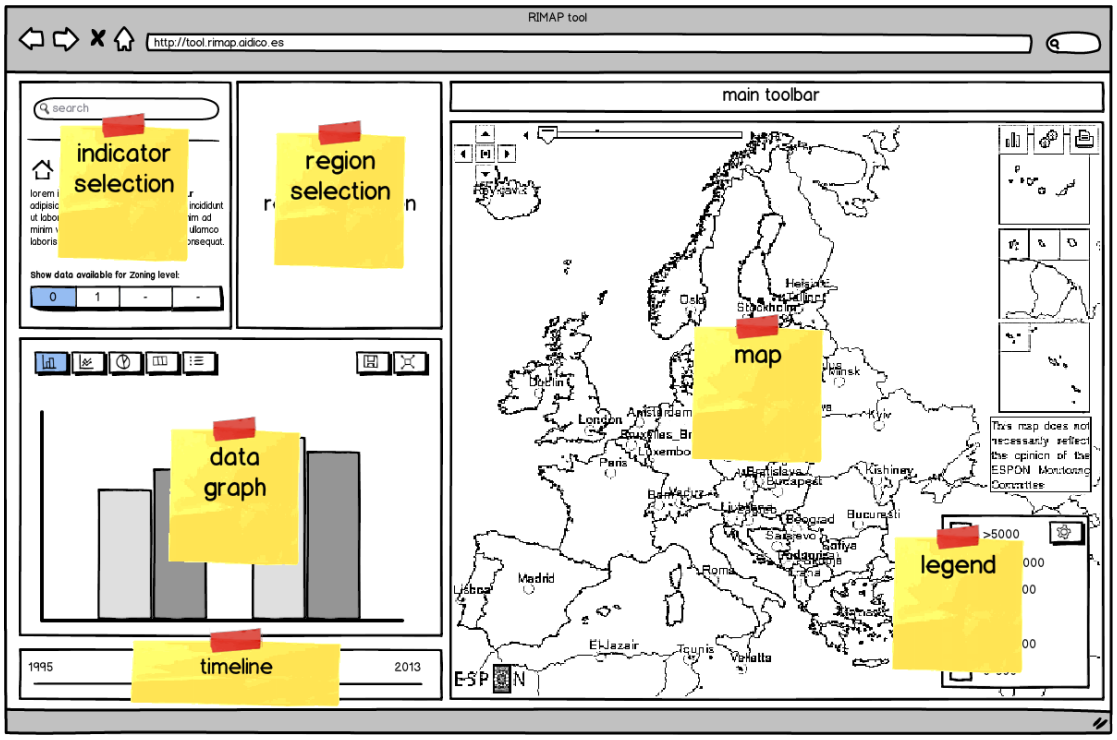
In the Inception Report, a deliverable **D1 - User and Data Needs and Requirements Report** was developed. However, this deliverable was improved during the Interim period taking account some MC comments. However, some new improvements have been developed taking account some comments received from some ESPON project leaders.

Some tasks have been developed in order to improve the Requirements:

- New Online Mapping Tool Wireframing.
- New User Modes Definition.

2.1.1. Online Mapping Tool Wireframing

In this period, the Wireframing has been restyled in order to increase the Map size.



The main change is the map and graph position, also its size as can be seen in the image below.

Now the map is bigger and by default it is located on the right side because is the most important issue of the tool.

Other characteristics of the new design are:

Indicator Selection

- Indicator selection areas can expand.
- It has included a description of the selected indicator

Region Selection

- Regions Selection can expand.
- The user can select/deselect a region by clicking on in on the map.
- The user can choose to display or not data in the data graph for a region by checking the checkbox.
- Only data for selected regions is displayed on the data graphs (except for NUTS0).
- A new area in the GUI should display the complete list of regions, and allow to search, select/deselect regions from it. The action is equivalent to select those regions on the map
- The user can create sets of selected regions and save them for reuse later (e.g. the user selects Spain, Italy, France, Greece and creates a set called “Mediterranean countries”).
- For NUTS1, NUTS2 and NUTS3, they should appear grouped in NUTS0 sections. The tool should allow selecting all regions of a country with a single operation.

NUTS Level selection

- The NUTS level of the map and the data graph is determined by the indicator selected by the user. If an indicator has data for more than one NUTS level, the user has to choose which one to display, and by default it will be the highest one.
- The region list will display regions of the currently selected NUTS level (grouped by country).

Map display options

- The map allows to display or not the regions borders.
- The map allows displaying capital cities.
- By clicking on a category in the legend section, the tool opens a modal window to change the colour scheme, the ranges, or the specific colour for the selected category.
- Data Graph and map sections can switch.

General

- The mouse pointer changes to the proper icon on interactive elements of the tool (e.g. a hand when something can be selected)
- Provide feedback to the user when data is loading with a status icon (progress bar or spinning wheel)
- Do not block the tool when possible and use background operations so the tool does not feel unresponsive on non-critical operations (e.g. load new data with web workers).
- Preload or save locally when possible all critical info (e.g. indicators list) so the user does not have to wait for it to load each time.
- Tooltips should be provided for interactive elements to indicate their function.

Map Navigation

- The map allows zooming in and out using the scroll wheel.
- The map allows to reset the view to the default zoom and position.

Look and feel

- The tool will use the same color and font schemes as ESPON websites:
    - Main color: deep blue #003399
    - Secondary color: medium grey #CCCCCC
    - Tertiary color: Light grey #F2F2F2
    - Font family: Trade Gothic, Arial, san-serif

The following figure shows the tool with this new look and feel.

Indicators Classification Select between theme, project or policy

Indicators Search bar

NUTS Level Selector

Study Area. Selection, creation and delete

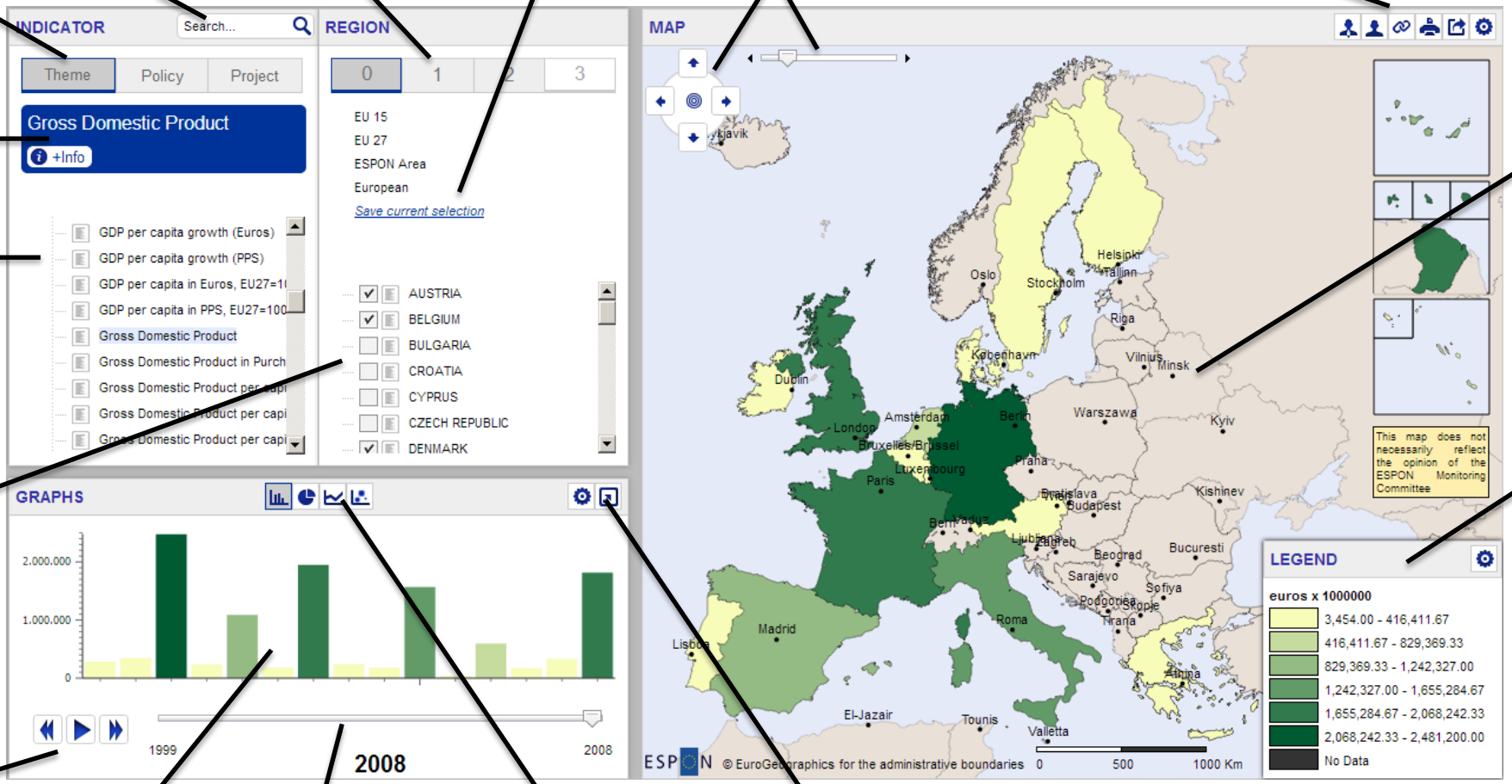
Pan and Zoom controls Selector

Main Tool Bar: Profile, Share, Print, Export, Help and Map Settings.

Selected Indicator Description

Indicator Selection. Select one indicator to visualize on the map and the graph

Region Selection. Select regions to visualize on the map and graph.



Map. Regions are mouse sensitive. Mouse over: show information. Mouse click: region selection

Legend and legend settings. Legend window is draggable.

Animation buttons.

Data Graph.

Timeline

Graph Type selection: bar, chart, time series and scatter

Graph tool bar. Settings and Switch.

2.1.2. User Modes definition

Taking account the scenarios and user cases included in the deliverable **D1 - User and Data Needs and Requirements Report**, two well differentiated User profiles have been defined:

- Basic Mode. This mode should be quite simple, offering the most important functionalities.
- Expert Mode. This mode will integrate all the possibilities, integrating some analysis functionalities.

The following table summarizes the functionalities in each Mode taking account the different Domains (Visualization, Analysis, Output, Support):

Domain		Basic Mode	Expert Mode
Data	Indicators	Only core indicators from ESPON Database will be accessible.	All the ESPON Database indicators will be accessible
Data	Indicators Selection	Selection will be by theme in two steps: 1. Theme selection. 2. Indicator selection. A keywords search will be integrated too.	Selection will be by theme, policy or project (theme by default) in three steps: 1. Selection between Theme, Policy or Project; 2. Theme/Policy/Project Selection. 3. Indicator Selection. A keywords search will be integrated too.
Data visualization	Study Area	Predefined study areas, such as ESPON, UE27, UE15, will be available for the user.	A keywords search has been integrated Predefined study areas, such as the ESPON, UE27, UE15, Danube region, NWEurope, Baltic Sea and Mediterranean regions, are available for the user. The user also is able to define a study area based on a group of countries and/or regions (NUTS 0, 1, 2, 3). This can be done by selecting them from a list or from the map using the mouse right-button. A button to save the selection is available. A button to delete user study areas will be available
Data visualization	Remark Area	Areas can be remarked (increasing its bright in the map and the graph) by hovering over them.	
Data visualization	Geometry Levels	Concerning the geometries and layers are included in the Mapping tool NUTS0 to NUTS3 geometries and the capital layer.	
Data visualization	Time evolution	When an indicator is available for a time series the user will have the possibility to view the changes over time in the map and the graph with some time controls: play, next, back, stop.	

Data visualization	Maximize	A maximize button will be included in the graph window.	
Data visualization	Map Zoom	Map Zoom in/out is available through buttons or mouse.	
Data visualization	Map Pan	Map Pan is available through buttons or mouse.	
Data visualization	Map Settings	No available	Map settings will be automatically saved using the browser cookies. On the other hand, a Restore button will initialize the map settings.
Data visualization	Map Ranges	6 lineal Ranges are defined. If positive and negative values are available, then 0 should be used as a break value.	6 lineal Ranges are defined. If positive and negative values are available, then 0 should be used as a break value. User will have the opportunity to change the minimum and/or maximum value, the number of Ranges and the type of classification (equal, quantiles, Jenks and manual intervals) and if 0 is a break value. Quantiles distribution would be: • 10, 50, 90. • 25, 50, 75. • 5, 25, 50, 75, 95.
Data visualization	Maps Colours Scheme	A default colour scheme will be available.	A default colour scheme will be available. User will have the opportunity to make changes in the colour scheme from a set of 8 different colour schemes (see Interim Report Annex II). Moreover User will be able to create a new colour scheme.
Data visualization	Map Capitals	As a default the capitals will be indicated in the map displayed by their names and a symbol	As a default the capitals will be indicated in the map displayed by their names and a symbol (•).

		(•).User will have the opportunity to select if they are displayed or not.	User will have the opportunity to make some changes in this in the font type, font size, colour, symbol, and if they are displayed or not.
Data visualization	Map Borders	As a default the borders should have a fixed setting on thickness and colour of the lines.	As a default the borders have a fixed setting on thickness and colour of the lines. The user has the opportunity to change the visualization of the borders regions (to each level) changing the thickness and colour of the border line and if they are displayed or not.
Data visualization	Map Contextual Information	The user also is able to retrieve information from the map by hovering over it, to retrieve information about the values in the map. The information that is displayed is the name and code of the region and the value of the data displayed.	
Geographical Comparison	Bar Chart	Some possibilities will be available: • 1 Indicator selected, Study Area Selected, 1 Year Selected. • 1 Indicator selected, Study Area Selected, 2 or 3 Years Selected. • 2 Indicators selected, Study Area Selected, 1 Year Selected.	
Geographical Comparison	Bar Chart Sort	In a Bar Chart, data will be available to be sorted by: • Alphabetic. • Ascending. • Descending.	
Geographical Comparison	Bar Chart Average	A line with average value will be able to be shown or not.	
Geographical Comparison	Pie Chart	Some possibilities will be available: • 1 Indicator selected, Study Area Selected, 1 Year Selected. • 1 Indicator selected, Study Area Selected, 2 or 3 Years Selected. 2 or 3 pies will be shown in this case. • 2 Indicators selected, Study Area Selected, 1 Year Selected.	

		The number of regions shown in the pie would be defined.
Time Evolution	Line Graph	This graph will be used to show information about 1 or 2 indicators in the Study Area Selected for several years.
Data Analysis	Scatter Diagram	This graph will be able to compare only one couple of Main Indicators.
Data Analysis	Frequency diagram	The bar chart diagram works as frequency diagram in case of the Indicator was not numerical.
Data Analysis	Overlays	With this utility, two indicators will be shown in the map at the same time by different ways: one by a colored layer and the other by a circle with variable size.
Output	Print	User will be able to print the map as viewed to a selected printer via the normally used printer selection window.
Output	Save	User will be able to save the map created.
Output	Open	User will be able to open a map saved previously.
Output	Share	User will be able to share the map with a link through email or social networks.
Output	Export	User will be able to export the map made as a file in various formats such as pdf, jpg, png, xls.
Guidelines		User Guide available in .pdf format.

2.2. Architecture Design

The architecture of the Web Mapping Tool was defined in the Inception Report.
However, a small change has been done during this last period.
This change affects only to the Client (or Presentation) Tier, where, after making an analysis between different JavaScript Graphic Components Libraries, we have chosen Dojo Toolkit 1.8 Open Source, http://dojotoolkit.org to use it in the Web Mapping Tool.

Next table summarizes the different options analysed and the strengths and weakness of each.

Library Name	Link	Strengths	Weakness
Dojo Toolkit 1.8	http://dojotoolkit.org	• Free • Open Source • In addition to chart components, includes some control components. • Nice components.	None
JQplot	http://www.jqplot.com	• Free • Open Source	• Not too nice.
Highcharts	http://www.highcharts.com	• Nice components.	• Not Free • Not Open Source

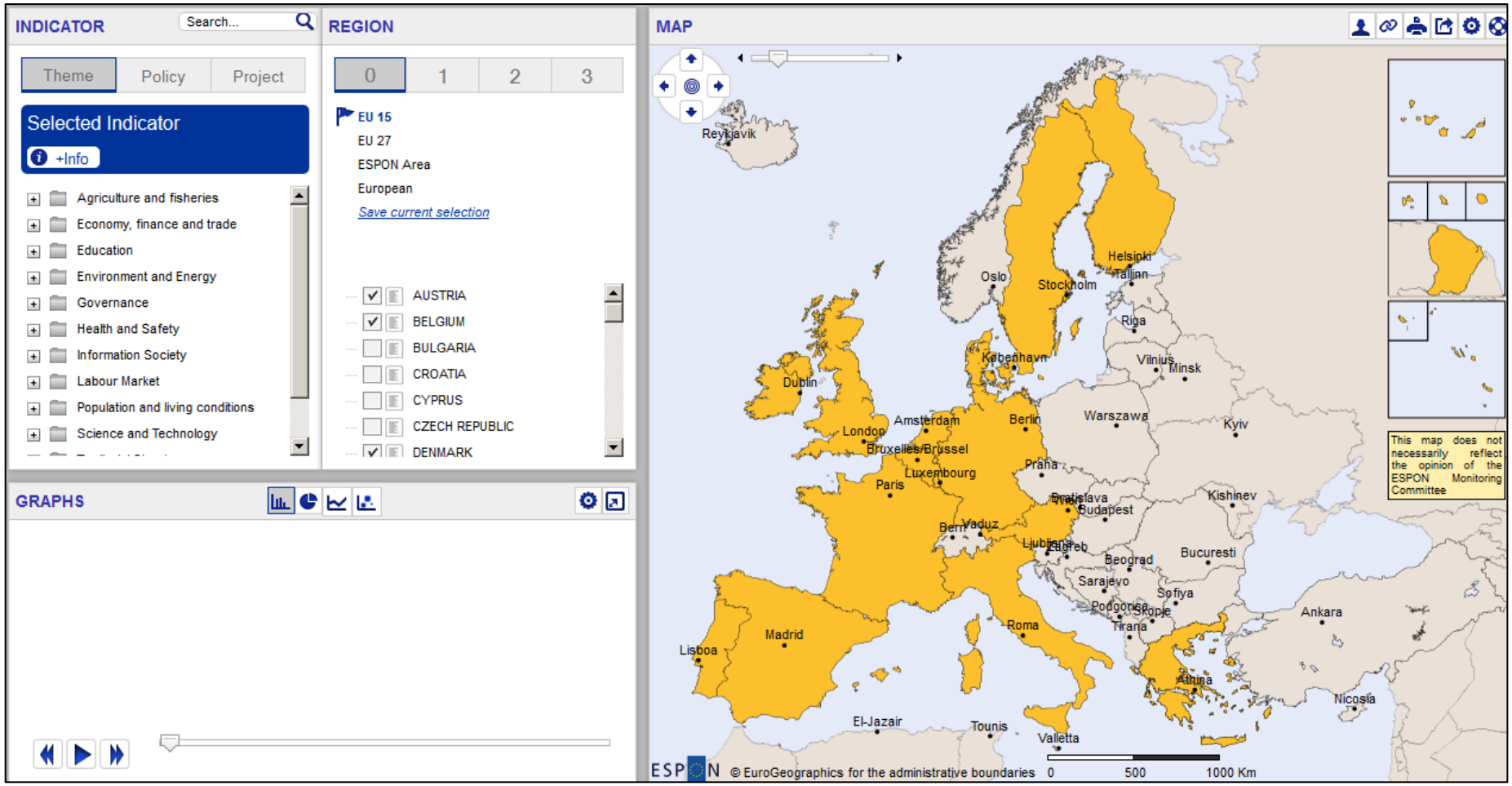
2.3. Draft Version of the Online Mapping Tool

The Online Mapping Tool has been developed taking account the User and Data Requirements.

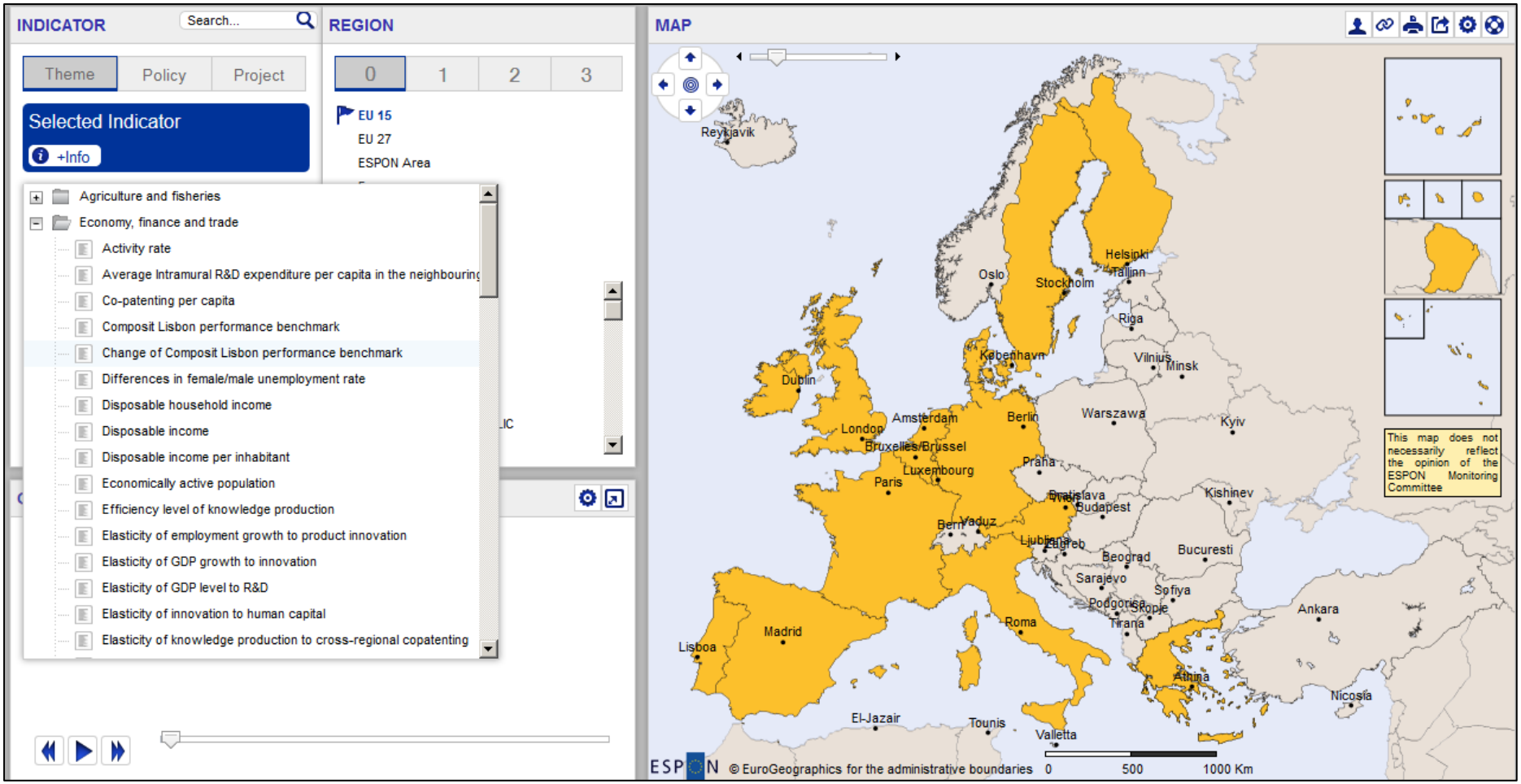
It has been installed into the ESPON Servers in order to check the behavior of the tool.

RIMAP Draft version is available in http://tool.rimap.aidico.es.

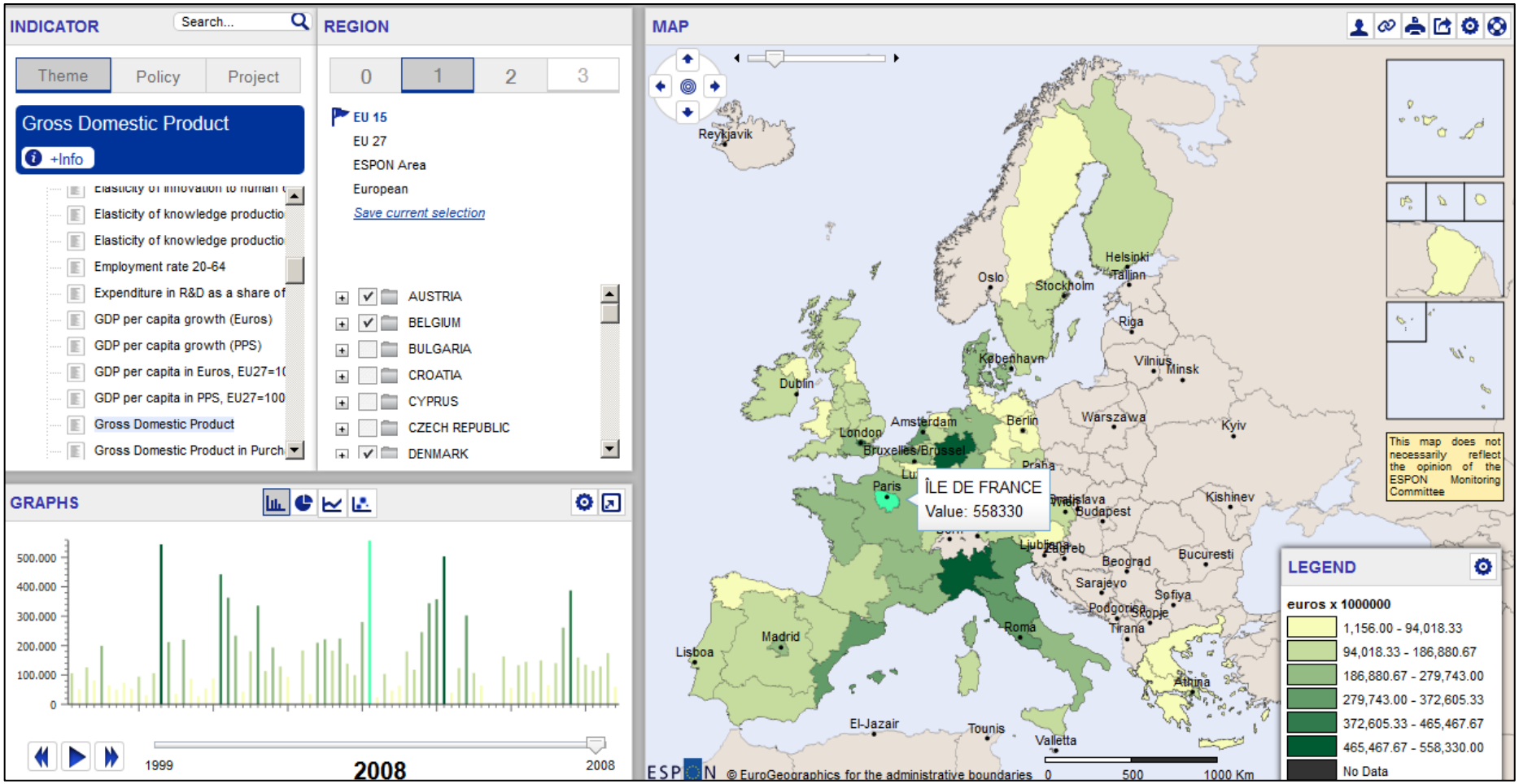
Some screenshots and a video tour (annexed) are included in this Report in order to be analyzed by ESPON Committee.


INDICATOR
Search...
Theme
Policy
Project
Selected Indicator
+Info
Agriculture and fisheries
Economy, finance and trade
Education
Environment and Energy
Governance
Health and Safety
Information Society
Labour Market
Population and living conditions
Science and Technology
REGION
0
1
2
3
EU 15
EU 27
ESPON Area
European
Save current selection
AUSTRIA
BELGIUM
BULGARIA
CROATIA
CYPRUS
CZECH REPUBLIC
DENMARK
GRAPHS
MAP
Reykjavik
Oslo
Helsinki
Tallinn
Stockholm
Riga
Vilnius
Minsk
København
Dublin
London
Amsterdam
Berlin
Warszawa
Kyiv
Bruxelles/Brussel
Luxembourg
Paris
Praha
Bratislava
Budapest
Kishinev
Bern
Vaduz
Ljubljana
Zagreb
Beograd
Bucuresti
Sarajevo
Sofiya
Podgorica
Skopje
Tirana
Ankara
Madrid
Lisboa
Roma
Athina
Nicosia
El-Jazair
Tounis
Valletta
This map does not necessarily reflect the opinion of the ESPON Monitoring Committee
ESPON
© EuroGeographics for the administrative boundaries
0
500
1000 Km

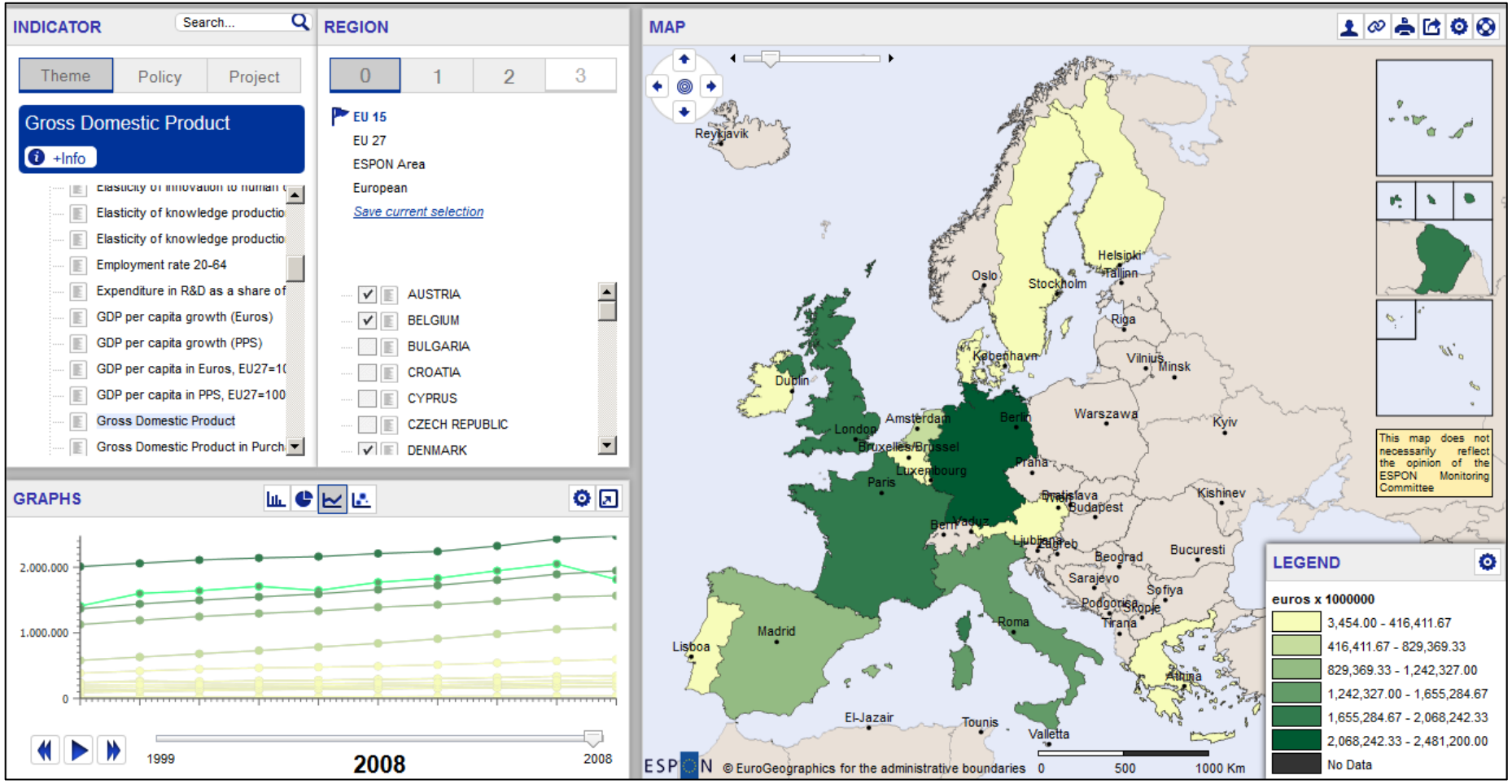
Homepage



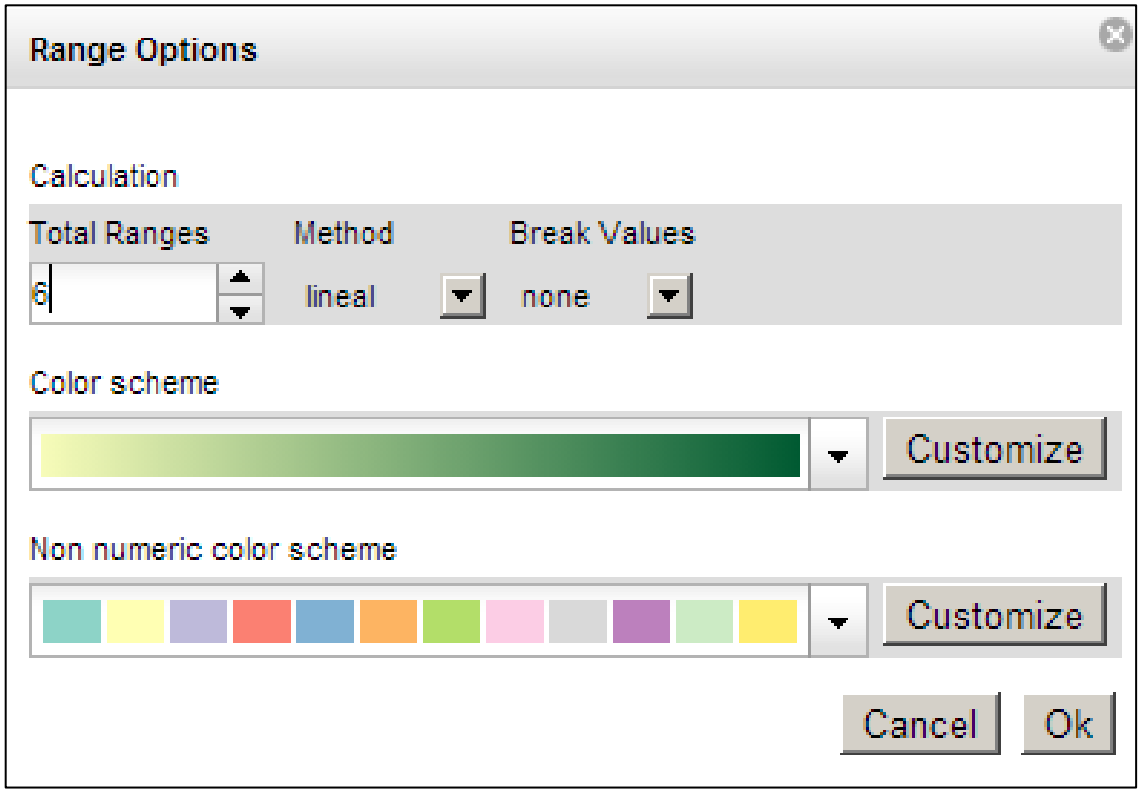
Indicator Selection



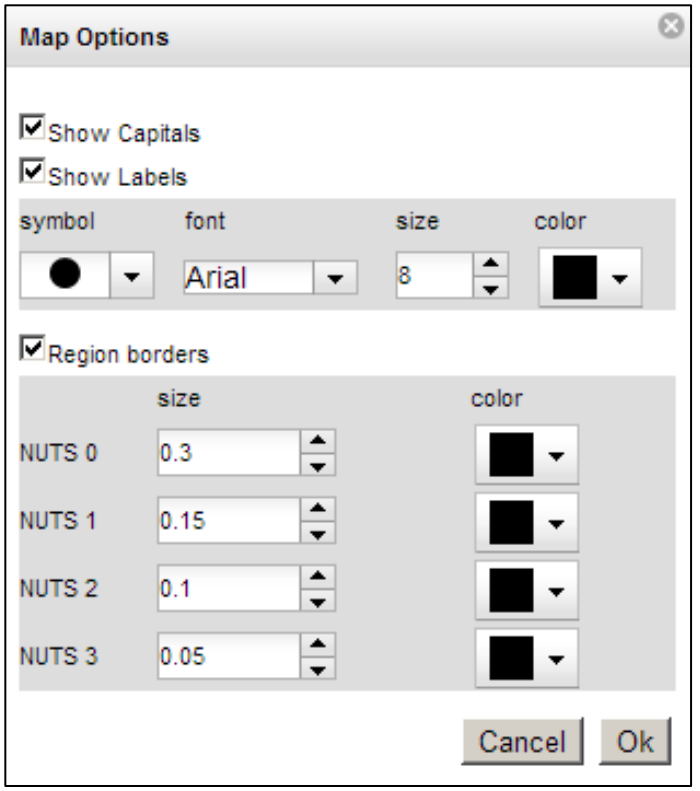
Choropleth Map and Bar Chart and Map contextual information



Choropleth Map and Time Graph



Legend Settings Window



Map Settings Window

2.4. Table of Contents for the User Guidelines

We have taken into account the comments and recommendations given by the Managing Authority and the Coordination Unit so that we have reviewed the user guideline.

1. Overview
    - 1.1. ESPON - RIMAP Web Mapping Tool

2. Main Tool Bar
    - 2.1. Profile Selection. Basic/Expert mode.
    - 2.2. Share
    - 2.3. Print
    - 2.4. Export
    - 2.5 Help menu.

3. Indicator selection
    - 3.1. By theme
    - 3.2. By Policy *
    - 3.3. By project *
    - 3.4. Keyword search

4. Geographic selection
    - 4.1. Elementary Zone. Selection of country, regional, subregional or departmental areas.
    - 4.2. Study area(s). Predefined, created by user.

5. Maps
    - 5.1. Overview
    - 5.2. Map Settings *
    - 5.3. Legend Settings *

6. Charts
    - 6.1. Overview
    - 6.2. Geographical Comparison
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        - 6.2.2. Pie Chart
    - 6.3. Time Comparison
        - 6.3.1. Line Graph
    - 6.4. Data Analysis *
        - 6.4.1. Scatter diagram *
        - 6.4.2. Overlays – Various indicators showed in map *

7. Time Zone
    - 7.1. Overview
    - 7.2. Animation controls

* Only available to expert mode

2.5. Dissemination Activities

RIMAP website has been updated with a new video clip of the Online Mapping Tool.

RIMAP project was presented at Paris, France 16 and 17 May 2013. **"Tool Box Seminar"**. A presentation was done.

RIMAP project was presented at Dublin, Ireland 13 and 14 June 2013. "Open Seminar".
Due to the air controllers strike in France, Sergio Muñoz couldn't to attend the Seminar; however RIMAP was presented by Marjan Van Herwijnen.

On the other hand, contacts between RIMAP and M4D teams have been established during this period.

In the next months it is envisaged to identify and contact with other related initiatives and programs in order to promote the exchange of information and synergies.

4 Orientation of the project previewed towards the Final Report

Next period of the project will be focused mainly in the WP4.

Work Package 4 – Evaluation and Test.

The objective of this WP is to validate the system through testing and application examples.

The different modules will be checked; a document consisting of a history of errors detected which permits the correction of behaviors that do not match initial expectations.

Different test typologies will be done:

- Acceptance test, verifying that the functionality is developed.
- Functional test, following use cases described in the definition of requirements
- Integration test ensures the proper integration of the different modules of the application.

A detailed analysis of the triggers and effects of bugs detected during simulation testing will be done, which will have been recorded in the document tools error and appropriated and corrective actions will be taken in order to continue the verification process.

In those cases where updates were needed, the source code will be modified to ensure the quality of the result.

Expected results are:

- Final version of the Online Mapping tool.
- Final version of the User guidelines.

Annex I. Core Indicators

ESPON Database is composed by a high number of indicators. So, it's not useful to offer the possibility to access to these entire indicators in the Basic Mode.

Taking it account, the Core indicators have been selected in order to be shown in the Basic Mode.

Theme	Indicators (Basic /Expert)
01. Economy, Finance And Trade	7/66
02. Population And Living Conditions	45/227
03. Labour Market	3/89
04. Agriculture And Fisheries	0/18
05. Education	3/18
06. Health and Safety	0/0
07. Information Society	3/31
08. Science And Technology	0/50
09. Transport And Accessibility	0/74
10. Environment And Energy	0/59
11. Governance	0/66
12. Territorial Structure	0/27

Following tables show the current Core Indicators:

Economy, Finance and Trade:

- Economically active population
- Gross Domestic Product
- Gross Domestic Product in Purchasing Power Standards
- Gross Domestic Product per capita in Euros
- Gross Domestic Product per capita in PPS
- Persons in employment
- Persons in unemployment

Population and living conditions:

- Birth, total
- Death, total
- Migratory population change
- Natural population change
- Population, aged 0-4 years, females
- Population, aged 0-4 years, males
- Population, aged 10-14 years, females
- Population, aged 10-14 years, males
- Population, aged 15-19 years, females
- Population, aged 15-19 years, males
- Population, aged 20-24 years, females
- Population, aged 20-24 years, males
- Population, aged 25-29 years, females
- Population, aged 25-29 years, males
- Population, aged 30-34 years, females
- Population, aged 30-34 years, males
- Population, aged 35-39 years, females
- Population, aged 35-39 years, males
- Population, aged 40-44 years, females

- Population, aged 40-44 years, males
- Population, aged 45-49 years, females
- Population, aged 45-49 years, males
- Population, aged 5-9 years, females
- Population, aged 5-9 years, males
- Population, aged 50-54 years, females
- Population, aged 50-54 years, males
- Population, aged 55-59 years, females
- Population, aged 55-59 years, males
- Population, aged 60-64 years, females
- Population, aged 60-64 years, males
- Population, aged 65-69 years, females
- Population, aged 65-69 years, males
- Population, aged 70-74 years, females
- Population, aged 70-74 years, males
- Population, aged 75-79 years, females
- Population, aged 75-79 years, males
- Population, aged 80-84 years, females
- Population, aged 80-84 years, males
- Population, aged 85 years and above, females
- Population, aged 85 years and above, males
- Population, total
- Total area
- Total population
- Total population change
- Unknown age and sex

Labour Market:

- Absolute change in creative workforce
- Employment in creative class
- Employment in creative class, annual average

Education:

- Absolute change in creative workforce
- Employment in creative class
- Employment in creative class, annual average

Information Society:

- Absolute change in creative workforce
- Employment in creative class
- Employment in creative class, annual average

Annex II. Draft User Guidelines

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