ESPON

EUROPEAN UNION

Co-financed by the European Regional Development Fund

Inspire Policy Making with Territorial Evidence

TOOLS & MAPS //

# ESPON REGICO - comparing regions in multiple contexts

Final Report // March 2021

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**Coordination**
Stephanie Kirchmayr-Novak

**Authors**
Stephanie Kirchmayr-Novak, Roland Gaugitsch, Joanne Tordy, Chien-Hui Hsiung, ÖIR GmbH (Austria), Sergio Muñoz Gómez, Rubén Navarro, Laurentia Technologies (Spain)

**Advisory group**
ESPON EGTC: Marjan van Herwijnen

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Contact: info@espon.eu


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# ESPON REGICO

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# Abbreviations

| | |
|---|---|
| AEBR | Association of European Border Regions |
| CEMR | Council of European Municipalities and Regions |
| DB | Database |
| EEA | European Environmental Agency |
| ETC | European Territorial Cooperation |
| EU | European Union |
| GDP | Gross Domestic Product |
| GVA | Gross Value Added |
| LP | Large scale Perspective |
| MC | Monitoring Committee |
| MP | Meso Perspective |
| MTA | Multi-scalar Territorial Analysis |
| NP | Neighbouring Perspective |
| NUTS | Nomenclature des unites territoriales/Nomenclature of Territorial Units for Statistics |
| R&D | Research & Development |
| TIA | Territorial Impact Assessment |

# Foreword

The current reports represents the final delivery (D4) for the ESPON REGICO tool development and contains information on the progress of the project, the tasks completed and tasks still to come. The main report serves as a documentation and outline of the activities, while several accompanying documents. These are:

- Final User Manual
- Final Administrators Guide
- Final Model Report
- Final Leaflet
- Final Guidance Sheet
- Glossary

The final report is accompanied as well with all relevant files to deploy the final version of the tool. The testing application currently however is hosted at the service providers webspace and accessible via the URL https://regico.espon.eu/

The beta version of the tool was ready for external testing in order to gather input for the final design of functionalities and to get some input from potential end-users to shape the functionalities to their needs.

The improvement of the beta versions was based on input and guidance received by ESPON EGTC following D3 and two virtual presentations of ESPON REGICO, once with ESPON EGTC and once with an external audience. Further, feedback was provided by the initial developers of the tool, namely Ronan Ysebaert from UMS-RIATE, Université Paris and Claude Grasland from UMR, Université Paris.

Further the tool the team received input from MC Members and representatives from DG REGIO which was very helpful on the way to improve user-friendliness and usability of the tool and the related documents.

The tool has been amended reflecting the feedback regarding the functionalities and with “ESPON REGICO” a new title for the tool was found. Also other terms and definitions were amended in order to help understanding the tool intuitively.

An internal testing covered user application as well as technical aspects, as still some bugs were encountered in the beta version.

The final version of ESPON REGICO contains all functionalities and analyses which are relevant for the tool. Furthermore the customisation options such as colour selection for mappings, user generated indicators etc. have been implemented. The tool follows the ESPON Corporate Design and is ready to be visually integrated in the ESPON website. It can be used both by registered and unregistered users.

# 1 State of affairs of ESPON REGICO final version

The following sections provide information for each part of the tool regarding functionalities implemented and approved.

## 1.1 Welcome page

### Table 1.1: Welcome page – state of affairs and functions to be provided in later versions

| Alpha version | Beta version | Final version |
|---|---|---|
| Welcome text | Registration | Video available |
| Start button | Draft guidance documents | Final guidance documents |
| Layout elements | Explanation of MTA | Video of the Webinar |

The main elements of the welcome page have been included. The page is fully functional and allows access to the tool, the admin module as well as the guidance material provided.

### Figure 1.1: Welcome page of the tool


**Source: Consortium, 2021**

The user registration is fully functional as well. Users who wish to register are then able to save customised areas and individual indicators. They need to provide a username, password and e-mail address. Furthermore it is verified if a user is human and not a but by a mandatory reCAPTCHA to fulfil, after which the user is created in the database. Some non-mandatory fields such as organisation and phone number are available as well. After first registration the user is logged in automatically, in any subsequent session he/she can log in via the form on the top right of the website.

Elements on the welcome page which are still missing are mainly guidance material such as access to the video explaining the functionalities of ESPON REGICO, the video recording of the foreseen webinar as well as the final versions of all guidance documents.

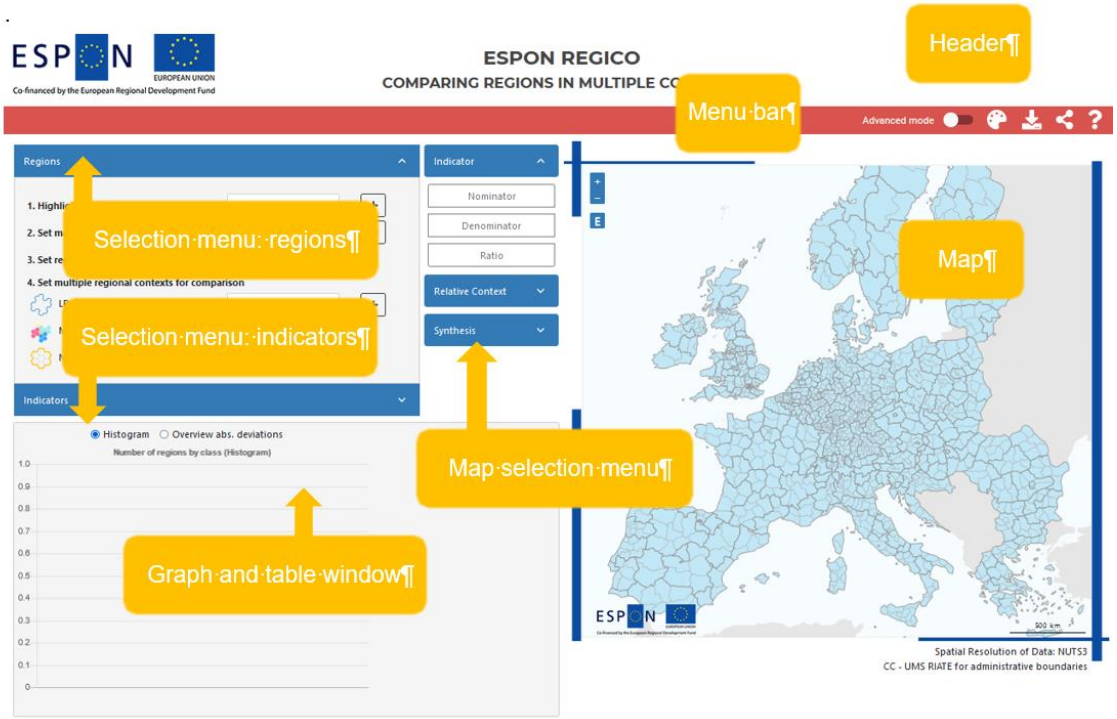
## 1.2 Tool in Standard Mode

The Standard Mode is the default mode of the tool opening when the user access it from the main page. The general elements of the standard mode have not changed since the alpha version and include:

- a menu bar at the top of the tool,
- the selection menu at the upper left side for
  (a) regions and
  (b) indicators
- the graph and table window at the lower left side,
- a map selection menu in the middle of the tool,
- the map in the right hand side.

The tooltips have been added to the functionalities, e.g. informing the user that clicking on the "+" symbol allows to add a custom study area or to upload an indicator (depending on which button it is).

**Figure 1.2: Standard mode of ESPON REGICO**




**Source: Consortium, 2021**

As the available space is limited and a wide range of functionalities and customisation options have to be provided to the user, a number of slide menus have been implemented. With 1-word headings each of those menus is clear and accessible to the user. Navigating through it follows a logical flow from top to bottom and from left to right.

### 1.2.1 Menu bar

The menu bar allows to switch between modes of the tool and further functionalities and presently contains four different options to select (see Figure 1.3). For the beta version, the settings dialogue has been updated and an export function for maps as well as a share button for maps has been introduced.

### Table 1.2: Menu bar- state of affairs and functions to be provided in later versions

| Alpha version | Beta version | Final version |
|---|---|---|
| ▪ Possibility to switch between standard mode and advanced mode | ▪ Advanced setting dialogue | ▪ Additional settings<br>▪ Export function<br>▪ Share function<br>▪ Access to further documents (Help function) |

The menu bar contains the following functionalities as depicted in Figure 1.3. From left to right:

- Possibility to change to advanced mode
- Options allowing to change different settings used in ESPON REGICO
- Export of map (pdf/png), charts (pdf/png), data (.csv)
- Sharing of the map via different channels
- Access to further documents (user manual, glossary, MTA in a nutshell, model report, video)

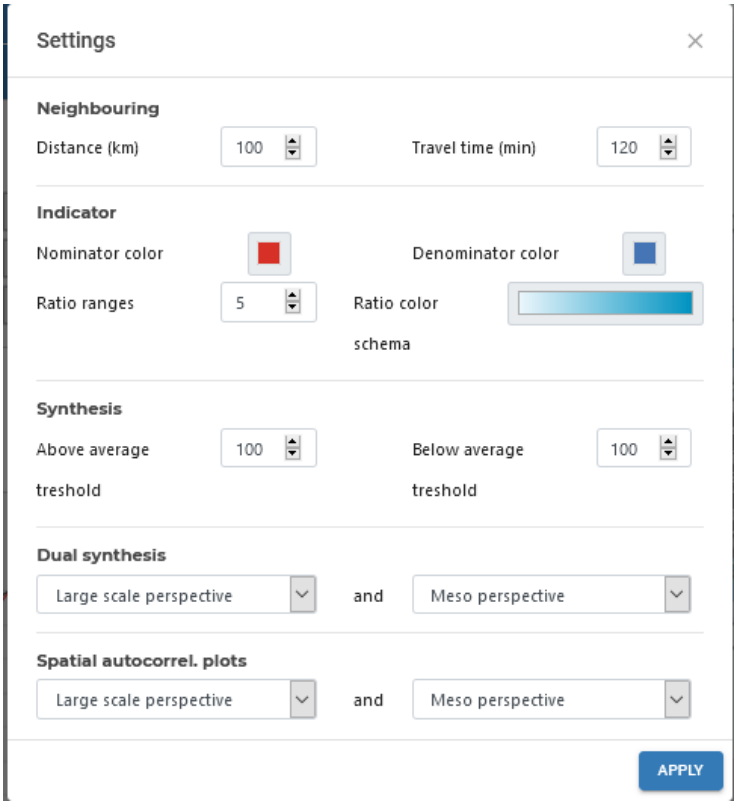
### Figure 1.3: Final version menu bar


**Source: Consortium, 2021**

Especially the settings menu (Figure 1.4) is more advanced, covering the following functions:

- Setting the distance respectively the travel time (min) for defining neighbouring functions
- Setting the colours for mapping the indicators (nominator map, denominator map, ratio ranges. The standard colour uses colour-blind friendly spectrum.
- Thresholds applied in the synthesis
- Data to be displayed in the dual synthesis map and the spatial autocorrelation plots.

**Figure 1.4: Settings menu**




**Source: Consortium, 2021**

### 1.2.2 "Regions" menu

As a first step the user is presented with the "regions" menu, which delineates the geographic extent and focal points of the analysis.

**Table 1.3: "Regions" – state of affairs and functions to be provided in later versions**

| Alpha/Beta version | Final version |
|---|---|
| ▪ Selection of study area<br>▪ Selection of Large-scale reference area and Aggregated NUTS level | ▪ Improved terminology for regional settings menu |
| **Beta version** | |
| ▪ New function to highlight area of interest<br>▪ Selection of regional granulation<br>▪ All functionalities for defining "neighbouring regions" are available<br>▪ Default study area is set EU27+5<br>▪ All macro-regions, ETC-programmes are available as study areas<br>▪ Neighbouring regions scale can be defined by distance or travel time | |

The user can select the following fields:

1. **Highlighting the area of interest**
   Each user can highlight an area of interest, e.g. a particular region or a wider study area. This function is solely visual and does not affect calculations.

2. **Set mapping frame**
   Each user identifies the area she/he is interested to work with. The user can select a pre-defined area or create a custom area pressing the "+" sign

3. **Set regional data level**
   What NUTS-level shall be used for the subsequent analysis? NUTS-0 to NUTS-3 regions can be selected at present.

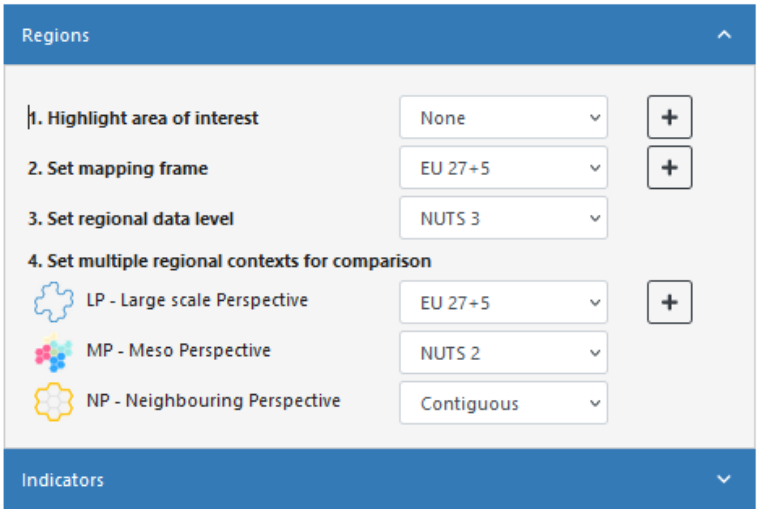
4. Set multiple regional contexts for comparison (max. 3)
   (a) **"Large-scale Perspective"** (formerly macro level) defines the overall regional context of regional comparison (e.g. EU27+5), by default it is set equal to the mapping frame
   (b) **"Meso Perspective"** (formerly meso level) defines the second level of interest. There, the user can select an aggregate of the "regional data level" defined before. E.g. studying areas at the NUTS3 level with reference to their respective NUTS0 region. This level is always an aggregate of the regional data level.
   (c) **"Neighbouring Perspective"** or the proximity level (i.e. a customized continuous area).
   The user can define this proximity by
   - the territorial contiguity (immediate vicinity)
   - the spatial "proximity" as the crow flies in less than X km (from one geographical centre of a region to another)
   - isochrones defined by driving time by car according to ESPON distance matrixes (from one geographical centre of a region to another)

Whenever custom selection of regions is possible, this is based on the "lowest" level selected for the regional granulation. A number of options are always predefined (such as EU 27, EU 27+5, Macro Regions …) which are likely to be useful for a broader range of users.

### 1.2.3 "Indicators" menu

The indicators sub-menu allows the user to select or compose an indicator and select the respective year. Furthermore, upload of user-generated indicators is possible.

**Figure 1.5: Sub-menu REGIONS**




**Source: Consortium, 2021**

**Table 1.4: Register "Indicators" – state of affairs and functions to be provided in later versions**

| Alpha version | Beta version | Final Version |
|---|---|---|
| ▪ Selection of thematic field<br>▪ Selection of indicator<br>▪ Selection of year<br>▪ Update button | ▪ Creation of user ratios by selecting two indicators (nominator/denominator) from absolute values<br>▪ Uploading user-created indicators | ▪ Adjust unit of indicators to single entities (thousands: k, millions: M, etc.)<br>▪ Predefined or custom indicator selection<br>▪ Renaming of the "custom" button to "all"<br>▪ Renaming of the heading<br>▪ Sorting the predefined indicators alphabetically |

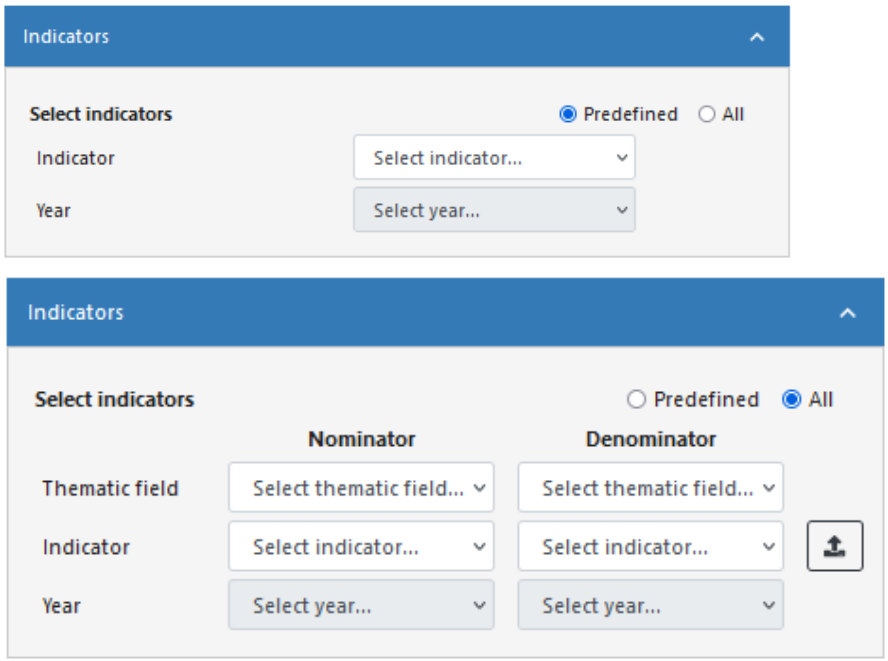
As the MTA methodology requires ratios as a basis for calculations, the indicators need to be provided as such. There are two different possibilities to select – either a) a predefined indicator (ratio) or b) a custom indicator (ratio). A custom indicator is created by the user selecting from all indicators both a nominator as well as a denominator.

- Selecting a predefined indicator (a ratio already available in the database – in standard mode only)

- Select a predefined indicator via the drop-down field (see list of predefined indicators in Table 2.2),
- Select a year (the latest year available is set by default)

- Setting a custom indicator (building a ratio out of two absolute indicators, see list of indicators in Table 2.1)
  - Numerator
    - Selection of Thematic field (optional)
    - Selection of an indicator
    - Selection of the year to be analysed (the latest year available is set by default)
  - Denominator
    - Selection of Thematic field (optional)
    - Selection of an indicator
    - Selection of the year to be analysed (the latest year available is set by default)
  - Uploading a custom indicator (adding an absolute indicator as nominator or denominator)

## Figure 1.6: Sub-menu INDICATORS




**Source: Consortium, 2021**

The tool provides both a set of predefined ratio indicators as well as predefined absolute indicators for various categories. The number of predefined ratios will be limited to those which can be assumed to be a "standard" relevant for most circumstances. The project team assumes, that for most policymakers and other users of the tool, the custom indicator creation is the preferred option as it can be aligned with their individual needs.

Numerical data is stated using unit prefixes for numbers in order to make the numbers easier tor read. For example, the number 5,000 (fivethousand) is stated in 5k (k= kilo = 1,000 → 5 x 1,000 = 5,000)

The following table informs about the unit prefixes used in the ESPON REGICO tool.

## Table 1.5: Unit prefixes used by ESPON REGICO

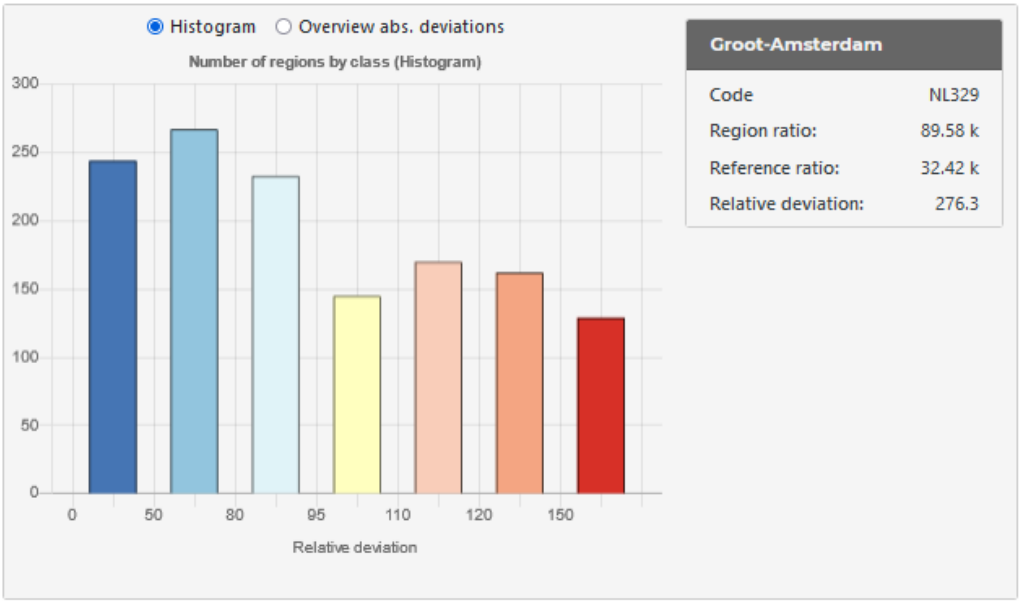
| Symbol | Prefix | Factor | Name |
|---|---|---|---|
| T | Tera | 1.000.000.000.000 | Trillion |
| G | Giga | 1.000.000.000 | Billion |
| M | Mega | 1.000.000 | Million |
| k | Kilo | 1.000 | Thousand |
| h | Hekto | 100 | Hundred |

**Source: Consortium, 2021**

### 1.2.4 Graph and table

The graph and table section includes a range of supplementary information both for the overall dataset as well as for individual regions the user would like to investigate.

**Figure 1.7: Graph and Table, example view**




**Source: Consortium, 2021**

It offers the following options, between which the user can switch via radio buttons.

- Histogram: a bar chart illustrating the frequency of occurrence by category of legend
- Overview of absolute deviation: a table for the more sophisticated user, informing about the absolute redistribution needed to obtain a perfect equilibrium (see chapter 4.1.3 of the User Manual)

In the advanced mode, further functionalities are available:

- Lorenz curve: a graphical representation of inequalities in the selected reference area. (more information on the interpretation of a Lorenz curve can be found under in chapter 4.1.1 of the User Manual)
- Spatial autocorrelation: a graph for the more sophisticated user informing about any interdependence between geographical observations (see chapter 4.1.2 of the User Manual)

Furthermore, a table to display the relevant values (name of the region as heading, code of the region, region ratio, reference ratio, relative deviation is always displayed on the right of the table. The region is selected by simply moving the mouse over the respective region of interest in the map. This is a more user friendly option than selecting the region via code, as it allows to quickly examine base information by navigating through the displayed values.

### 1.2.5 Map selection menu

Ensuing the selection of regions and indicators, the user can switch to the map selection menu located in the center of the screen. Here, the different maps (i.e. depicting the base information on the indicator and its compartments, depicting deviation maps and synthesis maps) can be selected to be viewed in the window.

### Table 1.6: Map selection menu – state of affairs and functions to be provided in later versions

| Alpha version | Beta version | Final version |
|---|---|---|
| ▪ Deviation maps:<br>Compare to reference area 1<br>Compare to reference area 2<br>▪ Synthesis map – preview of menu | ▪ Indicator maps<br>▪ Deviation maps<br>▪ Synthesis map, Dual synthesis map,<br>▪ Redistribution maps<br>▪ Other maps and functions (as described above) | ▪ Adjustment of names/options<br>▪ Adjustments of mapping titles |

The selection menu structures the mapping results into the following categories:

- INDICATOR maps:
  - Nominator: a map on the geographical distribution of the nominator selected
  - Denominator: a map on the distribution of the nominator selected
  - Ratio: a map on the geographical distribution of the ratio selected
- RELATIVE CONTEXT maps: the user can select the *"reference area"* to compare the regions with:
  - Relative deviation to LP (Large scale Perspective)
  - Relative deviation to MP (Meso Perspective)
  - Relative deviation to NP (Neighbouring Perspective)
- SYNTHESIS maps: a synthesis map overlaying the results of the three relative context maps (relative deviation). The user can choose between two options to highlight the regions. The thresholds is defined with 100 by default. Custom setting can be adjusted in the "settings menu":
  - Highlighting regions above average
  - Highlighting regions below average.

In order to interpret it more easily the colour code used by the SYNTHESIS map was adapted. It can be read as follows

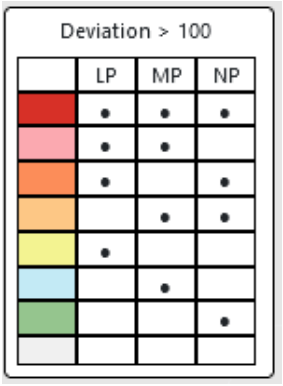
The legend of the SYNTHESIS map (by default) reads as follows:

- Row 1 marks all regions that are above/below 100 (=average) as compared to the Large-scale perspective (LP)
- Row 2 marks all regions that are above/below 100 (=average) as compared to the Meso perspective (MP)
- Row 3 marks all regions that are above/below 100 (=average) as compared to their respective neighbourhood's average (NP) (100=average).

The colour spectrum of the legend can be read as follows:

- Red coloured regions in different shades are regions above-average if looked at from all the Large-scale perspective, i.e. the regions are above-average as regards the LP level. Dark red are those regions that are above-average regarding all three perspectives, etc.
- Light orange regions are regions above-average regarding the MESO and NEIGHBOURHOOD perspective.
- Yellow depicts region above the average regarding the LARGE-SCALE perspective only.
- Light blue depicts regions above average regarding the MESO perspective only.
- Green regions are above-average looking at it from the NEIGBHOURHOOD perspective only.

**Figure 1.8: Legend of the Synthesis map**




**Source: Consortium, 2021**

The selection of map automatically updates the map not only graphically but also content wise, in case e.g. years for an indicator have been changed.

### 1.2.6 Map

The map located on the right of the screen depicts what is selected in the map selection menu and updates with a click in this menu. It fully reflects the ESPON Mapkit and ESPON corporate identity.

**Table 1.7: Map selection menu – state of affairs and functions to be provided in later versions**

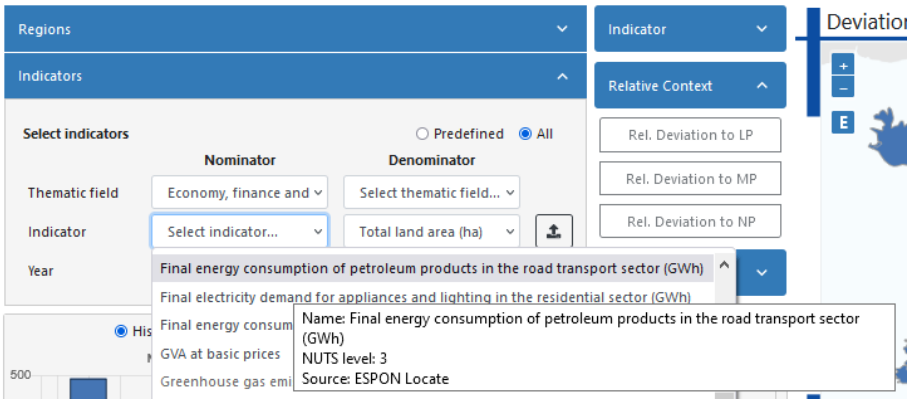
| Alpha and beta version | Final version |
|---|---|
| ▪ Automated title<br>▪ Automated sub-title explaining the calculation of the map<br>▪ Zoom in/out<br>▪ Fit to extent | ▪ Tooltips for Map selection buttons, Relative Context Legend, etc.<br>▪ Adjusted legend<br>▪ Adjustment of title according to units<br>▪ Adjustment of border colour to better distinguish the regions<br>▪ Adjustment of colour scheme of the Synthesis maps<br>▪ |

The map section currently contains the following features:

- A heading informing on the type of map chosen
- A subtitle that is derived automatically from the nominator and denominator name and year(s) selected
- Zoom in/zoom out function
- Fit to extent function (E)
- Legend
- Metadata and supplementary information

Metadata information is available via hoover over in the drop-down menu “indicators” and when downloading data (via export function metadata information is exported as well.

**Figure 1.9: Metadata information by hoover over**




**Source: Consortium, 2021**

The map and the different mapping options can be adjusted both in terms of visualisations (colours) as well as in terms of thresholds as laid down in section 1.2.1.

## 1.3 Advanced mode

The advanced mode of the tool can be activated via the menu bar as showed in section 1.2.1. It adds additional functionalities for calculations and corresponding maps to be displayed in the map selection menu. In particular those are:

- ABSOLUTE CONTEXT maps: the user can select the reference area to calculate the re-distribution value compared to each reference area
  - Absolute deviation to (LP)
  - Absolute deviation to (MP)
  - Absolute deviation to (NP)
- DUAL SYNTHESIS map: a map comparing the status of regions regarding two chosen deviations. The deviations to be compared can be defined in the settings menu.

All options are included fully functional in the final version. Guidance and methodological explanations is part of the final guidance documents.

## 1.4 Administrators module

The ESPON REGICO Administrator Tool allows to do all the necessary set up and maintenance tasks. The current version ESPON REGICO allows to

- create and maintain user accounts,
- update and maintain the default indicators and study areas,
- update and maintain user created indicators and study areas,
- update the welcome page, the logo in the welcome page,
- have an insight into the user statistics such as number of downloads and use of indicators.

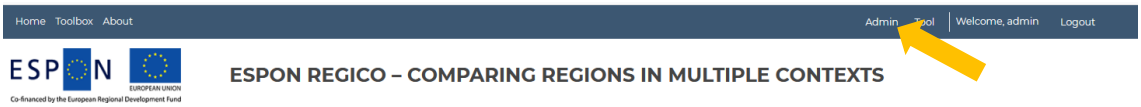
**Table 1.8: Administrators module – state of affairs and functions to be provided in later versions**

| Alpha/Beta version | Beta version |
|---|---|
| ▪ Add new user, edit, delete user, make user admin<br>▪ Add/edit indicators from the ESPON 2020 Database (alpha version)<br>▪ Confirmation for everything to delete has been integrated<br>▪ Add/edit indicators from external sources<br>▪ Confirmation for everything to delete has been integrated. | ▪ Final checks of functionalities |

| Alpha/Beta version | Beta version |
|---|---|
| ▪ Edit indicator values<br>▪ Edit indicator metadata<br>▪ Remove indicators<br>▪ Search and sort indicators (individually, by theme and NUTS version)<br>▪ Confirmation for everything to delete has been integrated | |
| ▪ Administration of content<br>▪ Administration of user statistics | |

The administrators module can be accessed by any administrator simply by logging in and clicking on the button “admin” next to the login as shown in Figure 1.10

**Figure 1.10: Panel**



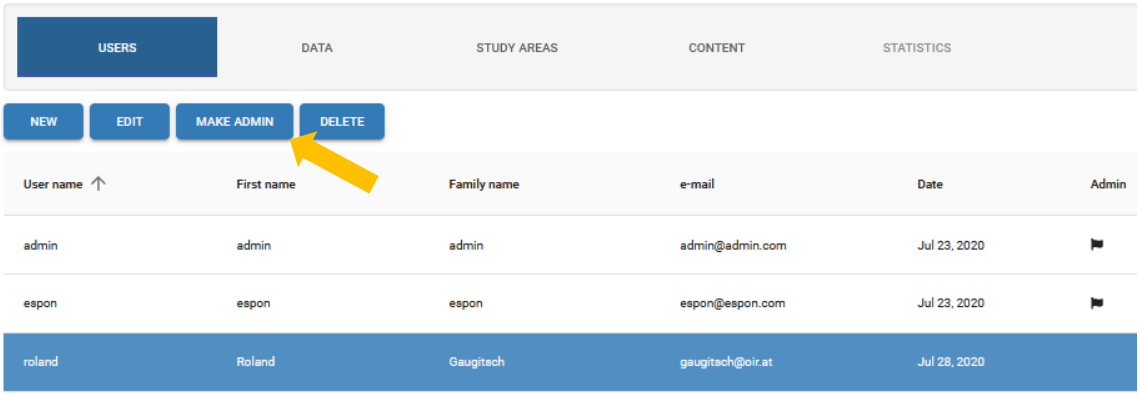

**Source: Consortium, 2021**

### 1.4.1 User administration

Through the user administration, the administrator is able to view existing users, edit their information (partly – e.g. the password cannot be changed and is only visible to the user) or delete them. Deleting always requires confirmation in a delete dialogue. Furthermore, the administrator can add new users directly through the admin module. This functionality has proven useful in the past e.g. when preparing testing sessions, where the administrator can create numerous test accounts to provide to testers.

Finally, as shown in Figure 1.11 any user can be assigned administrators privileges or have its administrators privileges revoked. Administrators privileges are flagged in the final column, the other columns containing user name, first name, last name, e-mail address and date of registration.

**Figure 1.11: Assigning administrative privileges**

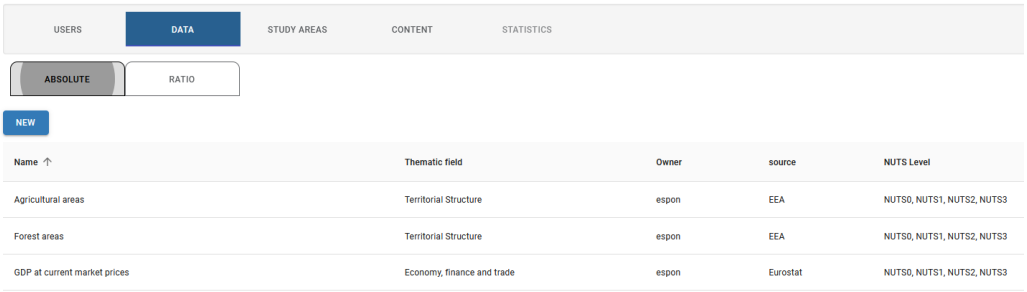



**Source: Consortium, 2021**

### 1.4.2 Data administration

The “data” tab allows the administrator to view any indicator uploaded into the tool, upload new indicators, edit existing indicators or delete indicators. This includes both global data as well as user generated datasets. Figure 1.12 shows the overview of the “data” tab. Both Absolute and Ratio indicators are available.

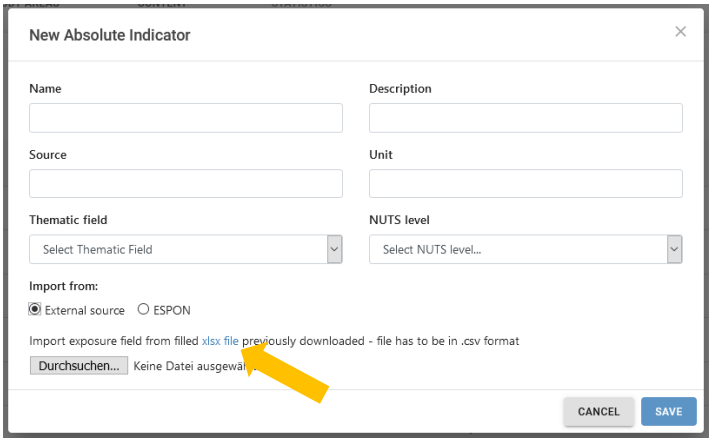
## Figure 1.12: Data management




**Source: Consortium, 2021**

Adding a new indicator is initiated by clicking on the “New” button. The admin module offers the possibility to upload an indicator via template from any source, or to directly import an indicator from the ESPON database. The selection is made via radio button in the tool.

## Figure 1.13: Adding an indicator




**Source: Consortium, 2021**

For uploading data from an external source a template (link via the text “xlsx file”) which is to be filled out in a spreadsheet application such as Microsoft Excel or LibreOffice (see Figure 1.13) is available for download in the tool. A description how to fill in the data and meta information is provided in the template as shown in Figure 1.14. Finally, one has to save the filled-in template in CSV format. This file can then be uploaded via the respective button in the dialogue.

Please note:

The rows have to be filled for all NUTS levels! There is no function automatically adding up NUTS3 to NUTS2, as if there is one NUTS3 region missing, the NUTS2-value generated thereof would be wrong. Please check your dataset for missing values before uploading.

Only absolute indicators can be used by the tool (do not upload percentages, shares, indexes, etc.)

## Figure 1.14: Template for adding a new indicator

Template for adding a new indicator

| | |
|---|---|
| **Indicator Name** | Insert indicator name here (e.g. *Natural change of population*) |
| **Indicator Def.** | Insert indicator definition here (e.g. *Difference between the number of live births and the number of deaths during the year*) |
| **Source** | Insert source here (e.g. *Eurostat*) |
| **Unit** | Insert unit here (e.g. *persons*) |

**Option to add a new indicator**
NUTS 2016 codes for regions of the ESPON Space are given
Possibility to upload a list of regions (NUTS2016 codes) with respective values for the new indicator
Only one new indicator plus respectivse value for multiple years can be uploaded within this task

Insert the meta information of the indicator on the left side
Data has to be aligned to corresponding NUTS regions
Insert the year to the right in row 16, with their respective values below
For adding another indicator, the procedure needs to be restarted

***The file has to be saved as .csv in order for the tool to be able to read it***

**Please consider the following quality check issues:**
Region codes need to be NUTS 2016 version in order to be assigned properly
If uploaded region codes differ from NUTS 2016 version, the tool will label them with N/A (no data available)

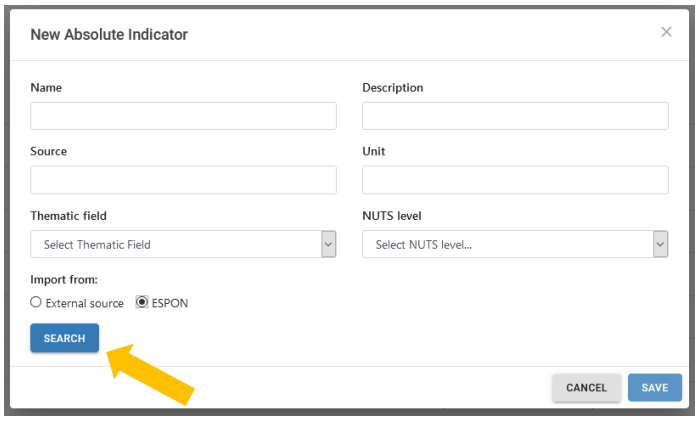
*Add years and values below*

| NUTS (2016) code | NUTS (2016) label | Insert year 1 | Insert year 2 | Insert year 3 | Insert year 4 |
|---|---|---|---|---|---|
| AT111 | Mittelburgenland | | | | |
| AT112 | Nordburgenland | | | | |
| AT113 | Südburgenland | | | | |
| AT121 | Mostviertel-Eisenwurzen | | | | |
| AT122 | Niederösterreich-Süd | | | | |
| AT123 | Sankt Pölten | | | | |

**Source: Consortium, 2021**

To download data from the ESPON database one has to switch the respective radio button to “ESPON Database” and press the search button as shown in Figure 1.15. Then one is presented with a list of possible datasets. After selecting the desired dataset one has to click “import” and gets back to the indicator editor as shown in Figure 1.13. Next one has to provide basic information on the new indicator. Except the description and the source, all other fields are obligatory. Finally press “Save” to add the new indicator or “Cancel” to abort the creation. Indicators created by an admin are by “default” (i.e. global) indicators.

## Figure 1.15: Importing data from the ESPON database




**Source: Consortium, 2021**

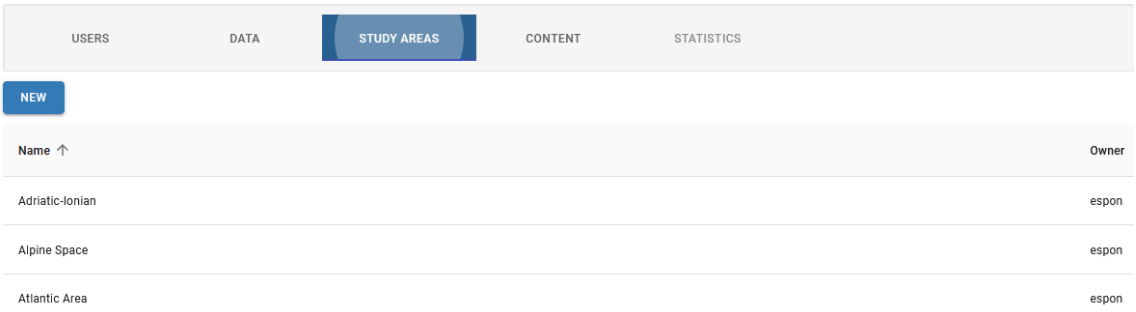
Furthermore, editing data – i.e. the metadata – of an indicator is conducted by clicking on the indicator, then clicking on “edit”. The respective fields can be edited, and if necessary, also a new import of indicator values via the ESPON DB or via template can be done.

Finally, an administrator can also delete indicators in the database by selecting it and clicking the “delete” button. Similar to the user administration, deleting always requires a confirmation.

### 1.4.3 Study area administration

Figure 1.16 shows the section of managing the study areas. There are two different types of study areas: default (or global) study areas accessible by all users and user-generated study areas usable only by the respective uploader. Default study areas are flagged in the last column of the data overview. The administrator can add, edit and delete study areas.

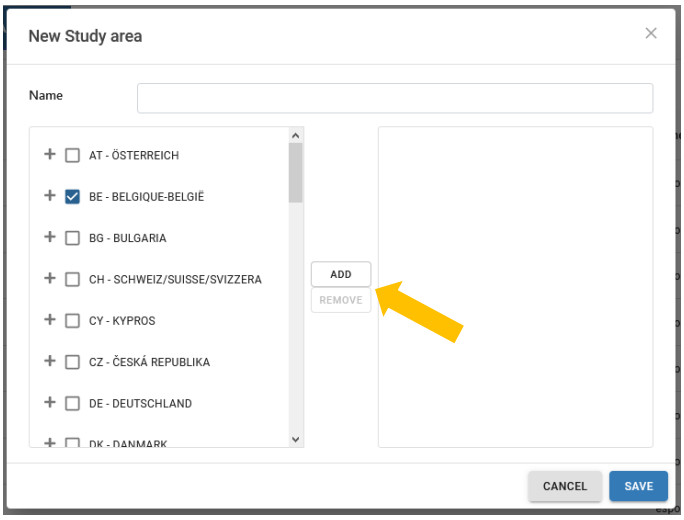
**Figure 1.16: Management of study areas**




**Source: Consortium, 2021**

Adding a new study area is initiated by clicking on the “New” button. A new study area can be created by the help of a simple interface that lists all NUTS regions available and those included in two side-by-side lists (see Figure 1.17). The regions are grouped by the member state and their NUTS levels. The list can be expanded by clicking on the “+” at the respective region. In order to add one or more regions to a new study area, one first clicks on the checkbox of the respective region(s) in the left list and then presses the “Add” button. The selected region(s) will be prompt added to the list on the right that shows the regions to be included to the study area. Please check through the selection tree, if all regions necessary are considered marked (+). Regions can be removed by marking them and subsequently clicking the “remove” button. When the selection is made and a name has been selected, the study area can be saved via the “save” button.

**Figure 1.17: Adding a study area**




**Source: Consortium, 2021**

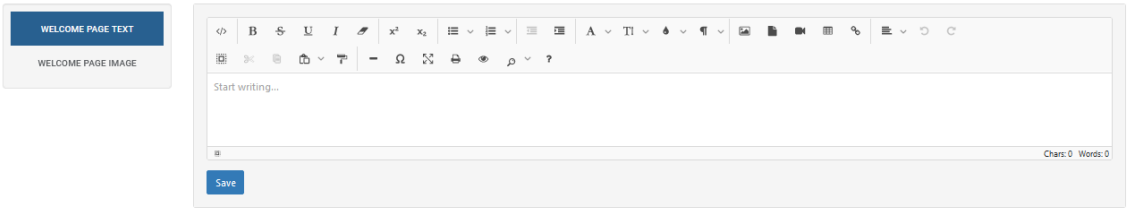
In case an administrator wants to edit an existing study area, selecting the dataset and clicking the “edit” button will open the same dialogue as for creating a new study area. All changes to selection of region and name can be made and then finalised via the “save” button. This is in particular relevant when for example cooperation areas (e.g. for INTERREG) throughout different periods experience some changes to their programme area with new regions being added or others being removed. As there is no standardised information on this, the administrators of the tool are advised to check e.g. the Operational Programmes of each INTERREG programme that is added as “default” with each change of programming periods.

Finally the admin tool allows to delete study areas via the respective button. A confirmation is necessary.

### 1.4.4 Content administration

The content administration site allows to edit the text of the welcome page as well as the image displayed in case e.g. logo updates take place. A standard html-text editor is provided with extended layout functionalities. The administrator can edit via the functionalities, but can also add any html code he or she wishes. This includes hyperlinks in case e.g. in the future current or recent activities need to be displayed. Figure 1.18 shows the editor.

## Figure 1.18: Welcome page text




**Source: Consortium, 2021**

Figure 1.19 shows the sub section where the welcome page image can be changed. Once a new image has been chosen the administrator has to click “Save” to upload the new image. The image has to be in png or jpg format.

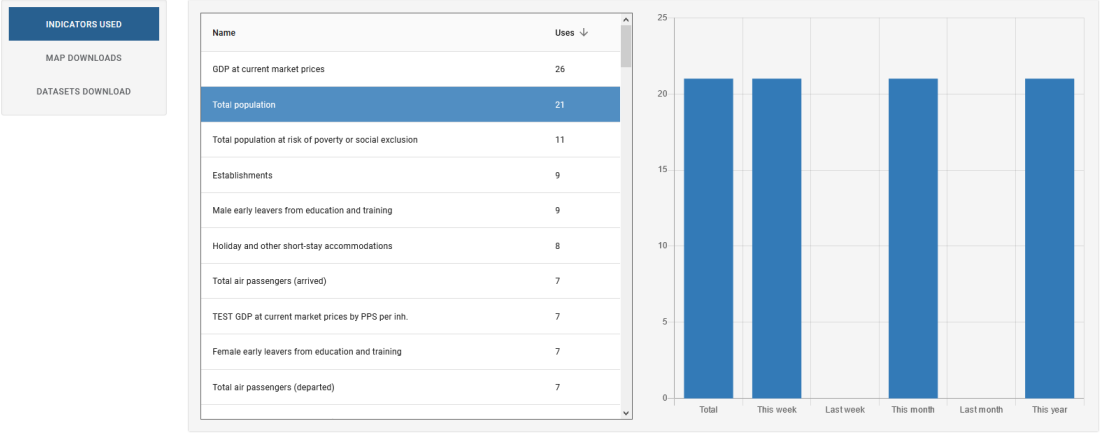
## Figure 1.19: Welcome page image


**Source: Consortium, 2021**

### 1.4.5 Statistics

The statistics section has been included and allows the administrator to assess the use and download of indicator sets as well as the frequency of the dataset and map downloads. These statistics are also provided for various time periods by clicking on the respective indicator (see Figure 1.20). This will allow to judge on the relevance of a specific dataset in the tool and might indicate where additional information is needed as a standard indicator.

## Figure 1.20: Statistics on frequency of indicator usage




**Source: Consortium, 2021**

## 1.5 Guidance documents

For ESPON REGICO the following Guidance documents are available in a draft final version. These documents are attached to the Delivery D3 as separate annexes:

- Administrator Manual for the administrator module explaining how to maintain, update and upgrade the tool
- User Manual explaining all functionalities of the tool as well as giving a guided tour for two use cases
- Model reports supporting users in learning to create and read the results and to inform them on the usefulness of the tool
- 1-page leaflet to promote the tool during events organised by ESPON. This follows a simple format in Word and can be adapted to the final ESPON layout for the final delivery
- Guidance sheet to show the potential of the tool. It explains ESPON REGICO in a nutshell and shows the most important maps it and results that can be created.
- A glossary describing the most important words and concepts used.

# 2 Data and indicators

## 2.1 Overview

The datasets proposed and agreed on with ESPON EGTC following the last delivery have been prepared and most of them have been uploaded into the tool. Some datasets identified in the last delivery still have to be prepared and uploaded as preparation and computation was met with some unexpected difficulties relating to data gaps and transformations.

The requirements checked for indicators were:

- to respect the methodology of the multi-scalar territorial analysis:
  - the indicator has to be available in absolute values or
  - the indicator is composed as a ratio of absolute values and can be transformed into an index (no percentages, etc.)
- to reflect the most granular local level possible (NUTS3) (exceptions are possible depending on the content of the indicator, as in some cases it might be relevant to include a specialised indicator of high value for ESPON REGICO even if it is not available at NUTS3 level)
- the indicator is available in version NUTS2016 or higher; value in NUTS2010 or NUTS2013 have to be transformed to NUTS2016[1]
- geographical coverage of ESPON space
- the indicator is not outdated (before 2010)
- low rate of data gaps both in terms of regional coverage and years available
- high probability of future updates

As can be seen in Table 2.1 numerous datasets are not available on NUTS3 level. Nevertheless, they were included due to their importance in terms of content/thematic coverage. Furthermore, about 2/3 of the datasets required computation and transformation by the project team in order to provide the dataset on NUTS 2016 level in the required detail. Indicators which have been available only as relative values (e.g. Expenditure on R&D as percentage of GDP) have been transformed in to absolute values (e.g. Total expenditure on R&D in EUR) to fit the methodological approach of ESPON REGICO.

## 2.2 Limitations

Limitations in terms of data relate mostly to the fact that MTA needs complete datasets to function correctly, thus data gaps are a crucial issue. With datasets even when collected by Eurostat only in rare cases can be considered complete, and with additional transformations between NUTS versions, data gaps cannot be completely avoided. In general, data gaps occur mostly:

- for the latest available year, if countries have not yet reported to Eurostat
- for the French outermost regions
- missing values for previous periods in case of NUTS-changes (e.g. data for NUTS 2016 regions only available from 2013 onwards)
- other reasons for missing values of individual regions within a country (see the table in the appendix)

For the application of the methodology, this creates issues where a study area or reference area is covered for the most part with the indicators selected, but not fully covered. As for calculating deviation maps, sums

[1] It has to be noted, that the consortium intends to use NUTS2021. The use is however depending on the availability of data. Thus, the project team will start to build up the database on the basis of NUTS2016.

of values of regions are built, data gaps even for single regions in there lead to an error in the calculation. The project team has identified three possible solutions for this:

- Calculate complete datasets, filling all regions with data gaps with estimated values. This is possible on a sound basis for some instances (e.g. single regions in a large dataset missing, smaller gaps in time series etc.). If large scale gaps occur (e.g. for some indicators Germany does not report any values at all) throughout time series, this however inevitably leads to estimation errors.
  → The project team only completed datasets by calculation in case of NUTS-changes. Whenever data was not available for NUTS2016 region, data from other NUTS-coding was re-calculated to fit to NUTS2016.
  → In cases with systematically missing data (e.g. GDP), an official European dataset was taken instead of Eurostat data. This was the case for the important indicator GDP at current market prices, PPP which taken from JRC ARDECO dataset[2]
- In case regional values are still missing in a selected dataset calculating the deviations to the large-scale perspective (LP) and Meso perspective (MP) , the tool displays a warning to the user advising him/her to exclude the respective regions from the study area or to select another indicator.
- Furthermore, the calculation of the neighbourhood perspective (NP) is supressed in case of one regional value of the reference region is missing. This is necessary to avoid displaying incorrect values.

## 2.3 Data integrated

The following indicators have been integrated into the ESPON REGICO database. The name, Thematic Field as defined by the ESPON database thematic fields and the source is indicated. The asterisk marks all indicators for which transformation by the project team was necessary to integrate them in the ESPON REGICO database. All indicators are supplied with metadata in the tool.

### Table 2.1: Indicators integrated to the database

| Name | Thematic Field | Source | Available NUTS level |
|---|---|---|---|
| Total population by gender and age groups | Population and living conditions | Eurostat | 0, 1, 2, 3 |
| Total births | Population and living conditions | Eurostat | 0, 1, 2, 3 |
| Life expectancy by age and gender | Population and living conditions | Eurostat | 0, 1 |
| Mean age of women at childbirth | Population and living conditions | Eurostat | 0, 1, 2, 3 |
| Median age of women at childbirth | Population and living conditions | Eurostat | 0, 1, 2, 3 |
| Natural change of population | Population and living conditions | Eurostat | 0, 1, 2, 3 |
| Net migration incl. statistical adjustments | Population and living conditions | Eurostat | 0, 1, 2, 3 |
| Total deaths by gender and age groups | Population and living conditions | Eurostat | 0, 1, 2, 3 |
| Disposable income of private households | Population and living conditions | Eurostat* | 0, 1, 2 |
| Early leavers from education and training | Education | Eurostat* | 0, 1, 2 |
| Female early leavers from education and training | Education | Eurostat* | 0, 1, 2 |
| Male early leavers from education and training | Education | Eurostat* | 0, 1, 2 |
| Tertiary educational attainment by gender, age group 25-64 | Education | Eurostat* | 0, 1, 2 |
| Long-term unemployment | Labour Market | Eurostat | 0, 1, 2 |
| Unemployment by gender and age groups | Labour Market | Eurostat* | 0, 1, 2 |
| Bed places in various establishments | Economy, finance and trade | Eurostat* | 0, 1, 2 |

[2] https://knowledge4policy.ec.europa.eu/territorial/ardeco-database_en

| Name | Thematic Field | Source | Available NUTS level |
|---|---|---|---|
| Camping grounds and similar establishments | Economy, finance and trade | Eurostat* | 0, 1, 2 |
| Establishments by types | Economy, finance and trade | Eurostat* | 0, 1, 2 |
| GDP at current market prices, PPP | Economy, finance and trade | JRC | 0, 1, 2, 3 |
| Maritime transport of freights (loaded, un-loaded) | Economy, finance and trade | Eurostat* | 0, 1, 2 |
| Maritime transport of passengers (embarked, disembarked) | Economy, finance and trade | Eurostat* | 0, 1, 2 |
| Total air passengers (arrived, departed) | Economy, finance and trade | Eurostat* | 0, 1, 2 |
| Available beds in hospitals | Health and Safety | Eurostat* | 0, 1, 2 |
| Households with broadband access | Information Society | Eurostat* | 0, 1, 2 |
| Persons who have never used a computer | Information Society | Eurostat* | 0, 1, 2 |
| Human resources in science and technology | Science and Technology | Eurostat* | 0, 1, 2 |
| Intramural R&D expenditure by sectors | Science and Technology | Eurostat* | 0, 1, 2 |
| Patent applications | Science and Technology | Eurostat* | 0, 1, 2, 3 |
| Total land area ($km^2$)** | Territorial Structure | Eurostat | 0, 1, 2, 3 |
| Total land area (ha)** | Territorial Structure | Eurostat | 0, 1, 2, 3 |
| Agricultural areas (ha) | Territorial Structure | EEA* | 0, 1, 2, 3 |
| Forest areas (ha) | Territorial Structure | EEA* | 0, 1, 2, 3 |
| Industrial and commercial areas (ha) | Territorial Structure | EEA* | 0, 1, 2, 3 |
| Shrub and herbaceous vegetation associations (ha) | Territorial Structure | EEA* | 0, 1, 2, 3 |
| Urban fabrics (ha) | Territorial Structure | EEA* | 0, 1, 2, 3 |
| Water areas (ha) | Territorial Structure | EEA* | 0, 1, 2, 3 |

***additional transformation by the consortium; ** total land area is stated in $km^2$ and ha in order to fit different kinds of calculation | Source: Consortium, 2020**

Table 2.2 lists all predefined indicators available in the dataset in alphabetical order. All predefined indicators are composed of single absolute values listed in Table 2.1 and thus have the same sources as listed above.

### Table 2.2: Predefined indicators integrated to the database

| Name | Nominator | Denominator | Available NUTS level |
|---|---|---|---|
| Disposable income per capita in PPS | Disposable income in EUR PPS | Total population | 0, 1, 2, 3 |
| Female unemployment rate | Unemployed women aged 20-64 years | Economically active women aged 20-64 years | 0, 1, 2 |
| GDP per capita in PPS | Gross Domestic Product, EUR PPS | Total population | 0, 1, 2, 3 |
| Hospital bed density (beds per capita) | Available beds in hospitals | Total population | 0, 1, 2, 3 |
| Land consumption (share of urban fabrics in total area) | Urban fabrics (ha) | Total land area (ha) | 0, 1, 2, 3 |
| Old age dependency ratio | Total population aged 65 years or more | Total population aged 15-64 years | 0, 1, 2, 3 |
| Ratio of patent activity to GDP | Patent applications | Gross Domestic Product, EUR PPS | 0, 1, 2, 3 |
| Share of agricultural land area | Agricultural areas (ha) | Total land area (ha) | 0, 1, 2, 3 |
| Share of forest areas | Forest areas (ha) | Total land area (ha) | 0, 1, 2, 3 |
| Share of households with broadband access | Households with broadband access | Total households | 0, 1, 2 |

| Name | Nominator | Denominator | Available NUTS level |
|---|---|---|---|
| Share of human resources in science and technology | Human resources in science and technology | Economically active population aged 20-64 years | 0, 1, 2 |
| Share of persons virtually interacting with public authorities | Persons who used the internet for interaction with public authorities | Economically active population aged 15-64 years | 0, 1, 2 |
| Share of persons with a tertiary education | Persons aged 25-64 with a tertiary education | Total population aged 25-64 years | 0, 1, 2 |
| Unemployment rate | Unemployed persons aged 20-64 years | Economically active population aged 20-64 years | 0, 1, 2 |
| Young age dependency ratio | Total population aged 14 years or below | Total population aged 15-64 years | 0, 1, 2, 3 |

**Source: Consortium, 2021**

# 3 ESPON REGICO in the ESPON toolbox

Supporting policymaking not only through research results and territorial evidence, but also through practical and accessible tools made available to policymakers has been an integral part of ESPON for several programming periods. In the current period it is implemented through Specific Objective 3 of the ESPON programme, “Improved territorial observation and tools for territorial analyses.” which so far has supported to the development (or upgrade) of 13 tools. These are gathered in the ESPON Toolbox, provided with data from all ESPON Applied Research and Targeted Analysis projects through the ESPON database and supported by guidance material and a selection wizard to guide policymakers to the right tool for the purpose. The ESPON Toolbox has been gradually grown over the years, with multiple tools being improved and refitted to new emerging needs of policymakers.

ESPON REGICO is one of the oldest tools in the Toolbox, dating back to the ESPON 2006 programme. It has been upgraded once in the 2013 period and now is being updated for a third time to improve the technical implementation as well as the delivery and accessibility of information to policymakers. Key challenge for ESPON REGICO is the complex methodology that forms the basis of territorial analyses, which needs to be both easy to use for laymen as well as produce comprehensible results which can be embedded in assessments, reports etc. without complex and long explanations. As one of the main target groups are policymakers on a local and regional level, which might not have the expertise at hand to use and interpret results if they are not accessible to them, this issue is even bigger than in other tools which target policymakers at a higher geographical level.

Other ESPON tools circumvent the issues arising from complex methodologies and their applicability for regional policymakers e.g. by the use of skilled facilitators supporting the whole analysis process as it is done in the TIA Tool. In other cases, the set of indicators available in a tool is limited on purpose to those with complete data and a high communicative value for specific thematic fields, which reduces the complexity of the tool. Examples include the ESPON Citybench, ESPON Functional Indicators Tool or the ESPON European Territorial Monitoring System Tool. ESPON REGICO on the other hand has to be fully customisable (i.e. no constraints on indicators or selection of regions) and allow the user to independently calculate and upload data, create comparison areas for benchmarking etc. Furthermore, it has to allow a completely independent use by the end user, which has to be able to create meaningful, sound and comprehensible results without support from specialised experts.

ESPON REGICO therefore fills an important spot in the ESPON Toolbox covering aspects not covered by any other tool. Comparative territorial analyses for individual regions respectively areas which can be freely defined allow policymakers on any level to tailor the tool to their needs. Such a high geographic resolution is not offered by other tools at the moment, apart from the TIA Tool which allows for individual definition of analyses areas as well. The TIA Tool however has a different purpose than ESPON REGICO, and does not cover analyses of territorial developments and characteristics, but rather impacts of specific policies on the territories.

ESPON REGICO in that regard complements several tools, e.g. the Functional Indicators Tool which allows for pan-European analyses, depicting individual regions developments as well as to benchmark individual regions against each other in terms of some territorial characteristics. Similarly comparative territorial analyses both on pan-European level as well as on a number of predefined areas and typologies are provided by the Citybench tool, which is complemented by ESPON REGICO which allows for analyses and benchmarking outside of cities as well.

Ultimately each tool in the ESPON Toolbox fulfils a specific purpose and has a specific target group, thus they are supposed to complement each other rather than replace each other. ESPON REGICO is one element of a multi-facted toolbox and fills a specific spot complementing other tools and being complemented by other tools. It is among the most customisable and among the most complex, covering target groups not covered by other tools. It is at the same time in need of comprehensive guidance and support material in order to achieve its high-set goals of bringing a complex methodology and complex mathematical model to non-expert end users.

# 4 Testing and outreach

The ongoing Covid-19 crisis and the related restrictions on travel and events have limited the possibilities for outreach activities in the course of the project. The originally developed outreach strategy had to be modified in order to accommodate these limitations. Outreach activities in order to make ESPON REGICO known to the target groups are however a core element of the project. Public authorities need to be both aware of the availability of the tool as well as they have to be informed about the functionalities and ideally they are provided with some initial “guided experience”.

The activities undertaken in the course of the project have served both promotion purpose as well as provided input to the development of the tool. They involved members of the project team and ESPON as well as external users. The concrete activities in developing the final version of the tool were:

- The project team continuously tested new functionalities internally
- Following each deliverable, an online test account was made available for ESPON EGTC and the MC. It allowed to give feedback to the basic functionalities of the tool and the arrangement of functions
- A workshop with ESPON EGTC staff was conducted on the beta version of the tool, collecting feedback on the layout and clarity as well as the functionalities of the tool.
- A workshop with the core testing group, participants from DG REGIO and JRC as well as other interested persons was conducted on the beta version, collecting feedback mainly on the usability and clarity of the tool
- The team received feedback from the original developers of the previous version which improved the tool even further.

The feedback was collected and taken into account in the further development of the tool. The originally foreseen testing activities in the context of ESPON seminars could not take place due to the planned seminars over the course of the projects running time were switched to an online format. To compensate for this, the additional testing workshop with the ESPON EGTC staff originally not foreseen was conducted and the proposal for further outreach activities after project closure was adapted.

## 4.1 Finished activities

### 4.1.1 Internal test-workshop with ESPON EGTC members

In order to get a first user impression on the tool by people who have not been involved into the development of the tool so far, an internal test session with ESPON EGTC was held in January 2021 as an online event. The workshop included a brief presentation by the project team on the methodology, the tool overall and the general functionalities. Ensuing, a computer lab session took place where participants were granted access to the tool and guided through the steps of preparing and setting up the tool, creating an analysis concept, making the necessary adjustments and producing useable output. Analysis of results were discussed as group exercise, where both technical as well as conceptional elements of the tool were addressed.

### 4.1.2 Workshop with potential users

The workshop with potential users served two purposes: firstly informing a small group of users and multipliers about functionalities of the tool and secondly a testing and development element as regards user-friendliness, namely the interaction with the core testing group. Further participants from DG REGIO and JRC were present and gave valuable feedback to the tool and the data used. The approach was similar the internal testing workshop, presenting the main elements of the methodology and the tool followed by an interactive session allowing the participants to use the tool to answer specific questions about “their” region. Valuable feedback on the necessary adjustments of the user interface could be gathered from this workshop as well as some methodological remarks.

## 4.2 Upcoming activities

### 4.2.1 Webinar on the use of the tool

The webinar is addressed to a wide audience and will provide a quick overview on the functions and application cases of ESPON REGICO. The duration shall not exceed 2 hours in order to encourage participation, as longer events might discourage people or might hinder participation due to employer-related limitations (such as limited amount of time available for training of employees) and will be held via Microsoft Teams.

The webinar will be held by two persons of the project team, sharing the workload of handling the videoconferencing software, handling ESPON REGICO during the presentation and moderating. Participants will briefly be made familiar with the methodological concept behind ESPON REGICO (i.e. the Multiscalar Territorial Analysis) and then introduced to the tool itself. Primarily, participants should be made familiar with all options the tool offers so they can explore them in depth on their own. Depending on the interest of the participants, specific aspects can be explained in more detail if requested.

The core element of the webinar will be the discussion of two specific use cases and the relevant steps to be taken in the tool. This includes setup and data management as well as calculation and interpretation of results. Each step will be explained and participants will be given the opportunity to ask questions. The webinar session will be recorded and made available on the ESPON website as well.

Date and time: a date following the finalisation of the project be fixed in consultation with ESPON EGTC.

Participants: no limit on the number and type of participants will be set. Once date and time are set, an invitation will be sent out to the addressees already identified out of past TIA-Tool workshop participants, which will furthermore be encouraged to share the invitation with potentially interested persons. The project team will also make use of contacts at the Committee of the Regions, the CEMR, the AEBR, the Covenant of Mayors and other network organisations which are able to reach members of the target group efficiently.

Material: participants will be provided with guidance material developed within the project such as the user manual. Furthermore, the video recording of the session will be made available after the webinar.

## 4.3 Further proposed activities

The further activities are proposals by the project team, how the ESPON REGICO can be promoted to the target audience after project closure and are not part of the main project. The implementation specificities will be discussed with ESPON EGTC

### 4.3.1 Workshop with ESPON MC members

ESPON MC members can act as multipliers within the ESPON community as well as in their respective fields of work. They are therefore an important target group of promotional activities and making them familiar with the tool can be valuable. The project team suggests a testing workshop similar to the activities conducted for ESPON EGTC and the core testing group. A general introduction to the methodology and tool will be followed by an interactive session guiding the participants through the practical application on the basis of an example case. Particular attention will be paid to the participants background and interests in designing the session.

Date and time: a date following the finalisation of the project can be fixed in consultation with ESPON EGTC.

Participants: no limit on the number and type of participants will be set.

Material: participants will be provided with guidance material developed within the project such as the user manual, the model report and the recording of conducted webinars.

### 4.3.2 Tailored webinar

The webinar on the general use of the Tool as outlined under section 4.2.1 will be recorded and made available on the ESPON website. It might be of interest however for interest groups to provide them a tailored webinar addressing specific questions for them or assisting them in the application of the tool on a specific example. The concrete agenda and topics of the webinar can be fixed in consultation with the interest groups.

Date and time: a date following the finalisation of the project can be fixed in consultation with ESPON EGTC.

Participants: no limit on the number and type of participants will be set.

Material: participants will be provided with guidance material developed within the project such as the user manual and model reports.

### 4.3.3 Tailored trainings

Experience for other ESPON tools has shown, that there is broad interest from policymakers as well as from academia in the methodology as well as the practical application. Many interested parties however shy away from the use of tools which at a first glance might seem difficult or too complex. Some guided “first steps” are oftentimes preferred, which enable the users to conduct their own analyses more easily. The project team has already received a request for such a training exercise at an INTERACT event which could be used as a pilot for such trainings.

Each training session can be tailored to the participants needs in terms of thematic issues to be addressed. These will be discussed in advance, potentially adding additional indicators to the tool as well if they re relevant for the analyses and if they are available in the geographic scope required. Both technical trainings (i.e. in-depth training on the tool including all advanced functionalities, in-depth exploration of the methodology and extensive hands-on sessions supported by the trainers) as well as content-oriented trainings (i.e. basic overview of the methodology and the functionalities of the tool, in-depth assessment of the tools outcomes, interpretation of maps and graphs, policy oriented conclusions) depending on the needs.

The general format envisaged is an approximately half-day workshop with two trainers. Experience from past trainings on such tools has shown, that two trainers are necessary as one trainer can focus on general explanations and showcases for a group, while the second trainer can provide individual support to participants in particular during hands-on sessions using the tool.

Date and time: a date following the finalisation of the project can be fixed in consultation with ESPON EGTC. The preferable format for a training is a physical meeting, as individual support especially for technical trainings is harder to accomplish in a virtual setting.

Participants: in a physical meeting a maximum of ~15 participants can be accommodated. More participants might require an additional trainer to cover individual support needs.

Material: participants can be provided with all guidance material ahead of the session. For conducting the training, a room with 1 PC available per participant as well as one presenters PC is required

### 4.3.4 Open desk at conferences

As external events (such as conferences), the European Week of Regions and Cities or ESPON seminars gather a large number of stakeholders potentially interested in the ESPON REGICO, an information desk at such an event can provide easy access and first hands-on experience from a user perspective. A member of the project team could host such an information desk equipped with a desktop PC and access to the ESPON REGICO. Any interested person will be able to click through the functionalities of the tool, ask questions to the host as well as get access to some information material on the spot. The information desk would provide guidance material as well, and support interested parties in the request of further trainings if of interest.

Date and time: a date following the finalisation of the project can be fixed in consultation with ESPON EGTC. The format however is only feasible for physical meetings, as such an open desk conceptually does not work in a virtual setting.

Material: a desktop PC with internet access will be necessary to explore the tool. Further guidance materials (such as the guidance sheet) will be available on the spot.

# Appendix: Spatial coverage of the indicators

The following table informs about the spatial coverage of the particular indicator and its limitations.

| Name | Thematic Field | Source | Available NUTS level | Limitations |
|---|---|---|---|---|
| Total population by gender and age groups | Population and living conditions | Eurostat | 0, 1, 2, 3 | *No data (total population):*<br>DE (2005-2013): several NUTS 3 regions<br>DK (2005, 2006)<br>IE (2005-2011)<br>NL (2005-2013): several NUTS 3 regions<br>PL (2005-2013): several NUTS 3 regions<br>*No data (by gender and age groups):*<br>DE (2005) – except from DE300 and DE600<br>DE (2005-2013): several NUTS 3 regions<br>DK (2005, 2006)<br>IE (2005-2011)<br>NL (2005-2013): several NUTS 3 regions<br>PL (2005-2013): several NUTS 3 regions |
| Total births | Population and living conditions | Eurostat | 0, 1, 2, 3 | *No data:*<br>DE (2005-2012): several NUTS 3 regions<br>DK (2005)<br>FRY: several missing years<br>HU1 (2013)<br>IE (2005-2012)<br>NL (2005-2010): several NUTS 3 regions<br>PL (2005-2012): several NUTS 3 regions |
| Life expectancy by age and gender | Population and living conditions | Eurostat | 0, 1, 2 | *No data:*<br>DE (2005-2010): several NUTS 2 regions<br>DK (2005, 2006)<br>FRY: several missing years<br>HU1 (2013)<br>IE (2005-2012)<br>PL (2005-2013): several NUTS 3 regions<br>SI (2005-2007): NUTS 3 regions |
| Mean age of women at childbirth | Population and living conditions | Eurostat | 0, 1, 2, 3 | 2013: data only at NUTS 2 (except from IE)<br>*No data:*<br>HU1 (2013)<br>PL (2013) |
| Median age of women at childbirth | Population and living conditions | Eurostat | 0, 1, 2, 3 | |
| Total deaths by gender and age groups | Population and living conditions | Eurostat | 0, 1, 2, 3 | *No data (total deaths):*<br>FRY50 (2013)<br>NL (2013): several NUTS 3 regions<br>*No data (by gender and age groups):*<br>DE (2018)<br>FRY50 (2013)<br>NL (2013): several NUTS 3 regions |
| Total households | Population and living conditions | Eurostat* | 0, 1, 2 | NUTS 2010/2013 data for some regions<br>*No data:*<br>DK (2005-2009): NUTS 2 regions<br>IE (2005)<br>PL (2005-2012): two NUTS 3 regions<br>SE (2005-2008) |
| Disposable annual income (in Euro, PPS) | Population and living conditions | Eurostat* | 0, 1, 2 | *No data:*<br>EL62 (2005)<br>PL9 (2017) |

| Name | Thematic Field | Source | Available NUTS level | Limitations |
|---|---|---|---|---|
| Persons at risk of poverty | Population and living conditions | Eurostat* | 0, 1, 2 | original data as share of total population, NUTS 2006/2010/2013 data for some regions<br>Quite a few missing in some member states (BG, DK, EL, IT, LT, NL, PL, RO, FI, SE) in terms of year and regional data availability |
| Persons at risk of poverty or social exclusion | Population and living conditions | Eurostat* | 0, 1, 2 | original data as share of total population, NUTS 2006/2010/2013 data for some regions<br>Quite a few missing in some member states (BG, DK, EL, IT, LT, NL, PL, RO, FI, SE) in terms of year and regional data availability |
| Persons living in households with very low work intensity | Population and living conditions | Eurostat* | 0, 1, 2 | original data as share of total population, NUTS 2006/2010/2013 data for some regions<br>Quite a few missing in some member states (BG, DK, EL, IT, LT, NL, PL, RO, FI, SE) in terms of year and regional data availability |
| Persons suffering from severe material deprivation | Population and living conditions | Eurostat* | 0, 1, 2 | original data as share of total population, NUTS 2006/2010/2013 data for some regions<br>Quite a few missing in some member states (BG, DK, EL, IT, LT, NL, PL, RO, FI, SE) in terms of year and regional data availability |
| Early leavers from education and training by gender | Education | Eurostat* | 0, 1, 2 | original data as share of total population, NUTS 2010/2013 data for some regions<br>Quite a few missing in many member states in terms of year and regional data availability |
| Tertiary educational attainment by gender, age group 25-64 | Education | Eurostat* | 0, 1, 2 | original data as share of total population aged 25-64 years, NUTS 2010/2013 data for some regions<br>*No data:*<br>DK (2005-2006)<br>HR (2005-2006): NUTS 2 regions<br>PL91 and PL92 (2005-2012) |
| Economically active population by gender and age groups | Labour Market | Eurostat* | 0, 1, 2 | NUTS 2010/2013 data for some regions<br>*No data:*<br>DK (2005-2006): NUTS 2 regions<br>HR (2005-2006): NUTS 2 regions<br>PL91 and PL92 (2005-2012) |
| Long-term unemployment | Labour Market | Eurostat | 0, 1, 2 | Quite a few missing in many member states in terms of year and regional data availability |
| Employment by gender and age groups | Labour Market | Eurostat* | 0, 1, 2 | NUTS 2010/2013 data for some regions<br>*No data:*<br>DK (2005-2006): NUTS 2 regions<br>HR (2005-2006): NUTS 2 regions<br>PL91 and PL92 (2005-2012)<br>FI20 |
| Employment by economic activity (NACE Rev.2) | Labour Market | Eurostat* | 0, 1, 2, 3 | 2018: data only for BE, DK, EE, ES (NUTS2), CY, LU, LU, HU, MT, SI<br>*No data:*<br>FR<br>PL (2005-2015) |
| Employment by size of enterprise | Labour Market | ESPON SME | 0, 1, 2, 3 | NUTS 2010/2013 data<br>Quite a few missing in most of the member states in terms of year and regional data availability |
| Number of enterprises by size | Labour Market | ESPON SME | 0, 1, 2, 3 | NUTS 2010/2013 data<br>Quite a few missing in most of the member states in terms of year and regional data availability |
| Unemployment by gender and age groups | Labour Market | Eurostat* | 0, 1, 2 | NUTS 2010/2013 data for some regions<br>Quite a few missing in most of the member states in terms of year and regional data availability |

| Name | Thematic Field | Source | Available NUTS level | Limitations |
|---|---|---|---|---|
| Bed places by types of establish-ments | Labour Market | Eurostat* | 0, 1, 2 | NUTS 2010/2013 data for some regions<br>*No data:*<br>Few missing in DE, EL, FRA, SI and SK in terms of year and regional data availability |
| Establish-ments by types | Economy, finance and trade | Eurostat* | 0, 1, 2 | NUTS 2010/2013 data for some regions<br>*No data:*<br>Few missing in DE, EL, FRA, SI and SK in terms of year and regional data availability |
| Nights spent by type of es-tablishments | Economy, finance and trade | Eurostat* | 0, 1, 2 | NUTS 2010/2013 data for some regions<br>*No data:*<br>Few missing in DE, EL, FRA, SI and SK in terms of year and regional data availability |
| GDP at cur-rent market prices (Euro, PPS) | Economy, finance and trade | JRC | 0, 1, 2, 3 | |
| GVA at basic prices | Economy, finance and trade | Eurostat* | 0, 1, 2, 3 | *No data:*<br>NUTS 3 data for some regions (2017 and/or 2018)<br>FR (2005-2014)<br>NO (2005-2007) |
| Maritime transport of freights (loaded, un-loaded) | Economy, finance and trade | Eurostat* | 0, 1, 2 | NUTS 2010/2013 data for some regions<br>For most regions, data unavailability means either 1) there are no port(s) or 2) there were not enough loaded/unloaded freights to be included into the sta-tistics |
| Maritime transport of passengers (embarked, disembarked) | Economy, finance and trade | Eurostat* | 0, 1, 2 | NUTS 2010/2013 data for some regions<br>For most regions, data unavailability means either 1) there are no port(s) or 2) there were not enough em-barked/disembarked passengers to be included into the statistics |
| Air transport of freights and mail (loaded and unloaded) | Economy, finance and trade | Eurostat* | 0, 1, 2 | For most regions, data unavailability means either 1) there are no airport(s) or 2) there were not enough loaded/unloaded freights to be included into the sta-tistics |
| Total air pas-sengers (ar-rived, de-parted) | Economy, finance and trade | Eurostat* | 0, 1, 2 | For most regions, data unavailability means either 1) there are no airport(s) or 2) there were not enough embarked/disembarked passengers to be included into the statistics |
| Electric power gener-ation by wind onshore | Economy, finance and trade | ESPON LOCATE | 0, 1, 2, 3 | NUTS 2013 data |
| Electricity generation by solar photo-voltaics (GWh) | Economy, finance and trade | ESPON LOCATE | 0, 1, 2, 3 | NUTS 2013 data |
| Final electric-ity demand for appliances and lighting in the residential sector (GWh) | Economy, finance and trade | ESPON LOCATE | 0, 1, 2, 3 | NUTS 2013 data<br>*No data:*<br>NO |
| Final energy consumption in the rail transport sec-tor (GWh) | Economy, finance and trade | ESPON LOCATE | 0, 1, 2, 3 | NUTS 2013 data<br>*No data:*<br>NO |

| Name | Thematic Field | Source | Available NUTS level | Limitations |
|---|---|---|---|---|
| Final energy consumption of petroleum products in the road transport sector (GWh) | Economy, finance and trade | ESPON LOCATE | 0, 1, 2, 3 | NUTS 2013 data |
| Greenhouse gas emissions (tonnes) | Economy, finance and trade | Eurostat | 0 | |
| Primary energy consumption (tonnes of oil equivalent) | Economy, finance and trade | Eurostat | 0 | |
| Available beds in hospitals | Health and Safety | Eurostat* | 0, 1, 2 | NUTS 2013 data for some regions<br>Quite a few missing in some member states (CZ, DK, DE, IE) in terms of year and regional data availability<br>2019: data only for BE, DK, LU |
| Households with broadband access | Information Society | Eurostat* | 0, 1, 2 | original data as share of total households, NUTS 2010/2013 data for some regions<br>Quite a few missing in some member states in terms of year and regional data availability |
| Persons who have never used a computer | Information Society | Eurostat* | 0, 1, 2 | original data as share of total population, NUTS 2010/2013 data for some regions<br>2006: data only at NUTS 0 level for BE, BG, CZ, DK, ES, PT, RO, SI<br>2007: data only at NUTS 0 level for BE, BG, DK, RO, SI<br>*No data:*<br>FR (2006-2013 – most regions)<br>DE, IT, CY, HU, FI, SE: few missing in terms of year and regional data availability<br>NUTS 2 region of PL (2007-2017) |
| Persons who used the internet for interaction with public authorities | Information Society | Eurostat* | 0, 1, 2 | original data as share of total population, NUTS 2010/2013 data for some regions<br>NUTS2010/2013<br>2006: data only at NUTS 0 level for BE, BG, CZ, DK, ES, PT, RO, SI<br>2007: data only at NUTS 0 level for BE, BG, DK, RO, SI<br>*No data:*<br>FR (2006-2013 – most regions)<br>DE, IT, CY, HU, FI, SE: few missing in terms of year and regional data availability<br>NUTS 2 region of PL (2007-2017) |
| Persons who ordered goods services over the internet | Information Society | Eurostat* | 0, 1, 2 | original data as share of total population, NUTS 2010/2013 data for some regions<br>NUTS2010/2013<br>2006: data only at NUTS 0 level for BE, BG, CZ, DK, ES, PT, RO, SI<br>2007: data only at NUTS 0 level for BE, BG, DK, RO, SI<br>*No data:*<br>FR (2006-2013 – most regions)<br>DE, IT, CY, HU, FI, SE: few missing in terms of year and regional data availability<br>NUTS 2 region of PL (2007-2017) |

| Name | Thematic Field | Source | Available NUTS level | Limitations |
|---|---|---|---|---|
| Human resources in science and technology | Science and Technology | Eurostat* | 0, 1, 2 | NUTS 2010/2013 data for some regions<br>*No data:*<br>DK (2005-2006): NUTS 2 regions<br>HR (2005-2006): NUTS 2 regions<br>PL91 and PL92 (2005-2012) |
| Intramural R&D expenditure by sectors | Science and Technology | Eurostat* | 0, 1, 2 | NUTS 2013 data for some regions<br>Quite a few missing in some member states (DK, DE, EL, FR, IT, NL, AT, SE, ) in terms of year and regional data availability |
| Patent applications | Science and Technology | Eurostat* | 0, 1, 2, 3 | NUTS 2010/2013 data for some regions<br>Quite a few missing in some member states (BG, EL, ES, HR, IT, LT, PT, PL, RO, SI) in terms of year and regional data availability |
| Total land area (km2) | Territorial Structure | Eurostat | 0, 1, 2, 3 | |
| Total land area (ha) | Territorial Structure | Eurostat* | 0, 1, 2, 3 | |
| Built-up areas (km2) | Territorial Structure | JRC* | 0, 1, 2, 3 | *No data: NO, CH;* NUTS 2010/2013 data for some regions |
| NATURA 2000 areas (km2) | Territorial Structure | EEA, DG REGIO, Eurostat* | 0, 1, 2, 3 | NUTS 2010/2013 data for some regions<br>*No data:* NO, CH, HR |
| Agricultural areas (ha) | Territorial Structure | EEA* | 0, 1, 2, 3 | |
| Forest areas (ha) | Territorial Structure | EEA* | 0, 1, 2, 3 | |
| Industrial and commercial areas (ha) | Territorial Structure | EEA* | 0, 1, 2, 3 | |
| Shrub and herbaceous vegetation associations (ha) | Territorial Structure | EEA* | 0, 1, 2, 3 | |
| Urban fabrics (ha) | Territorial Structure | EEA* | 0, 1, 2, 3 | |
| Water areas (ha) | Territorial Structure | EEA* | 0, 1, 2, 3 | |
| Sealed areas (ha) | Territorial Structure | EEA* | 0, 1, 2, 3 | |
| Permanent settlement areas (ha) | Territorial Structure | EEA** | 0, 1, 2, 3 | |

***additional transformation by the consortium, **definition for permanent settlement area by STATISTIK AUSTRIA (additional transformation by the consortium) | Source: Consortium, 2021**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**ESPON 2021**

ESPON EGTC
4 rue Erasme, L-1468 Luxembourg
Grand Duchy of Luxembourg
Phone: +352 20 600 280
Email: info@espon.eu
www.espon.eu

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