ESPON TOOLS // INFORMATION

ESPON REGICO

In a nutshell: Multi-scalar territorial analysis

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The ESPON REGICO tool was built for regional planners and politicians to have a tool at hand that allows to analyse regions regarding social phenomena in different spatial contexts and relations. The ESPON REGICO tool applies multi-scalar territorial analysis (MTA), in order to illustrate how a statistical indicator depends on the territorial context it is seen in. In other words, ESPON REGICO allows to analyse a region within their wider territorial framework (e.g. ESPON space), their administrative belonging (e.g. National background) or their closer vicinity (e.g. neighbouring regions, catchment areas of commuters).

Thereby, a territorial hierarchy is generally assumed (e.g. EU→Nation→Region/District/Departement). ESPON REGICO allows for analysing a region in **three different regional contexts**:

a Large scale Perspective, a Meso Perspective and a Neighbouring Perspective,

which could also be called "Macro", "Meso" and "Micro" context – which however confusing because of existing terms (e.g. macro-regions).

Further it is anticipated that, although absolute indicators are important for regional analysis, the comparison of the **relative disparities** between the regions is often more informative in policy context.

Consequently, the **indicators** analysed with ESPON REGICO are always defined as a **ratio consisting of a numerator** (e.g. inhabitants) **divided by a denominator** (e.g. area km²), i.e. inhabitants/km². Bringing these indicators into **relative context** these indicators are transformed into **indexes,** with the average value of the regional context area set to 100).
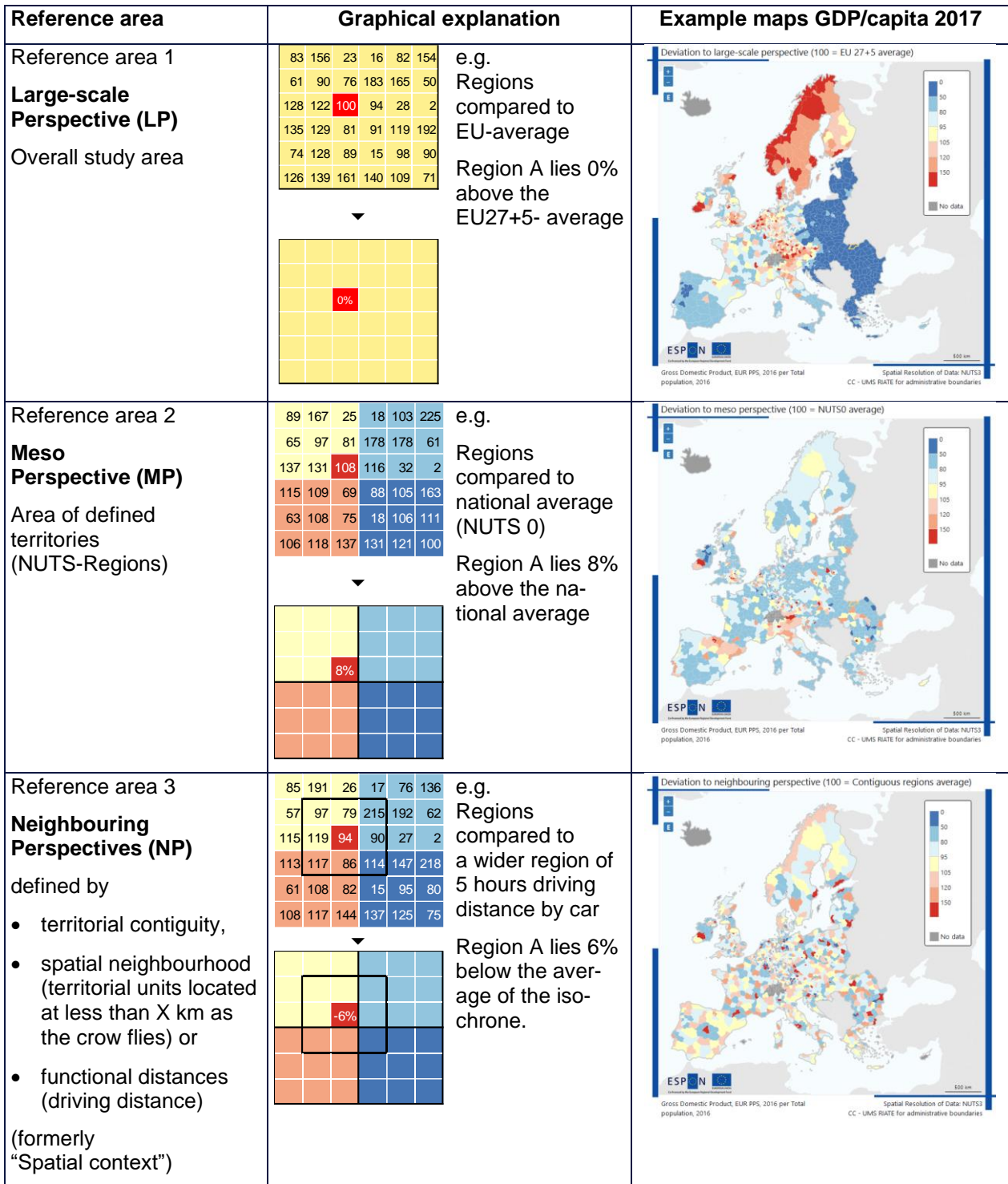
In order to more easily understand the basic functionality of MTA, an example is shown for the indicator of GDP/capita in 2017. Figure 1 gives an overview on the calculation and results by comparing the regional GDP/capita in a given region **to the regional context** of ESPON space, i.e. the average GDP/capital of EU27+5, the respective national average (NUTS0) and a wider isochrone of 5 hours driving time by car (neighbourhood).

The graphical explanation for the calculation, borrowing from the initial project team, uses squares to depict the different regions. The difference or deviation of each region to the respective average value is displayed with in **index**, where the regional context (e.g. EU27+5) is set to 100. A region with an index of 108 would thus be 8% above the regional context value (e.g. EU27+5).

The example in Figure 1, is given for a fictive "Region A" which falls perfectly into the EU27+5 average and lies 8% above the national average at the same time. The situation differs once again when looking at the neighbourhood context, especially in border regions: in our case Region A is even 6% below the neighbourhood average, since other regions within 5 hours driving distance have a much higher GDP/capita.

ESPON REGICO allows to look at the regions from two angles: a) the **relative context** calculating the regional deviation as explained in Figure 1 and b) the **absolute context**, quantifying the absolute deviation. These maps show, how much of a value has to be shifted from transferred to a region in order to achieve an (theoretical) equi-distribution across all regions. Figure 2 indicates the mathematical explanations for calculating relative and absolute deviation.

Figure 1: Overview on ESPON REGICO functionality – Relative deviations

Reference area	Graphical explanation		Example maps GDP/capita 2017
Reference area 1 **Large-scale Perspective (LP)** Overall study area	(grid of values: 83 156 23 16 82 154 / 61 90 76 183 165 50 / 128 122 100 94 28 2 / 135 129 81 91 119 192 / 74 128 89 15 98 90 / 126 139 161 140 109 71) ▼ (grid with 0%)	e.g. Regions compared to EU-average Region A lies 0% above the EU27+5- average	
Reference area 2 **Meso Perspective (MP)** Area of defined territories (NUTS-Regions)	(grid of values: 89 167 25 18 103 225 / 65 97 81 178 178 61 / 137 131 108 116 32 2 / 115 109 69 88 105 163 / 63 108 75 18 106 111 / 106 118 137 131 121 100) ▼ (grid with 8%)	e.g. Regions compared to national average (NUTS 0) Region A lies 8% above the national average	
Reference area 3 **Neighbouring Perspectives (NP)** defined by • territorial contiguity, • spatial neighbourhood (territorial units located at less than X km as the crow flies) or • functional distances (driving distance) (formerly "Spatial context")	(grid of values: 85 191 26 17 76 136 / 57 97 79 215 192 62 / 115 119 94 90 27 2 / 113 117 86 114 147 218 / 61 108 82 15 95 80 / 108 117 144 137 125 75) ▼ (grid with -6%)	e.g. Regions compared to a wider region of 5 hours driving distance by car Region A lies 6% below the average of the isochrone.	

Source: own elaboration based on Giraud et al 2015: ESPON REGICO un outil au service du débat public.

Figure 2: MTA mathematical explanations for relative and absolute deviation

a) Relative deviation (Relative Context)

The relative deviation states the position of each region in regard to a context of reference (perspective) expressed in index 100. It is based on the following calculation:

$$Relative\ deviation\ (Region\ i) = 100 * \frac{Numerator\ (Region\ i)/Denominator\ (Region\ i)}{Numerator\ (Context\ of\ reference)/Denominator\ (Context\ of\ reference)}$$

Territorial units characterized by a context of reference (perspective) below index 100 are under the average of a given context of reference (perspective), and reciprocally.

b) Absolute deviation (Absolute Context)

The absolute deviation calculates the "absolute" difference of the regional value context of reference (perspectives) as compared to the average of the context of reference (perspectives) in order to reach a arithmetical equi-distribution. It is calculated as follows:

$$Absolute\ deviation\ (Region\ i)$$
$$= Numerator\ (Region\ i) - (\frac{Numerator\ (Context\ of\ reference)}{Denominator\ (Context\ of\ reference)} * denominator\ (region\ i))$$

It specifies how much amount of the numerator (e.g. GDP) needs to be added to a region or contributed by a region, in order to reach equi-distribution for all denominators (e.g. inhabitants).

This is a perfectly statistical calculation in order to prominently illustrate disparities between regions and has to be handled with care in a policy context.

The calculations of all **three different perspectives** (Large-Scale, Meso, Neighbourhood) can subsequently be transferred into a **synthesis map**. This map overlays the results on top of each other and thus illustrates more easily the regions that are above-average in all three deviations, the regions that are ultimately below-average in all three deviations and the regions with mixed results, showing over-average values from some perspectives and below-average values viewed from other perspectives.

Figure 3: Synthesis map (example)
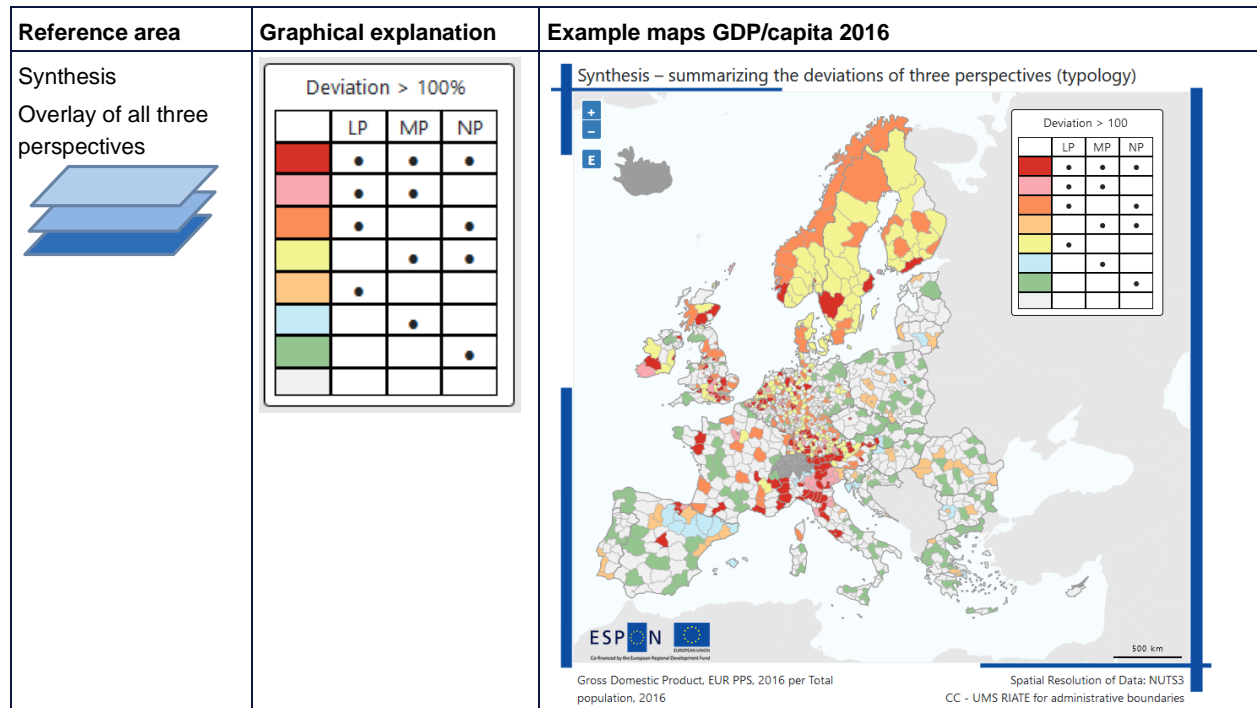
Source: own elaboration based on Giraud et al 2015: HyperAtlas un outil au service du débat public. Map: ESPON REGICO.