

# OECD explorer: Making regional statistics come alive through a geovisual web-tool

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# Agenda

- ❑ Short background to regional statistics in OECD;
- ❑ NCVA research and eXplorer;
- ❑ Time Animation;
- ❑ Advanced analytics tool – Parallel Coordinates;
- ❑ Collaboration through Stories;
- ❑ eXplorer Architecture;
- ❑ Questions;

# Regional policy in OECD countries

A place-based policy to foster competitiveness and well-being for all regions, implemented through cooperation among different levels of government;

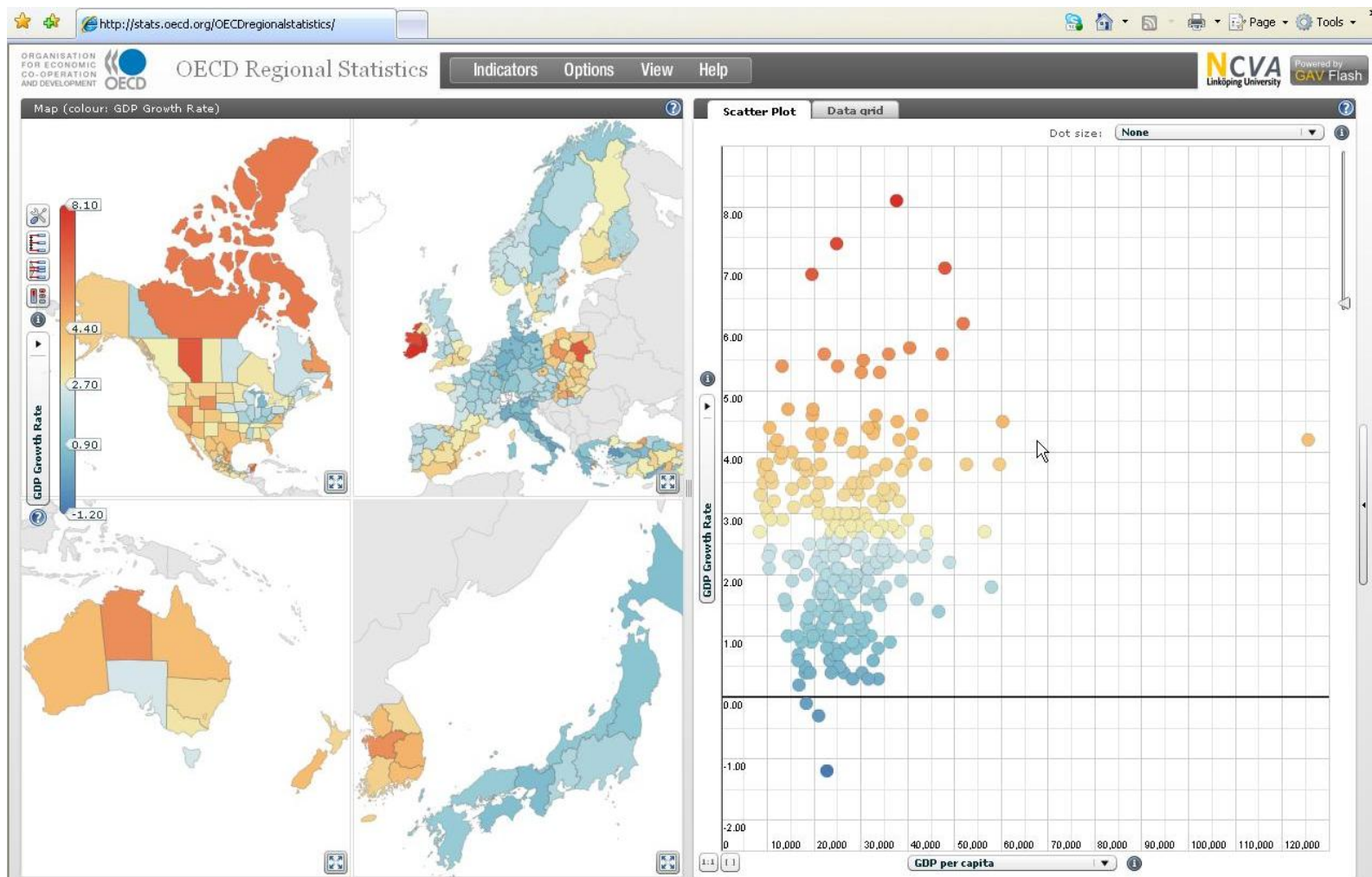
Regional development is multidimensional.

The OECD regional indicators range from demographic characteristics to economic output, from industrial concentration to labour market performance, from innovation activities to education levels, from health status to environmental conditions

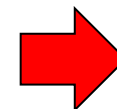
Comparative (within and across countries) statistical information on around 2,000 regions in OECD countries

...Some stylized fact from the OECD Regions at a Glance 2009

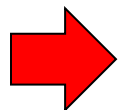
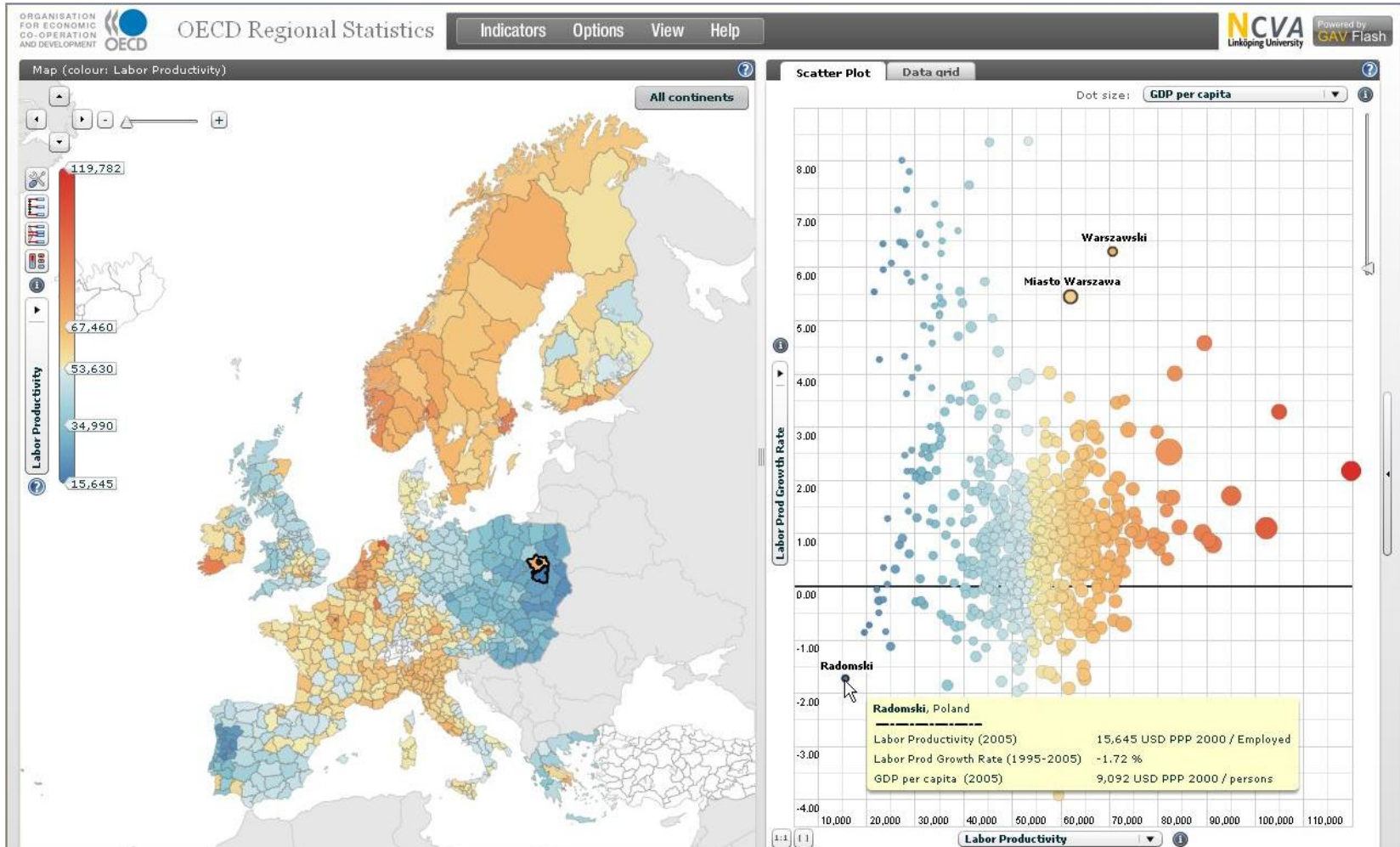
# Local factors matter in attaining growth: more than 40% of GDP and employment growth in recent years are due to 10% of regions



Resources for competitiveness are many (population, age structure, education, activity rates, environmental assets etc.)...



# Regional differences in economic output, labour productivity, job creation within countries have been at least twice as much among countries

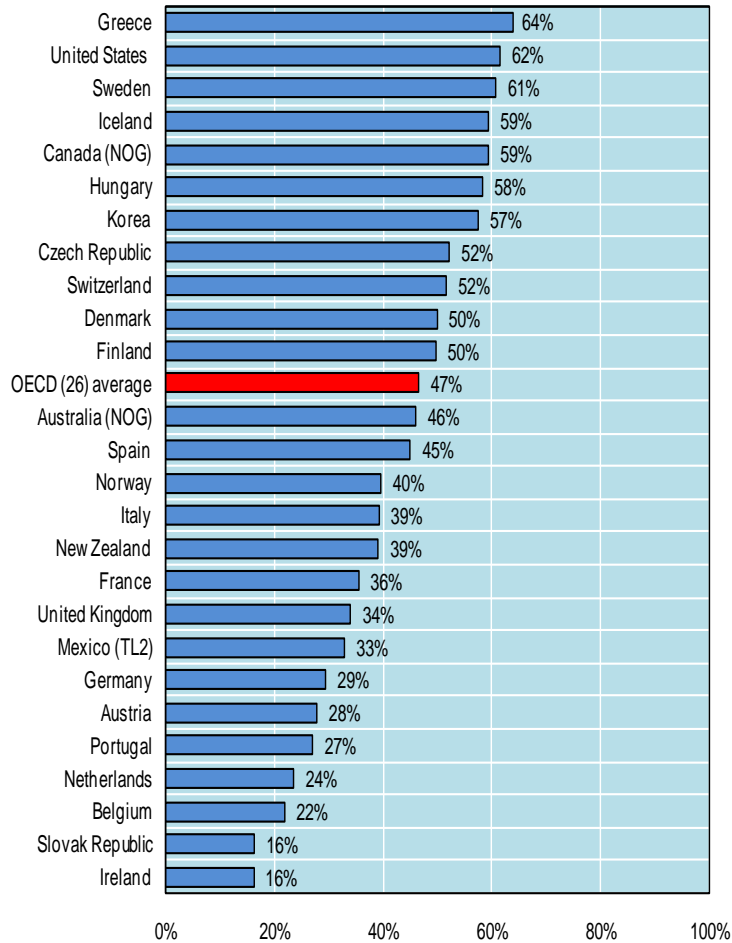


How can they be mobilized to improve a region competitiveness?

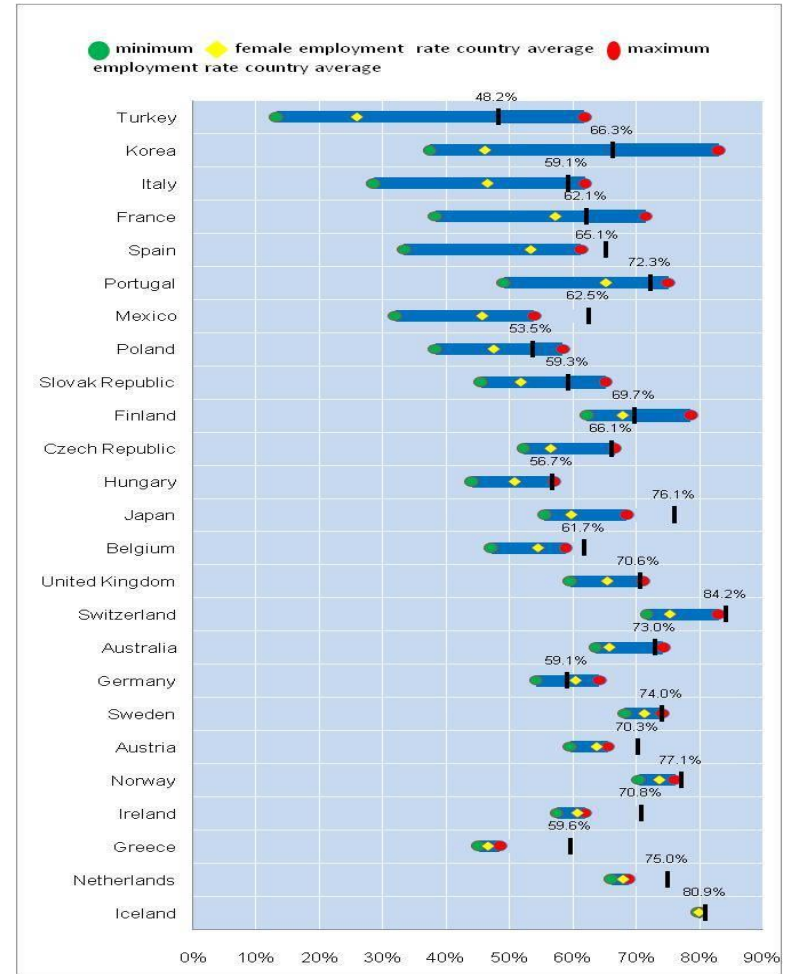


# Improve regional competitiveness through the supply and utilization of the labour force

Between 1999-2006 almost half of employment was created in 10% of OECD regions...

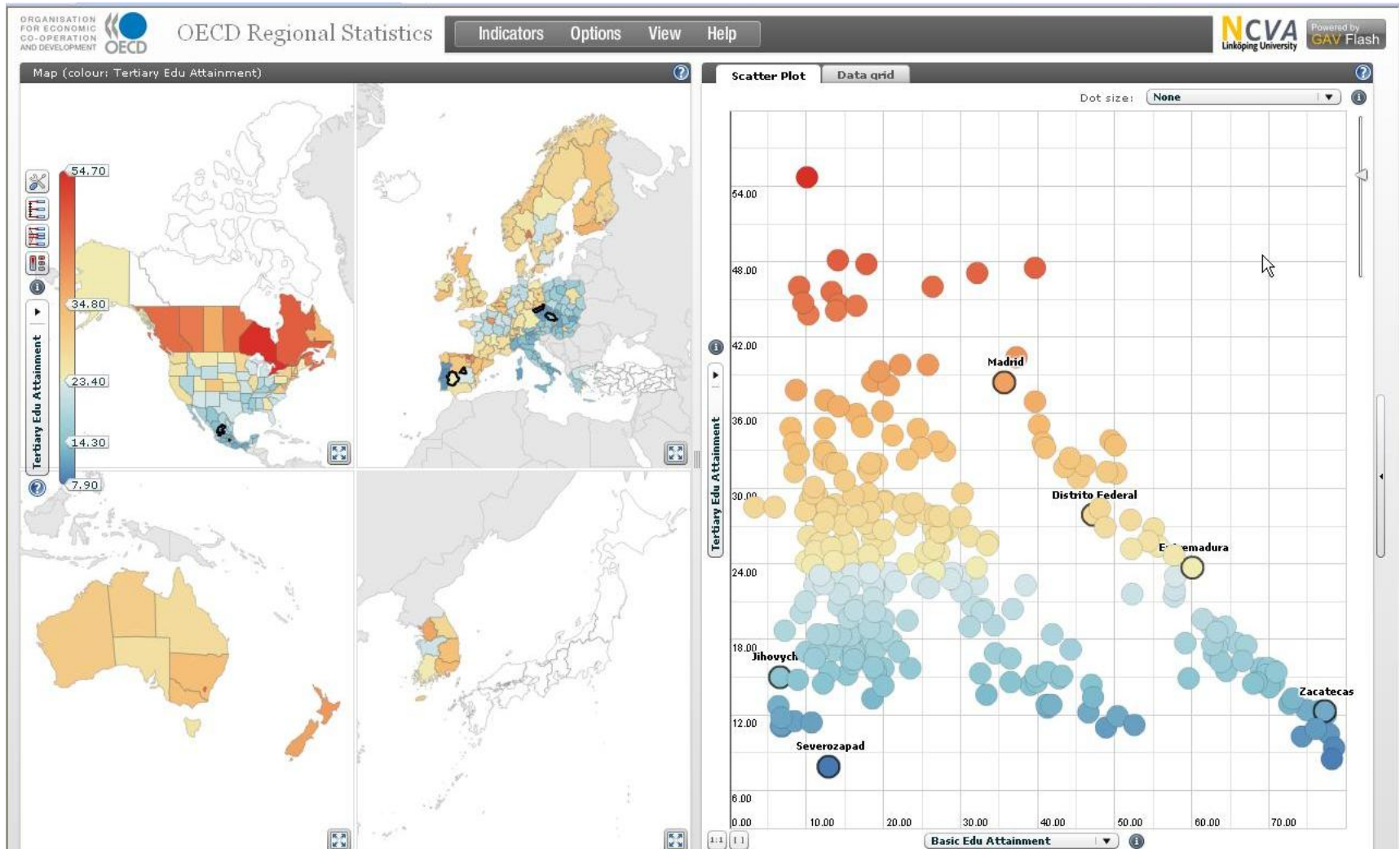


and in 2006 in 15% of OECD regions less than 40% of working age women are employed

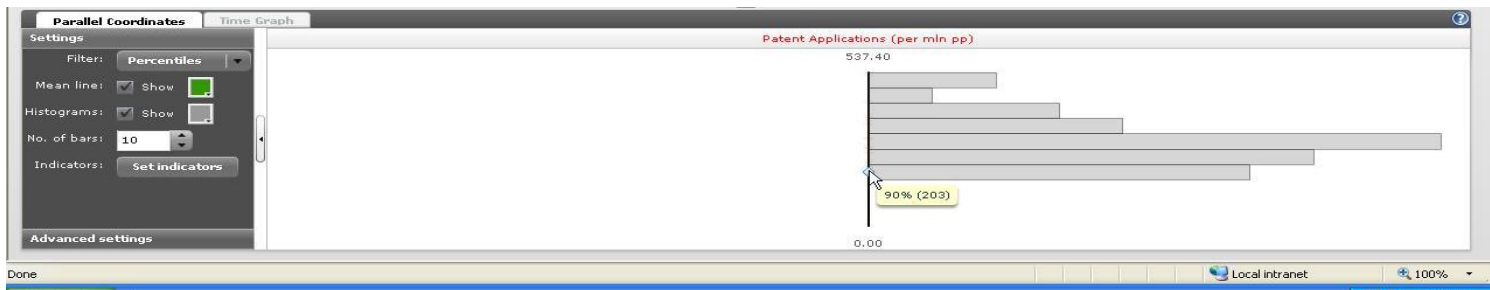
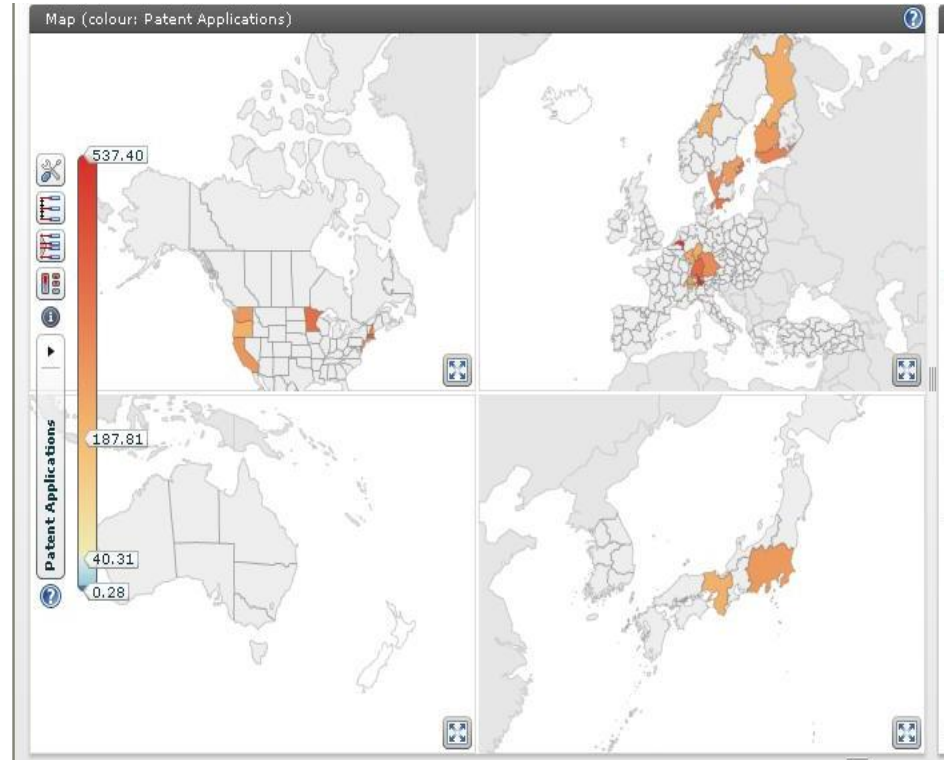
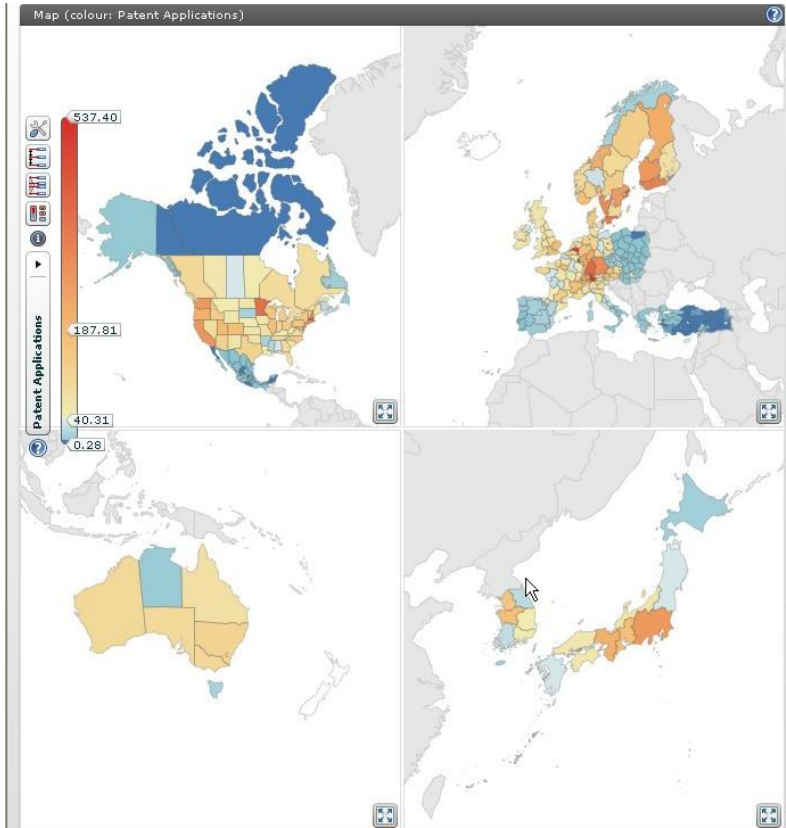


# ... Through improvement of human capital in the knowledge based economy and increased access to education

Almost one third of OECD countries the regional difference in tertiary education varied from 150% to 70% the national value ... and almost one fourth of the OECD labour force in 2006 had received only basic education



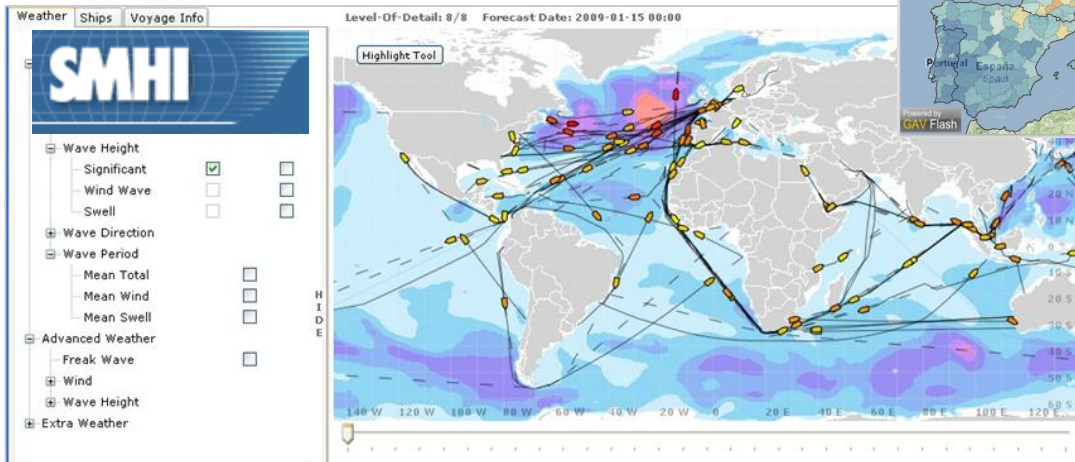
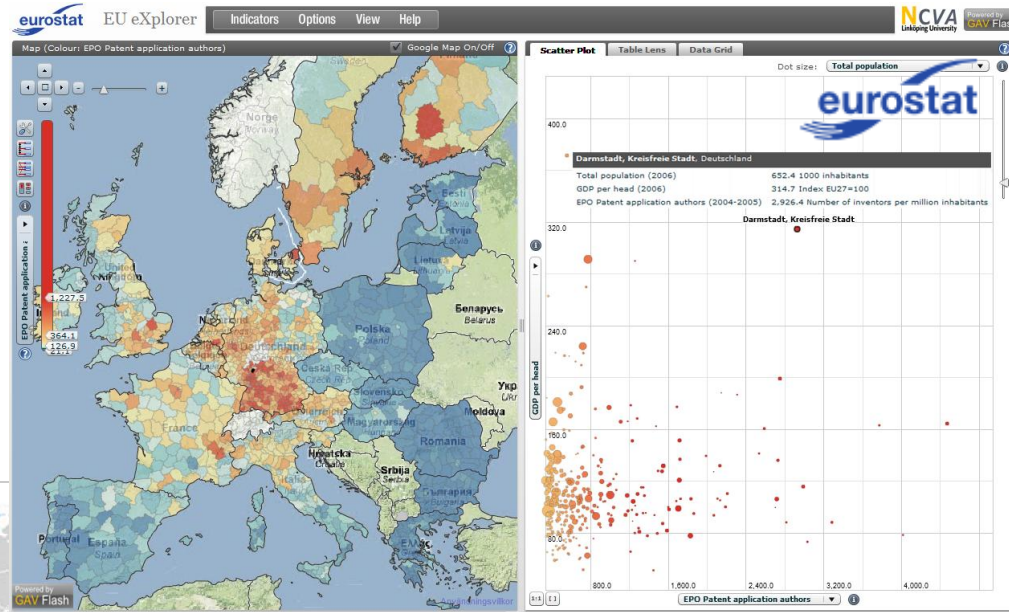
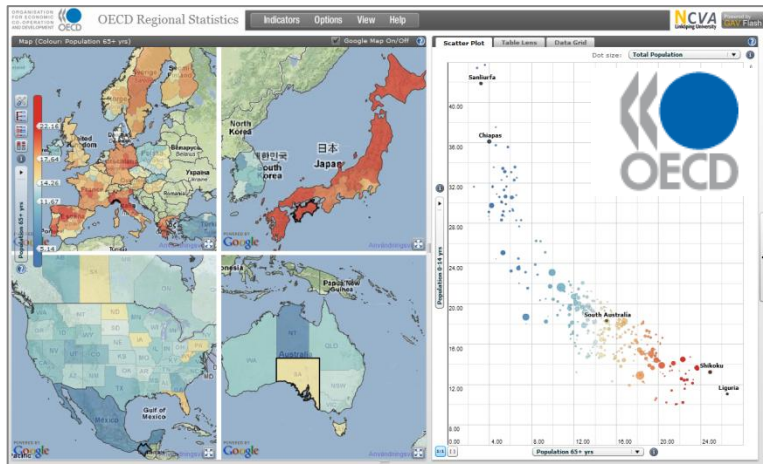
**Factors for innovation are geographically concentrated; interaction between business and non business innovation activities as well as cooperation among regions are crucial for national innovation objectives:**



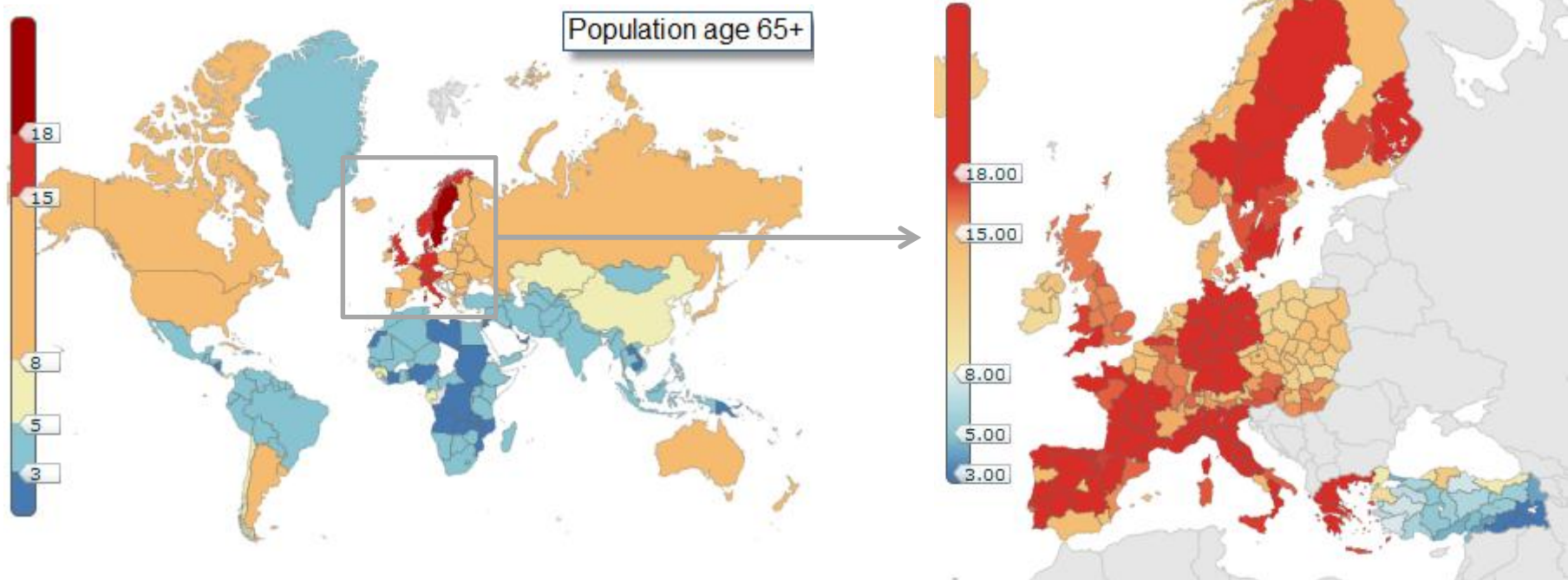




## We develop advanced Geovisual Analytics tools for the Internet in close collaboration with our Partners

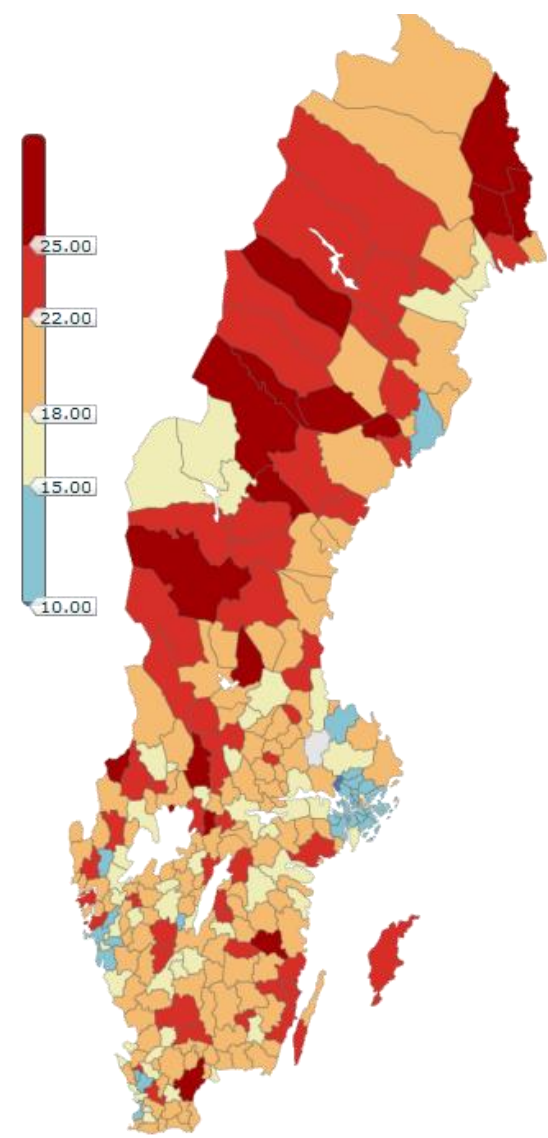
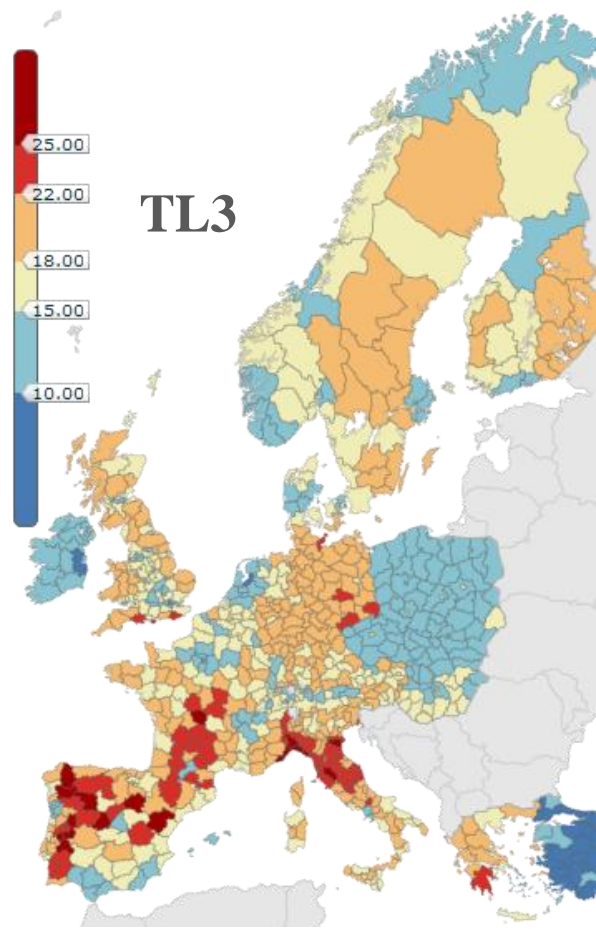
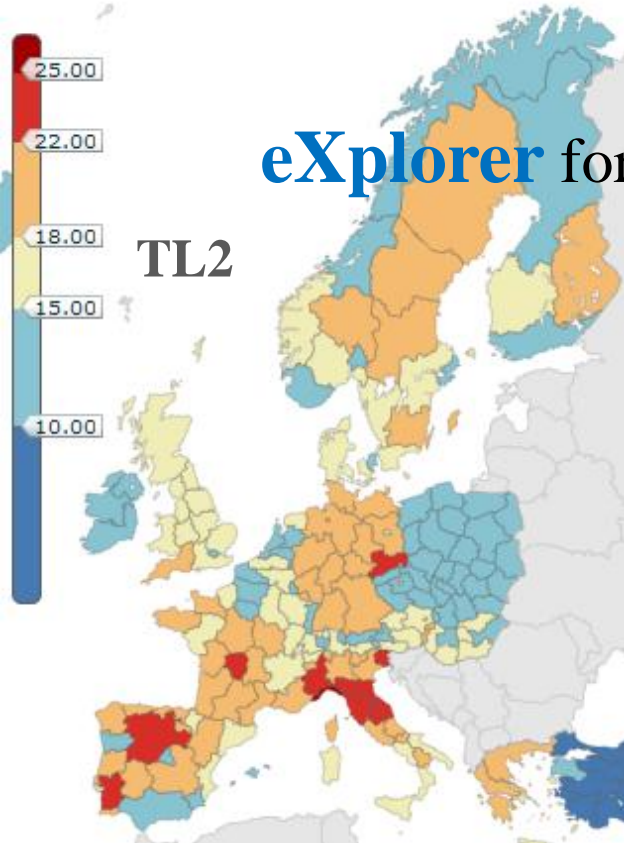


# eXplorer for the World, OECD Europe, ...

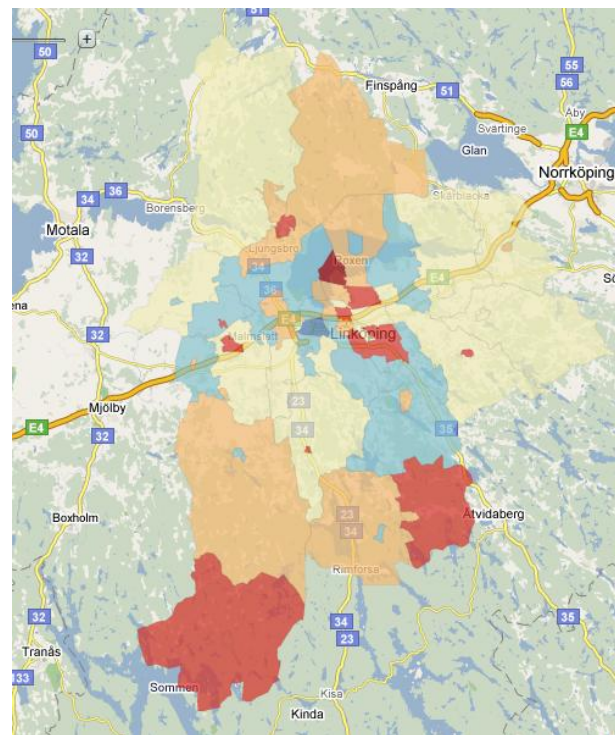
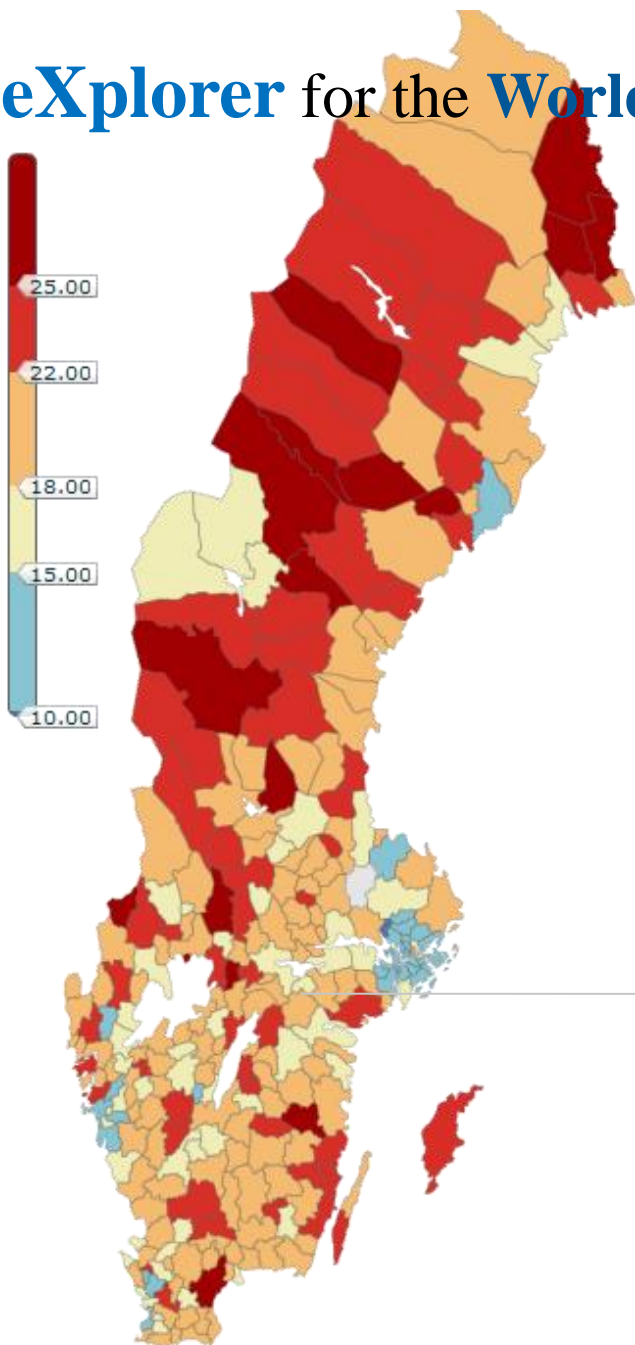




# eXplorer for the World, OECD Europe, Sweden, ..

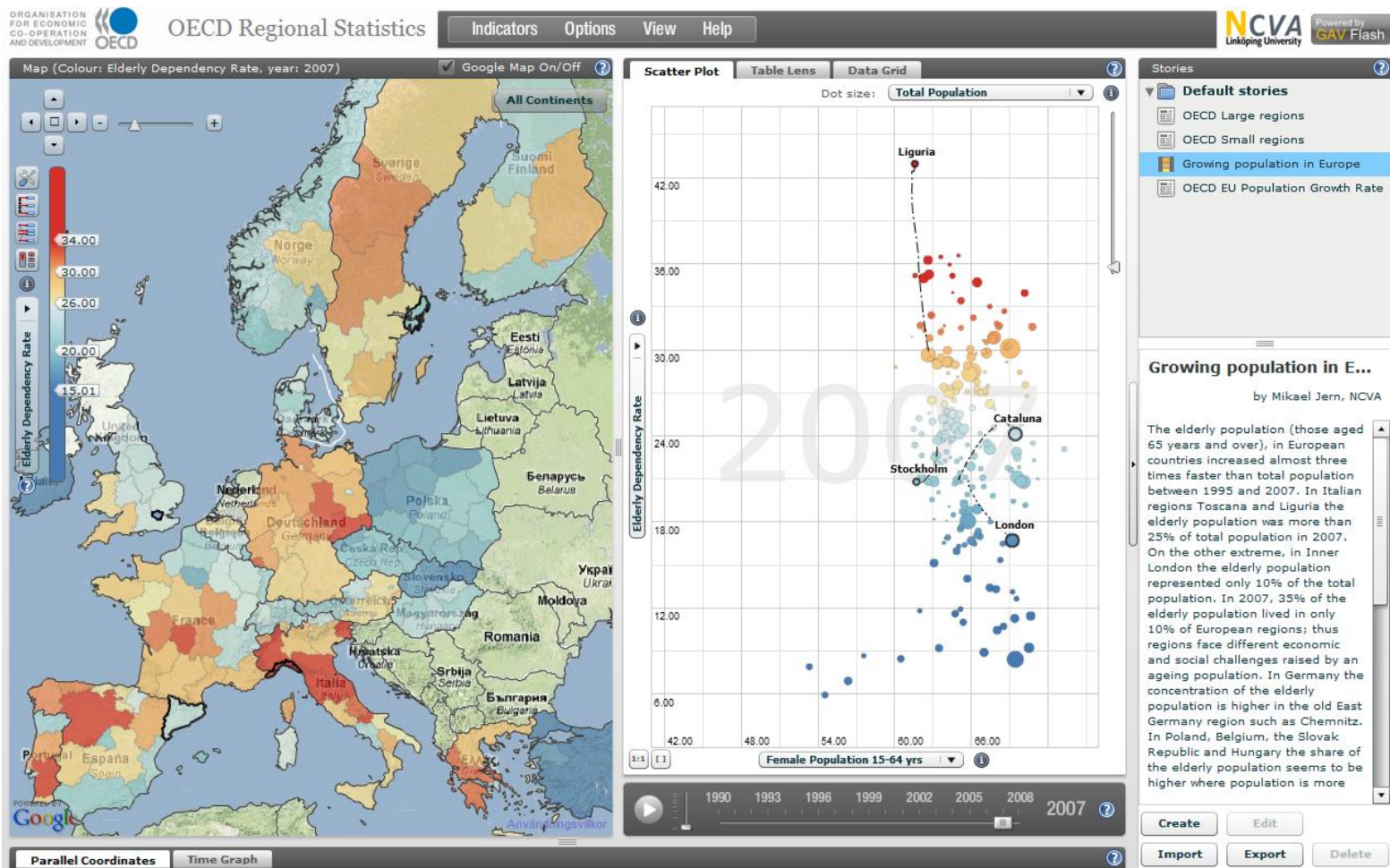


# eXplorer for the World, OECD Europe, Sweden, Municipality



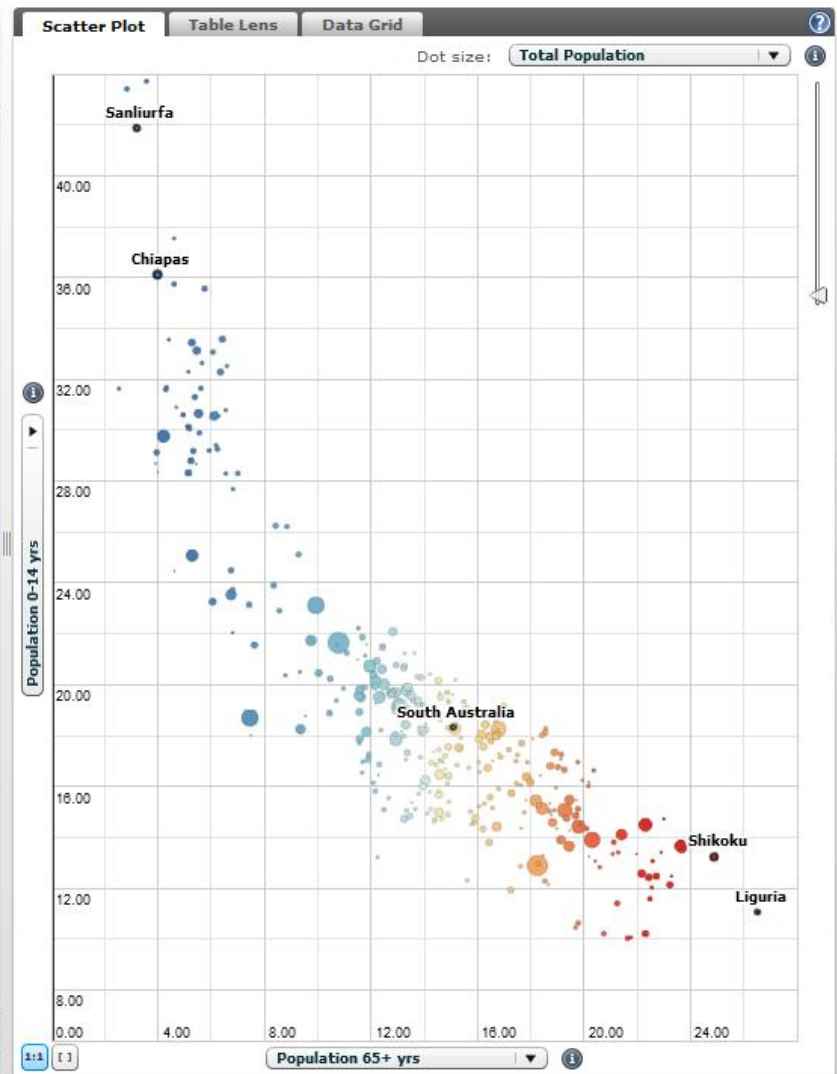
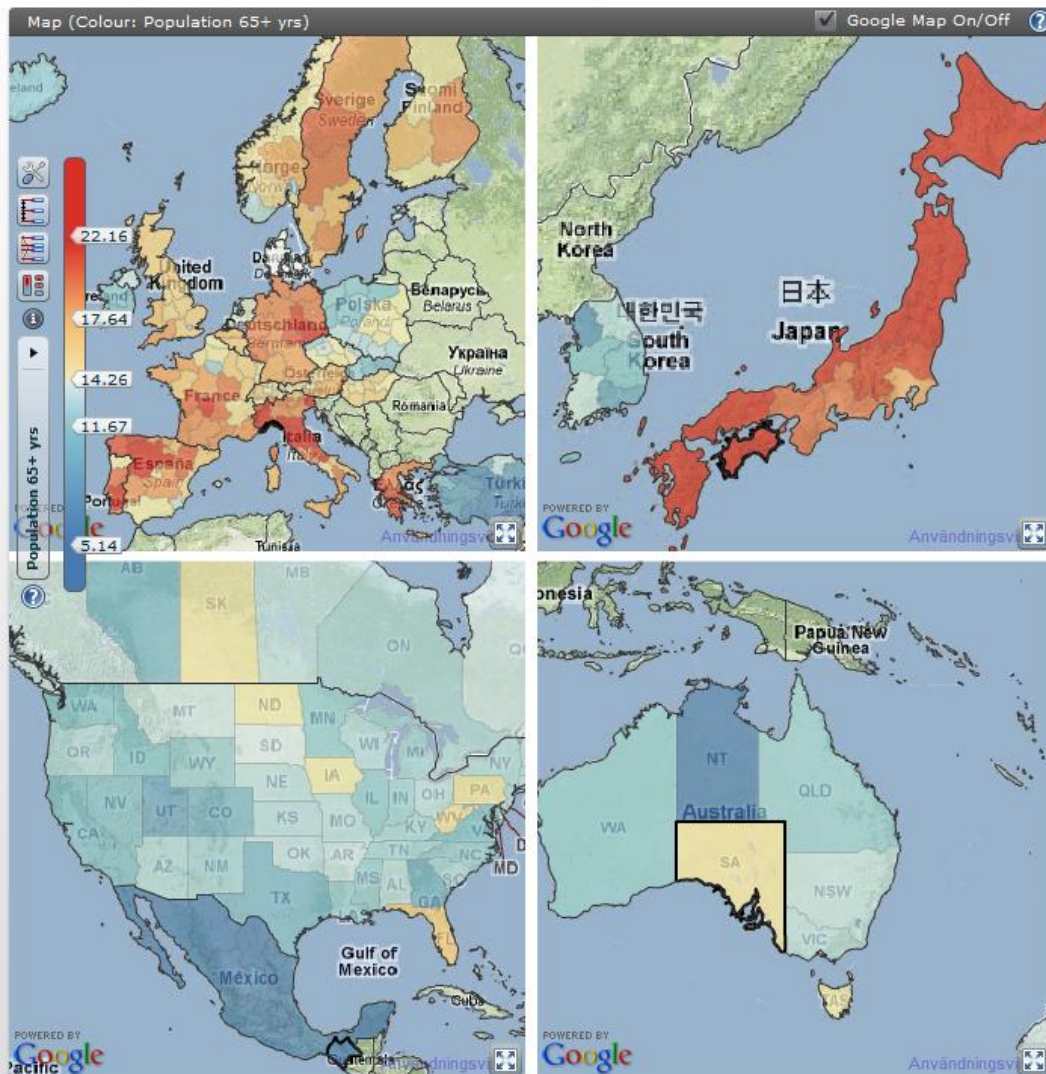
# eXplorer for regional development

- ❑ **Web 2.0** compliant - facilitating **explorative** and **communicative** visualization with **analytics reasoning** aspects;
- ❑ Regions are **simultaneously** explored in **dynamically linked** views;
- ❑ Integrated Story Telling and Web Publishing;

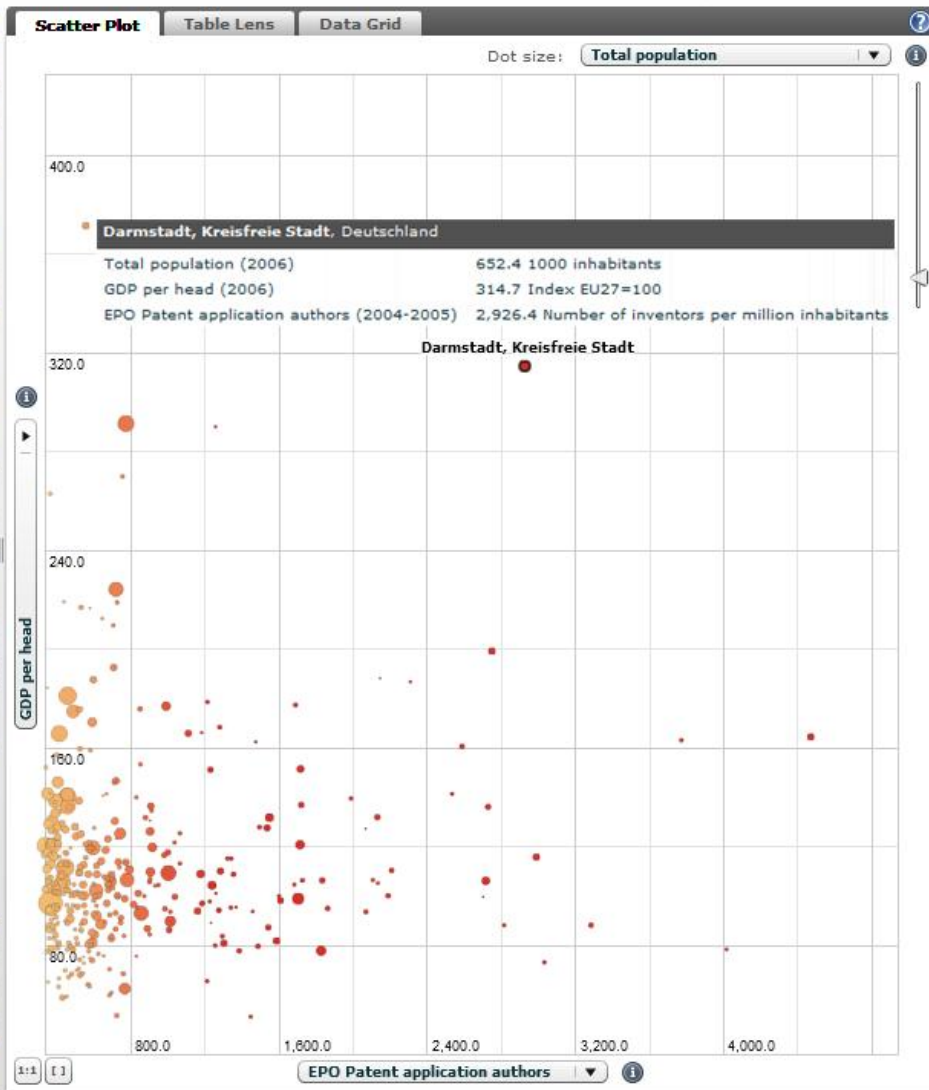
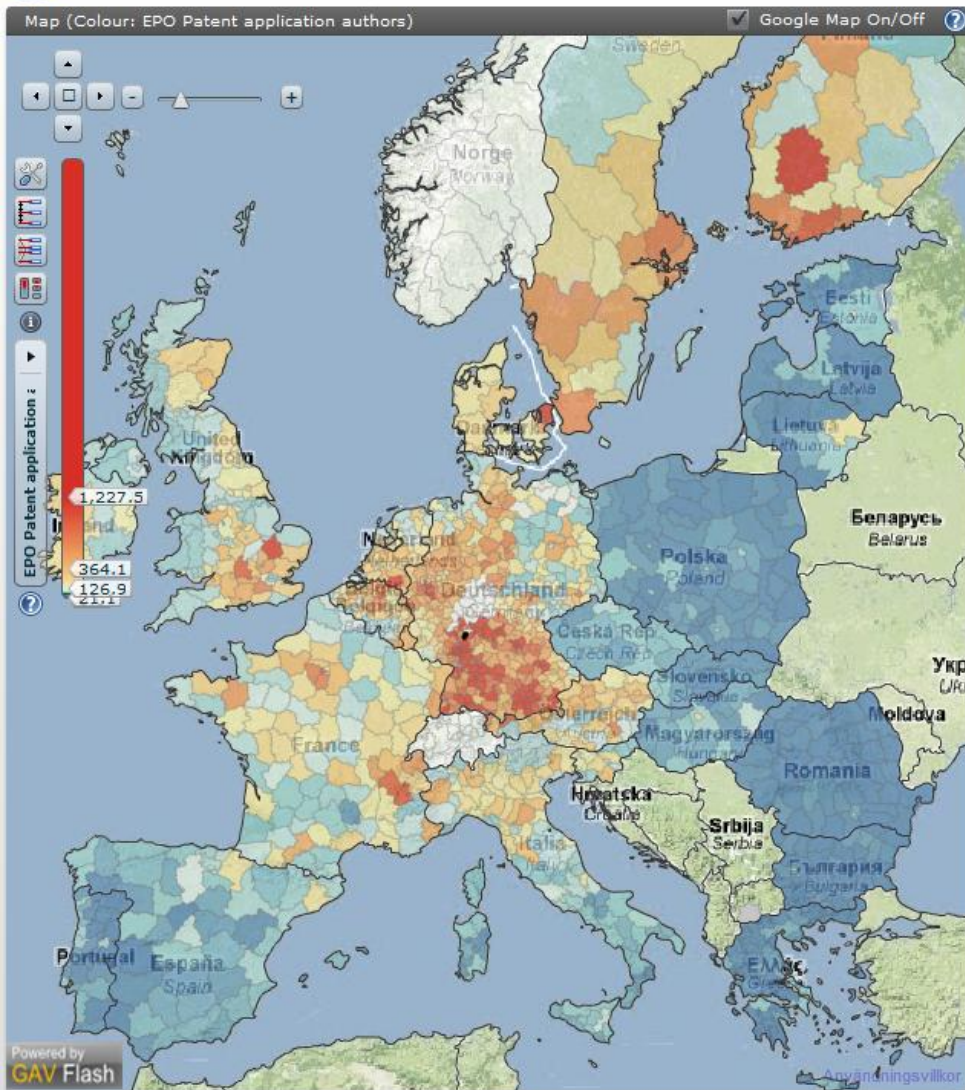




# A growing interest from **static** reports to **dynamic** visualization



# A growing interest from **static** reports to **dynamic** visualization

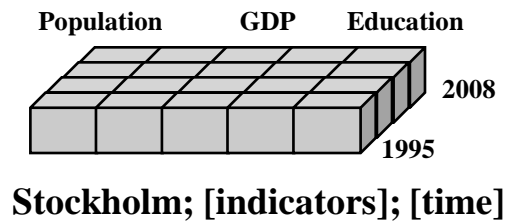
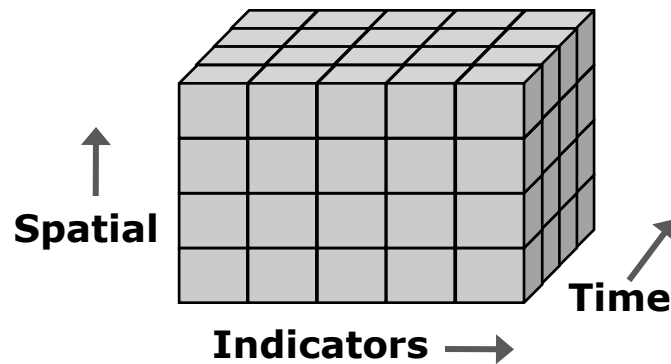


# Visualize and Interpret **Spatial-Temporal** and **Multivariate** data using the **Data Cube**



**Stockholm; Education; 2008**

OECD eXplorer supports 3,000,000 data cells



Large regional data sets require an architecture facilitating dynamic performance

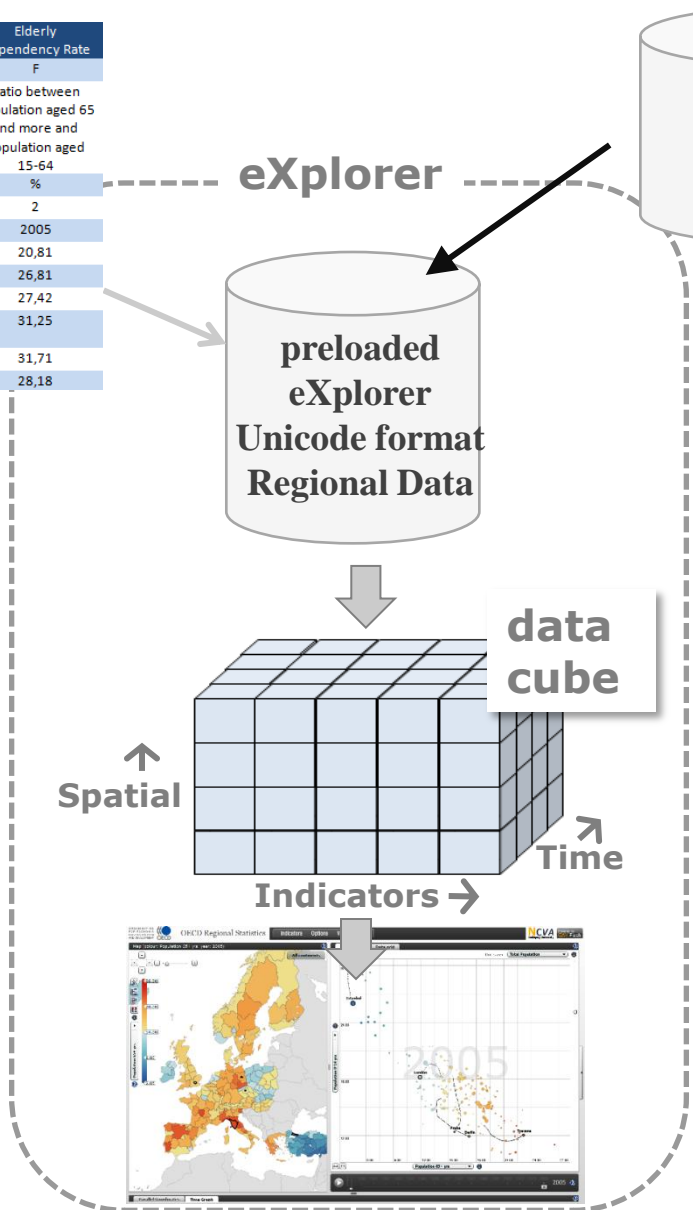
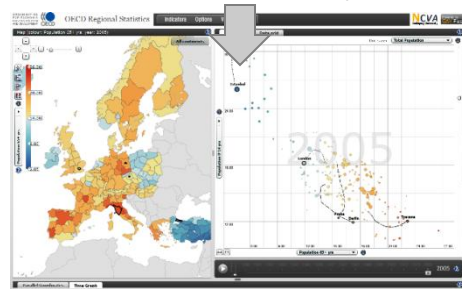
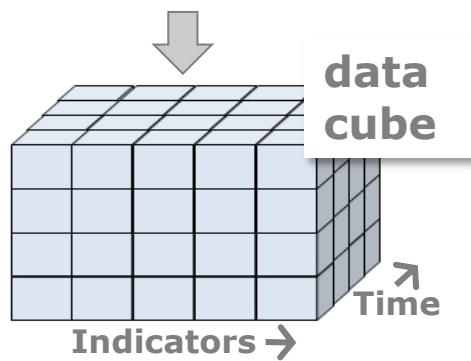
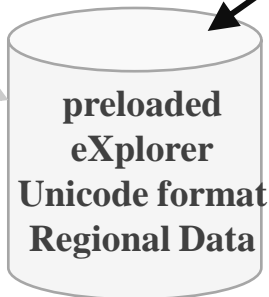
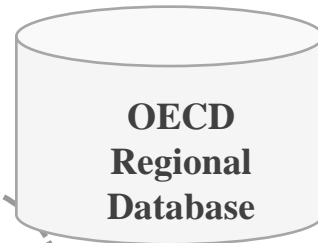
# Data are preloaded or input from client

META	CODE	Name	Area	Total Population	Elderly Dependency Rate
PARSETYPE	S	S	F	F	F
DESCRIPTION	Regional ID	Name of region	Land area	Resident population of a given region.	Ratio between population aged 65 and more and population aged 15-64
UNIT	NA	NA	Km2	pp	%
PRECISION	NA	NA	1	0	2
CAPTURED	NA	NA	2005	2005	2005
	SE01	Stockholm	6519,3	1881423	20,81
	SE02	Östra Mellansverige	38607,4	1516313	26,81
	SE04	Sydsverige	13982,1	1315707	27,42
	SE06	Norra Mellansverige	63987	825613	31,25
	SE07	Mellersta Norrland	71027,6	371192	31,71
	SE08	Övre Norrland	153438,7	509426	28,18

external  
Unicode format  
Regional Data

Flash 10

eXplorer





# Data are pre-loaded

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT **OECD** OECD Regional Statistics

Indicators Options View Help

NCVA Linköping University Powered by GAV Flash

Map (colour: Labor Productivity)

Map navigation controls: Home, Previous, Next, Zoom In, Zoom Out, Full Screen, Refresh, Help

Color scale for Labor Productivity: 95,011 (top), 69,417, 53,917, 33,400, 24,710 (bottom)

Scatter Plot Data grid Dot size: Total Population

120,000

Load Data...  
Load Your Own Data...  
Save Current Data...

Load indicators

**Demographic**

Select all Select none

- Area
- Total Population
- Population Density
- Population by Age
- Female Population by Age
- Elderly Dependency Rate

Select Territorial Level:

TL2 (large regions)

Latest data only (exploration mode)  
 Single year (exploration mode)  
 Time span (animation mode)

1990 1995 2000 2005

Minimize time span  Maximize time span

**Economic**

**Social**

**Innovation**

About datasets Cancel Load

Parallel Coordinates Time Graph



# Advanced tools for Colour Mapping

## Diverging colour scales and dynamic colour scale sliders

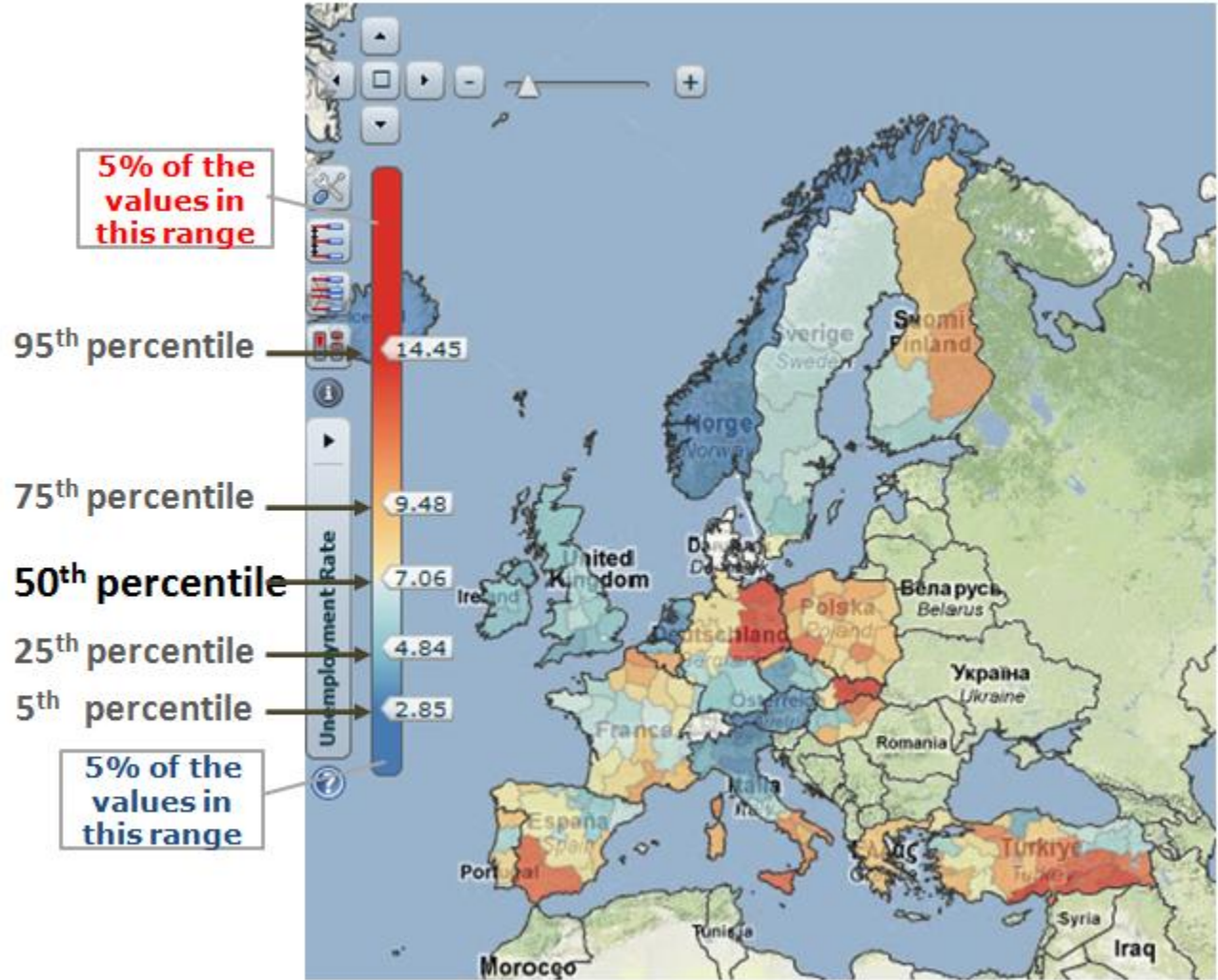
Colour indicator and scale

Color map

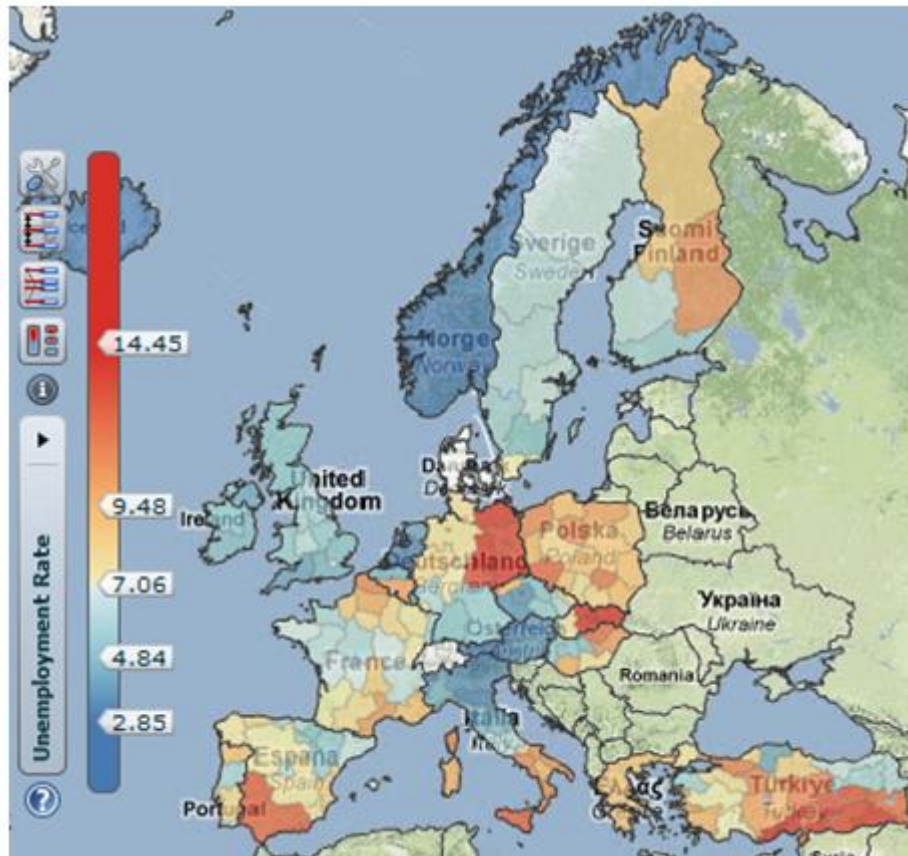
- [Color map 1]
- [Color map 2]
- [Color map 3]
- [Color map 4]
- [Color map 5]
- [Color map 6]
- [Color map 7]

Colour map indicator

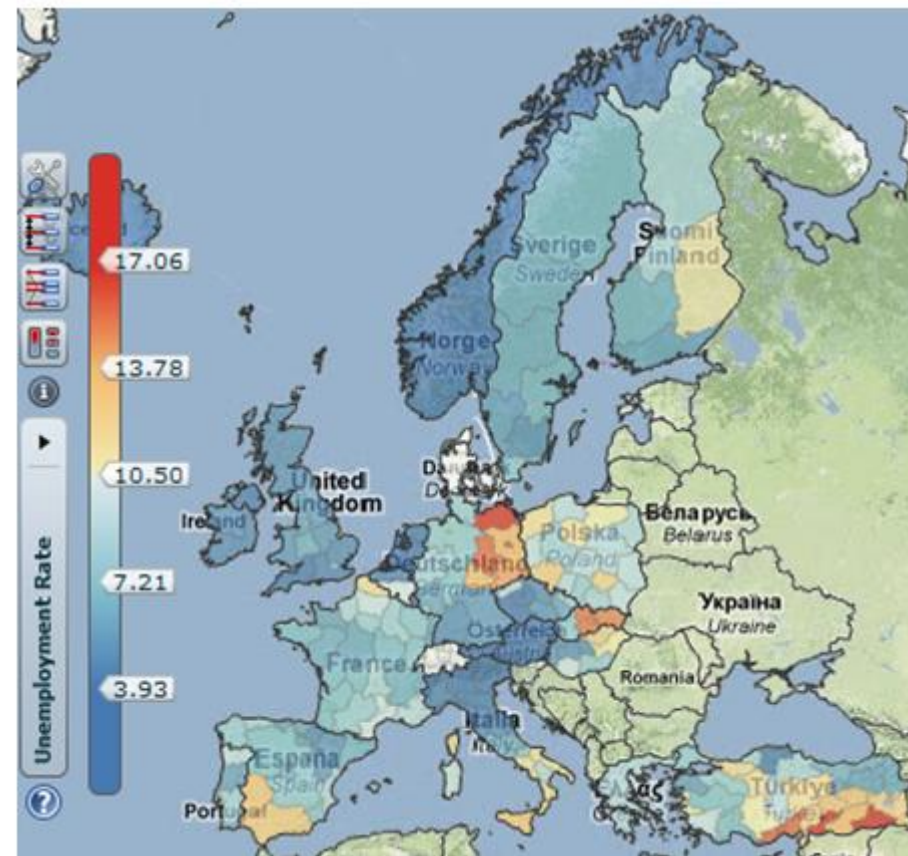
Unemployment Rate



# Advanced tools for Colour Mapping



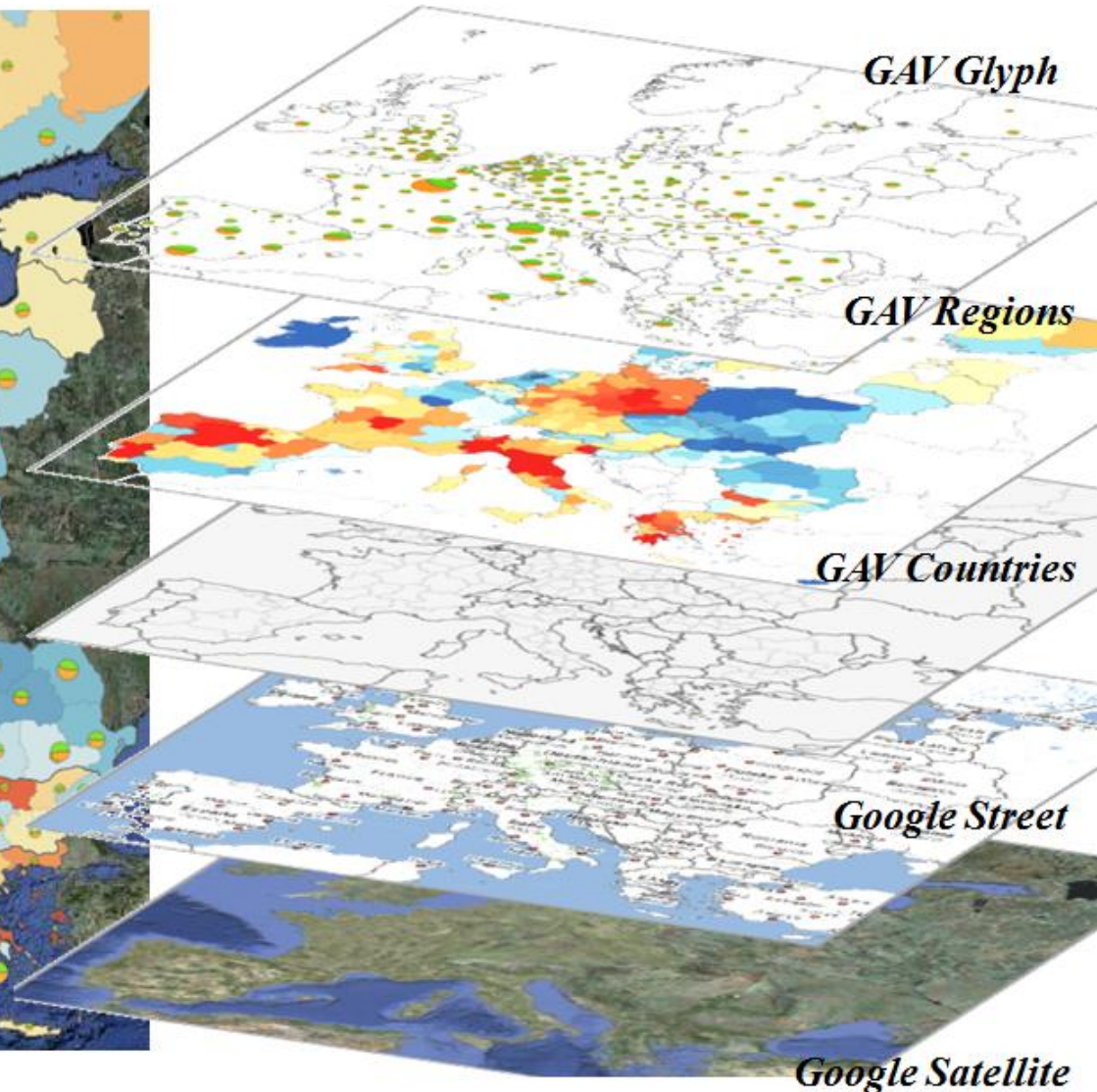
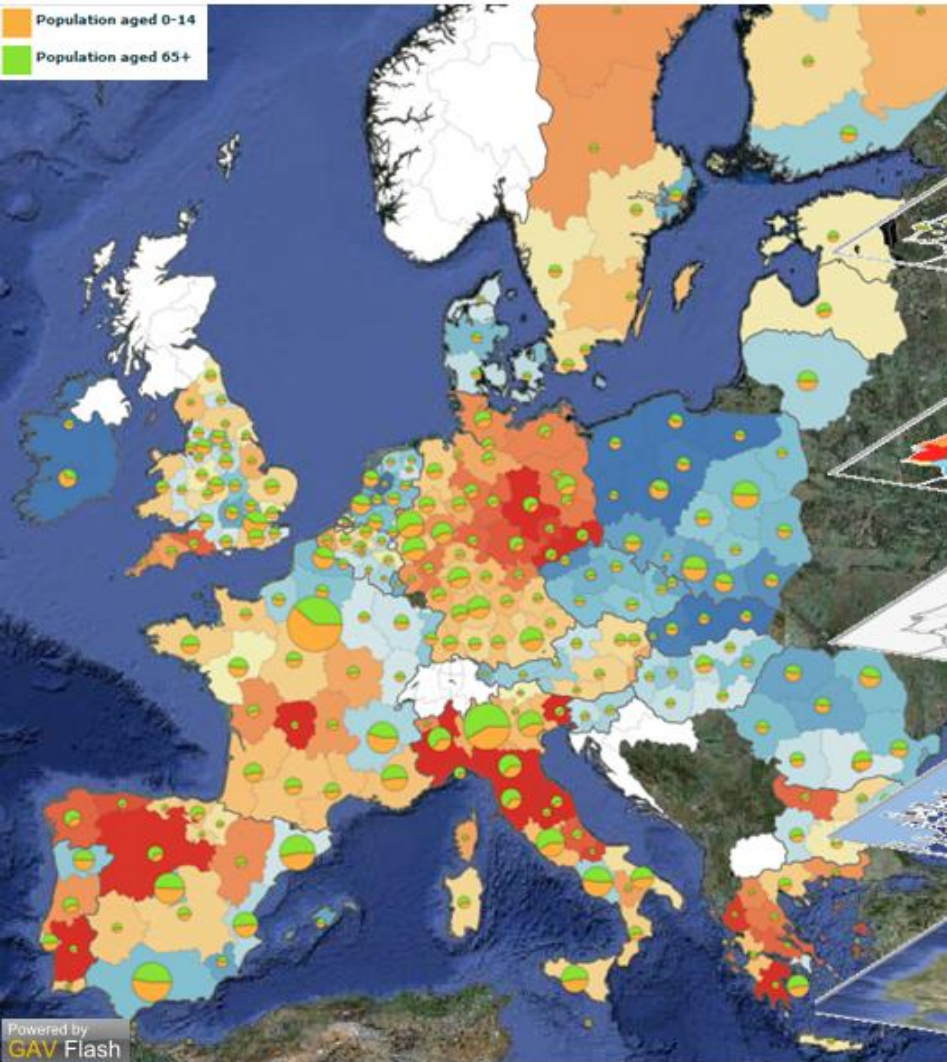
Colour classes based on percentiles



Colour classes based on linear calculation

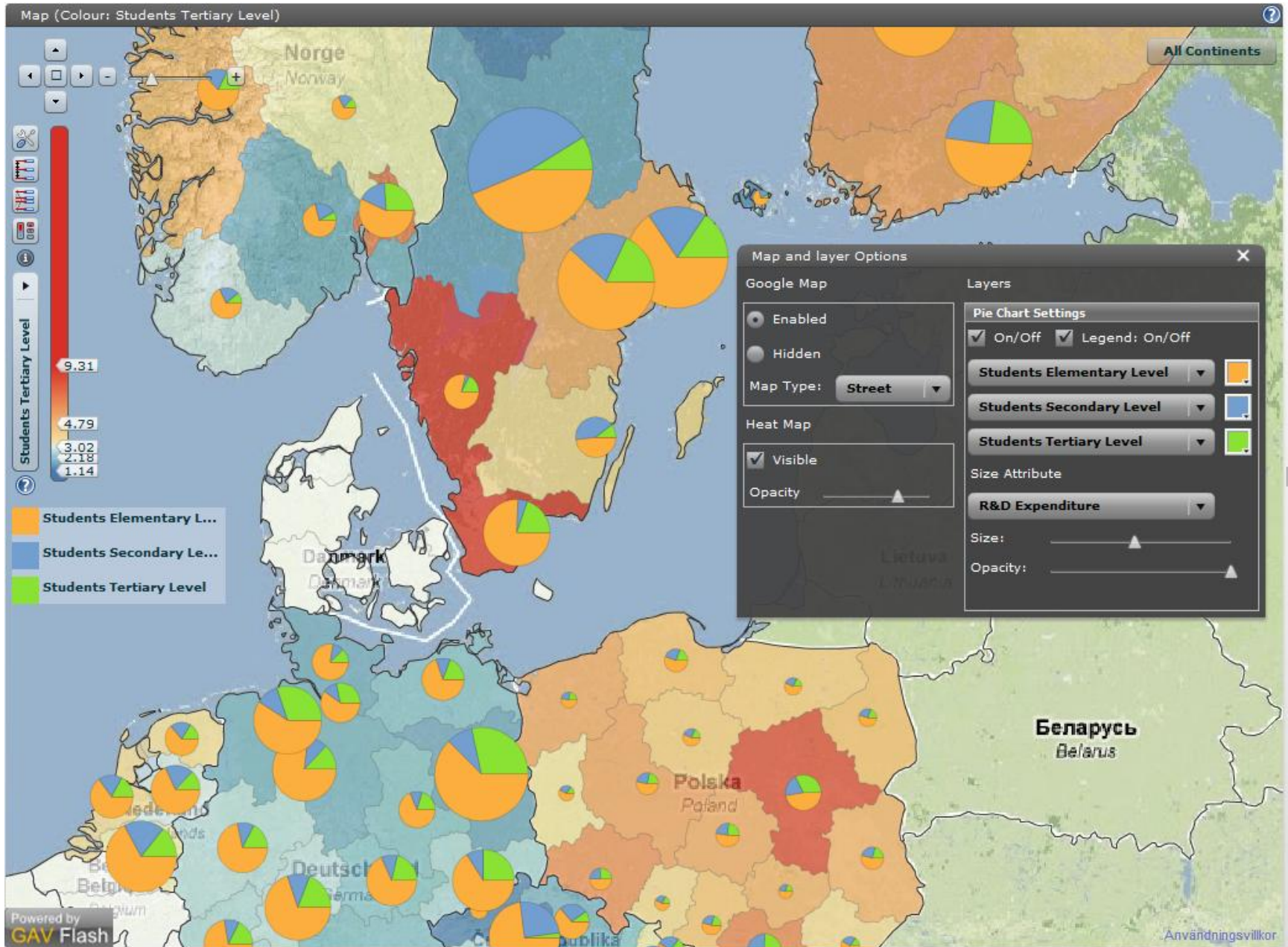


# Choropleth Map – GAV Flash Layers



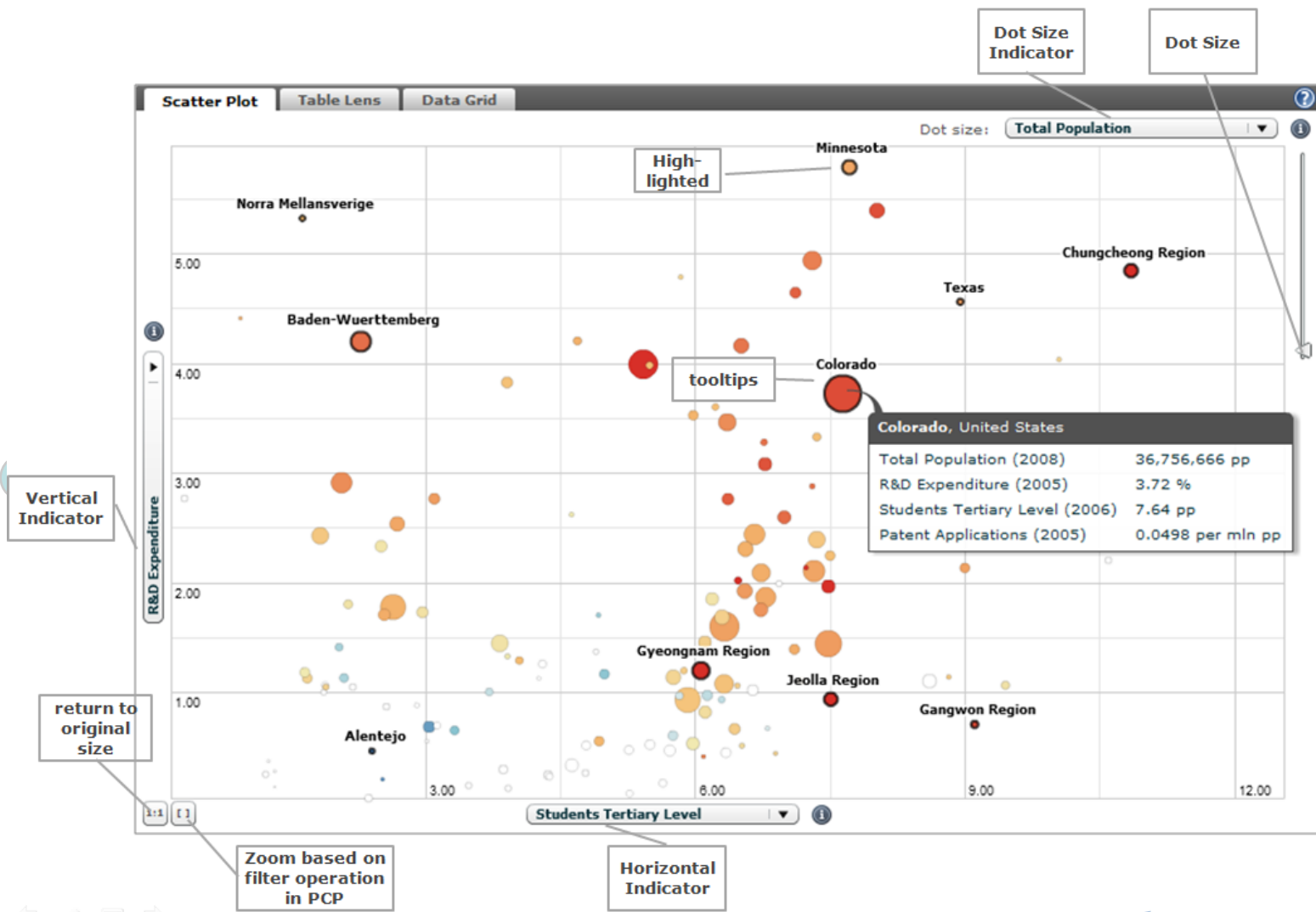


# Choropleth Map with Pie Charts



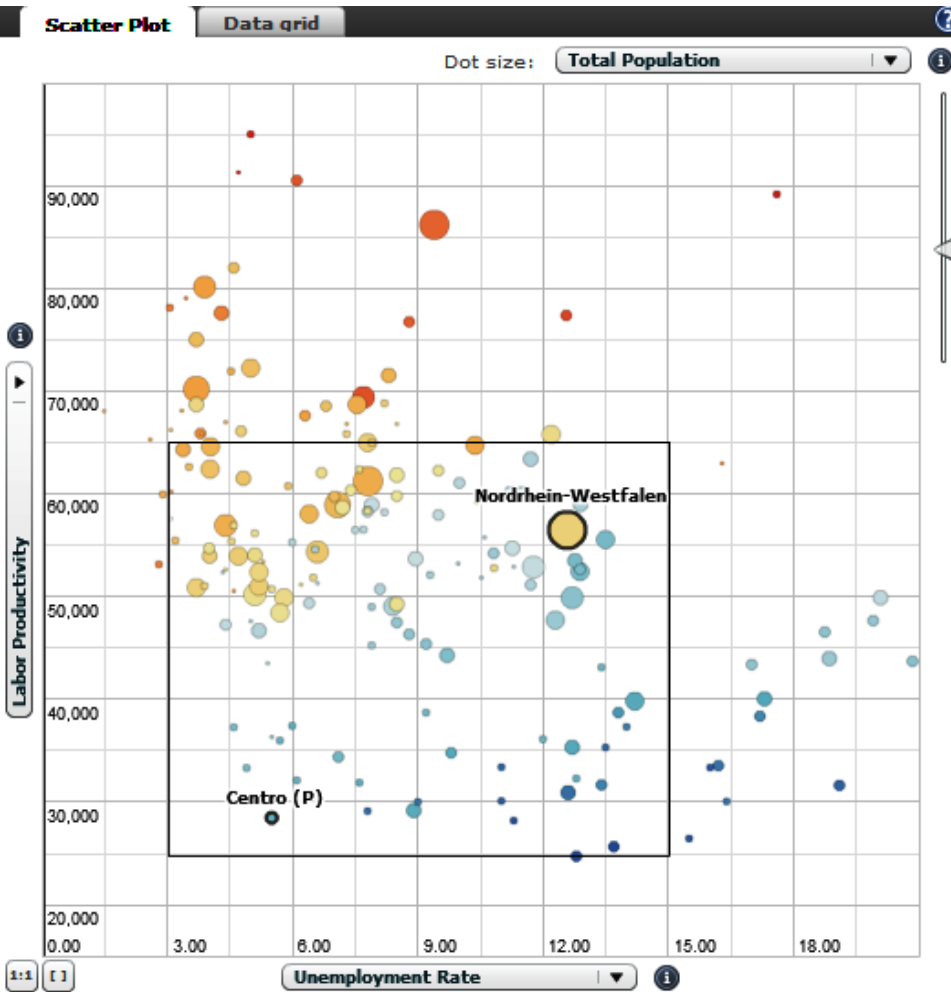
# Advanced Scatter Plot – allocate 4 indicators **NCVA**

- 1: X-axis
- 2: Y-axis
- 3: Colour ●
- 4: Dot Size ●●





# Advanced Scatter Plot – Zoom



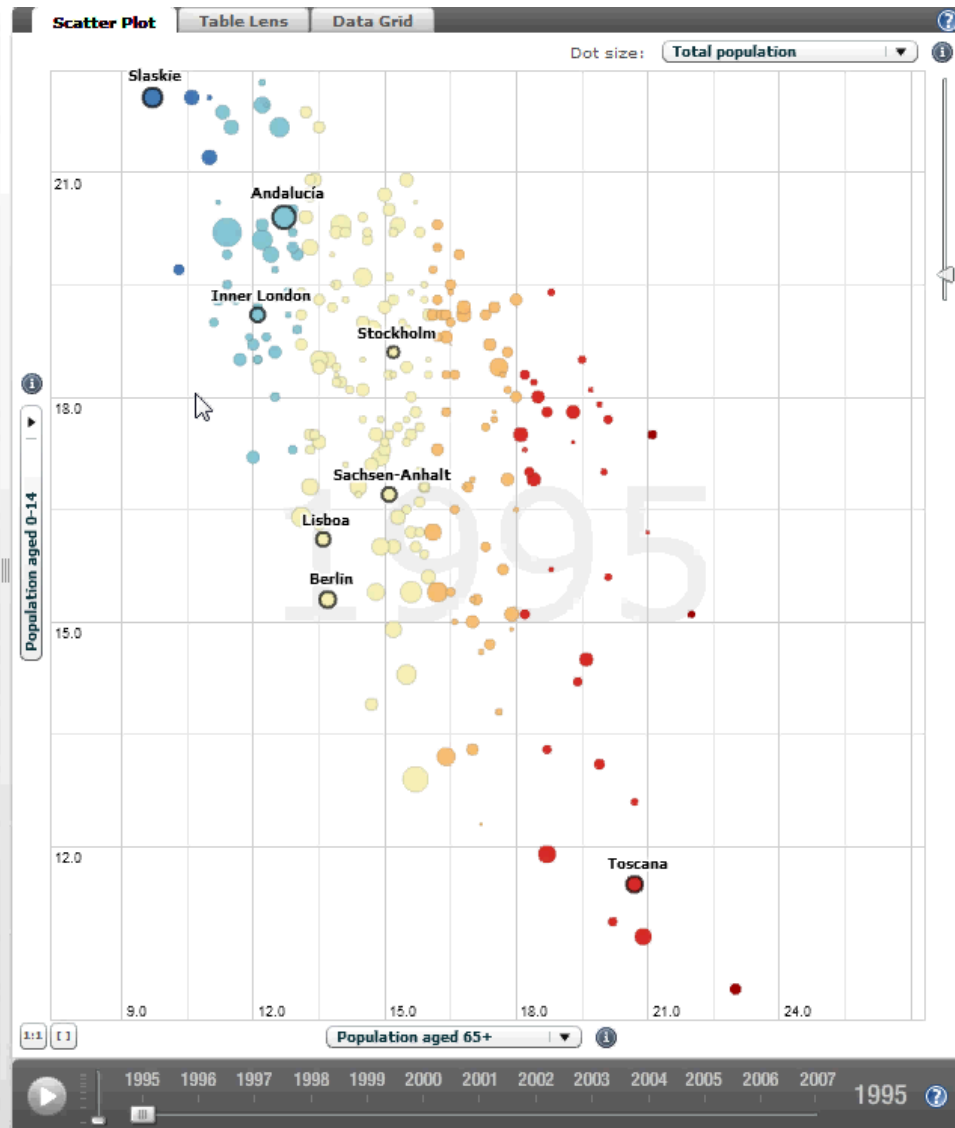
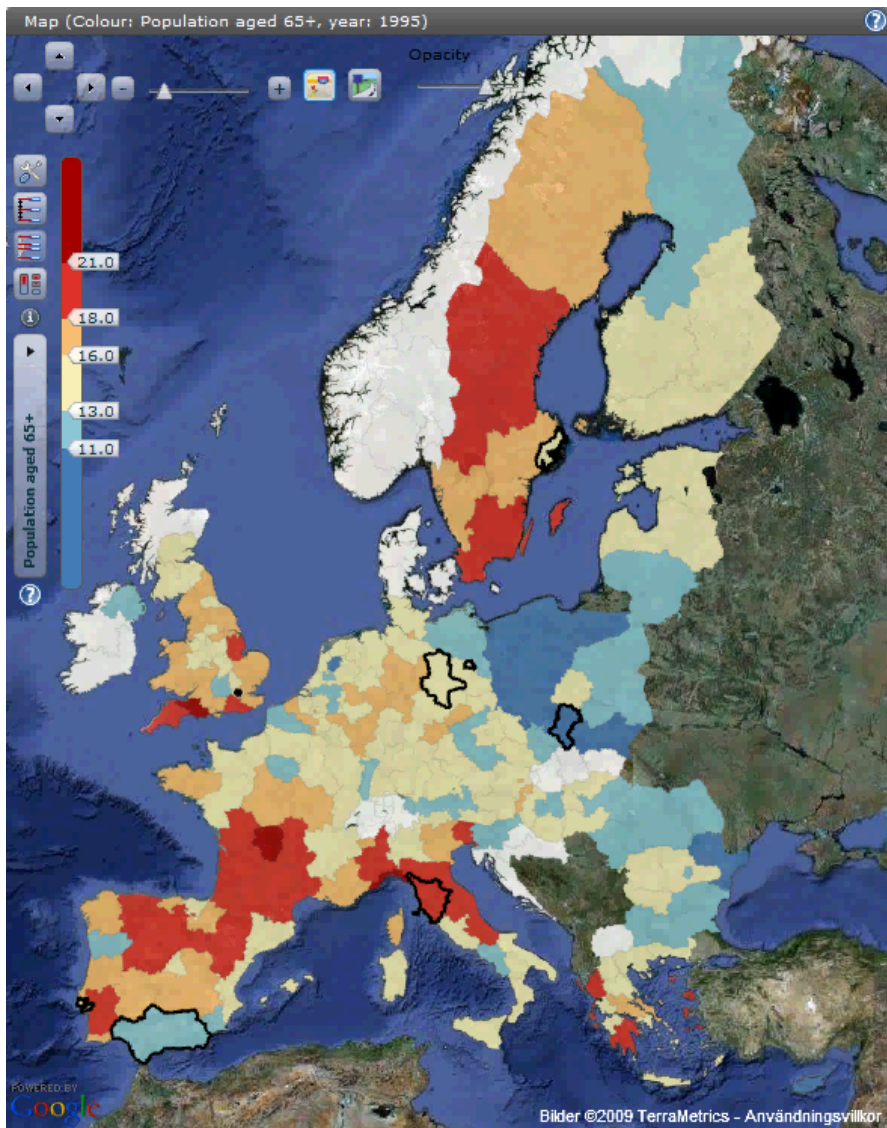
# Advanced Scatter Plot – Time Animation



# Dynamic Linked Time Animation

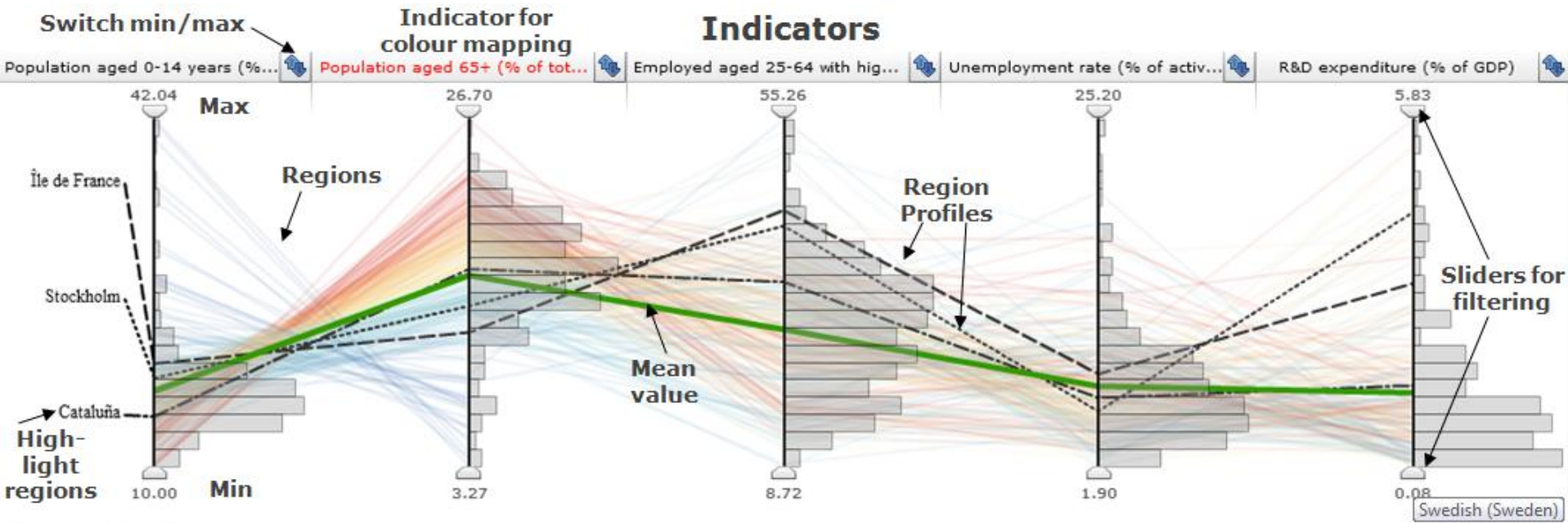
Simultaneously analyse multiple indicators, time-steps and regions

## DEMO



# Parallel Coordinate Plot

new interactive visual tool to aim statistical analysis

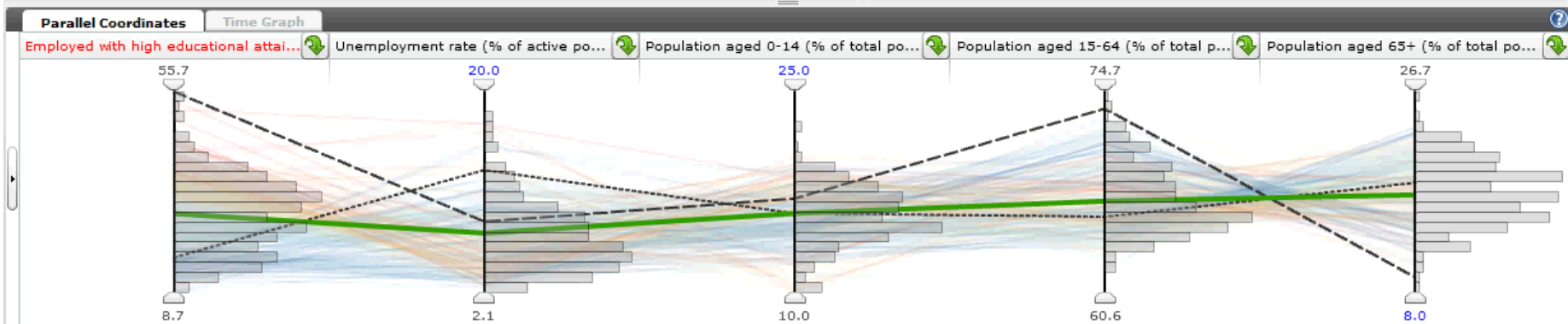
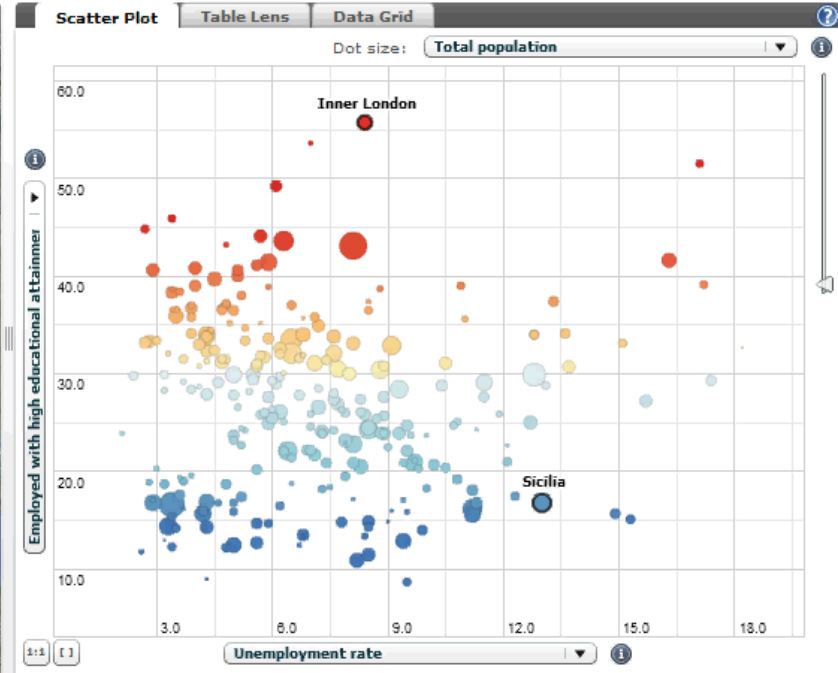
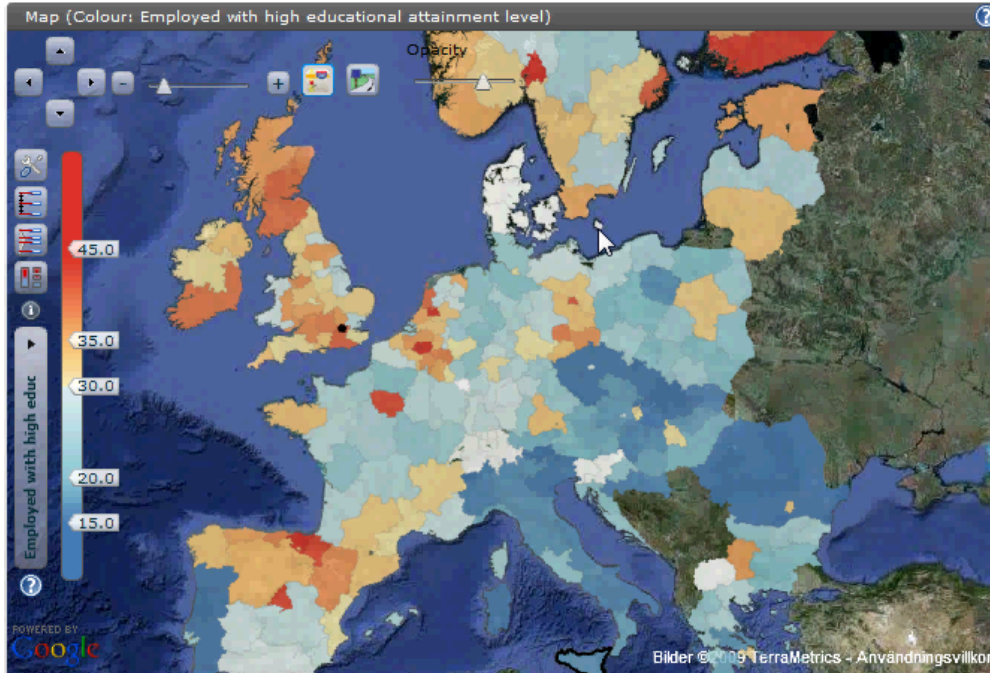


1. One axis per indicator
2. One coloured line per region
3. Frequency histogram
4. Profiles – Highlight and Compare selected regions
5. Statistical filter operation using percentiles
6. Mean values

# Advanced Parallel Coordinate Plot

remove regions based on statistical methods

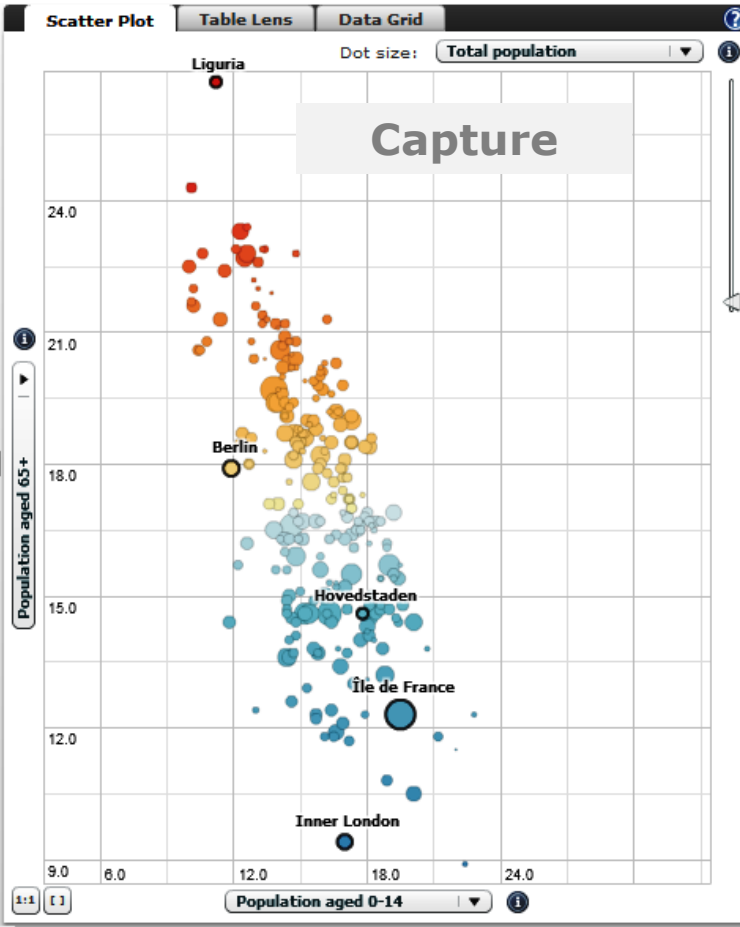
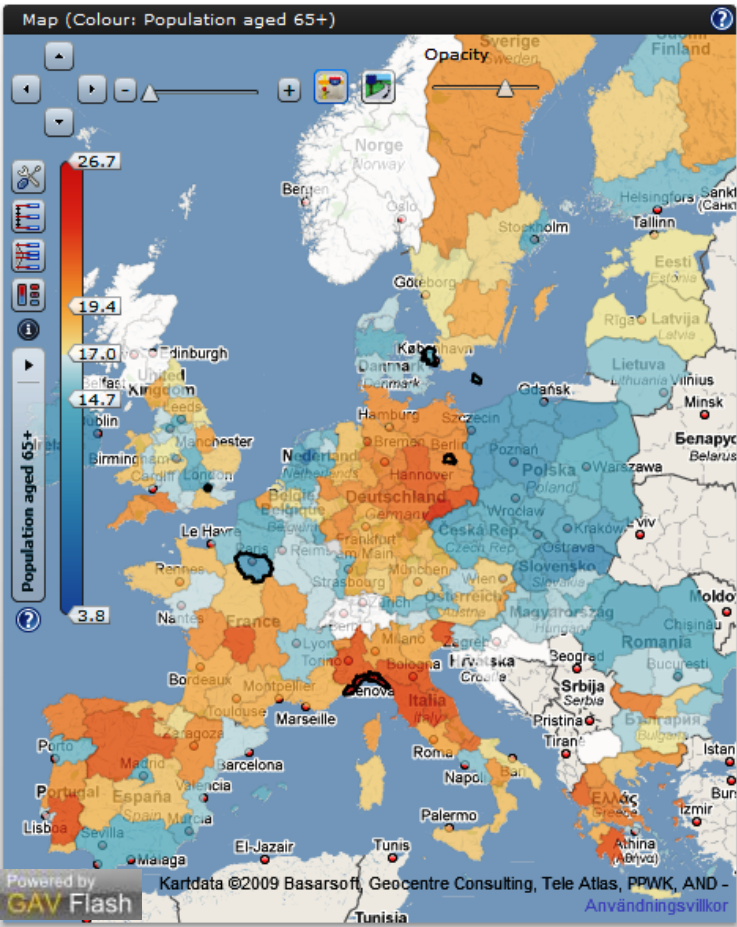
## DEMO





# Capture, Share and Communicate discovery and knowledge

The Story and its Chapters are saved to XML



Stories

Note: You have loaded an unofficial story.

Dashboard

- Elderly population growing in EC
- Younger generation animation
- NUTS3 time animation GDP per head
- EU NUTS3 Unemployment rate 1999...

Growing elderly population in Europe

Population 65+

Edit story

The elderly population (those aged 65 years and over), in European countries increased almost three times faster than total population between 1995 and 2007. In Italian regions Toscana and Liguria the elderly population was more than 25% of total population in 2007. On the other extreme, in Inner London the elderly population represented only 10% of the total population. In 2007, 35% of the elderly population lived in only 10% of European regions; thus regions face different economic and social challenges raised by an ageing population. In Germany the concentration of the elderly population is higher in the old East Germany

Storytelling

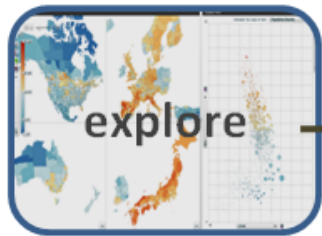
Create Remove Open Save As

## Collaboration through Stories

- ❑ Allows the analysts to capture single snapshots or “*Storytelling*” during the explorative process;
- ❑ A snapshot includes information about the visualization scenarios such as regions-of-interest, selected indicators, colour scale, filter conditions etc for all views;
- ❑ Highlighted regions of particular interest and meta text information guide other analysts to important discoveries and include Analytics Reasoning by Domain Experts;

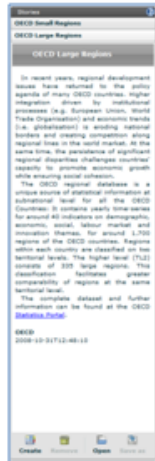
# Capture, Share and Communicate discovery and knowledge

Regions, Indicators, Trends, Outliers, etc



Discovery

Create Story

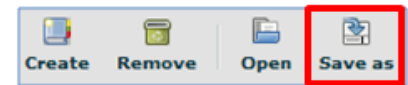
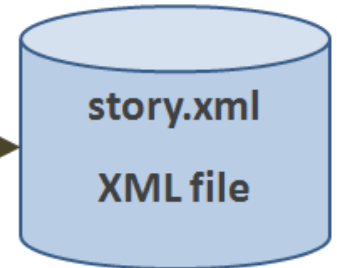


Story Editor  
Text, Reasoning



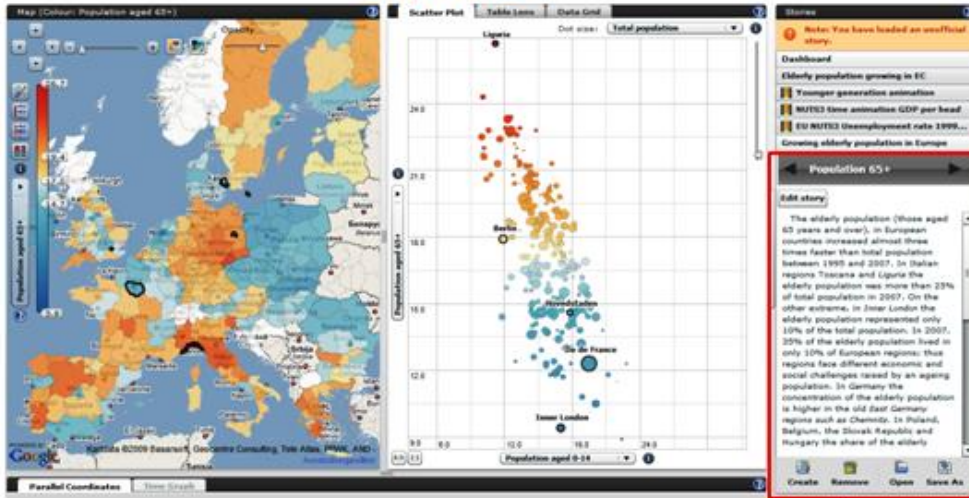
additional Chapter  
in the Story Editor

Save Story



# From Story in eXplorer to Wiki article

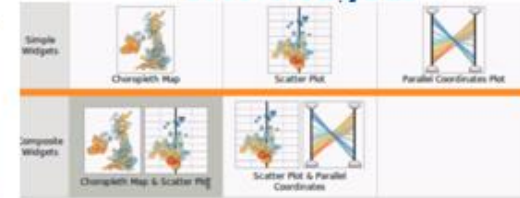
## eXplorer



Capture(s)



GAV Widgets



## Story Editor

The Story Editor interface includes the following fields and sections:

- Story Title:** EU - growing elderly population in Europe
- Author:** Name: Mikael Jern, Organisation: NCVA
- Chapters:** age group 65+ vs. C, Germany in Focus
- Chapter Title:** age group 65+ vs. 0-14
- Chapter Text:** The elderly population (those aged 65 years and over), in European countries increased almost three times faster than total population between 1995 and 2007. In Italian regions Toscana and Liguria the elderly population was more than 25% of total population in 2007. On the other extreme, in Inner London the elderly population represented only 10% of the total population. In 2007, 35% of the elderly population lived in only 10% of European regions; thus regions face different economic and social challenges raised by an ageing population. In Germany the concentration of the elderly population is higher in the old East Germany region such as Chemnitz.
- Buttons:** New, Reset, Capture, Close

## Wiki article

The Wiki article page titled "Example article" features a navigation bar, a search box, and a sidebar. The main content area displays a map of Europe and a scatter plot of population aged 65+. The text of the article is:

The elderly population (those aged 65 years and over), in European countries increased almost three times faster than total population between 1995 and 2007. In Italian regions Toscana and Liguria the elderly population was more than 25% of total population in 2007. On the other extreme, in Inner London the elderly population represented only 10% of the total population. In 2007, 35% of the elderly population lived in only 10% of European regions; thus regions face different economic and social challenges raised by an ageing population. In Germany the concentration of the elderly population is higher in the old East as Chemnitz. In Poland, Belgium, the Slovak Republic and Hungary the share of the elderly population seems to be higher where population is more generally in urban regions.

The elderly dependency rate - i.e. the ratio between the elderly population and the number of people of working age (15-64) - gives an indication between the economically active and retired populations. In 2007, the elderly dependency rate across European regions was on average higher in regions (London, Paris, Copenhagen); at the same time, only 24% of the elderly population lived in rural regions in 2007. As such, rural regions as the challenge of ageing due to higher elderly dependency rates and lower concentrations of the elderly and thus these regions may bear higher



# eXplorer Architecture

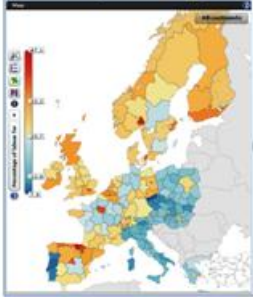
- ❑ Research methods from **Information and Geographical Visualization**
- ❑ Object-oriented **Component** toolkit;
- ❑ Optimized code in Adobe<sup>©</sup> **ActionScript** for Flash 10 and Flex 3;
- ❑ **Interactivity, Time Animation and Storytelling**;
- ❑ Mechanism for creating **dynamic Wiki articles** and **HTML** documents



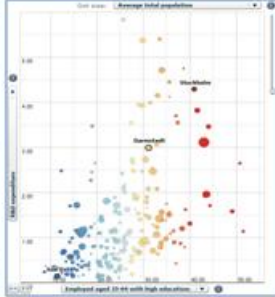


# eXplorer is built from GAV Flash components

Choropleth Map



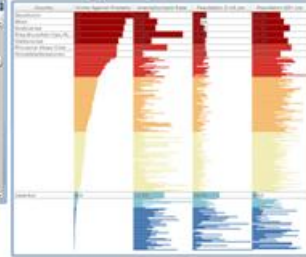
Scatter Plot



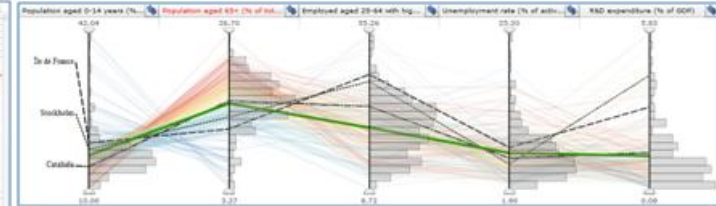
Data Grid

Region	Country	Population	High Education	High Education (%)	High Education (%)	High Education (%)	High Education (%)	High Education (%)	High Education (%)
Stockholm	Sweden	2,342,000	18.5	18.5	18.5	18.5	18.5	18.5	18.5
Stockholm	Sweden	2,342,000	18.5	18.5	18.5	18.5	18.5	18.5	18.5
Stockholm	Sweden	2,342,000	18.5	18.5	18.5	18.5	18.5	18.5	18.5
Stockholm	Sweden	2,342,000	18.5	18.5	18.5	18.5	18.5	18.5	18.5
Stockholm	Sweden	2,342,000	18.5	18.5	18.5	18.5	18.5	18.5	18.5

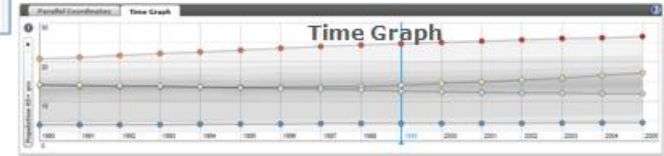
Histogram/Table Lens



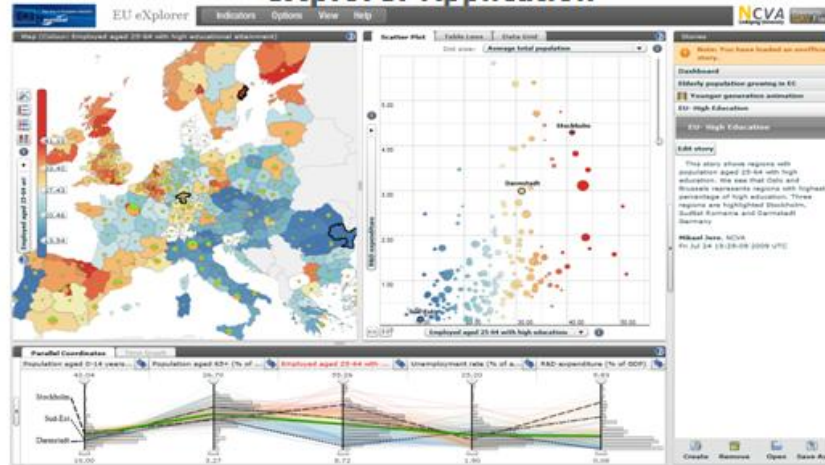
Parallel Coordinates



Time Graph



## eXplorer Application



Pie Graphs in Map Layer



Colour Legend



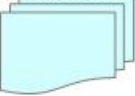
Animation Manager



Data Providers



Storyteller Manager



Visibility Manager

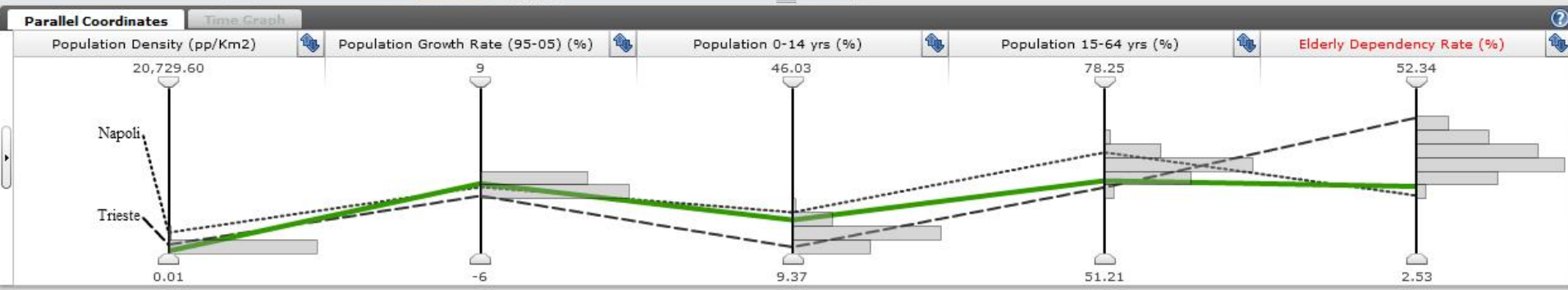
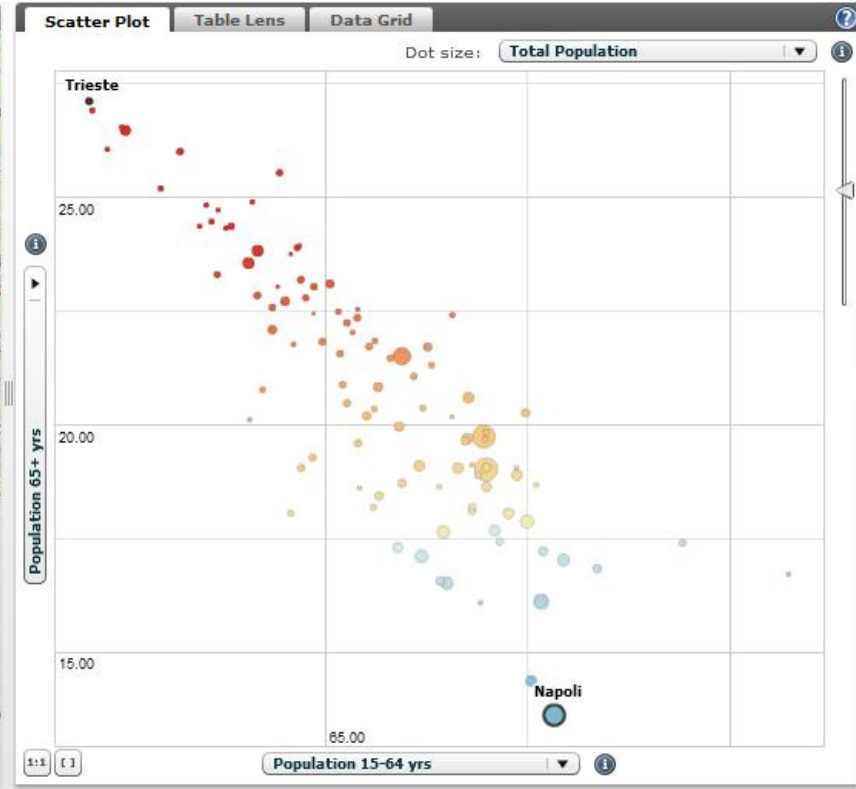
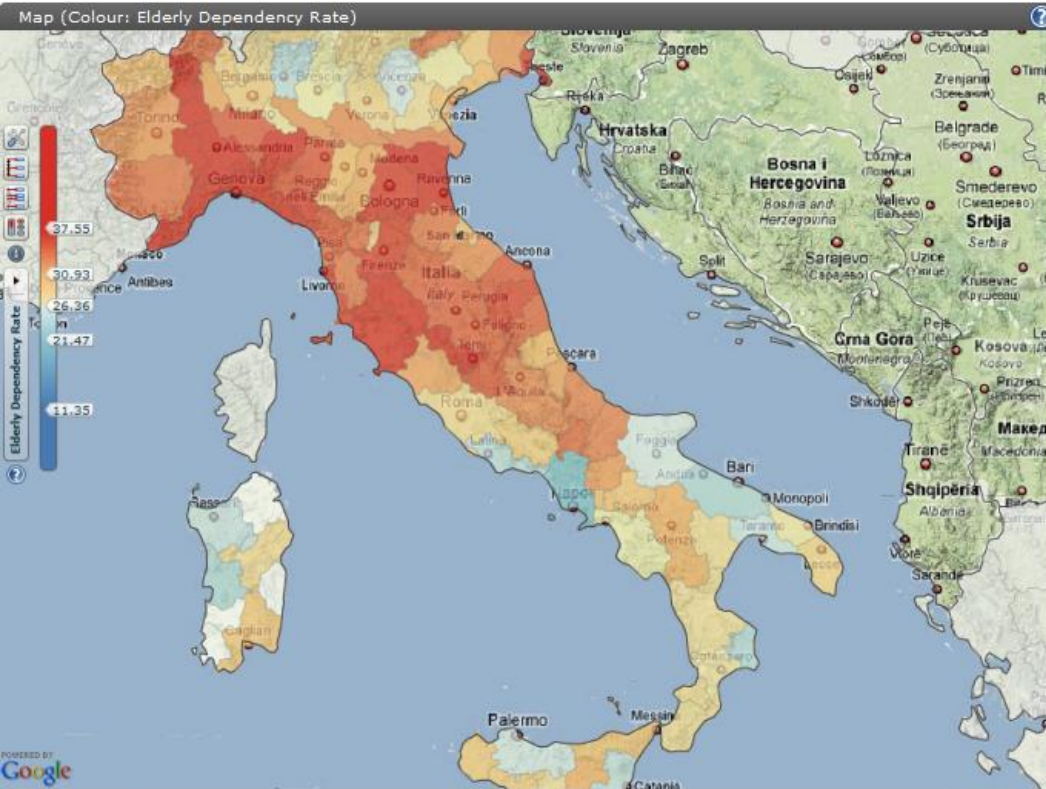


Data Cube



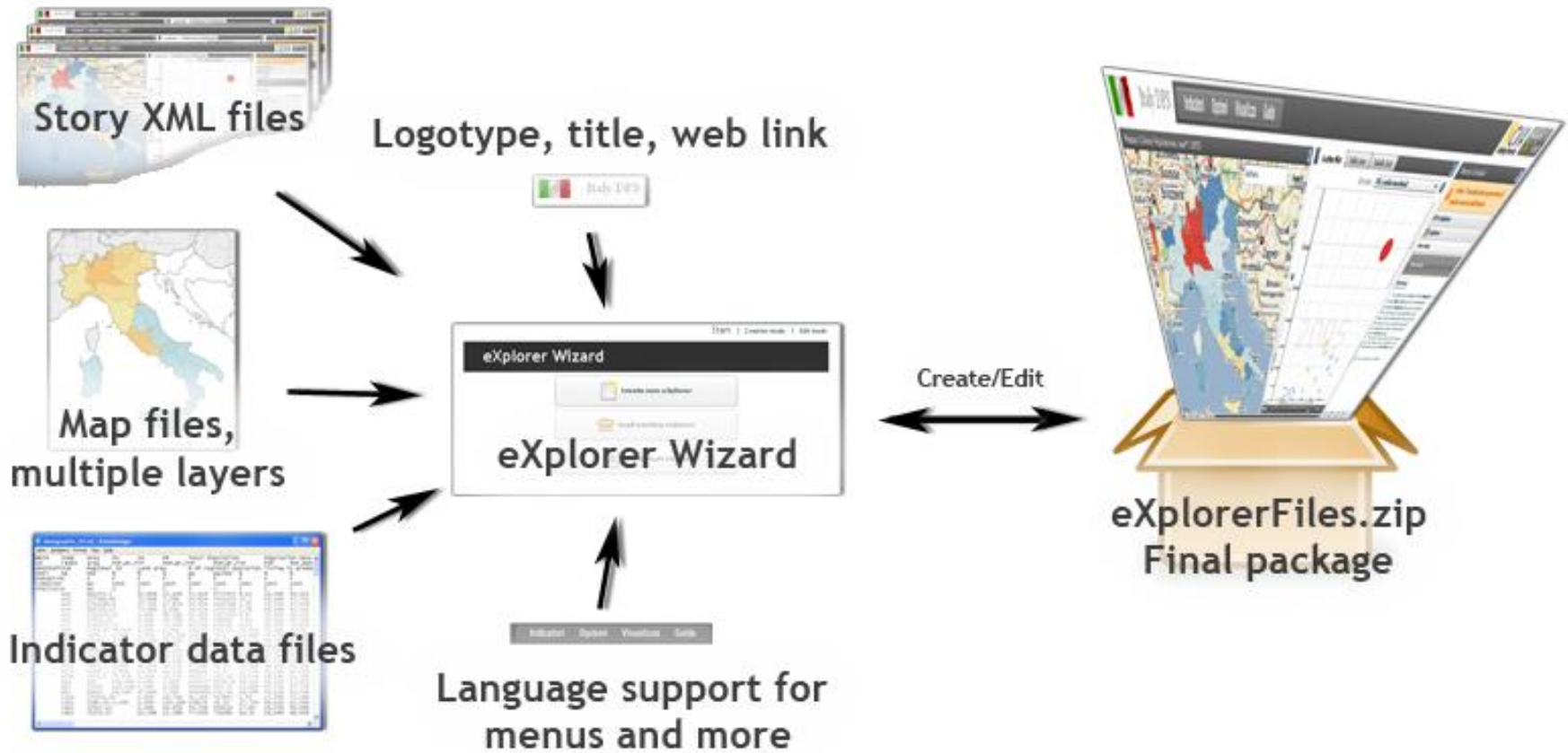
# Select Italy only for TL3 regions

How is my region achieving over time and in comparison with other similar regions?



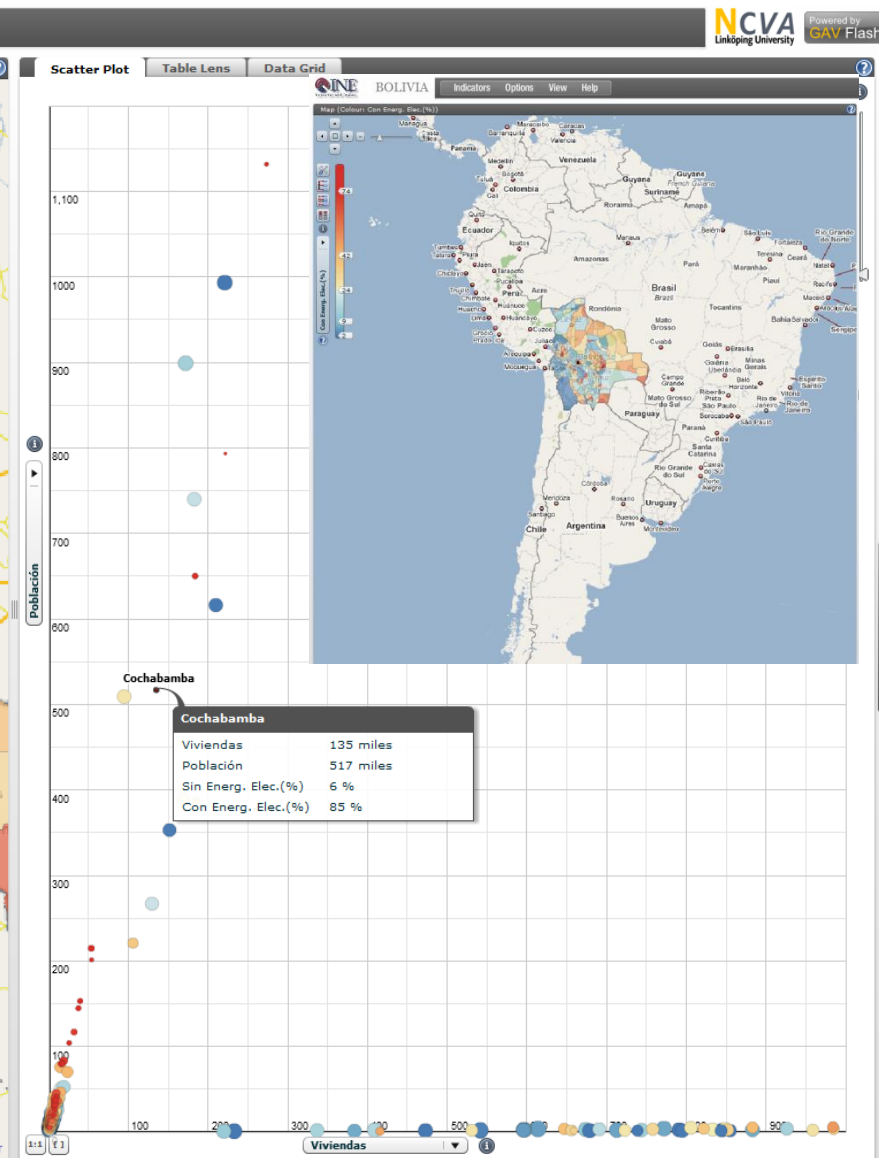
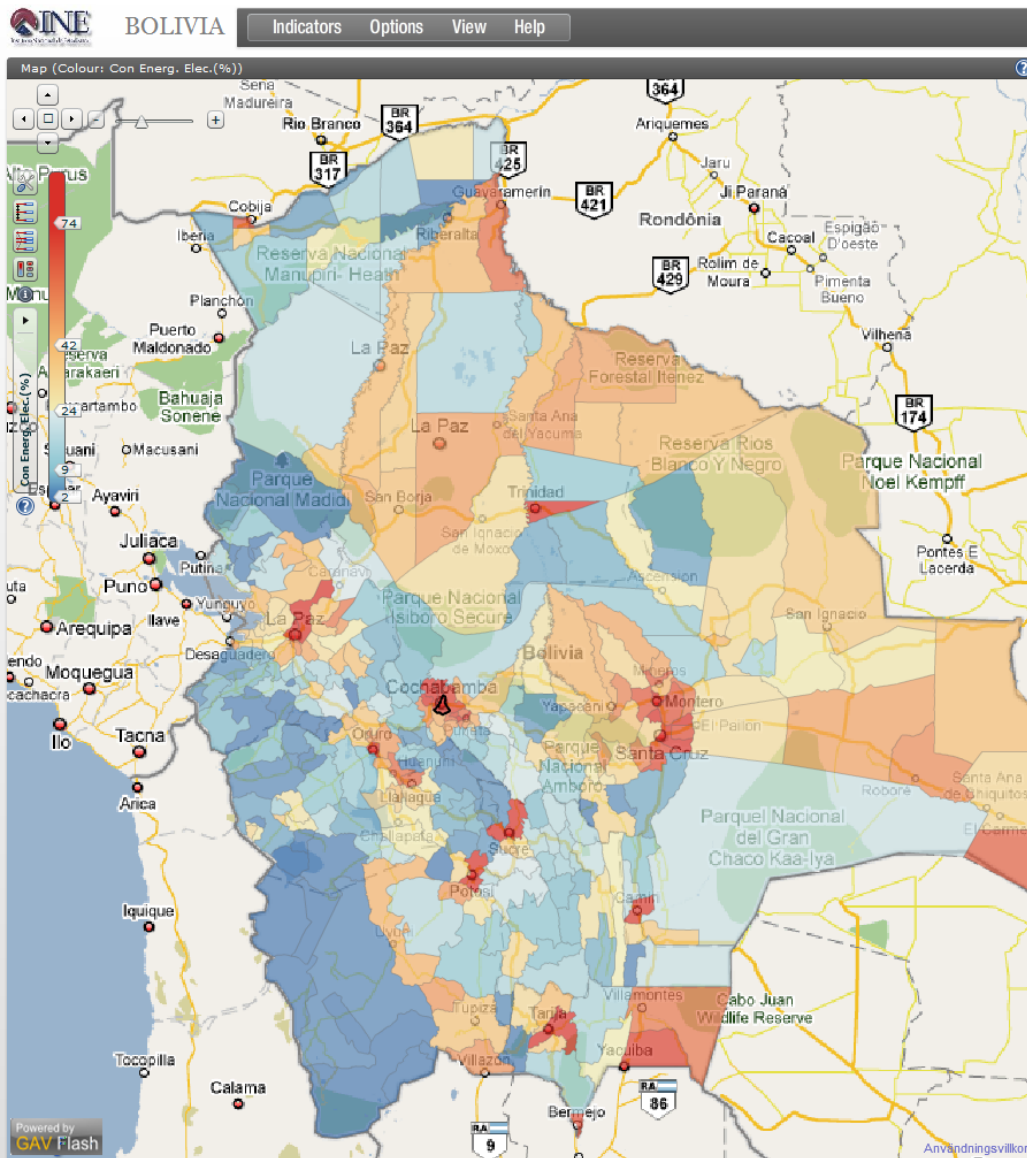
# Open eXplorer and the Wizard

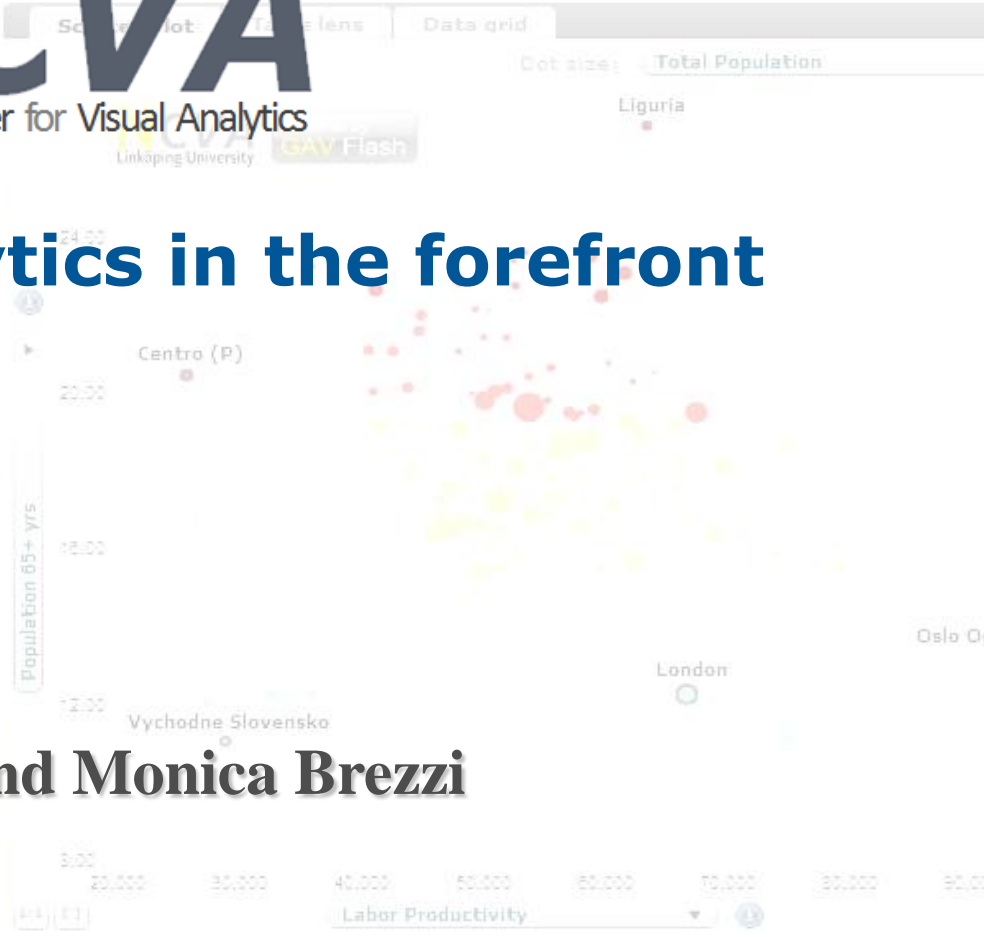
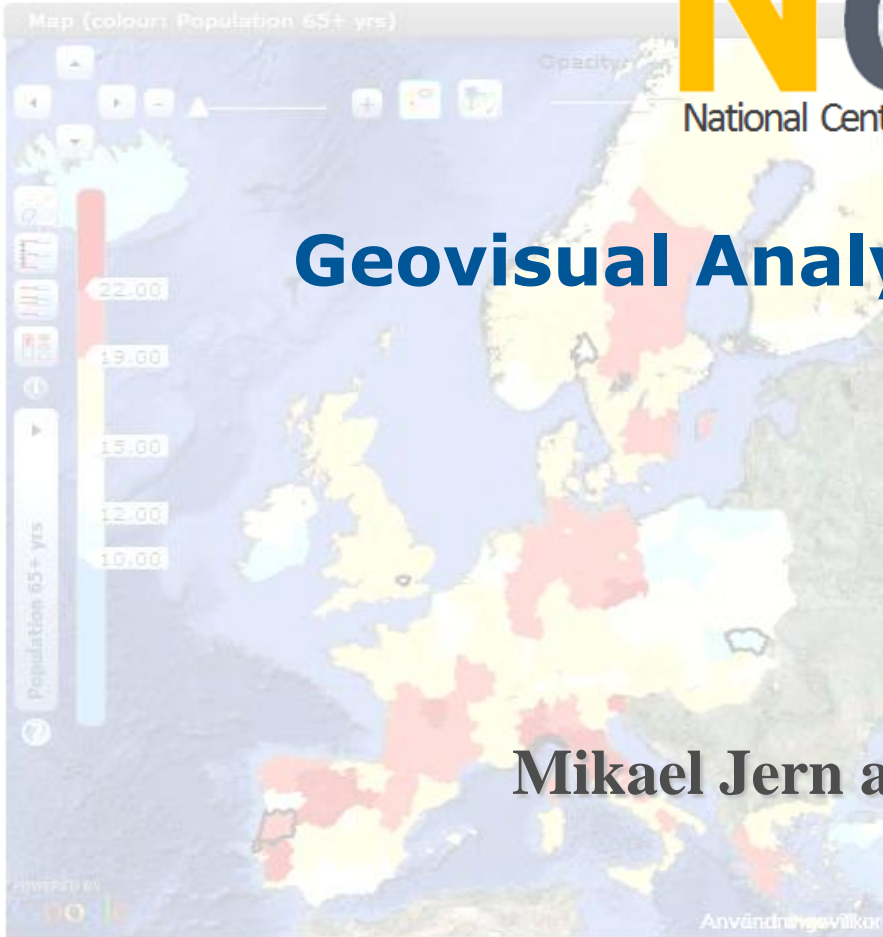
## Customize your own eXplorer Application





# Open eXplorer used in Bolivia





## Geovisual Analytics in the forefront

Mikael Jern and Monica Brezzi



# Questions?

<http://ncva.itn.liu.se>