

Territorial fiche

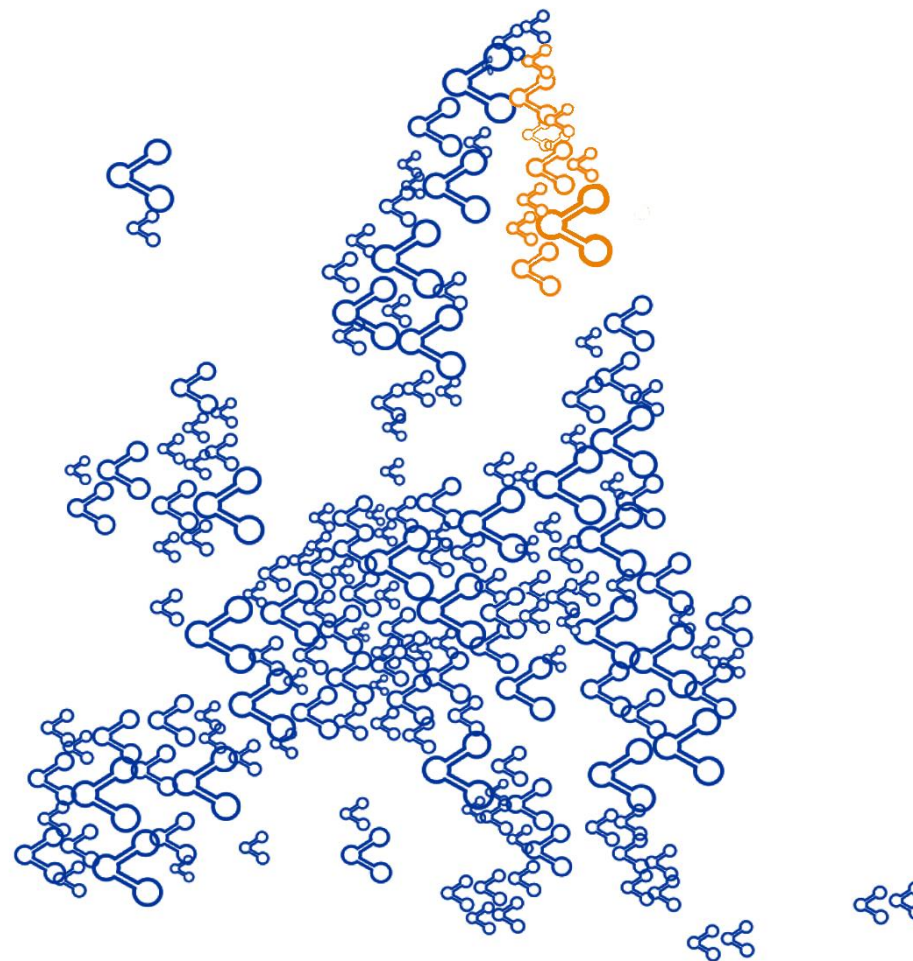
# Territorial patterns and relations in Finland

Climate change and sustainable use of resources

Physical and digital accessibility

Economy and innovations

Urbanisation



## **Introductory remarks**

The content of the following overview is a summary of research results from different thematic applied research projects under the ESPON 2020 programme. As a consequence, most indicators and analyses are not based on most recent data but represent the data availability at the time when the research was undertaken. Only in a few cases, for some rather basic indicators that could easily be reproduced, more up-to-date information was used.

It is therefore important to note that this overview is mainly a collection of available findings with different time stamps and not an up-to-date, comprehensive analysis. Its main goal is to showcase the wide range of ESPON research and, by zooming-in on a specific country, to raise interest for the scientific results at a more national and even regional scale.



## Climate change and sustainable use of resources

Aggregate impact of Climate Change

Overall adaptive capacity to Climate Change

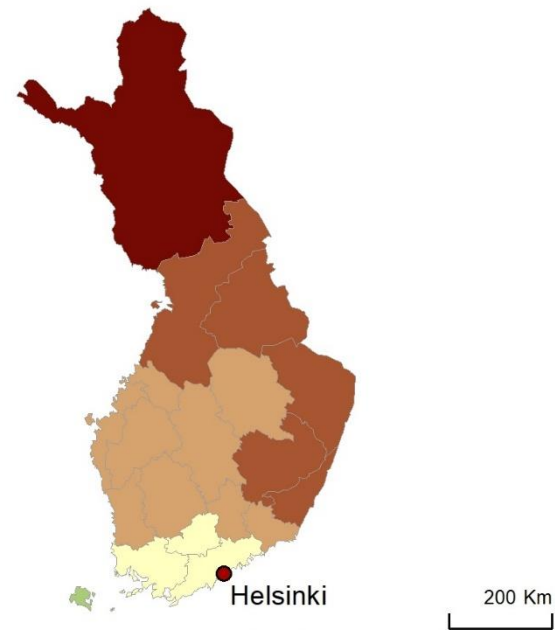
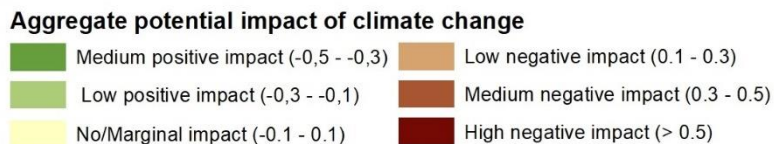
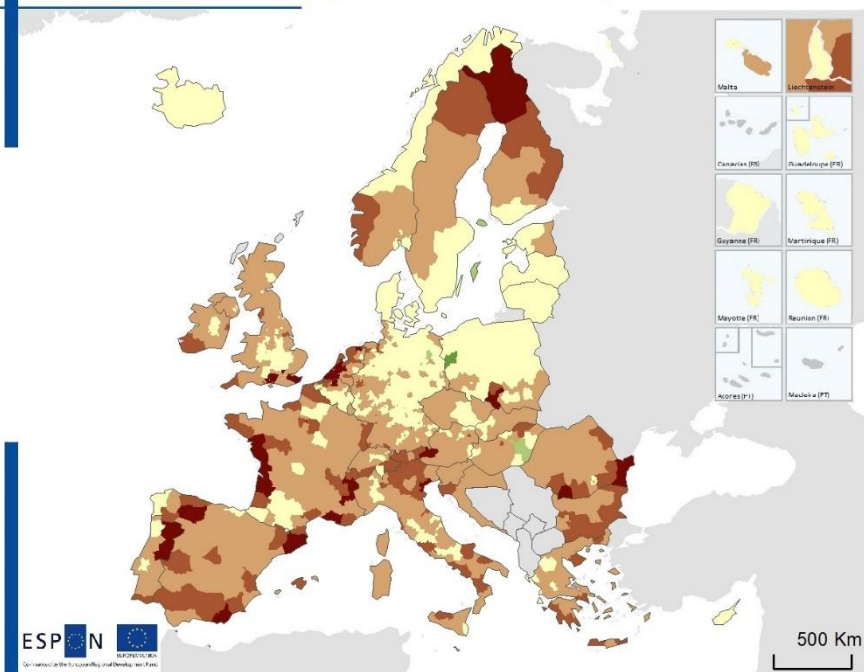
Circular economy

Climate Change environmental impact

Climate Change economic impact

Northern and eastern regions of Finland are among those in Europe where potential environmental impacts due to climate change are expected to increase the most. The potential aggregate impact of climate change is predicted to become more pronounced in the northern part of Finland. Northern Finland is expected to become especially exposed to river flooding. Finland is, however, estimated to have high adaptive capacity similar to other Nordic countries. Within Finland there are considerable differences foreseen in the economic impacts of climate change. The southern parts of the country are generally expected to see more positive economic impacts.

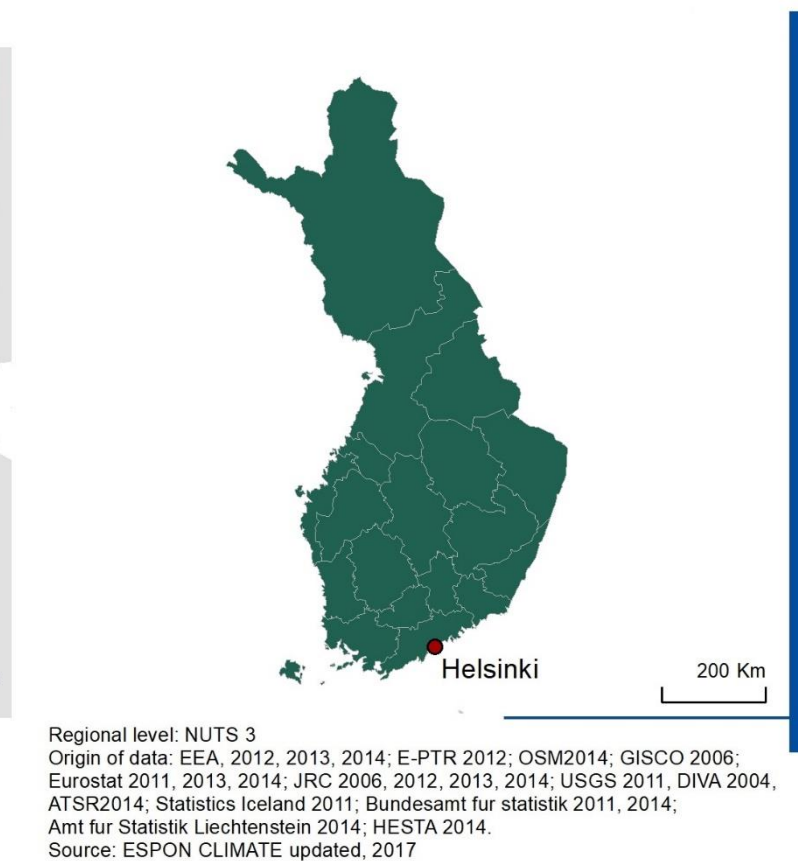
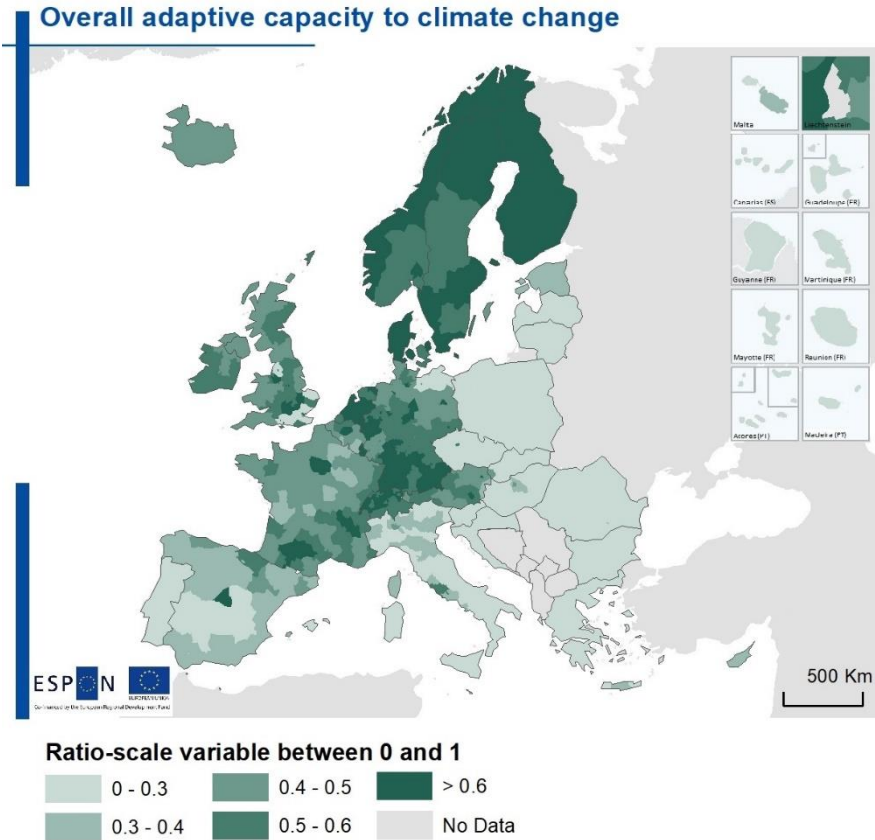
Aggregate potential impact of climate change from 2071 to 2100



Regional level: NUTS 3  
 Origin of data: EEA, 2012, 2013, 2014; E-PTR 2012; OSM2014; GISCO 2006; Eurostat 2011, 2013, 2014; JRC 2006, 2012, 2013, 2014; USGS 2011, DIVA 2004, ATSR2014; Statistics Iceland 2011; Bundesamt für Statistik 2011, 2014; Amt für Statistik Liechtenstein 2014; HESTA 2014.  
 Source: ESPON CLIMATE updated, 2015

ESPON CLIMATE developed a vulnerability assessment methodology for climate change and applied it to NUTS 3 regions in order to create an evidence base for responses to climate change. South and southeast Europe as well as north Scandinavia and Finland were projected to experience the highest temperature changes of more than 3.5°C. Among the reasons for high impact in the area are flood-prone infrastructures and sensitivity of the environment.

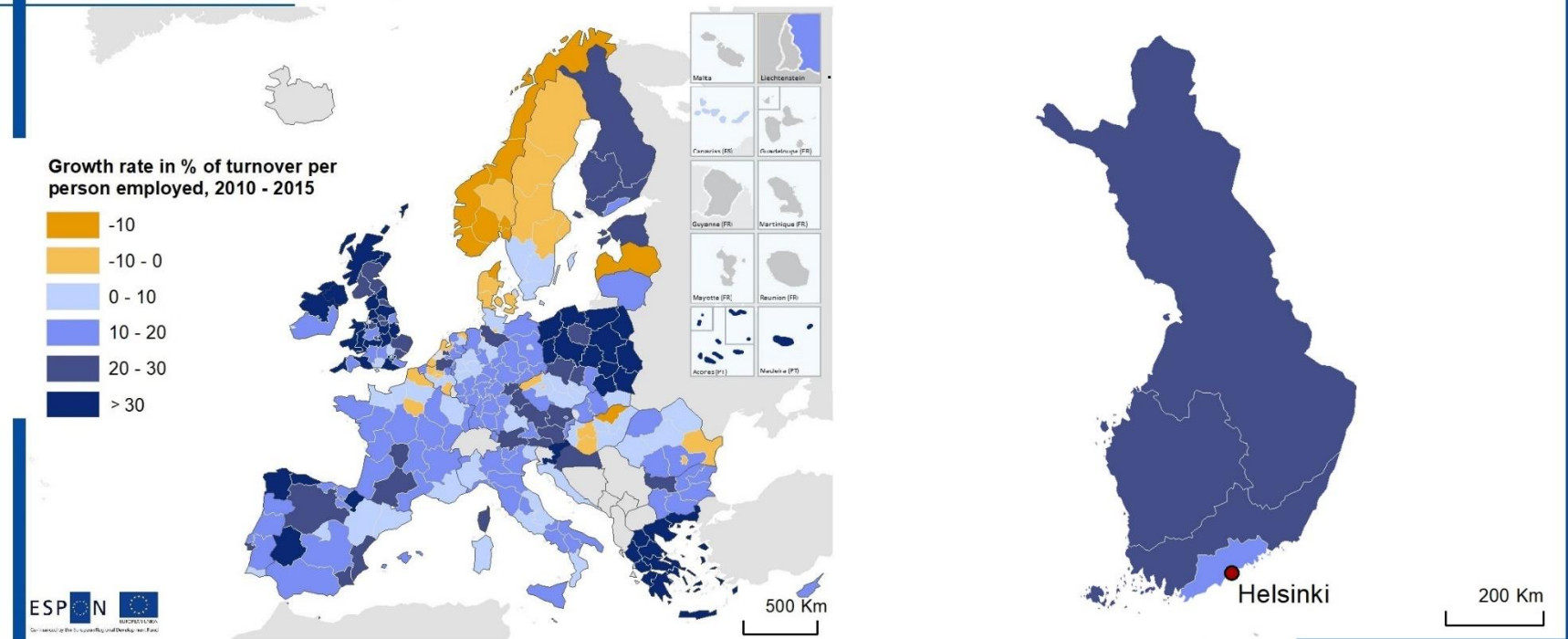
The potential aggregate impact of climate change is predicted to become more pronounced in the northern part of Finland. Finland is among the European countries where annual mean temperature is expected to have a relatively large increase, or by 3.6-4°C according to ESPON CLIMATE. Other changes where impacts in Finland are pronounced is a decrease in annual number of days with snow cover and an increase in precipitation during the summer months. Northern Finland is expected to become especially exposed to river flooding.



The map shows an index for adaptive capacity to climate change based on the findings from the ESPON CLIMATE project. The project applied it to NUTS 3 regions in order to create an evidence base for responses to climate change. The map shows an index for adaptive capacity to climate change. The capacity is calculated as a weighted combination of economic, infrastructural, technological, knowledge, awareness and institutional capacity. The Nordic countries appear to have the most adaptive capacity.

According to ESPON CLIMATE, high adaptive capacity in sparsely populated areas such as the Nordic countries, including Finland, relates to the fact that impact of climate change on such regions is less relevant in economic and social terms than it is on other regions, since fewer people and assets are potentially affected in absolute terms. The study also indicated that many metropolitan regions have a low or even marginal vulnerability, because their adaptive capacity is generally higher than non-metropolitan regions. This is an interesting find and may explain high score for the Helsinki area.

### Turnover growth of material providers

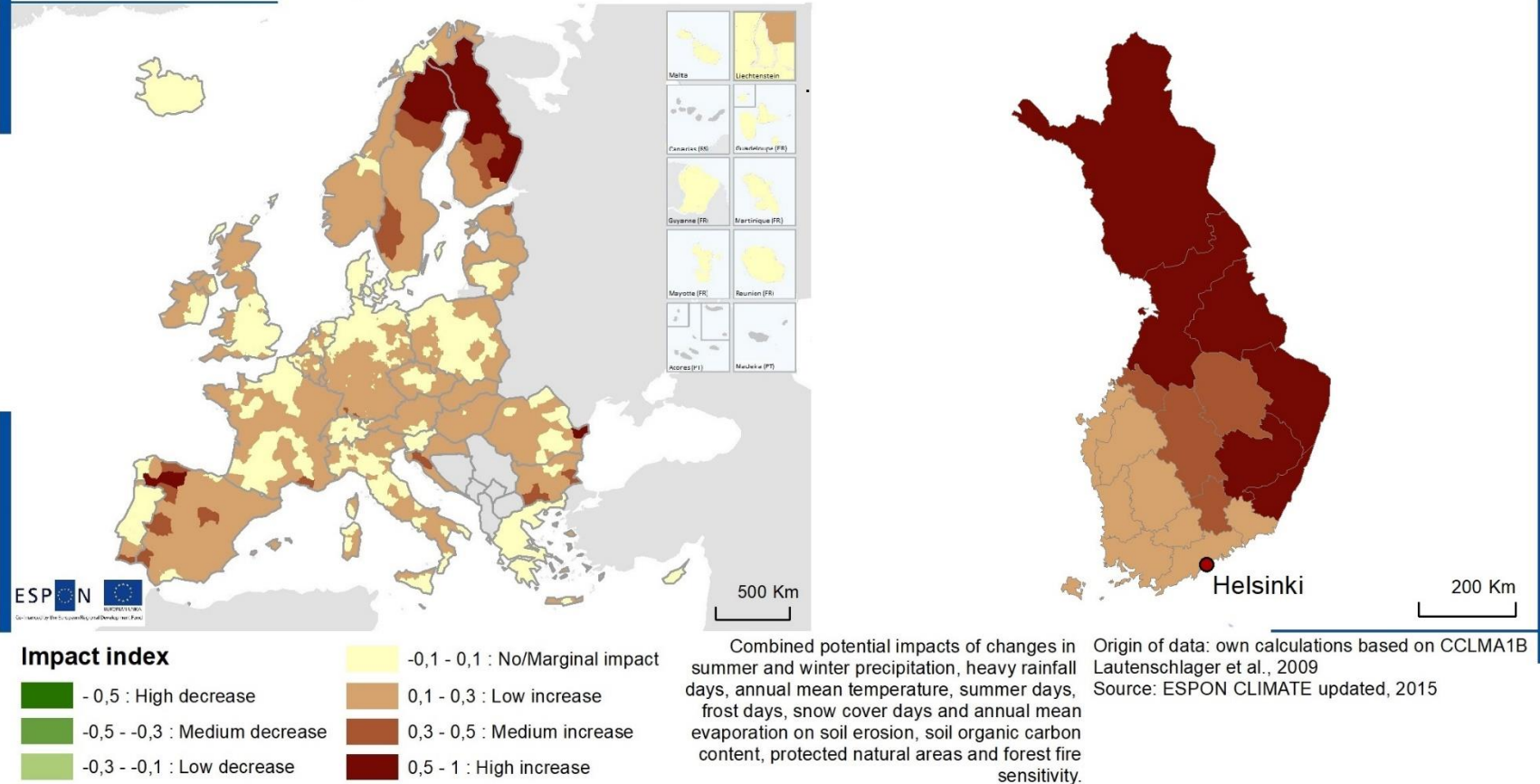



Circular Material Providers in circular economy represent mainly the biological cycles but also those essential services that reintroduce wastes as resource into existing value chains. They provide materials comprised of renewable and recycled materials.


The ESPON CIRCTER project focused on conditions to improve the circular economy needed to replace the linear economy in order to reduce the impact of anthropic activities on global ecosystems. A circular economy significantly reduces material throughputs and increases material efficiency over the long run. The map shows material providers which represent mainly the biological cycles but also those essential services that reintroduce waste as a resource into existing value chains. Finland is among the regions in Europe where most growth is expected.

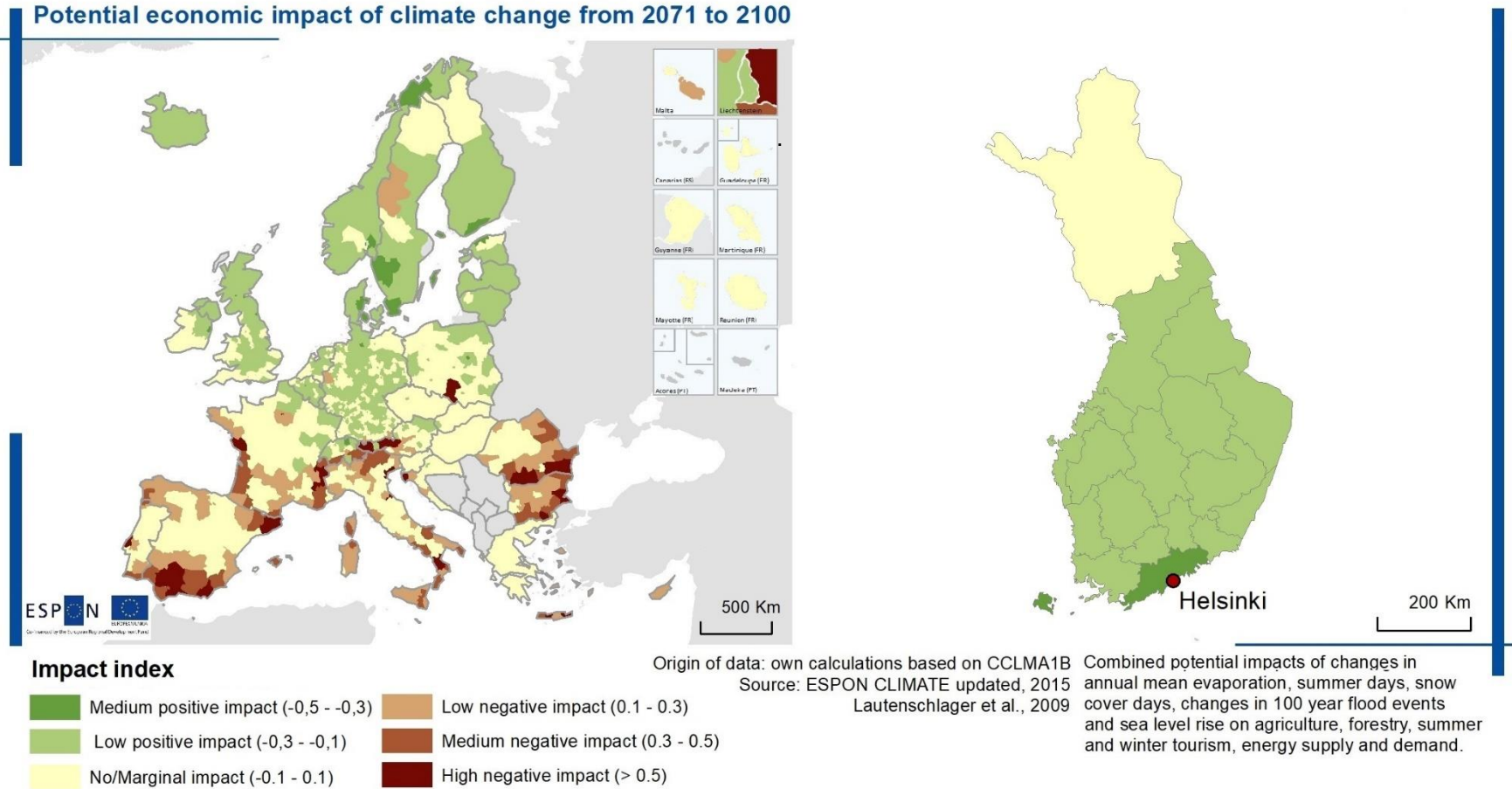
Material Providers are, relative to the total economy, more prevalent in rural regions. According to the CIRCTER project, the high growth rate in Northern Europe, including Finland, highlights the important role of sustainable agricultural and forestry activities in the European peripheral regions which stand out for their large areas covered in forests. In 2015, Northern and Eastern Finland were among the top five regions in Europe with the highest circular economy material providers share in total economy by sectors.

Potential environmental impact of climate change from 2071 to 2100



 This map from the ESPON CLIMATE project shows that climate change is expected to have the highest negative environmental impacts in the southern and northern parts of Europe. In the Mediterranean, drier and hotter climates increase the likelihood of forest fires. Soils in river deltas or along coasts seem to also be negatively impacted by climate change. The severe impacts in northern Scandinavia are due in part to large protected areas where climate change is expected to negatively affect large ecosystems under protection.

 Northern and eastern regions of Finland are among those in Europe where potential environmental impacts due to climate change are expected to increase the most. The ESPON CLIMATE project explains the severe impacts in these regions as being due to the presence very large protected areas where any climatic change (in this case a warmer and wetter climate) is considered as being very negative for these protected ecosystems.



According to the ESPON CLIMATE project, economic impacts of climate change are expected to have a clear north-south gradient. Many large economies such as Germany, Poland and Scandinavia may expect a positive economic impact. The main reason for the gradient is the economic dependency of large parts of Southern Europe on (summer) tourism but also on agriculture. Both are projected to be negatively impacted due to the increase in temperature and decrease in precipitation while the environmental conditions for agriculture in North-Eastern Europe tend to improve with higher temperatures. Moreover, energy demands come into play through the increased need for cooling in Southern Europe.

Within Finland there are considerable differences foreseen in economic impacts within the country. The southern parts are generally expected to see more positive economic impacts. Among the changes expected to take place due to climate change in Finland, there are an increase in summer tourism, precipitation, forest growth, crop yields, hydropower potential, but also heavy precipitation events, risk of forest pests and damage from winter storms. Decrease is expected in snow, lake and river ice coverage and energy demand for heating is expected to decrease. Regions will be differently economically impacted by these changes (e.g. depending on the local importance of the respective issue).





## **Physical and digital accessibility**

Global accessibility

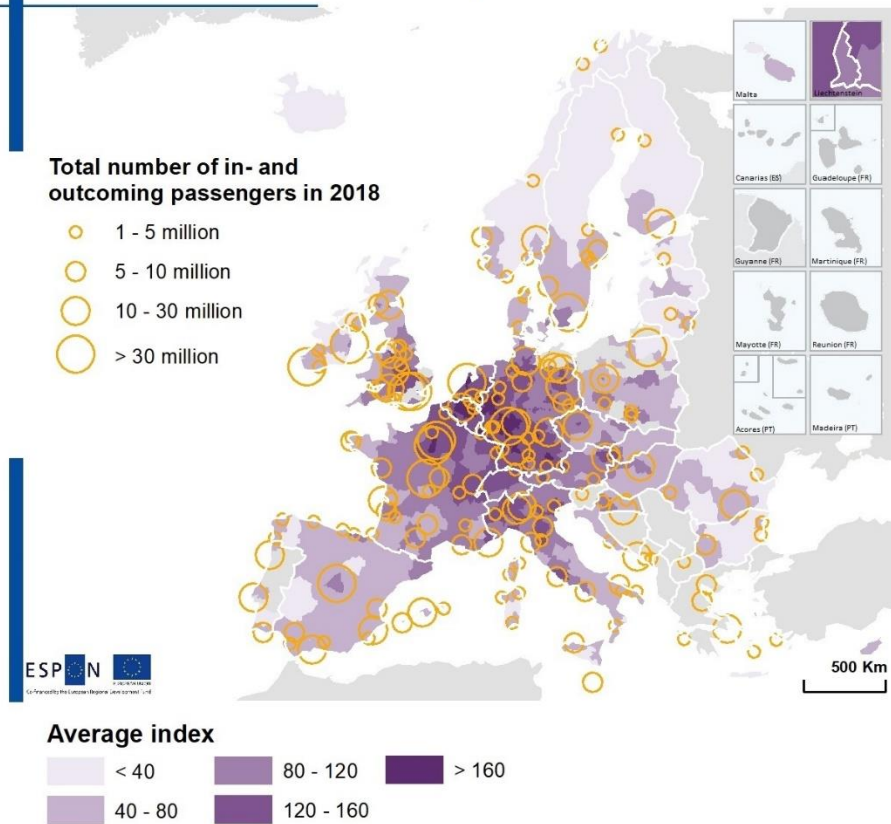
Accessibility by road

Accessibility by rail

**Broadband access and high-speed internet**


Global accessibility is calculated as being best in the capital region of Helsinki as well as in its adjacent regions to the West and North as well as in Åland. This pattern is similar to that of Sweden and Norway where accessibility by road and rail is highest in the capital region where the road network is best and densest. The accessibility gradually becomes lower towards northern Finland. Finland is, along with other Nordic countries, among the countries in Europe where people have the best access to high speed internet. More than 90% of households in the capital region and 85-90% households in the remainder of the country had broadband access in 2017.


### Global accessibility and main airports



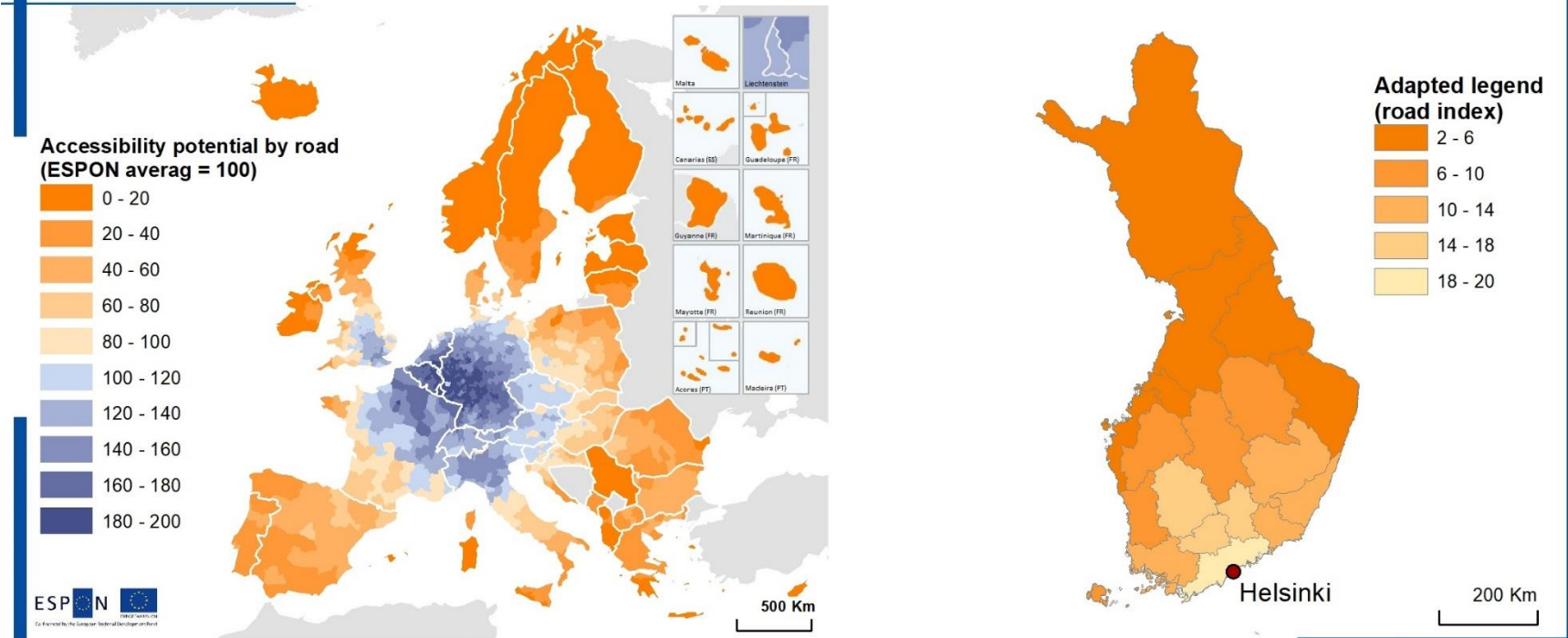
Number of passengers: Level: Airports  
Source: Eurostat, 2020

Accessibility index: The index is calculated as the average index from the Spiekermann & Wegener study (2014) combining the accessibility by road, rail and air.  
Source: ESPON S1W, 2014 | Level: NUTS 3

 ESPON has, in several projects, mapped accessibility which is a key theme in polycentric development. The map above shows an example of calculated accessibility and number of incoming and outgoing passengers in the ESPON area. The accessibility index assumes that the attraction of a destination increases with size and declines with distance, travel time or cost. Destination size is represented by population. Thus, potential accessibility to population is seen as an indicator for the size of market areas for suppliers of goods and services. Not surprisingly, accessibility indicators are highest in the core of Europe and gradually become lower towards its edges.

 In Finland the global accessibility is, not surprisingly, calculated as being highest in the capital region of Helsinki, its adjacent regions to the west and north, as well as in Åland. The pattern is actually very similar to that of Sweden and Norway where the accessibility is highest in the southern parts of the countries and in regions close to the capital.

**Accessibility potential by road in 2030**



Regional level: NUTS 3 \* For each NUTS-3 region the population in all destination regions is weighted by the travel time to go there. The weighted population is summed up to the indicator value for the accessibility potential of the origin region. All indicator values are expressed as index, i.e. related to the ESPON average.  
 Source: ESPON ACC SCEN, 2017  
 Origin of the data: S&W Accessibility Model 2016; RRG GIS Database, 2014. Calculations for the accessibility potential rely on an expected and realistic timetable for the development of the TEN-T.

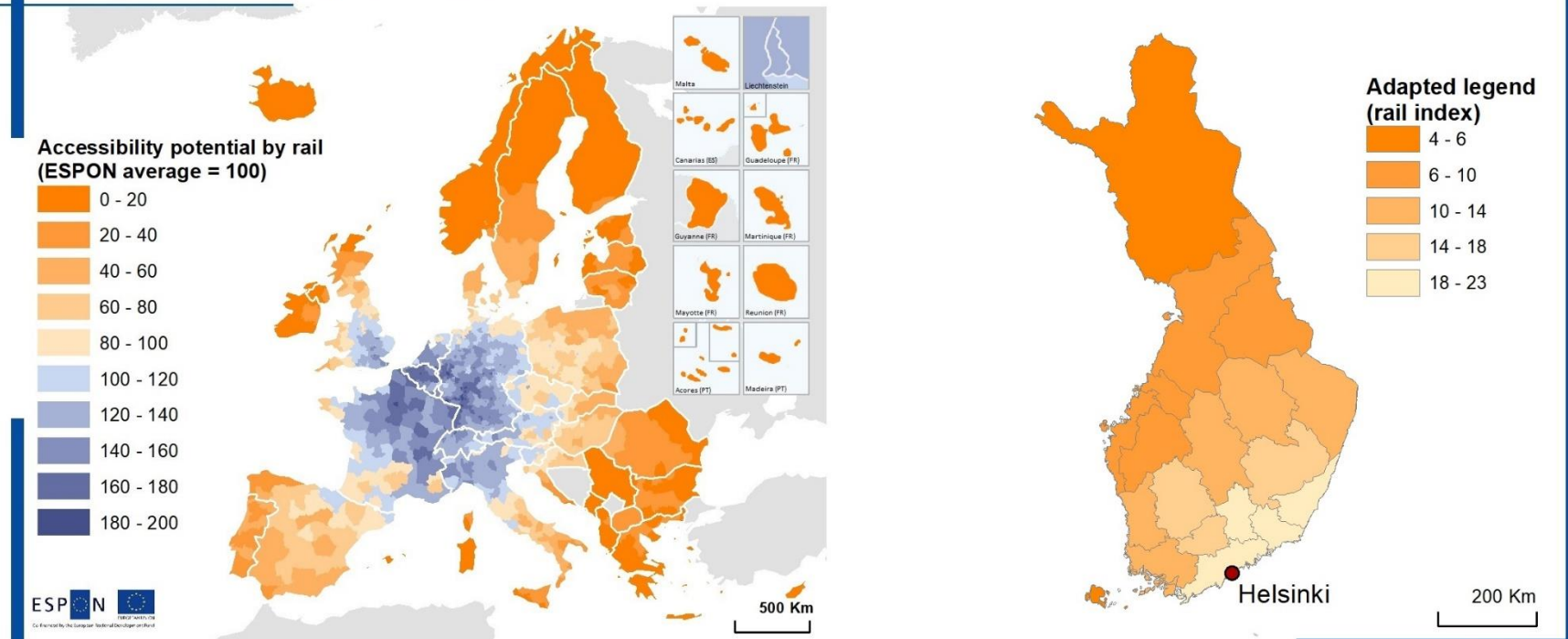


Accessibility by road is a key issue in the regional development and interconnectedness, especially on shorter and medium distances. Accessibility plays an important role when regarding issues such as commuting to work and accessibility of goods and services. The map above shows an example of calculated accessibility across the ESPON space and it is very interesting to observe how this type of accessibility decreases with distance from the economic and geographical centre of the continent.



Within Finland we can see similar pattern as in Europe in general, but on a smaller scale. Accessibility by road is highest in the capital region of Helsinki where the road network is densest and has the best quality. Gradually the accessibility index becomes lower towards northern Finland, and away from the capital region. Similar patterns can be observed in Sweden, Denmark and England.

### Accessibility potential by rail in 2030



\* Accessibility potential is also presented for regions that at the moment don't have railways, but have plans on developing this kind of infrastructure. Calculations for the accessibility potential rely on an expected and realistic timetable for the development of the TEN-T.

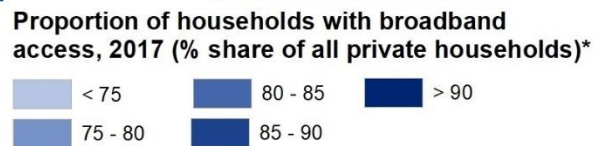
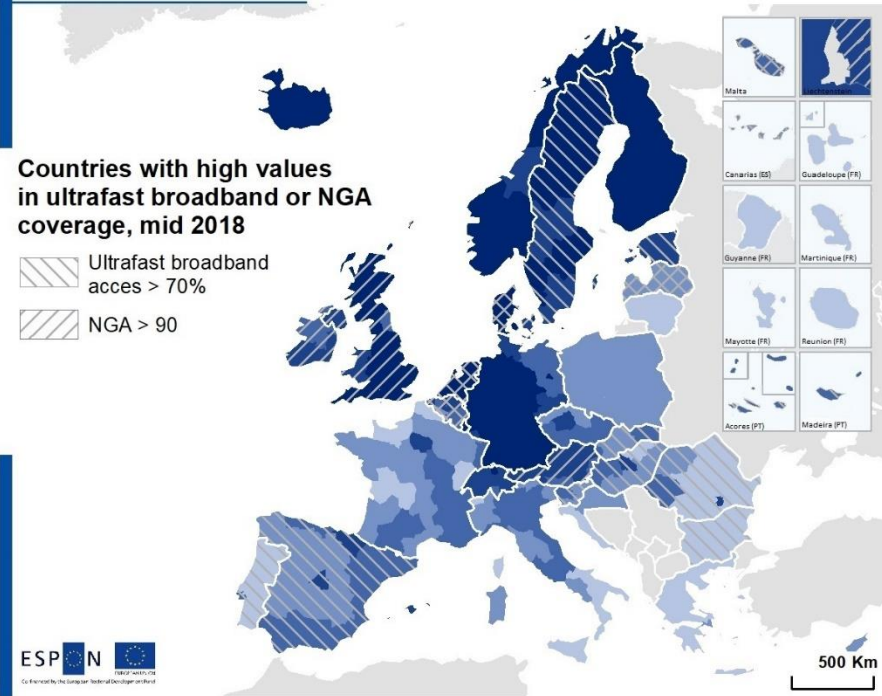


Accessibility by rail has also been studied by ESPON. On the European level this type of accessibility has very similar characteristics as accessibility by road. There are striking differences between the core regions where the accessibility is best and towards the periphery of the ESPON space where it decreases. This decrease is to the extent that no railroads exist in some areas of the periphery, such as in the case of Iceland, even if this does not directly show on the map.

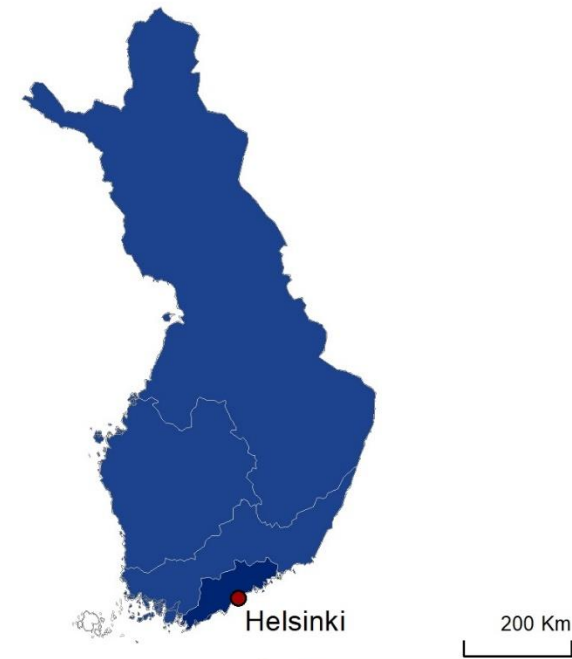


In Finland, the accessibility by rail can be seen to get gradually lower towards the northern part of the country in a NUTS 3 classification. The accessibility index is highest in the capital region but gradually shows a lower score as distance from the region increases. The picture is quite clear and there are no notable exceptions from the main picture at the European level.

**Broadband access in households and high speed internet coverage**



Regional level: NUTS 2 / 1 / 0  
 Source: ESPON SOET (2019)  
 Origin of the data: Eurostat, DESI index, 2019



\* The availability of broadband is measured by the percentage of households that are connectable and thus refers to coverage.

According to the project State of the European Territory (ESPON SOET), the core of Europe, south-western France, the Nordic states and UK show highest values of computer use and households with basic broadband access. Most regions have over 75% of households with ultra-fast broadband access. The study found gaps of digital connectivity between urban and rural areas. The scale of the map does not portray this, but it shows that the sparsely populated Nordic countries have among the highest rates of broadband access.

As is the case with the other Nordic countries, Finland is among the European countries where people have the best access to high speed internet. More than 90% of households in the Helsinki capital region and 85-90% households in the remainder of the country had broadband access in 2017. Data for Åland is missing from the map.



## **Economy and innovation**

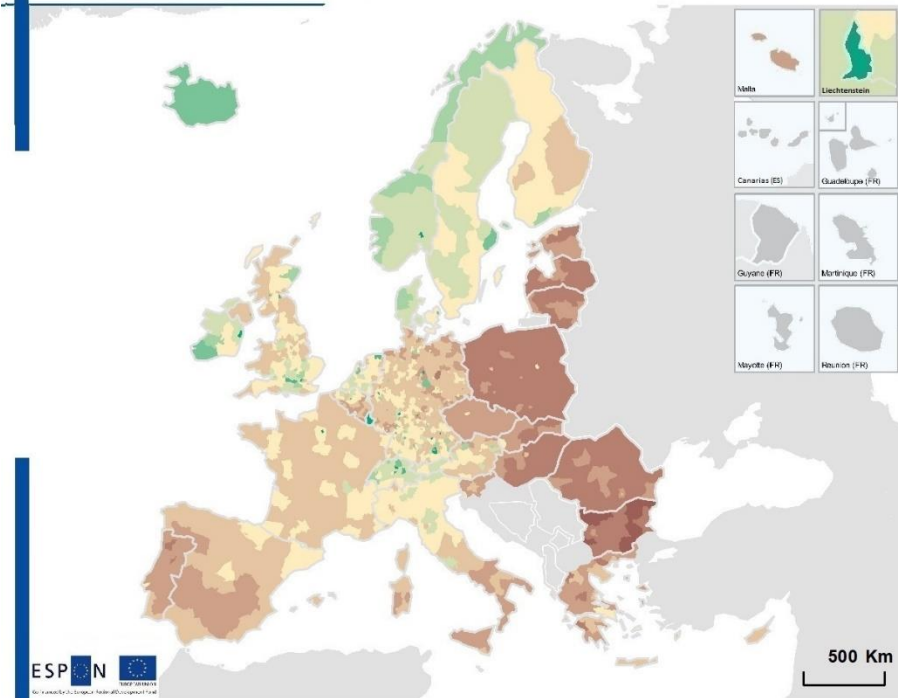
Potential GDP per capita 2030

Extra FDI inflows

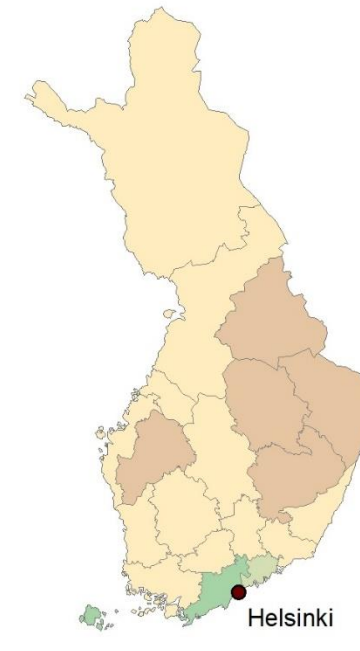
Knowledge economy

There are considerable regional differences foreseen within Finland as regards development of GDP per capita until 2030. The capital region and Åland are expected to experience an increase in GDP. South Ostrobothnia and regions in the central-eastern part of the country are, however, expected show a negative development in GDP per capita. Foreign direct investment (FDI) in Finland has the highest concentration in the south around Helsinki. There is also an interesting concentration of FDI in Lapland. To a lesser degree, Eastern Finland also seems to be a destination for FDI. Finland is among the countries with the highest scores on the Regional Innovation Scoreboard and the highest performance is observed in the capital region. The Helsinki area is among the regions in Europe which have the most competitive knowledge-based economy.

**Regional GDP change compared to EU average (baseline 2030)**



**Change in GDP per capita in 2030 (%)**



Regional level: NUTS 3  
Source: ESPON ET2050 (2015)

The potential GDP per capita in 2030 is calculated in % compared to the EU forecasted average (= 100) according to the baseline scenario. This scenario assumes that current trends and policies will remain in the future.

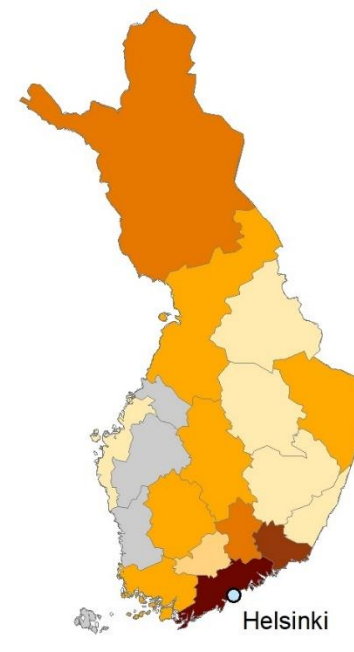
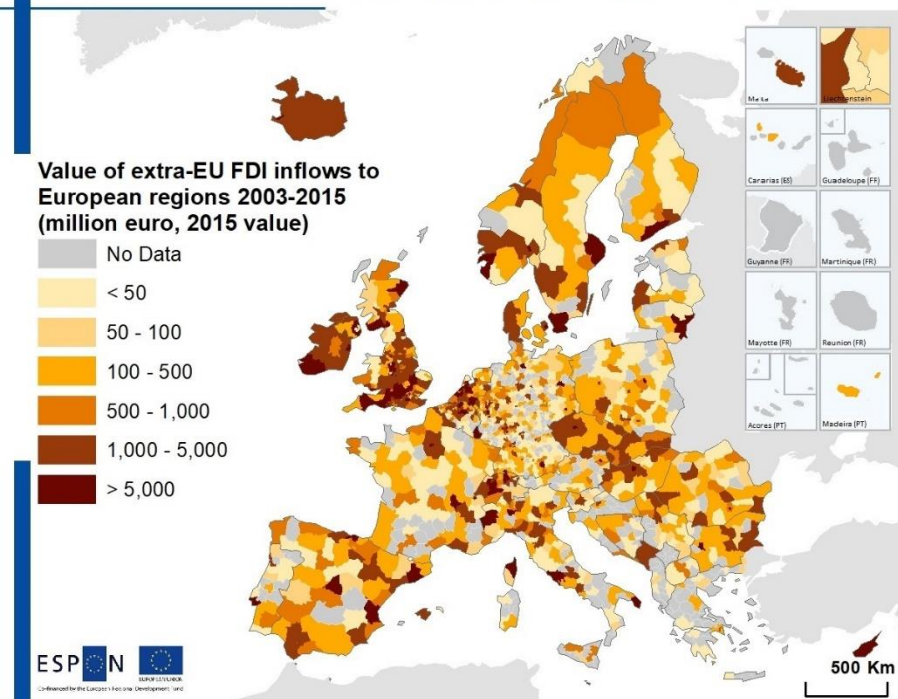


The ESPON ET 2050 project shows substantial regional differences in the outlook for GDP until 2030. According to the project, current imbalances are expected to continue and a considerable divide between north, south and east is expected in 2030. Furthermore, increased differences between regions within countries are foreseen. The map shows only the change in, but not absolute level of, GDP and thus present values may increase even more.



Within Finland, there are considerable regional differences foreseen as regards to change in GDP per capita until 2030. The capital region and Åland are expected to experience an increase in GDP. On the other hand, South Ostrobothnia and regions in the central eastern parts of the country including Kainuu, North Karelia, Northern Savonia and Southern Savonia are forecasted show a negative development in GDP per capita.

### Extra FDI inflows across European regions, 2003 - 2015



Regional level: NUTS 3  
 Source: The world in Europe, global flows towards Europe, 2017  
 Origin of the data: Copenhagen Economics based on BvD's Zephyr and the Financial Times databases, 2016

Deal value originating from outside Europe, both Greenfield projects and M&A deals (around half of the M&A deals did not have a reported deal value – the total deal value is reported for the GF and M&A projects that had a reported deal value).



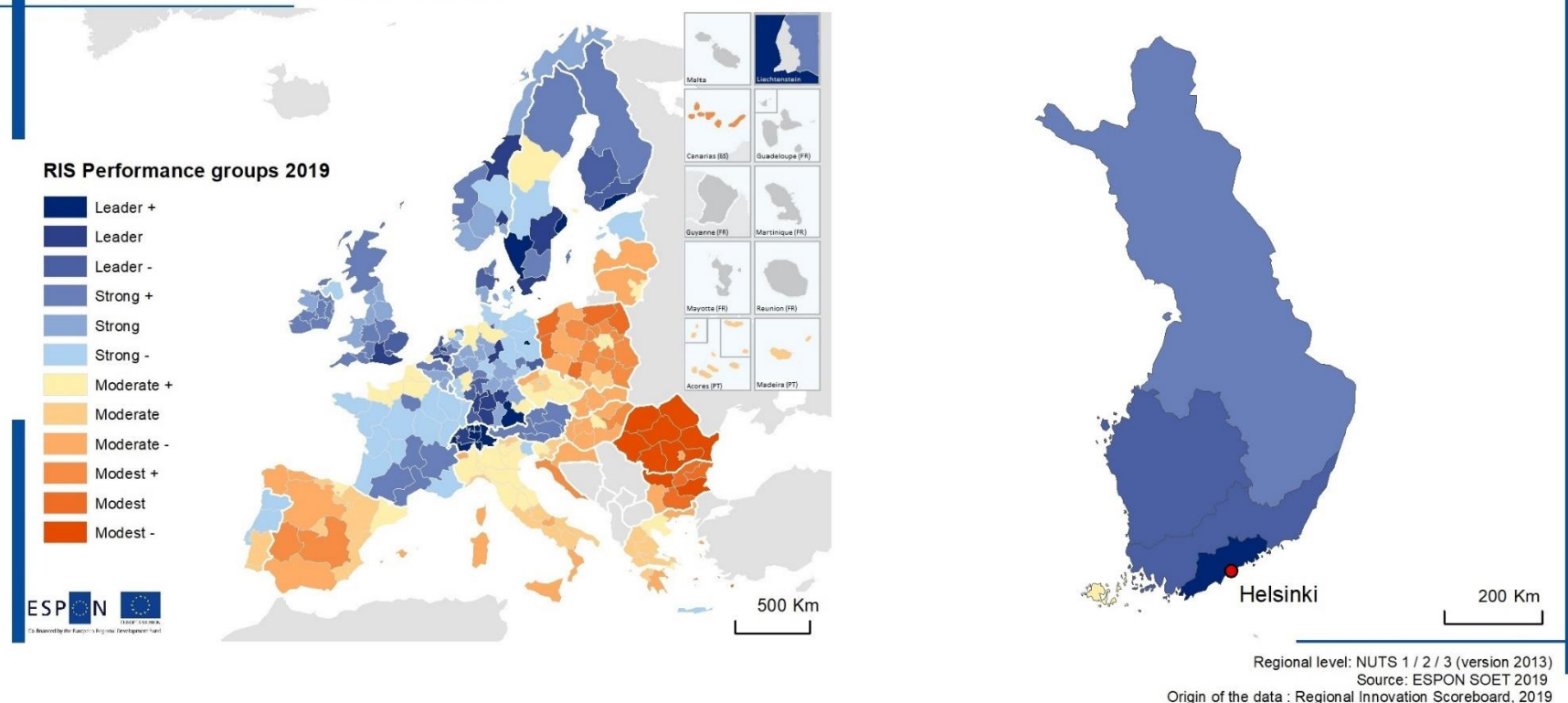
Foreign direct investment (FDI) is considered one of the key factors relating to economic growth. The map shows inflows of foreign investment into the European economic area from 2003 to 2015. This is both greenfield investments, i.e. when a foreign firm establishes itself a region or expands an existing business and so-called M&A projects i.e. when a foreign firm acquires more than 10% of the voting stock in an existing firm or merges with a local firm. During this period 25% of FDI originated from the US. Almost 60 per cent of the FDI flows towards Europe (2003-2015) were aimed at the economic core, i.e. Germany, UK, France, Italy and Spain. Countries with incentives such as low taxes were also destinations for foreign investment.




FDI inflows into Finland have the highest concentration in the south around the Helsinki area. There is also an interesting concentration of FDI in Lapland. To a lesser degree, Eastern Finland also seems to be a destination for FDI. Among the economic strengths of Finland, in the context of FDI, is a highly educated workforce, a knowledge-based and innovative economy, political stability and a strategic geographical location between Russia, Scandinavia and the Baltic countries.



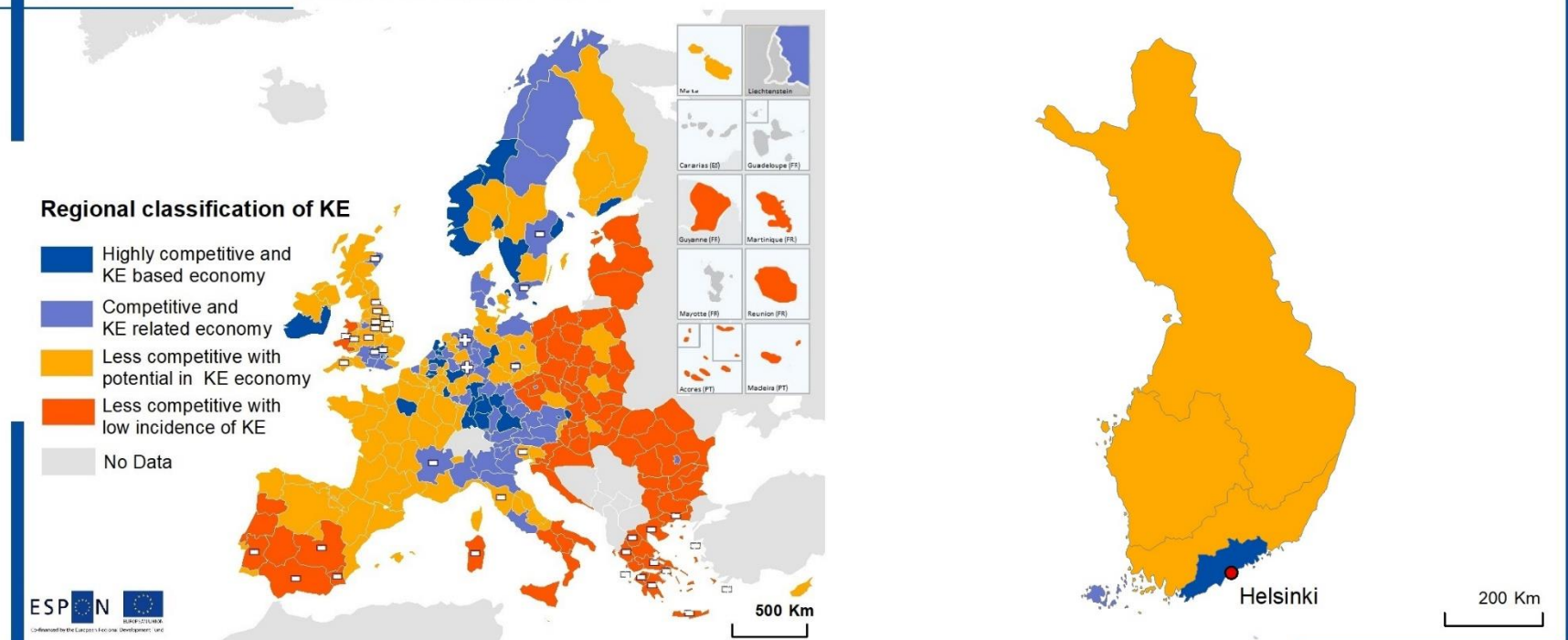
### Regional Innovation Scoreboard 2019



 This map from the ESPON SOET project shows classification by performance of regional innovation systems across Europe. Innovation leaders are 38 regions in Finland, southern Germany, southern Sweden and Switzerland. Strong innovators are 73 regions located mostly in western and northern Europe, i.e. France, Germany, Norway and the UK. 97 regions are termed moderate innovators located in the Baltics, central Europe, Italy and Spain. The modest innovators are 30 regions which are mostly located in eastern Europe).

 Finland is among the countries which have the highest scores on the Regional Innovation Scoreboard. Within the country the highest performance is observed in the capital region and gradually decreases towards the northern part of the country. However, all the NUTS 2 regions of the country, except Åland, are classified as being leaders in the context of regional innovation systems. Åland's regional innovation system is classified as being moderate.

### Knowledge economy (KE) clusters, 2012 - 2015



#### Change in typology

- ⊕ Change towards a more KE based typology
- ⊖ Change towards a less KE based typology

The classification is based on labour market conditions, KE potential, population and migration dynamics and context indicators for the years 2012 and 2015. For more information: ESPON EMPLOY, 2017

Regional level: NUTS 2  
 Source: ESPON EMPLOY, 2017  
 Origin of the data: Eurostat, IRS Milano, IES Brighton and IRS Erkner, 2017



The map shows knowledge economy regions which are, to a large degree, concentrated in metropolitan regions, mostly in western and northern Europe. These regions are characterized by the highest R&D expenditure as a percentage of GDP, highest percentages of individuals employed in technology sectors, highest incidence of the population having a tertiary education and the highest capacity to turn innovation into regional growth. According to the ESPON SOET project, innovation tends to facilitate growth in already developed regions and large urban centres and this tends to widen the territorial development gap.



There is a clear difference between NUTS 2 regions in Finland in the context of the knowledge-based economy. The Helsinki area is among the regions in Europe which have the most competitive knowledge-based economy. Åland is termed as a “competitive and knowledge-economy-related economy”. Other regions of Finland are, however, categorized as “being less competitive with potential in knowledge economy” (ESPON SOET, 2019). However, in northern Finland there are well-known examples of knowledge-based innovation, such as in Oulu. Finland has placed an emphasis on universities and research institutes outside the capital area strengthening the conditions for the knowledge economy.

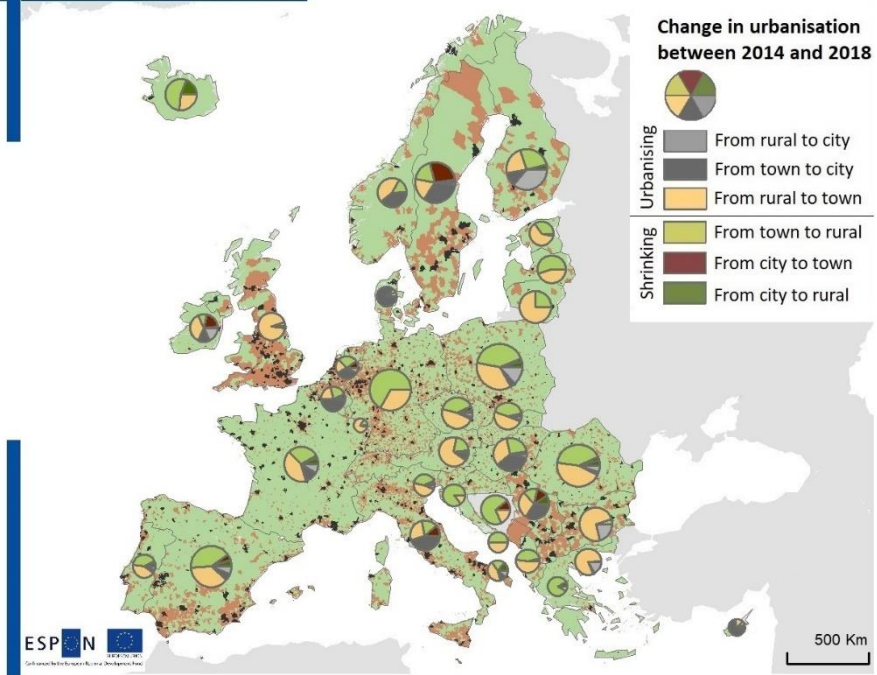


## Urbanisation

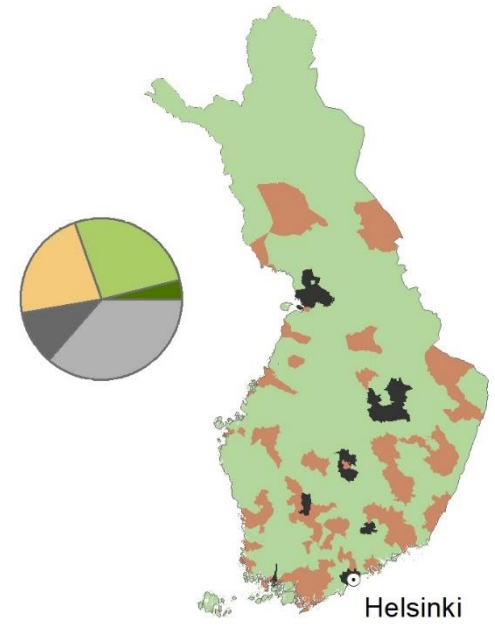
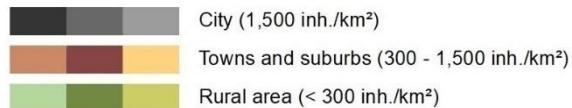
### Change in urbanisation degree

The dominant pattern of urbanisation that can be observed in Finland during the period 2014-2018 is migration to rural areas, which become cities due to an increase of their population densities. The second pattern are towns losing population and shrinking to rural areas. The third main trend that can be observed are rural areas becoming towns.

### Change in urbanisation between 2014 and 2018



#### Urban areas 2018



This dataset contains the difference in degree of urbanisation between 2014 and 2018. The classification is based on a population distribution grid with raster cells of 1 km<sup>2</sup> that classifies local administrative units into three categories: rural areas (< 300 inh./km<sup>2</sup>), town and suburbs (300 - 1,500 inh./km<sup>2</sup>) and cities (1,500 inh./km<sup>2</sup>).

Local level: LAU2 boundaries  
Source: Eurostat, 2018

The map shows the change of urbanization during the period of 2014-2018 and urban areas in 2018 on a local level, i.e. LAU 2 (e.g. regions composed of regional associations of municipalities or similar). The scale of the map is not large enough to observe details in each country. The picture is actually very complex, but it is interesting that in many countries, especially in central and Eastern Europe, there appears to be considerable shrinking of smaller urban areas (from town to rural). The other large development is the opposite (from rural to town).

The dominant pattern of urbanisation that can be observed in Finland during the period of 2014-2018 is migration to rural areas that become cities. An opposite trend can be observed where the population density in towns has decreased to such a level that they became rural areas. The third main trend that can be observed are rural areas becoming towns. The second trend may be counter-urbanisation, i.e. migration towards rural areas and smaller villages in the vicinity of larger urban areas to seek amenities and lower housing prices, for example, but at the same time being able to commute to work and access diverse services.

## ESPON EGTC

4 rue Erasme, L-1468 Luxembourg  
Phone: +352 20 600 280  
Email: [info@espon.eu](mailto:info@espon.eu)  
[www.espon.eu](http://www.espon.eu)

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Authors: Hjalti Jóhannesson, Grétar Þór Eypórsson and Tom Goosse

With contributions from:  
Hanna-Maria Urjankangas

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