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## Report trends, policies and future challenges in economic, demographic, legal , social and environmental field and their territorial dimensions

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## Project Abstract

The objectives of FLAGSHIP are:

- i) Understanding and assessing the state of the art of forward looking methodologies in relation to Grand Societal Challenges (GSC) and developing tools and modelling frameworks beyond state of the art;
- ii) Applying an enhanced set of forward looking methods and tools to support EU policies, by analysing reference and alternative scenarios of long-term demographic, legal, economic, social and political evolutions of Europe, in a world context, and assessing potential progress in technological and social innovation;
- iii) Driving change, producing a set of EU-relevant policy recommendations on the potential of the EU for transition and change.

In relation to these objectives the project will:

- i) Take stock of the existing forward-looking studies: a review will be done of the central questions, key trends, critical uncertainties and scenario frameworks;
- ii) Proceed to apply and combine enhanced qualitative and quantitative methods mastered by the project partners in a coherent framework, producing a combination of GSC-driven qualitative and quantitative scenarios - coping with a range of possible global paradigm shifts and geo-political changes - and engaging a community of experts and stakeholders in a scenario thinking and assessment exercise;
- iii) Focus further on EU policy responses to emerging transition challenges, and the potential role of EU in shaping global governance as well as new territorial dynamics within the continent, aiming to deliver policy recommendations to support the formulation of strategic EU policy agendas.

The project will be articulated in 10 WPs, providing a consistent sequence of research activities with a good balance between methodological developments and policy applications addressing long term GSC scenarios. FLAGSHIP consortium includes 16 partners, representing 11 MS, including 3 NMS. The FLAGSHIP project will organize 4 stakeholders workshops and 1 final conference, and it plans to implement a wide and diversified range of participation, communication and dissemination actions.

# Deliverable Editor Feedback Form

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## 0.- Executive Summary

### 0.1 Aims and contents of D1.2 "Report on trends, policies and future challenges")

The objectives of FLAGSHIP can be summarised in the following three, according to the Description of Work:

- i. Understanding and assessing the state of the art of forward looking methodologies in relation to Grand Societal Challenges (GSC) and developing tools and modelling frameworks beyond state of the art;
- ii. Applying an enhanced set of forward looking methods and tools to support EU policies, by analysing reference and alternative scenarios of long-term demographic, legal, economic, social and political evolutions of Europe, in a world context, and assessing potential progress in technological and social innovation;
- iii. Driving change, producing a set of EU-relevant policy recommendations on the potential of the EU for transition and change.

Within this general context, WP1 aims at consolidating the conceptual framework of FLAGSHIP by refining the formal approach to the scenario building activities in the project; and to provide a solid ground for these FLAGSHIP forward looking activities by identifying today's key Grand Societal Challenges (GSC). While the first objective is addressed in FLAGSHIP Deliverable D1.1. "Inception Report", the second objective is reported in this Deliverable D1.2 "Report on trends, policies and future challenges".

In particular, Deliverable D1.2 undertakes a review of existing literature in different thematic areas to identify most relevant Megatrends and Challenges for Europe in the World context, derived from current policy and scientific debates; and the opportunities and threats for Europe in the World context raised by these trends.

Reference literature can be consulted in the FLAGSHIP virtual library, <http://80.33.141.76/flagship/>

Deliverable D1.2 is organised following the analysis of 4 thematic areas (economy & innovation; demography & society; environment; governance), to later end up discussing the implications for territorial development of the identified trends and challenges in each of the mentioned thematic areas. Operatively, Deliverable D1.2 is structured as a set of five independent reports, each one of them presented in chapters 1 through chapter 5, as presented below.

<b>D1.a</b>	Report "Future Economic, Research and Innovation Trends and Challenges"
<b>D1.b</b>	Report "Demographic and Social Change Trends and Challenges"
<b>D1.c</b>	Report "Environmental Trends and Challenges"
<b>D1.d</b>	Report "Global Governance Trends and Challenges"
<b>D1.e</b>	Report "Territorial dimension of grand societal challenges"

*Table 1 – List of WP1 Thematic Reports included in D1.2*

All reports have been developed co-ordinately, following an agreed common structure and approach (see below).



Additionally, Annex I of Deliverable D1.2 takes stock of the existing forward looking studies, elaborating quick portraits on the central questions, key trends, critical uncertainties and scenario frameworks defined in these studies.

Annex II of Deliverable D1.2 contains key bibliographic references, institutions and experts in each of the thematic areas.

Other specific annexes are presented thereafter.



Figure 1 – Structure of WP1 Thematic Reports

## D1.a “Future Economic, Research and Innovation Trends and Challenges”

### 0.1.1 Approach

The current economic crisis in the European Union has totally modified the previous analysis. Before the 2008, the economic development in EU appeared to be sustainable in the long run and at that time the main economic concern appeared to be the ageing population in Europe and the potential shortage of labour supply in the coming decade. Then, even if structural challenges for European Union will remain in the long-term, the stagnation of the economic growth since 2008 has brought the concerns to short-term.

This report appraises the state of the art foresight studies and scenarios concerning the evolution of the global financial crisis and its impact on global economic prospects for Europe and the other regions of the world (US, BRICs, MENA, etc.). Possible outcomes of the current euro crisis are analysed, and their likely impact on the future of the European economy discussed. Another important focus is the evolution of the European economy productivity, innovation and the shift of Europe to a knowledge society, and the related risks of creating societal divides. The analysis takes stock of the most recent studies and analysis articles and paper by key experts.

### 0.1.2 Key megatrends and derived uncertainties

The following key trends and uncertainties have been identified from the existing literature:

#### Growing global economy in the long-term

In 2007, the World Bank forecasted a sustained 2.9% yearly average World economic growth between 2008 and 2030 (W. Stevens, 2007). Despite the crisis, global GDP growth levels are projected to increase from 3.3% to 4.5% by 2017 according to IMF, while China is expected to keep growing above 8% yearly at least until 2017, and India above 6%. (IMF 2013). However, most forecasts agree on a slowdown of potential GDP growth in emerging countries and especially in China where the labour force should decrease from 2020 on.

#### Increasing global flows

Since 1990s the World has experienced amazing accelerated changes in terms of demographic growth, information flows, integration of global financial systems, exponential increase of global trade, and tourism, emergency of Asian economies, increasing oil prices and growing environmental concerns. In this context, we have seen the fast development of the "Space of Flows" that blurs political borders, diminishes the power of Nation-States and in many aspects subverts geographic distances.

- Global trade multiplied by 10 between 1960 and 2005, a much faster rhythm than economic growth (World Bank WDI).
- Maritime container trade expanded at an average 8.2% between 1990 and 2010. (UNCTAD 2011).
- Air traffics have doubled approximately every 15 years, and are expected to keep growing an average 4.7% yearly up to 2030 (Airbus 2013).
- Tourism went from 700 million tourist arrivals worldwide in 2004 to 1 billion in 2011 and is expected to grow 75% up to 2030 (UNWTO in 2011).

The growth of global flows may have positive consequences on the economy, but also increases the pressure on resource consumption and environmental impacts.

#### A more plural World geopolitical framework

The increase in the number of players driven by economic strength of Asian economies and BRICS implies that the dominant influence of the West will diminish in the future. The European GDP has already dropped from being 37% of global output in 1970 to 28% in 2010, and will still decrease up to 20% in 2030 and 17% in 2050 (UNCTAD). Consequently, the world GINI inequality coefficient dropped from .65 to .61 between 1990 and 2006 (Pinkovskiy, Sala-i-Martin, 2009). However, the richest 1% in the World controls today 39% of World's wealth, on an increasing trend (Boston Consulting Group's Global Wealth report, 2013).

With 40% of the world's population and 25% of global GDP in the BRICS, the intensity of trade with one another will be increasing fast and, becoming more independent from today's developed World (W. Hankel & R. Isaak, 2011). By 2020, emerging markets' share of global financial assets is projected to almost double, assets becoming much more evenly distributed around the world. (US National Intelligence Council, DNI, 2012). Countries such as China, despite having strict regulations for the use of international private funds to finance their growth, are transferring large public savings to finance Western public debts (W. Hankel & R. Isaak, 2011).

### Roots and final outcomes of the crisis in Europe

Experience has shown that major financial crises arise after a credit boom, going usually hand in hand with an unusual increase in asset prices. This happened before the crisis on both sides of the Atlantic. Today, the euro area is immersed in an unstable situation which combines a high level of overall leverage<sup>1</sup> with a financial system which is only partially integrated. This partial integration constitutes a source of instability because cross border claims of banks are large enough to ensure that national shocks are transmitted to the entire system. But integration is not deep enough to ensure the same interest rate throughout the area. National banking systems are segmented along national lines and are in the end supported only by the national government. This has led to what has been officially called the 'doom loop' between sovereigns and banks which has destabilized the euro area financial markets.

A key problem for Europe and the euro area is how to deal with the existing overhang of debt, both private and public. Three alternative scenarios seem to depict possible outcomes of the financial crisis in Europe: 1) gross cross border claims in the banking sector diminish until only the net positions remain (being rather small) in a scenario of re-nationalisation of the banking sector. 2) Status quo continues with important gross cross border stocks remaining, but with cross border flows being small; in this case, the remaining stocks are large enough to transmit national shocks to the entire system. 3) Policy makers get scarred by a recrudescence of the crisis and opt for a full Banking Union, which leads to an equalisation of interest rates and a resumption of cross border lending. It can be stated, temptatively, that in terms of stability of the financial system of the euro area the two extremes seem preferable to the status quo.

### European economic perspectives

In the short-term, experts forecast a second year of recession in EU after 2012, which will be followed by a smooth recovery period. In the long-run projections are relatively contrasted, some expecting a smooth rebound after the recovery period (2018 to 2030) and others only anticipating weak long-run GDP growth with large divergence among Members States. Long-term GDP growth in the EU27 is projected to fall from 2.7% before 2008, to 1.6% in for 2015-2030 and to 1.4% for 2030-2050 (EC FIN Ageing Report 2012).

Before the crisis, GDP growth in the EU was driven by the increase of households' and Government's final consumption, and gross fixed capital formation. Since the crisis, economic reforms aim at a wage moderation that allows the re-balancing of external trade, especially in the Eurozone where change in exchange rates cannot be play this role. Nevertheless, this "unavoidable" external adjustment for imbalanced Eurozone countries, will probably durably penalised households' final consumption. Unemployment is expected high in almost all EU countries up to 2018, even very high in several European countries (22.9% Spain; 16.3% Portugal; 10.4% in France; IMF 2013).

### Effects of the financial crisis in Europe

The economic crisis has hit all countries of Europe but in differentiated ways. Out of the 121 regions below GDP per capita average in 2000, 99 had improved their condition by 2008 (82%); out of the 138 regions below GDP per capita average in 2010, 84 are expected to experience further regression by 2030 (65%), according to recent ESPON project (ESPON ET2050, 2013).

In their way out of the crisis, European economies are moving to increase their trade with world emerging economies. Companies located in different European countries and economic sectors are taking advantage of the growth of emerging markets differently,

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<sup>1</sup> Leverage defined as the ratio debt to equity financing, or in simplified terms, credit to (nominal) GDP.

based on pre-existing social, economic and cultural links. The European economies may become, after the crisis, increasingly more interdependent from the rest of the world economies than on the internal European market. European foreign policy may become even more difficult, since global national interest may easily diverge.

An increased polarisation of the European territories is expected under prevailing globalization, given that accessibility to intercontinental transport hubs will be determinant for the competitiveness of European regional economies. Major gateways for passengers and freight transport will continue to expand their capacity to achieve even higher economies of scale. Today, four European ports along concentrate 60% of the total container throughput and four airports concentrate 70% of the extra-EU aerial passengers.

#### Trends in the European Labour market

The total number of hours worked per employee and year (labour input) has had a declining trend since decades ago. In 2010, Europeans worked on average 1,746 hours per year, while in 1980 they worked 2,000 hours. The legal retirement age is currently established at 65 in most European countries, but the average retirement age of European population is 61.2. Retirement age is expected to increase due to policies addressing unbalances in the welfare system financing. Man and woman participation rates converge, but still there is a 6% difference on average with important geographical differences. An aim of the European policies is the raise of the participation rate.

In average, between 1998 and 2011 productivity per capita grew 0.5% in the euro zone, against 2.5% in USA and 3.0% in Sweden. The level of investment on research and development and the training and professional qualification of the population is low, and the economic structure of many European countries is dominated by sectors providing low productivity, such as agriculture, construction, distribution or tourism.

Unit Labour Costs (ULC, ratio of compensation per hour to output per hour) in the European peripheries have grown at higher rates since 1995 than in central Europe, in a convergence process experienced since the 80s (J. Felipe and U. Kumar, 2011). Despite increases in salaries in Europe before the crisis, the rise of the ULC in many European countries (and in the PIGS<sup>2</sup> in particular) did only partially compensate for the steeply rising prices that attended EU convergence between 1980 and 2008 (Waldman 2012, based on Felipe&Kumar 2011). The very large unemployment level in many European regions will keep driving salaries down in real terms for the years to come.

#### New social behaviours

Economics is becoming less about ownership and more about access, younger generations becoming less interested purchasing and more in renting and sharing. (CSIRO 2012). Proximity consumption is on the rise: within the food sector, one important trend is the increase of local markets for agricultural products sensitive to ecological higher quality. Consumption identified with environmentally sensitive goals is also on the rise. As "Green" becomes a business and a consumption good, corporations, not governments, are driving the push toward sustainability (Bakas 2006). New measures of economic performance, such as the stable Genuine Progress Indicator (GPI), become increasingly relevant, as citizens seem more interested in alternative economic models.

#### Innovation driving change

While some hold that the increase of technological development is exponential (Kurzweil's 2030 Singularity and NBIC), others expect the ending of the Moore's law in the coming decades (Michio Kaku, 2011). Constant progress in ICT (faster and faster Internet, IoT,

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2 PIGS: Portugal, Ireland, Greece, Spain



cloud) creates a wider and wider range of possible applications that has to be carefully taken into consideration. Just as railways and airplanes reduced physical distance in the domain of transport, new ICTs are now reducing the size of the World, with the number of daily contacts and interactions by any human rising exponentially. The rise of the digital world is changing business models, just as Internet and smart phones have already changed lifestyles.

Expenses on R&D are about 1.9% in the euro zone against 2.6% in USA. Despite target set to increase R&D up to 3.0% of GDP, progresses are limited. Competition in innovation will be huge as new emerging powers do also invest in key sectors such as materials (rare materials, superconductors, etc.), energy and nanotechs, and entrepreneurship in Europe remains low. The education system remains to be adapted in many European countries to the requirements of the emerging economy, favouring more pro-active, collaborative, creative and entrepreneurial competences in students.

## **D1.b “Demographic and Social Change Trends and Challenges”**

### **0.1.3 Approach**

This report reviews past trends in indicators of demographic and socioeconomic change, in light of population policies. Future challenges are identified. Results of the report are, among others, input to activities in task 2.2 focussing on qualitative and quantitative demographic scenarios and projections.

### **0.1.4 Key megatrends and derived uncertainties**

The main demographic trends across Europe are decline of population growth, ageing of population and labour force, decline in the working age population, urbanisation, increase in the number of international migrants, and migrant integration and social cohesion issues. The underlying causes of these trends are declining fertility and mortality rates. Large-scale immigration of people to EU countries has mitigated population ageing and the decline of population growth. Most of these (labour) immigrants, and their families, tend to concentrate in the main metropolitan areas. In some regions, their integration has posed new challenges to policy makers in terms of properly integrating newcomers in local communities to preserve social cohesion.

#### Human Capital

In general in Europe, people are not only growing older but are also staying healthy for a longer period of time, contributing to the general well-being of the population.

Levels of educational attainment have increased strongly across most European countries. As a result younger cohorts are significantly higher educated than preceding ones. Higher levels of education and better-qualified populations have several advantages, both for the individuals as for the societies. Good education is one of the strengths of the European Union, and to further improve its human capital is one of its challenges.

Improving human capital at the global level may have several advantages. It can reduce gender inequalities and narrow the gap between countries, as productivity and economic growth may increase with increasing levels of education in less developed countries.

Furthermore, it can contribute to high skilled migration to countries with labour shortages and to a reduction of unemployment in countries with labour surplus.

Declining fertility levels will result in decreasing pupil and student populations, which may give countries the opportunity to put more effort in raising the quality of education.

#### Economic dimension of demographic developments

Notwithstanding that life expectancy in Europe is among the highest in the world, in a number of eastern European countries, low life expectancy and large gender gaps in life expectancy remain a problem.

Ageing populations put pressure on the sustainability of welfare systems. Ageing and the related pressure on the social welfare systems may result in intergenerational conflicts on taxes and expenditures to take care for the elderly and thus be a threat to social cohesion.

Persistently low birth rates and declines in the size or the share of the working age population may result in declining labour forces which hamper economic growth. If growing numbers of young people entering the working age will not find jobs, this may create a 'lost generation'.

In past decades increasing participation has been an important factor leading to growth of the work force and economic growth, however, there is still room to further raise participation of women, the elderly and migrants.

#### Social dimension of demographic developments

Postponement of partnering and rising age at childbearing may result in less children than needed to ensure demographical balance, and increases the age gap between generations. This negatively impacts intergenerational support as grandparents are older when their children become parents, and children are still active on the labour market and taking care for their own children when their parents reach the age they may need support.

Increase in partnership dissolution and so-called patchwork families (new families made up from members of divorced families) may weaken family ties and may negatively affect the financial situation of households and well-being of children.

Population diversity and growing disparities between majority and minority groups within countries may cause societal turmoil.

On the other hand, as people live longer and healthier, this makes it possible for many people to remain active in society also after they reach retirement age. It is an opportunity for societies to utilize the potential of older people, not only in the labour market, but also in other fields like voluntary work and informal care.

While intergenerational conflicts may be a threat, fostering intergenerational solidarity may be an opportunity. If we can achieve a society where on the one hand people of all ages can benefit from economic and social progress on an equal basis and at the same time can contribute to society and provide mutual support, this will be beneficial for society as a whole, as well as for its inhabitants.

#### Territorial dimension of demographic developments

Regions experiencing population decline may have problems to maintain an economy strong enough to be able to continue to provide good quality services and offer their inhabitants a pleasant living and working environment.



Europe has several strong metropolitan areas that are less vulnerable to the consequences of ageing because of the mitigating effects of migration. In these regions, international migration of relatively young workers could make up for high levels of internal outmigration of people in their forties and fifties, preserving a relatively young age structure. Although migration is not a permanent solution to the challenges of a declining working age population, it does fill specific gaps in the labour market. It is mainly strong metropolitan areas that profit from migration.

Another global opportunity is to fully utilize demographic dividend in those countries where increasing shares of the youth or working age persons in the total population lower the dependency ratio. If successfully utilized, this can significantly raise per capita income as well as living standards.

Rural areas may present advantages in terms of attractive living environments and quality of life, compared to other urban or intermediate regions. To maintain and enhance these qualities could help these regions to turn their weakness, like population decline, into strengths.

## **D1.c “Environmental Trends and Challenges”**

### **0.1.5 Approach**

This report identifies the critical environmental megatrends in the areas of energy and materials, their drivers and future environmental challenges. The proposed megatrends are evaluated at a global and EU level, providing information on the underlying driving forces and main uncertainties.

### **0.1.6 Key megatrends and derived uncertainties**

Below the main global megatrends and uncertainties are presented.

#### Climate change and global warming

Climate change and global warming are affecting the functioning of ecosystems and have become a threat to human society. There is enough evidence that global temperatures are rising. In the last century alone, the global temperature has climbed 0.6°C to 0.9°C.. Moreover, if these trends continue in the future the global temperature may rise to 1.8-4.0°C by year 2100.

In recent years GHG emissions of industrialised countries have flattened or even reduced, as in the case of the EU. Technological improvements, changes in trade patterns or reduction in population growth rates and economic slowdown are among the main drivers of these trends. On the other hand, emerging economies such as, China, India, Brazil, Indonesia and other fast growing regions are trying to catch up with industrial countries, and as a consequence are leading the growth in global GHG emissions. Projections indicate that these trends will continue in the future.

Climate change mitigation and adaptation will become one of the major environmental challenges for Europe. On the one hand, given its self-imposed targets, the EU is leading the fight against climate worldwide and has committed to reduce its GHG emissions by 20% below 1990 levels by 2020. On the other hand, the EU is already suffering the impacts of climate change in terms of extreme events and in the future further efforts on adaptation will be necessary: the EEA has projected that the land temperature in Europe will increase by 2.5°C to 4.0°C by year 2100. Winter temperatures of eastern

and northern Europe and summer temperatures of southern Europe will increase drastically.

In the case of the EU, climate change could be considered as one of the main environmental challenges, since the evolution of global warming as well as the mitigation and adaptation policies will have a deep impact on all the other challenges. However, this relation is not unidirectional: the evolution of the other challenges will also affect climate change.

Although climate science has progressed significantly in recent years in establishing causal connections between human activities and climate change, it still has many uncertainties. Other uncertainties are derived from the non-linearities of the climate system which make it difficult to investigate the relation between GHG emissions and changes in the climate. Furthermore, climate models are not complete, in the sense that they do not incorporate some important elements of Earth's climate system such as clouds or the carbon cycle. Regardless of the uncertainties of the climate science, a key source of uncertainty is the path that the emissions of GHG will follow in the future. The evolution of this parameter depends on different variables such as demography, economic growth or the climate policy. While it is expected that global population and economy will continue expanding in the future, there is uncertainty on the possibility of reaching a global agreement on climate change.

#### Loss of biodiversity and ecosystem services.

Changes in biodiversity and in ecosystems are usually caused by multiple interacting drivers. On the one hand, direct drivers, such as land use, climate change, over exploitation or environmental pollution have a direct influence on ecosystem processes that bring about species to extinction. On the other hand, indirect drivers include changes in variables like human population, income or lifestyles which have an effect on direct drivers. Scientists have projected that a large number of species may disappear by the next century if the current extinction rate, which is estimated to be 100 to 1000 times faster than in historical times.

The main threats to biodiversity in Europe are habitat loss and degradation, invasive alien species, pollution, nutrient load, overexploitation and unsustainable use, and climate change. Over the past decades, pollution from agriculture in freshwater systems has decreased in Europe, but this has to some extent been replaced by other types of pollution. There is enough evidence that some species may be or already are in a stage of extinction in the EU. Biodiversity loss is an enormous challenge in the EU, with around one in four species currently threatened with extinction and 88% of fish stocks over-exploited or significantly depleted. Furthermore, biodiversity loss is a global problem and, therefore, the evolution of biodiversity worldwide will impact the EU.

The evolution of biodiversity challenges will be closely linked to other challenges such as climate change and clean air and vice versa. Climate change and air pollution has the potential to undermine the efforts for the conservation and sustainable use of biodiversity. Moreover, some climate mitigation policies can affect biodiversity by altering land uses. On the other hand, biodiversity can help us cope with the impact of climate change in many ways and to improve the quality of air. Protecting biodiversity can, for instance, help limit atmospheric concentrations of air pollutants. Furthermore, healthy ecosystems can also help mitigate climate change impacts, by absorbing excess flood water or buffering us against coastal erosion or extreme weather events.

Although there is a consensus among scientists on the relevance of biodiversity conservation there are still some uncertainties related to the link between biodiversity loss and ecosystem services. These uncertainties are related to the insufficient level of detail of the links between ecosystem functions and services, the limitation to explore more realistic scenarios of diversity change reflecting how human activities are altering biodiversity, and the need of developing models and statistical tools allowing to up-scale

from experiments that detail local biological processes to landscape-scale patterns where management and policy take place.

#### Air Pollution

Air pollution has become a major threat both to human health and environment. The combustion of fossil fuels in stationary sources (e.g. in industries or households) and mobile sources (transport sector) is one major source for air pollutants. Other major sources of air pollution are the emission of different substances in industrial activities like quarrying, cement production or chemical industry, and in agriculture. In the future population increase and economic growth could contribute to worsen this problem.

In the EU, the concurrence of air policies and structural changes has contributed to an improvement on the quality of air. However, in some areas the concentration of some specific pollutants is still high and constitutes a risk for health safety. This is the case of particulate matter (PM) and ground-level ozone. According to EEA, 40 % of EU's urban population is exposed to PM above threshold levels and over 50% to ozone.

The excess of nitrogen deposition due to the emissions of NO<sub>x</sub> and the acidification of freshwater and forest soils are also of major concern for the EU. In this sense, the European Commissions has proposed the reduction of the emissions of NO<sub>x</sub> and other acidifying pollutants.

In the future, it is expected that the implementation of the revised Thematic Strategy on Air Pollution will contribute to mitigate air pollution in EU. Moreover, the decrease in the use of fossil fuels promoted by climate policy can contribute to reducing not only GHG but also other air pollutants. However, climate policy may also have drawbacks in terms of air quality. For instance, the rise in the use of biomass for heating may contribute to increase the emissions of PM.

#### Water management

As of 2010, over 780 million people worldwide lacked access to clean drinking water and 2.6 billion to improved sanitation services. If current trends continue, more than 600 million people will still lack access to safe drinking water in 2015 and 2.4 billion people will lack access to improved sanitation facilities.

Human water demand is steadily growing. Agricultural, industrial and domestic water withdrawals are increasing to meet the demands of a growing population with increasing wealth and consumption levels. It has been estimated that in 2030 global water requirements will be 40% higher than current supply and that one-third of the world's population, mostly in developing countries, will live in basins where this deficit is larger than 50%. This situation will be worsened by climate change. Poor countries will be specially affected and water scarcity will be one important factor in the increase of illness and death rates in developing countries. In many river basins under severe water stress, there will be competition between different water uses and regions.

Water quality is another relevant challenge for water management, especially in developing countries. The growth in food production will probably be accompanied by an increase in the use of fertilizers, affecting the nitrogen and phosphorus load of hydric resources. In addition, other processes such as urbanization or industrialisation can contribute to increase the release of pollutants to water.

Water availability in the EU is not currently an issue. However, this situation could change in the future due to climatic change. The main medium term impact will come from a higher frequency of extreme weather events such as very hot summers with risks of water shortages, heavy rainfalls with subsequent flooding, heavy storms with damages and risks for floods and coastal erosion. These events will challenge existing water infrastructure and significantly increase the need for new ones.

### Decreasing the stock of natural resources

Historically, economic growth has been based on the availability of plentiful and cheap resources. However, the supply of resources is limited, and the natural resource base is being eroded. Growing global demand is adding pressure on commodity markets and competition for many resources is increasing.

In the last decades the prices of some key commodities show a rising trend. The increase in the demand of raw materials by emerging countries, together with supply constraints, geopolitical issues and speculation are the main factors behind these trends. The global economy is already suffering the effects of rising costs for critical raw materials and minerals, and it is expected that these trends will continue in the future generating tensions and intensifying global competition for resources.

The evolution of resource consumption can be assessed as a combination of three factors: population, income per capita, and efficiency. The development of these three variables will determine the demand for resources in the future and will affect other challenges such as climate change. Population growth and better living standards will keep the demand for energy increasing, especially in developing countries. Thus, the increase in resource efficiency will become one of the cornerstones for reducing the vulnerability to resource scarcity.

More than 80% of the energy consumed worldwide comes from non-renewable resources, mostly fossil fuels. The reserves of these resources are limited and extraction will peak somewhere in the future. The question of "peak oil" could be one of the most important challenges for the humankind in the near future. Oil plays an essential role in the economy: one third of global energy use comes from oil and more than 90% of transportation worldwide is fuelled by oil. The latter is especially relevant in the actual context of globalisation, since in the short run there are not many chances to transform the transport system to run with other energies. The high oil dependency of the EU makes the region vulnerable to constraints in energy availability. In this context, energy efficiency and innovation are destined to play a crucial role in a context of scarcity and high prices. In addition, there will be an increasing need for developing other energy sources (biofuels, synthetic-oil, hydrogen,...) and transport modes (e.g. public transport, electric car), and for reducing mobility. Electricity will play a much greater role in the future than now, almost doubling its share in 2050. Renewable power could account for 25% of the European energy mix by 2030, and around 50% in 2050. The EU has a significant potential for the production of biofuels, but it is estimated that between 4% and 18% of the total agricultural land in Europe would be needed to produce the amount of biofuels to reach the level of liquid fossil fuel replacement required for the transport sector in the Directive 2003/30/EC.

Europe relies on the rest of the world for the supply of many raw materials, and these resources are also embedded in products imported from outside the EU. Scarcities and volatile commodity prices can bring about instability in many regions of the world, which may affect the EU. Moreover, the EU is also highly dependent on the imports of some critical materials like rare earths; these materials are essential for the development of high-tech products and green technologies, which are expected to play a central role in the future structure of the European economy. These resources are located on very specific places around the world.

Energy and resource efficiency are destined to become a critical issue for Europe in the future. The depletion and scarcity of some key resources, together with the economic expansion of emerging economies will increase the competition for access natural resources. The EU and other importing regions will be impacted by increasing prices and tensions and conflicts between nations may appear. In this context, one of the key challenges for the EU will be the increase in resource efficiency. On the other hand, climate



change mitigation policies would decrease the demand for fossil fuels in the EU and, therefore, would reduce the vulnerability to fossil fuels depletion.

## D1.d “Global Governance Trends and Challenges”

### 0.1.7 Approach

This task will take stock of the law scenarios developed by Hiil to appraise the state of the art of legal trends and challenges. On the surface, the legal trends observed seem to be diverse and they sometimes point in different directions. But if we fade out the speculations, then there appears to be two major shifts in the global legal environment. One from a predominantly national to a predominantly international legal environment. The other from a predominantly public legal regime to a mixed public-private or even private regime (Muller, S et al.).

It remains to be explored whether the unfolding trends will continue and how they will evolve during the next few decades, whether internationalisation of rules and institutions will continue or stagnate and even reverse, whether private governance mechanisms and private legal regimes will further expand or if state institutions and legal regimes will retain or regain its position. For example,

- if Global Constitution unfolds, some of the expected transition challenges relate to how the rule of law can be effectively institutionalised in the evolving global constitutional order and how to the critical issue of enforcement and compliance can be implemented. For law does not have its full effect unless there is enforcement and this has traditionally been done best at the national level.
- if Legal Borders unfolds, major challenges expected are how to deal with legal pluralism, to what extent nation states and regional organisations can revert to soft power and international relations to coordinate rule-making and enforcement.
- in the event that legal internet unfolds, again how rule of law can be shaped will be a major challenge in an evolving global private regulatory framework, in particular how the principles of legality, universality of norms, democratic accountability and checks and balances can be secured.

### 0.1.8 Megatrends and Uncertainties, and derived Challenges

The Megatrends mentioned in the scenario reports related to global law and global scenarios can be synthesized in the following:

Global Politics and Law: a balanced global distribution of power and the rise of Asia. Because of the absence of a simple global political system, globalization will probably be the single most influential driver shaping international politics. A more balanced distribution of power is expected in the world. The US will maintain its military power, but its economic power weakens because of the rapidly growing economies of China, India, Brazil, Russia and South-Africa and the economic power of the European Union. Resource scarcity and resource dependency is another major driver of geopolitical change.

Global Security: diffusing risks and threats as well as diffusing power to deal with these risks and threats. The high-impact/high-likelihood risks are water supply crises and chronic fiscal imbalances. Top five risks include also a major systemic financial failure, food storage crisis and diffusion of weapons of mass destruction.

Global economy: new K-wave after crises driven adaptation of the global economy. Technological breakthroughs might radically increase eco-efficiency and possibly provoke a new long-term economic Kondratieff wave (EC 2012), with a strong incidence of resource efficient technologies, bioeconomy, digitalisation and the second economy, and growth of health services.

Global society: smaller families and exploding civil society. Major social developments are expected, e.g. the growth of one-person households, solo-parent households; and couples without children. Longer life expectancy and falling fertility rates will lead to a rise of the elderly. Technology, geopolitics and the markets have created opportunities and pressures, spurring the creation of millions of civil society organizations around the world, but the World Economic Forum observes at the same time increasing restrictions on civil society organizations and activities both online and offline

Regions and their global connections: Europe and the east-west axis. The Transatlantic Survey aims to map trends across both sides of the Atlantic. A longitudinal analysis reveals a number of stable trends: Americans and EU citizens expect strong leadership in world affairs from each others leaders; a large majority of Europeans has favourable views of the United States; a majority of Americans and Europeans think favourably of the EU; Europeans and Americans consider each other to be more important for their countries' national interests than Asia. The views on Russia 'turned from favorable to unfavorable on both sides of the Atlantic', contrasting with the fact a majority of Russian respondents has favorable views of the United States and the European Union'.

The critical uncertainties are:

- Will more fragmented or more coordinated legal and governance mechanisms evolve on the global level?
- Will legal and governance mechanisms become predominantly formal and connected with state actors or predominantly informal and connected with private actors?
- Will these legal and governance mechanisms be characterized by a 'thick' or broad rule of law approach (legality + human rights) or by a 'thin' or small rule of law approach (legality)

If the legal strategies of the EU are confronted with alternative scenarios (Hiil scenarios) at least two mutually connected key challenges for Europe are revealed. These challenges are derived from both the Megatrends and Critical Uncertainties. The two major challenges caused by these trends and critical uncertainties are the global coordination challenge and the global rule of law challenge.

The global coordination challenge. Many Megatrends and critical uncertainties trigger growing interdependencies on a global scale. These interdependencies are connected with increasing scarcity of resources, hyperconnectedness of economies and societies and growing risks and global shocks. The interdependencies should be countered by global governance mechanisms that enable either public or private regulation. Lacking global coordination will result in a governance gap. The first challenge for Europe as well as for other global powers therefore is to avoid the global governance gap. Closely connected with the challenge to avoiding a global governance gap is the challenge to align the necessary global governance mechanisms with the multi-layeredness of the EU legal order.

The global ('thick') rule of Law challenge. The 'thick' rule of law approach is a major cornerstone in the EU legal strategy. Both with regard to the internal EU order and the desired global legal order the EU pursues 'thick' rule of law strategies. These strategies aim at embedding the principle of lawfulness as well as fundamental rights in global governance mechanisms. Several Megatrends and critical uncertainties affect these strategic goals. For example, the rise of the Asian century and the geopolitical shift of



power may hamper the inclusion of fundamental rights in global governance mechanisms. Global risks and global shocks may also trigger policies that are in opposition with the fundamental rights currently embedded in the EU legal order. Third, migration may affect both the legitimacy of fundamental rights within the EU legal order and on a global scale. Europe is thus confronted with a rule of law challenge.

## **D1.e “Territorial dimension of grand societal challenges”**

### **0.1.9 Approach**

Trends, seeds and wildcards are selected on the basis on an extensive literature review, in which particular attention is paid for on their relevance for territorial development. The trends screened in this section overlap with trends discussed in other sections of this report. Among others, this section aims at identifying those trends which have the highest relevance for territorial development, or those which have the greatest impacts on the territorial dimension of Europe. The very same trend can play out differently in different types of regions or cities and therefore pose different governance challenges in different locations. In this overlap shows connection points (between different WP) for the further work of FLAGSHIP.

Territorial development covers many areas, which is why the analysis is sub-divided into five sub-themes, approximately corresponding to the themes of previous chapters: i) Resources & Environment; ii) Economy & Growth; iii) Knowledge & Technology; iv) Demography & Society; v) Governance

The findings of this illustrate the importance of place-based approaches for territorial governance, emphasising the needs to better consider local and regional development conditions and the involvement of ‘local elites’ and their tacit knowledge in multi-level governance approaches (see Barca 2009).

### **0.1.10 Key megatrends and derived uncertainties**

The territorial dimension of each of the following thematic areas is the following:

Resources & Environment. An increasing number of possibilities of mobility offer the opportunity for the population to develop more contacts and experiences encouraging further integration with global actors. The growing concerns triggered by the environmental challenges have proven to have beneficial effects on several issues, e.g. inducing energy efficiency improvements, introducing sustainability plans for electricity (e.g. European smart grid). The need of adaptation to climate change is in fact favourable to the development of new technologies. However, a significant part of the European population does not benefit from these advances, highlighting the persistence of territorial and/or social exclusion. The lack of common decisions to bring global solutions to environment and resource availability challenges raises risks of geopolitical conflicts but also possibilities for increased cross-border cooperation.

Economy & Growth. Despite an increasing convergence of European regions in the 2000s, a structural gap between south and north is persistent. The crisis has increased the focus on the sustainability of the financial policies in the EU, but in different degrees for different Member States (e.g. Italy, Germany or Portugal may have more sustainable financial policies than e.g. Luxembourg, Slovenia and the UK according to Stiftung Marktwirtschaft 2012). In parallel to globalisation, there is an increasing interest on local-based economies, with a growing number of local economy movements focussing on small-scale businesses

serving smaller geographic areas. Abandoning one-size-fits-all-strategies for territories along with the increasing emphasis on local economies leads to new strategies for economic development. The challenges that the economic crisis brings become a push factor for new creative solutions to societal problems, and increased social innovation.

Knowledge & Technology. The ICT infrastructure in Europe, being well developed in most areas, gives a solid basis for future innovation and materialising benefits derived from it. Despite this, the territorial development is influenced by the uneven distribution of investment in R&D and access to a performing IT infrastructure across Europe, implying a risk of marginalisation of certain territories, and promoting a technological divide across Europe.

Demography & society. EU facilitating a more smooth movement of labour has resulted in an increasing border-less labour market, which constitutes an asset for both workers and regions. Migration is an advantage for many regions, if the local labour supply is not sufficient. It can bring more interaction across borders, and act as a facilitator of international network building. However, migration (especially gender specific migration) increases the impact of out-migration from rural and peripheral areas, constituting a fertility-drain impacting on shrinking and dying towns and villages.

#### Governance

The European Integration is largely linked to economic ideas and developments. Market forces increasingly shape processes of European integration, striving towards an increasing harmonisation and integration of the European Single Market, but also the development of a European Research Area. A stronger role of the EU is expected in the mid term, maintaining relevant competencies ultimately at the disposal of the Member States but where the formulation and implementation of policy will be increasingly Europeanized and Brusselized by functionaries and services housed permanently at Brussels" (Barbé, Esther 2004).

In parallel, the role of the civil society is expected to increase, a trend that can already be observed in the fact that there is (a) an increasing readiness of people to express their opinions not only in elections and debating circles, (b) a decreasing consensus in society on how to cope with societal challenges which may point at increasing differences when it comes to values on which a society is based, and (c) an increasing disaffection with established democratic political channels, going hand in hand with a decreasing participation in public elections.

Aiming at enhancing the territorial cohesion of European territories, getting out the most of the territorial potential and minimising unbalances from previously reviewed developments, the following two principles are being integrated in the European policy making.

- *Policy integration / coordination.* Policy-making and governance processes focus progressively more on integrated approaches to be able to respond to complex challenges and trends. This concerns horizontal coordination or integration between different sectors, as well as vertical integration between different policy levels. In the case of territorial or regional policies it covers even approaches towards territorial policy integration or territorial impact assessments (Barca 2009; Böhme et al. 2011; TA 2020 2011). To a certain extend the trend of policy integration, goes together with a shift to more strategic approaches.
- *Place-based policy making.* An increasing trend stressing the role of local elites and the consideration of the territorial context in governance processes. This covers various types of participatory planning, community mobilisation and decision making trends. When it comes to territorial policies it is most pronounced in the

'place-based approach'. The focus is usually on the development of long-term strategies with the aim to reduce the underutilisation of resources, making use of people's tacit knowledge and capacities (Barca 2009; Böhme et al. 2011; TA 2020 2011).

In order to understand how these are used and implemented, three basic types of territorial governance, reflecting the status quo, are presented (following trends are based on Bauman 2012; ESPON 2012f; Faludi A 2012; Flockhart T 2010; Huber 2011; Leonardi and Nanetti).

- *Resistance: Territorial governance practices by conformity.* It implies incremental rise in multi-level government, in cooperation within government, and in the involvement of socio-economic stakeholders in TG. Governmental entities keep their prominence as primary actors in the formulation and evaluation of policies; socioeconomic stakeholders are queried only when policies are being formulated; and citizens are queried basically to fulfil formal or legal requirements. Participation is generally designed to provide answers to regulatory dispositions, either EU or national-related.
- *Adaption: Political-administrative based territorial governance practices.* This basic type reveals a wider openness on the part of governments and administrations towards territorial governance mechanisms; nevertheless, the state, at different administrative levels, does not waive its role as the most important policy agent.
- *Transformation: Functional based territorial governance practices.* It is based upon the establishment of coalitions between governmental and non-governmental entities in which spaces of intervention have a predominantly functional nature and fuzzy boundaries not coinciding with political or administrative limits. Where bottom-up processes are more effective and granted a chiefly role, citizen participation may take a deliberative form.

Furthermore possible future governance scenarios, which are likely in a scenario of disruption, have been identified:

- Marginalisation of the EU-Cohesion Policy: De-mainstreaming territorial governance in a context of "perfect storm"
- Political federalism: territorial governance in a context of EU-Led centralised decentralization
- Return of the state: Territorial governance in a context of state-led centralised decentralisation

# 1.- D1.a “Financial, Economic Development and Innovation Trends and Challenges”

## 1.1 Megatrends at Global and European level

### 1.1.1 Megatrends and drivers

#### 1.1.1.1 Introduction

In the current economic situation, it is unavoidable for Forward Looking Analysis (FLA) focusing on economics to look at short as well as at long term perspective. The current economic crisis in the developed countries and more particularly in the European Union has totally modified the previous analyse. Five years ago, before the 2008 financial crisis, the economic development in EU appeared to be sustainable in the long run and even more economic development in some EU countries had been elevated as references (e.g. Ireland or Spain) for others countries. And at this time, the unemployment rate in EU was at a low (7.2%) and the main economic concern for the European economy appeared to be its ageing population and the potential shortage of labour supply in the coming decade. Then, even if structural challenges for European Union will remain in the long-term, the stagnation of the economic growth since 2008 in EU has brought the concerns to short-term. Therefore, when looking at economic futures, it seems also important to look at the pathway from short to medium-long term. The current economic crisis in EU as well as its recovery path will impact the medium-term economic development of the EU.

#### 1.1.1.2 Growing global economy in the long-term

**Short-term global economic growth: overcoming the crisis.** According to IMF, in emerging countries, the real GDP growth rate is supposed to rebound from 2012 slowdown but the economic growth up to 2018 is assumed to be below its previous level. In Japan, the fiscal and monetary stimulus of Abeconomics allow Japan to get back to positive GDP growth in 2013, but the economic growth will remain weak after 2014. At the opposite, the recovery in US is expected to continue up to 2015 with 3.6%, pulled by internal demand. This return of high economic growth in US allow the creation of new jobs and the decrease of the unemployment rate which is expected to reach almost its pre-crisis level in 2018. All international organisations forecast a second year of recession in the EU followed by a fast recovery period between 2014 and 2015, and a more smooth growth thereafter.

**Long-term global economic growth.** In 2007, the World Bank forecasted a sustained 2.9% yearly average World economic growth between 2008 and 2030, almost doubling GDP at the moment (W.Stevens, 2007). Despite the crisis, global GDP growth levels are projected to increase from 3.3% to 4.5% by 2017 according to IMF, while China is expected to keep growing above 8% yearly at least until 2017, and India above 6%. (IMF 2013). However, most forecasts agree on a slowdown of potential GDP growth in emerging countries and especially in China where the labour force should decrease from 2020 on.

- **Long-term forecast by the Conference Board (*Global Economic Outlook, May 2013*).** The GDP growth projections appear relatively pessimistic for emerging economies. The GDP in China is expected to grow at 5.8% up to 2018, and 3.7% between 2019 and 2025, a weak growth resulting from almost null contribution of the labour quantity and quality and from a weak growth of TFP. Similarly, the GDP growth in India is expected to slow down at 4.7% up to 2018 and 3.8% thereafter.



In EU, low GDP growth expected for France, Italy or the UK (1%, 0.9% and 0.8% respectively during 2019-2025). The USA and Japan economic growth are supposed to be closer from their pre-crisis level with 2% and 0.9% respectively.

- **Long-term forecast by the OECD (*OECD Economy Outlook, Long-run growth, May 2013*).** OECD long-run potential GDP growth projections can be characterised by a global slowdown, World GDP is expected to grow at 3.7% between 2012 and 2017, 3.6% between 2017 and 2030 and 2.2% between 2031 and 2060. The OECD projections are more optimistic for developing countries than the Conference Board. China could grow about 8.4% between 2012 and 2017, 5.4% between 2018 and 2030 and 2.1% between 2031 and 2060, with slowdown in the long-term mainly due to a decrease of the labour force and (at a lesser extent) to the decreasing TFP growth. In India the slowdown of the potential economic growth is weaker with 6.8% (2018-2030) and 4.3% (2031-2060) resulting from a still growing labour force. In developed countries, similar figures are expected but at a lesser extent. USA and Japan growth of potential GDP fall to 1.7% and 1.1% respectively between 2031 and 2060. Nevertheless, between 2018 and 2030, several European countries should potentially grow faster than between 2012 and 2013.
- **Long-term forecast by the CEPII (*The World economy in 2050, 2012*).** Compared to other projections of potential GDP, the CEPII' ones display also a slowdown of the GDP growth up to 2050 but less emphasised than in the previous studies, especially in the emerging countries. In China, potential GDP growth rate is expected at 6.1% between 2015 and 2030 and 4.1% between 2030 and 2050 (despite similar expectations on the decline of the total Chinese labour force after 2020, the growth of TFP is assumed to remain high contrary to the other forecasts). In the USA GDP is expected to grow 1.6% up to 2030 and 1.7% thereafter up to 2050 (less than in the previous studies). The CEPII projections for EU are a little bit less optimistic, with 1.5% up to 2030 and 1.6% up to 2050. The economic growth in Germany is expected to be weak with 0.5% between 2015 and 2030 and 0.9% between 2030 and 2050. Similarly, Italy potential GDP growth is estimated at 0.3% during the first period and at 0.8% in the second.

**In the winter of a K-Waves.** The Kondratieff theory explains that economy expands and contracts according to regular cycles (K-waves). Kondratieff's observations postulate that capitalist countries tend to follow the long rhythmic pattern of approximately half a century (averages 54 years in length). By the end of a 25-30 year upwave period, heating of economy sets the stage for a deep recession that jolts the economy. The recession, which begins about the time commodity prices break from their highs, is longer and deeper than any that took place during the upwave. The depression marks a new era in which new technologies and social practices are developed which in turn heralds a new period of rapid growth. It has been suggested that the transition between successive k-waves is marked by technological changes (W.R.Thomson). Credit and banking also play a crucial role on cycle transitions, as new technologies spur growth, initiative and risk taking. Based on Thompson's analysis long K-cycles have nearly a thousand years of supporting evidence. Under the hypothesis of winters in K cycles lasting around 20 years, this would indicate that we are about halfway through the Kondratieff winter that commenced in the year 2000. (C.Quigley). A recently published report on global change in the foresight tradition (Finland Futures Research Centre, 2012) suggests that in fact what is currently being experienced is a 'socio-technologic paradigm shift', described as the shift from ICT (1970-2010) to intelligent technologies (2010-2050). This would be the sixth wave since 1780. Previous waves are labeled as the Steam engine wave (1780-1830), the Railway and steel wave (1830-1880), the Electrification and chemicals wave (1880-1930), and the Automobiles and petrochemical wave (1930-1970). According to this report, the 6<sup>th</sup> wave would primarily be driven by resource efficiency because of environmental strains and increasing scarcity of natural resources. The

development of new technologies (biotechnology, nanotechnology, combined with exponentially growing ICTs) would become the major driver of the 6<sup>th</sup> wave.

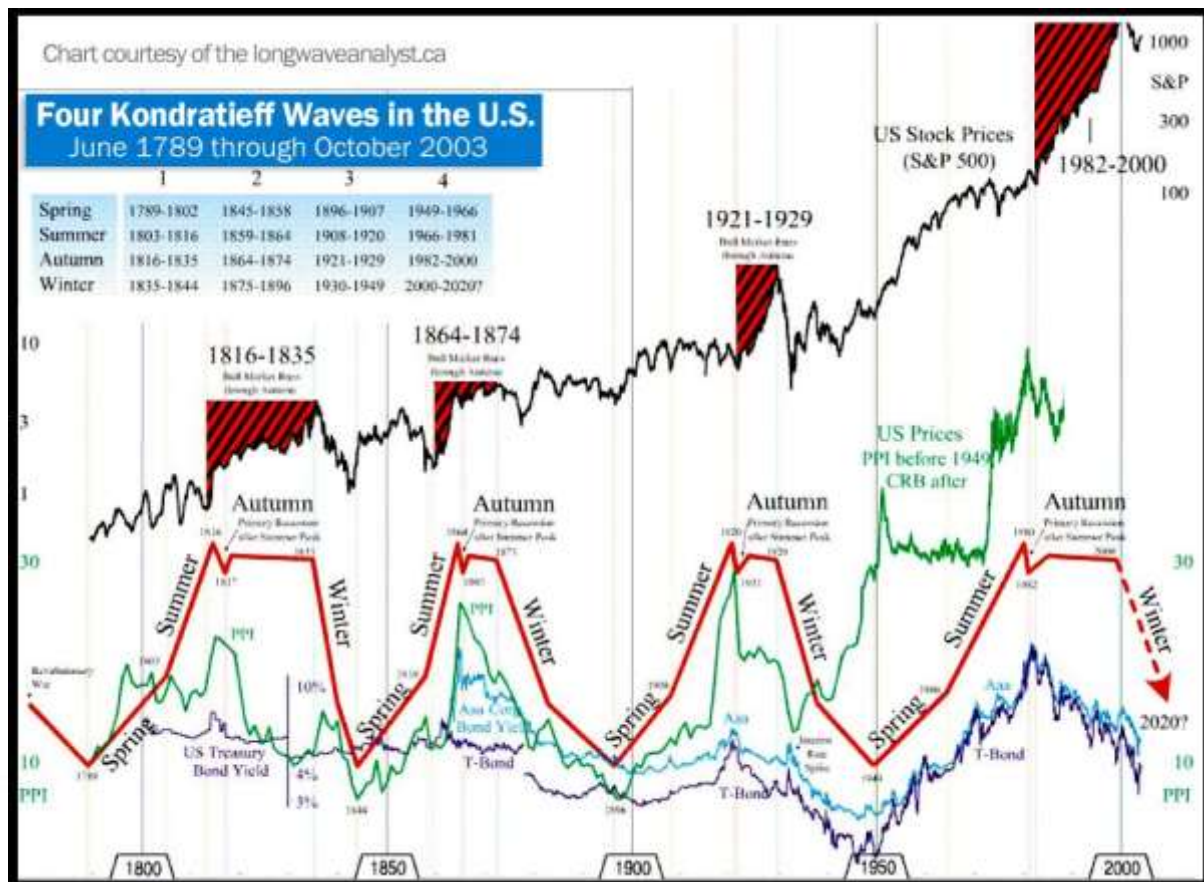


Figure 2 – Kondratieff Waves in the US 1789-2003  
Source: longwaveanalyst.ca

### 1.1.1.3 Increasing global flows

**In the age of Globalisation.** Since 1990s the World has experienced amazing accelerated changes in terms of demographic growth, information and communication technologies and information flows, integration of global financial systems, exponential increase of global trade, and tourism, emergency of Asian economies with China expected to become the first economic power in coming years, increasing oil prices and growing environmental concerns. In the “financial global capitalism system”, as it is often called, corporative profits have been increasingly decoupled from productivity, attached to future elusive expectations wherever they may be around the world. In this technologic and economic system, we have seen the fast development of the so-called “Space of Flows”, a “Networked Society” that blurs political borders, diminishes the power of Nation-States and in many aspects subverts geographic distances: neighbouring places became distant and remote locations much close if well connected to just-in-time communication networks. But the world is not flat: distance still matters but has a different meaning, for instance looking at the concentration in specific places (e.g. business districts in “global cities”) and the dispersion of extensive lower value activities worldwide, in regions with still cheap salaries. The number of large metropolis have grown worldwide, but not much in Europe.

**Growth of the World’s Middle Classes.** A Global Middle Class is emerging worldwide, approximately 100 million per year (Goldman Sachs, 2009), and their consumption level is also rising. The gap in GDP and welfare between European countries and emerging developing countries worldwide is getting reduced. Growing middle classes in developing



countries are likely to increase demand for rule of law and government accountability, and explode global consumption patterns, as well as transport and tourism worldwide. This may have positive consequences on the World economy, but also increases the pressure on resource consumption and environmental impacts. However, it can happen also that this trend gets smoothed if much of the BRICs new middle class consumption turns to be rather domestic, with a then lesser impact on global trade.

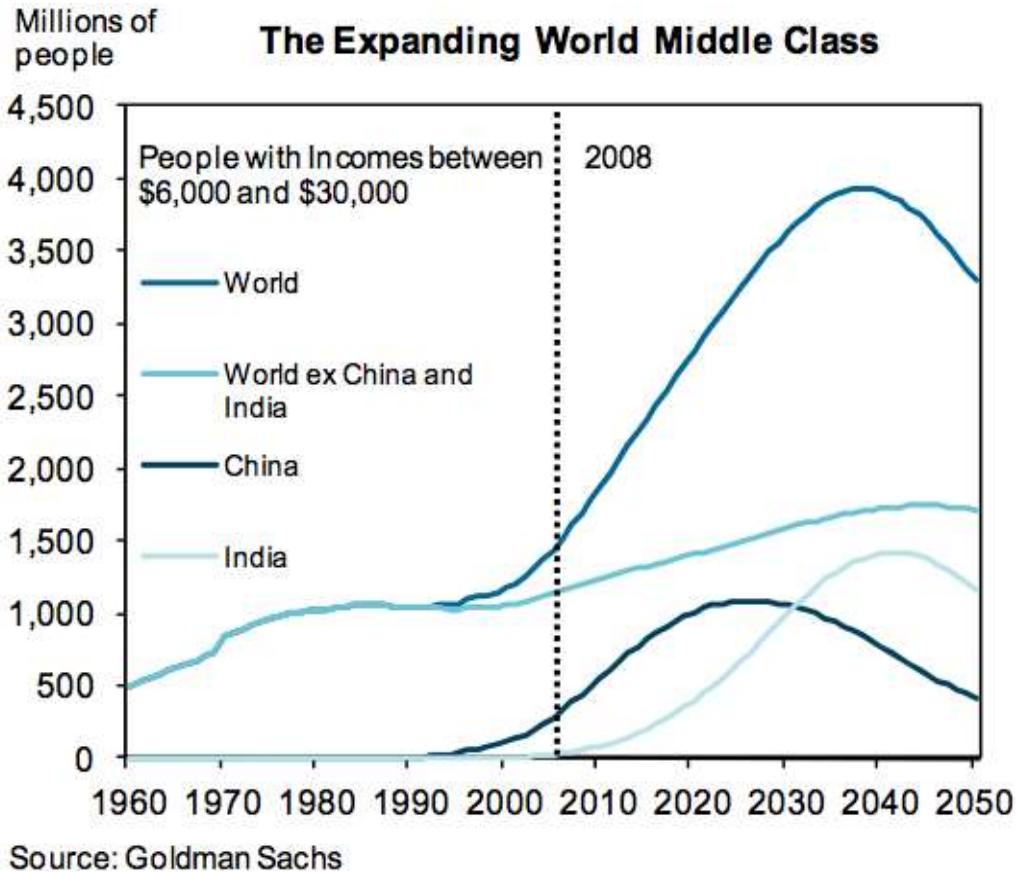
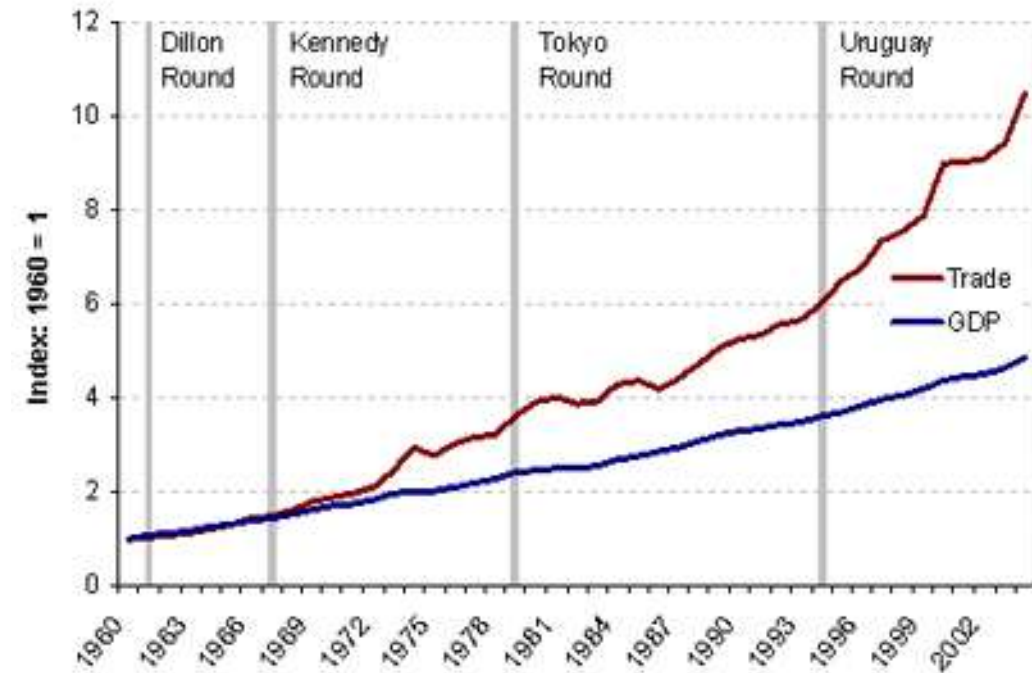


Figure 3 - Total Number of World Middle Classers (in millions of people)  
Source: Goldman Sachs 2008

**Rise of World trade.** Global trade multiplied by more than 10 times between 1960 and 2005, a significantly higher path than world output's ever since the early 1970s. The figure below reflects the considerable amount of trade liberalisation at the global level during the last quarter of the 20<sup>th</sup> century, along with GATT and WTO trade rounds. One recent study finds that China will overtake the United States and dominate global trade in 2030; China will feature in 17 of the top 25 bilateral sea and air freight trade routes (UNCTAD, 2011). Exports and imports account for around 40% of EU GDP in average. European imports and exports in merchandises and services more than doubled between 1995 and 2007 (AMECO DB, ECFIN 2013). Most important external trade partners of the EU are USA (18% of exports), China (8,4%) and Switzerland (7,8%). There has been a replacement of the USA towards China as regards to the main exporter towards Europe, while European exports are still mainly towards the USA. The comparison of Chinese figures against USA and, specially, Switzerland clearly indicates the growth potential for trade growth.

**Chart 1: Growth in Global Trade and GDP 1960–2004**



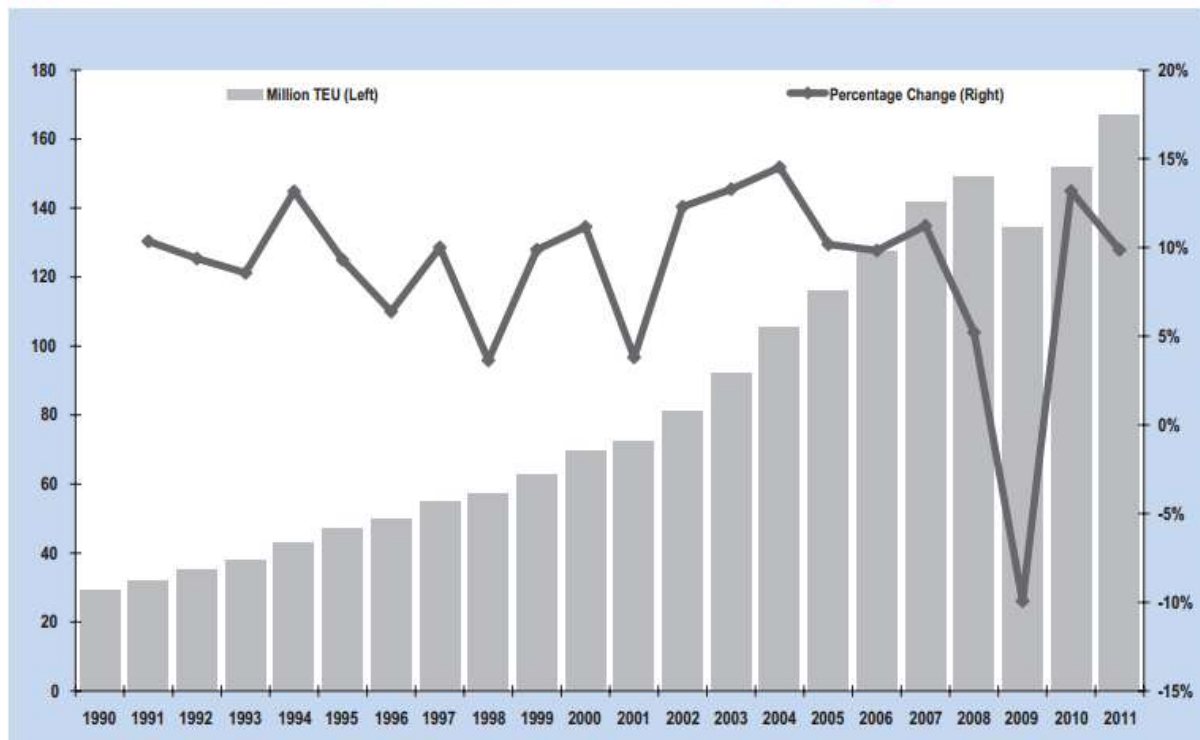
Source: World Bank WDI, Constant 2000 US\$ basis

Figure 4 - Growth of Global Trade and GDP 1960-2005 (1960=100)

Source: World Bank WDI

**Rise of intercontinental container freight transport.** Developments in the world economy and merchandise trade drive developments in seaborne trade. World seaborne trade in 2010 bounced back from the contraction of the previous year and grew by an estimated 7% surpassing the pre-crisis level reached in 2008. In 2010, seaborne trade continued to be dominated by raw materials (aprox 32%), and dry cargo including containerized (aprox 40%); the remainder (aprox 28%) is made of the five major dry bulks (iron ore, coal, grain, bauxite and alumina and phosphate). Container trade, the fastest-growing cargo segment, expanded at an average rate of 8.2% between 1990 and 2010, from representing a share 2.5% of total in 1990 to 16.6% in 2011. Major container flows happen between Asia and Europe (20.3 MTEU in 2011) and between Asia and North America (18.7 MTEU in 2011). East-West traffics are about twice as big as West-East traffics. About \$16 billion is spent yearly by the shipping industry repositioning empties (16% of total costs). (UNCTAD 2011)

**Figure 1.5. Global container trade, 1990–2011 (TEUs and annual percentage change)**



*Source:* Drewry Shipping Consultants, *Container Market Review and Forecast 2008/09*; and Clarkson Research Services, *Container Intelligence Monthly*, May 2011.

*Note:* The data for 2011 were obtained by applying growth rates forecasted by Clarkson Research Services in *Container Intelligence Monthly*, May 2011.

*Figure 5 - Global container traffic 1990-2011*

Source: UNCTAD 2011

**Rise of long-distance World passenger transport.** The global aerial transport growth appears resilient to the current economic shock. Despite the financial crisis, total RPKs have grown between 2001 and 2011 a remarkable 53%. In fact, the air sector expects an average 4.7% yearly growth of traffics between 2011 and 2031, based on the fact and the experience of air traffic having doubled approximately every 15 years in the past. Traffics between today emerging countries could represent 38% of total RPKs, contrasting to today's 27%, while traffics between advanced economies would drop from 45% to 32%, according to Airbus. The growth of Megacities in the World would also motivate that 90% of the long-haul air passengers in 2030 travel between these.

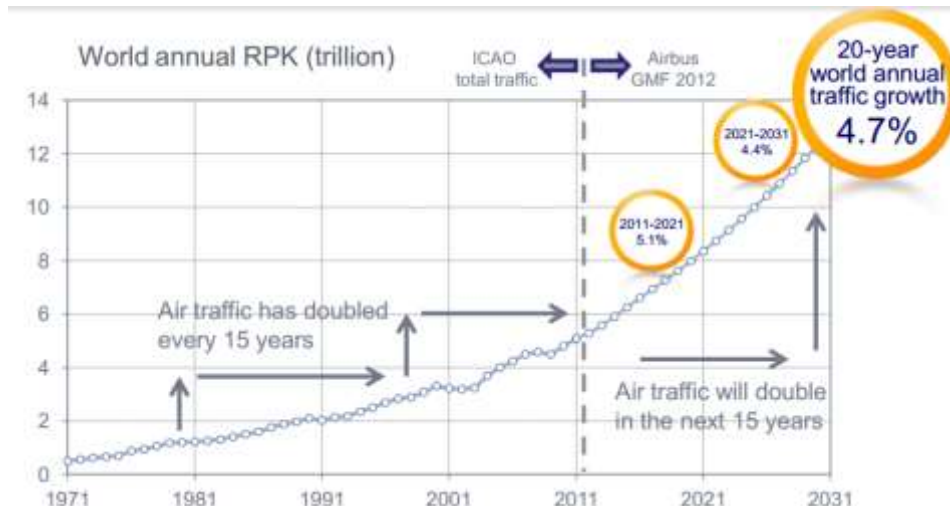


Figure 6 - Growth of Global Aerial Traffic  
Source: Airbus 2013

**Rise of World tourism.** Tourism went from 700 million tourist arrivals worldwide in 2004 to almost 1 billion in 2011. The activity is expected to keep growing, between 50% and 100% up to 2030 according to the UNWTO in 2011, depending on scenarios. Previously to the crisis, growth was sized in 60% between 2010 and 2020. Tourism in the 50s represented only a tens of millions. Tourism is the world's largest income earner and was worth \$500 billion in 2007. In 2008, there were over 922 million international tourist arrivals, with a growth of 1,9% as compared to 2007. Along time, there has been a continued dominance of Europe as a destination, but more recently there have been emergence in East Asia and the Americas. The growth of the World middle classes, the effect of globalisation and the availability of affordable transport are key to explain the growth of international tourism. France, Spain, the USA, China, Italy and the UK are the most visited countries in the World.

#### International Tourist Arrivals, million

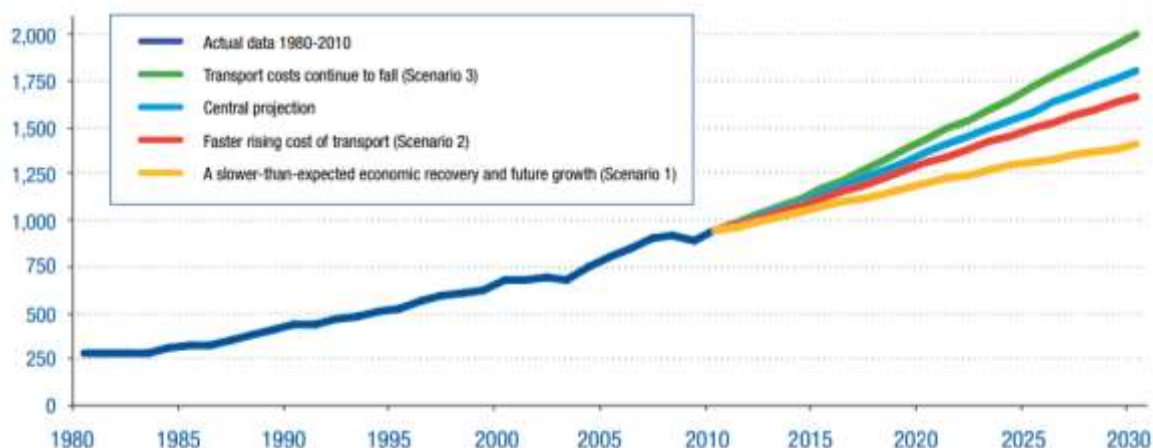


Figure 7 - International Tourist Arrivals 1980-2030  
Source: UNWTO 2011

**"Economic growth is a much more influential variable than transport cost. In a central scenario, international tourist arrivals worldwide are expected to grow at an average annual 3.3% and to reach 1.8 billion by 2030." (UNWTO 2011)**



### 1.1.1.4 A more plural World geopolitical framework

**The increase in the number of World actors.** The increase in the number of players alone implies that the dominant influence of the West will diminish. Increasing of the economic strength of Chinese and Indian corporations, at global level. Increasing external exposure and vulnerability of cities and regions, since there will be an increasing competition at global level. The economic shift towards the east will build new export markets, trade relations, business models and cultural ties. However, according to some (Panos Mourdoukoutas, Forbes 2013) conditions in e.g. China are such that it will be difficult for it to become the world economy leader (1- finite World market frontier for China, 2- citizen's lack of entrepreneurship despite remarkable exceptions, 3- the right cocktail of markets and government and 4- lack of business mind-sets placing consumers rather than government at the centre).



Figure 8 - Total Nominal GDP (top) and GDP based on PPP (bottom) for EU27, USA, and China 1980-2018  
 Source: IMF 2013

***"China has already overtaken the EU as the second largest economy in the world, and can be expected to surpass the U.S. economy as the world's biggest economy around 2016" (in PPP) (OECD 2013)***

**Shrinking role of Europe in the World since the 1970s.** After WWII, European Western economies raised in relation to USA largely because effective social and economic public policies and strong pro-growth social values, in a catching-up process, in the so called "European Model". However, the European GDP in the World context, having already dropped from 37% in 1970 to 28% in 2010, will still decrease towards 2030 and 2050 (up to 20% in 2030 and 17% in 2050 according to UNCTAD). But the diminishing role of Europe in the World can also be perceived in many other areas such as population, trade, transport, tourism. The shrinking role of Europe in the World is caused both by a decreasing dynamism of the European society and the rise of new global players.



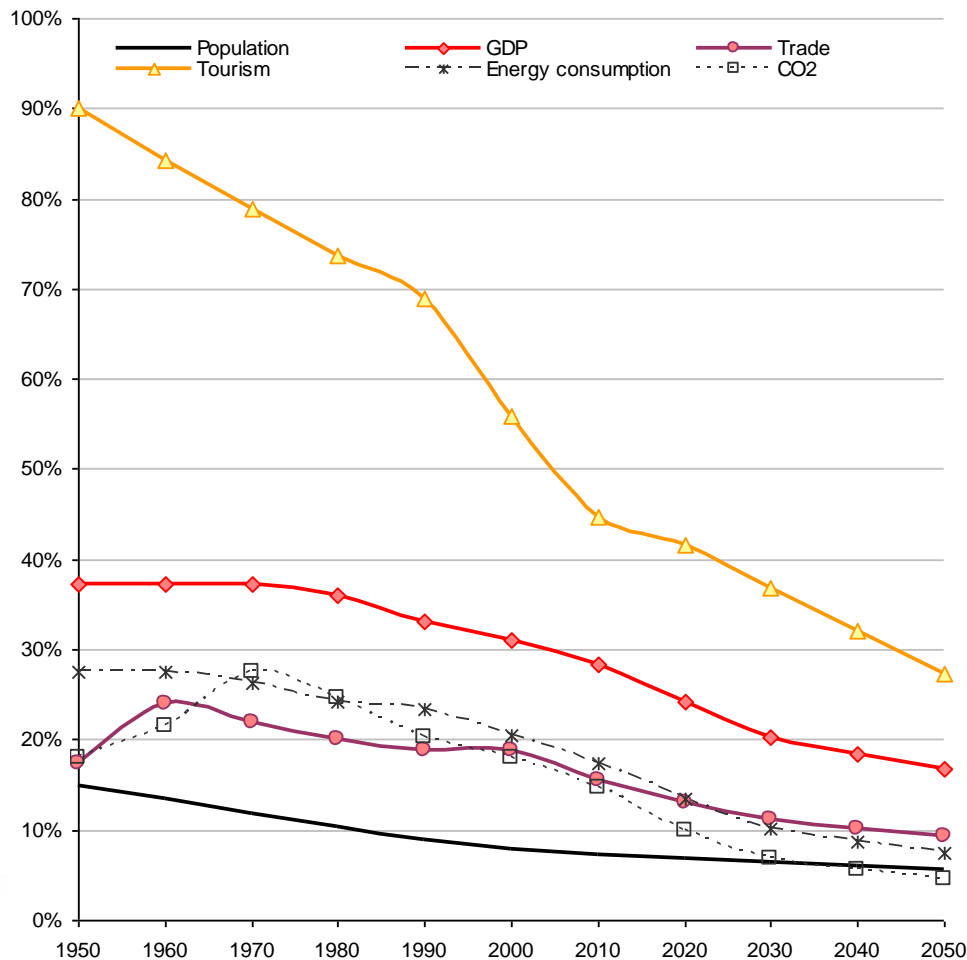


Figure 9 - Diminishing weight of Europe in the World  
 Source: ESPON ET2050, based on various sources 2012

**Increasing importance of World trade not involving developed countries.** With 40% of the world's population in the BRICs, concentrating already 25% of global GDP, and being expected to experience a continued rise in their internal market consumption, the intensity of their trade with one another, often in local currencies, will be increasing fast, becoming more independent from today's developed World. The shift in global reserves is a key indicator of the power shift away from the developed to the emerging economies. (W.Hankel & R.Isaak, 2011).

**Rapid growth of financial assets with an increasingly balanced global distribution.** Global finances have grown much faster than trade, in an unregulated process, often creating unstable dynamics (e.g. crisis in Asia in early nineties, crisis related to subprime in 2008). Paradoxically, developing countries such as China, that have strict regulations for the use of international private funds to finance their growth, used to transfer public savings to finance Western public debts; at the same time, private savings and private direct investments in Western countries have been increasingly transferred to developing countries where more business opportunities exist in the coming years. By 2020, emerging markets' share of financial assets is projected to almost double. (W.Hankel & R.Isaak, 2011). The global share of financial assets is expected to become much more evenly distributed around the world. (US National Intelligence Council, DNI, 2012).

### EMERGING MARKETS' SHARE OF FINANCIAL ASSETS, 2000-2020

By 2020, emerging markets' share of financial assets is projected to almost double. <sup>a</sup>

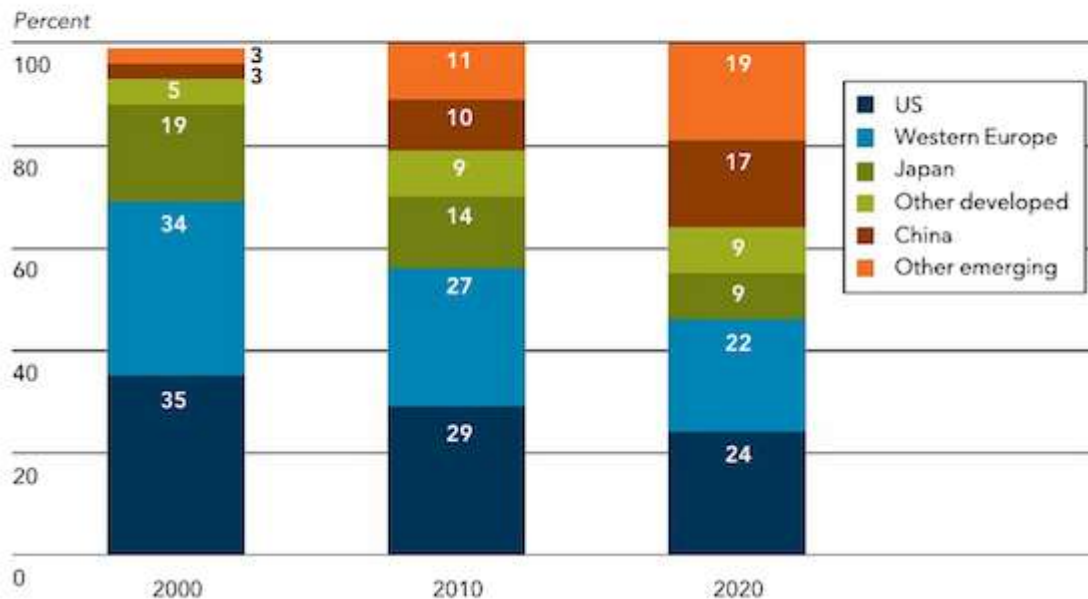


Figure 10 - Emerging Markets' Share of Financial Assets 2000-2020  
 Source: Global Trends 2030: Alternative Worlds, DNI

**Decreasing inequalities between world regions.** World disparities got reduced severely in the last 40 years, with poverty rates going from .27% to .08% between 1970 and 1990 (using the official \$1/day line), and GINI inequality coefficient (based on country GDP per capita) going from .65 to .61 between 1990 and 2006. The number of people below the \$1 a day poverty line has shrunk by nearly 64%, from 967 million in 1970 to 350 million in 2006, even when the World population has increased by about 80% over this time according to World Bank in 2009 (Pinkovskiy, Sala-i-Martin, 2009).

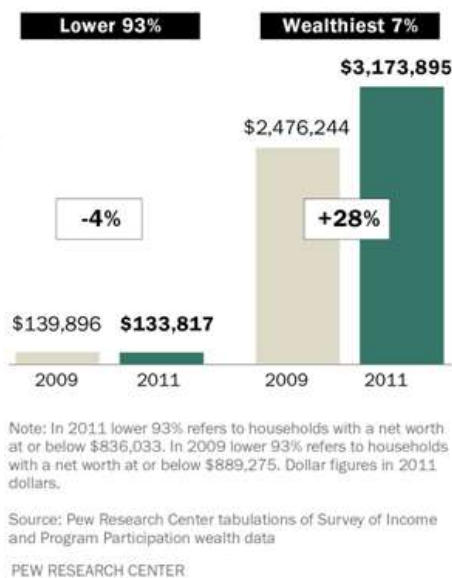


Figure 11 - World GINI inequality  
 Source: Pinkovskiy, Sala-i-Martin, 2009

**... but increasing social inequalities within regions.** However, the richest 1% in the World control 39% of World's wealth, up from 37% in 2009, and the number of millionaire households in the world grew by 12.2% in 2010 (*Boston Consulting Group's Global Wealth report*, 2013). In the USA, the Pew Research Center claims in a recent report an enormous growth in social inequality in the United States between 2009 and 2011, finding that the poorest 93% of US households saw, on average, a 4% decline in their net worth during these two years, while the wealthiest 7% saw their net worth increase by an average of 28% (*Pew Research Center*, 2013). The privatisation of state enterprises in China and the housing and social benefits that accompanied them, the re-zoning of rural land for industry, and a construction boom, created enormous possibilities for personal wealth according Credit Suisse report in 2012; although the average wealth per Chinese citizen was \$17,126 - almost double that of other high growth economies such as India - median wealth was just \$6,327, and the GINI coefficient of China stands at 0.47, above that of the USA and above the 0.4 threshold regarded as a warning level for dangerous levels of inequity (*2010 Credit Suisse Global Wealth Report*). In Europe, disparities between regions in countries is also on the rise; the Europe of 2 speeds also shows up within southern countries like Spain, where the north-south divide is increasing in terms of GDP per capita, exports, personal consumption, unemployment (*El País*, 03-31-2013). In many parts of the world, informal low-class neighbourhoods increasingly limit with top-end luxury closed condominiums, giving strong contrasts between the rich and the poor.

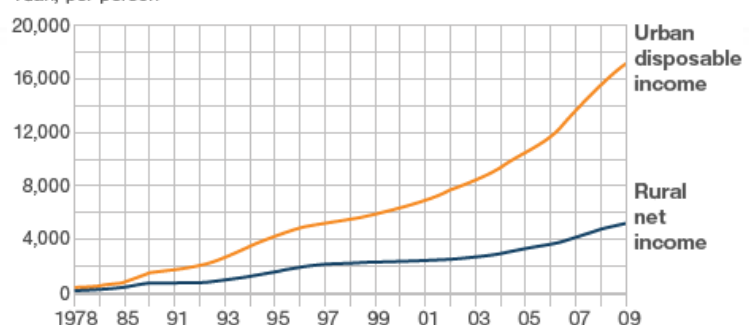
#### An Uneven Recovery

Change in net worth per household, 2009-2011



#### Income in China: urban vs rural

Yuan, per person



Source: National Bureau of Statistics of China

Figure 12 – Increasing social disparities with the USA (left) and China (right)  
 Source: Pew Research Center 2013 (left); Credit Suisse Global Wealth Report 2010 (right)

#### BOX 1 - Chinese future uncertainty

Since 1970, the Chinese economy has known an unprecedented economic development with on average 9% of GDP growth per year. Therefore, the GDP per capita has moved from US\$ 122 (constant 2000 US\$) in 1970 to more than \$2,600 in 2011 i.e. a multiplication of almost 22 times in 40 years. In comparison, the US GDP per capita has only doubled during the same period, passing from 18,200\$ to 37,700\$. Nevertheless, this economic development in China is not driven by the same components than in other countries.

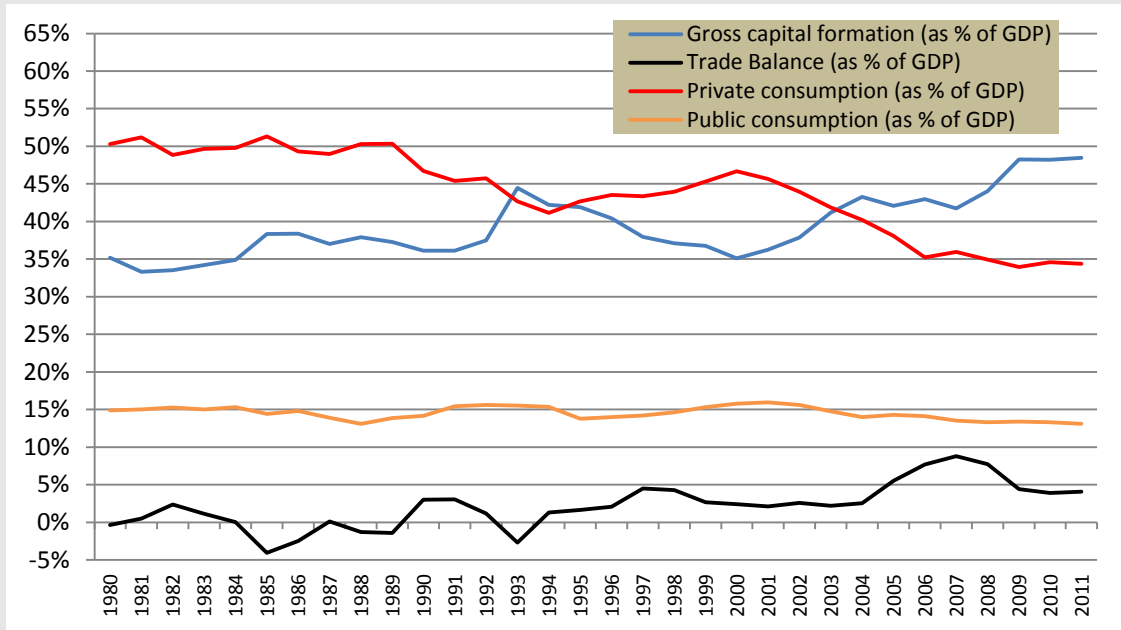


Figure 13 - Chinese GDP components in % of GDP  
Source: World Bank, 2013

Previous figure displays the importance of each GDP components in the Chinese GDP since 1980. Three different periods can be identified:

- From 1980 to 1990, where each component is relatively stable; a households' consumption around 50%, investments about 35%, 15% for government' final consumption and between - 4.1% and +3% for trade balance.
- From 1990 to 2007, the households' final consumption decreases from 50% to 35% of GDP whereas investments and trade balance increases from 35% to 45% and from 0% to almost 9%.
- And finally after 2007, the surplus of trade balance has been divided by two to reach 4% in 2011 and gross capital formation has reached almost 50%.

These figures display the importance of the capital formation in the current economic development of the Chinese economy. Indeed, following the 2008 financial crisis, the China has faced a decrease of the international demand which has implied a significant reduction of its external trade surplus. To offset this slowdown of the exports (from 39% of GDP in 2006 to 31% in 2011), the investments have been pushed up (from 42% of GDP in 2007 to 48% in 2011). Furthermore, the households' final consumption remains weak with around 35% of GDP. Therefore, the high Chinese economic growth is maintained thanks to huge investments (housing, infrastructure, etc). This situation is viewed, by several economists (e.g. Roubini, 2013 or Monan, 2013) as unsustainable in the medium-term. Indeed, without a raise of households' purchasing power and an increase of their consumption, these huge investments could be unprofitable, leading to a massive correction and could threaten the Chinese financial sectors.

For the same economists, even if the situations are not fully similar, the case of the Chinese economy reminds the 1997 Asian financial crisis. Regarding next figure, for Thailand, the situation was relatively similar with a very high share of capital formation in the GDP and a weak internal demand. Nevertheless, at the opposite end of the Thailand in 1997, the Chinese economy encounters a trade surplus that facilitates the control of its currency.

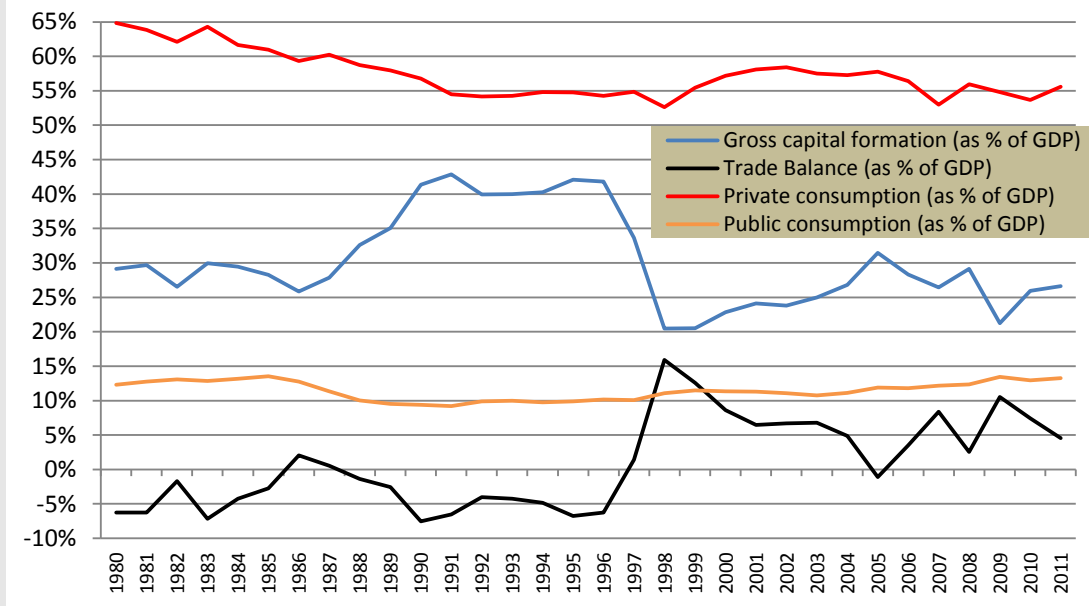


Figure 14 - Thailand GDP components in % of GDP  
 Source: World Bank, 2013

Thus, the economic development of China, despite some elements of stability such as a strong external surplus, a relatively skilled labour force and an efficient political equilibrium, could face an important collapse. Indeed, if the internal demand remains at the current low level, the returns on investment of the capital will not be ensured, which would depress the investment goods sectors and the financial sector. Finally, a collapse of the Chinese economic growth would have some major consequences for the economies in the rest of the World.

#### 1.1.1.5 Europe muddling through the financial crisis

**Sustained pre-crisis economic growth.** The European Union was growing around 2,5% before the crisis, below the 3,2% of the US but above the 1,2% of Japan. Within Europe, the new 12 Member States have significantly outperformed the old 15 Member States, by almost 2%, a very significant difference but still insufficient to fill the gap between the two groups in terms of income per capita. From 2005 to 2007, the European GDP growth was driven by the increase of households' final consumption (contributing about 1.3 pt to GDP annual growth rate), gross fixed capital formation (from 0.7 to 1.3 pt) and Government' final consumption (around 0.4 pt) while trade balance had no contribution to GDP growth.

**Short term economic forecasts: back to economic growth in 2014?** In the short-term, experts forecast a second year of recession in EU which will be followed by a smooth recovery period. The recovery period is penalised by the former imbalances correction in the Eurozone through wages moderation and through a fiscal consolidation. The last document DG ECFIN short term economic forecast for the EU and several others countries (ECFIN, 2013) expects a second year of recession in EU after 2012, with -0.1% of real GDP growth rate, and a return of the economic growth in 2014, with +1.5%. The last economic forecast of the OECD provides similar figures for real GDP growth for European Union countries, with a GDP growth rate about -0.1% in 2013 and 1.3% in 2014 for Eurozone. Opposed to the EU, very few other OECD countries have been in recession since 2009 (only Iceland in 2010 and Japan in 2011), and the economic growth for OECD countries is projected to rise from 1.4% in 2012 to 2.3% in 2014. The IMF forecasts the recovery period to continue until 2018 (with 2%), but the largest part being achieved in 2015 (with



1.7% of GDP growth), nonetheless, the expected economic growth in EU do not reach its pre-crisis level (around 3%) (IMF 2013)

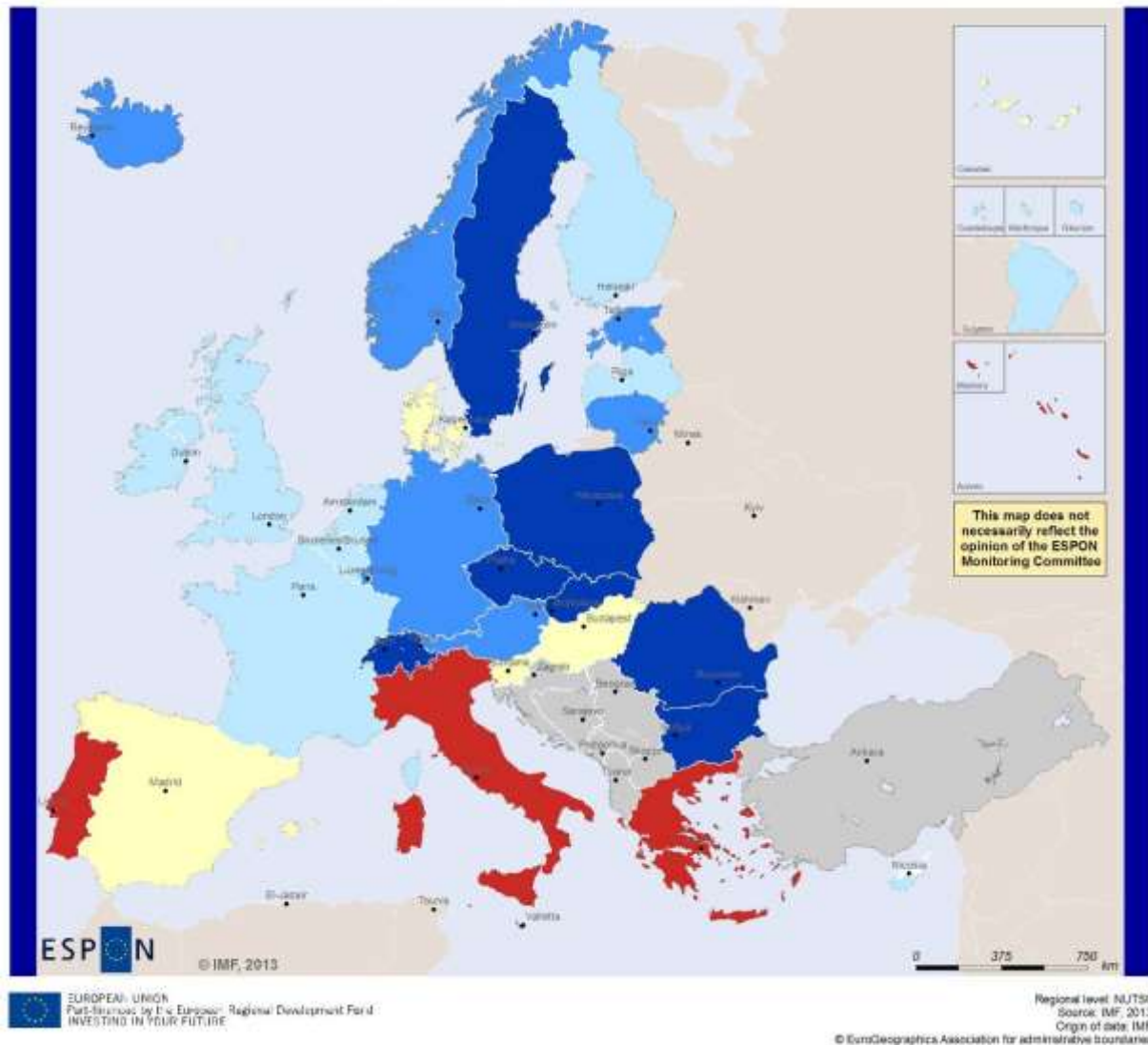


Figure 15 - Profile of recession and recovery of historical crisis. UK as an example  
Source: NIESR 2013

**"Depression" defined as the time period during which output remains below its previous peak is now longer than that experienced during the Great Depression, and is not likely to end any time soon (J.Portes 2012)**

## GDP Growth 2008 - 2017, 10 years period (Source: IMF 2013)

Measured as annual average GDP growth rate along the period



### GDP Growth annual average rate (Units: %)

Results obtained by IMF

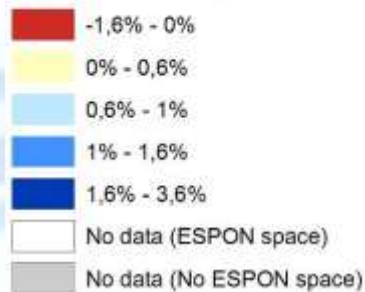


Figure 16 – European economic growth 2008-2017 (yearly ave.): IMF historic records and forecast  
Source: IMF 2013

## **BOX 2 – Roots and nature of the financial crisis**

### Genesis of a financial crisis

'Anglo Saxon' finance is often assumed to have been at the root of the financial crisis. But the US economy is now (2013) visibly recovering because its banks seem to be in better shape whereas in Europe the banking sector continues to constitute a source of problems. In order to understand this one has to look more closely at the genesis of the crisis.

Experience has shown that major financial crises arise after a credit boom, i.e. a sustained and unusual increase in credit and leverage. The expansion in credit goes usually hand in hand with an unusual increase in asset prices.<sup>3</sup> This is what happened prior to 2008 on both sides of the Atlantic<sup>4</sup>. Contrary to a widespread perception, in Europe the two trends which tend to lead to a crisis existed as much as in the US.

An important ingredient of a credit boom is a low degree of risk aversion, often rather the perception that risk is low. This was particularly the case before 2008 when the perception of low risk was justified by the notion that better macroeconomic policies had ushered the new era of the 'Great Moderation'. A combination of low interest rates and a stable macroeconomic environment seemed to make credit more attractive (relative to equity). It is thus natural that credit expanded on both sides of the Atlantic, leading in the end to a high level of leverage. When the 'Great Moderation' ended the stocks of debt which had been accumulated in the meantime suddenly turned out to be excessive relative to the new macroeconomic environment of a growth crises and a higher risk aversion. The 'great financial crisis' started in this way.

Leverage is defined in financial markets as the ratio debt to equity financing. A higher level of leverage indicates in general a lower capacity to absorb losses and hence greater fragility. In this respect there has been progress as Europe's banks which now have increased their equity cushion (from extremely low levels). European banks have thus increased, marginally, their ability to absorb losses.

But the likelihood of stress in the banking system (as opposed to the loss absorption capacity of an individual bank) can be measured better in macroeconomic terms via the ratio of credit to GDP. Leverage defined this way increases when credit expands relative to (nominal) GDP. A high level of leverage is an essential ingredient in any major financial crisis because it means that many agents have issued promises to pay a certain nominal amount but do not have necessarily the 'expected' regular cash flow to honor these promises. (See Minsky (2008) for the classical description of leverage leading systems towards instability). Since regular cash flows of individual units must on average be proportional to GDP, macroeconomic leverage can be measured by relating the stock of credit to GDP. It is not possible to establish an absolute benchmark for leverage as different financial systems can support quite different ratios of credit to GDP. However, changes over time, especially rapid increases in this ratio have been identified as reliable predictors of financial crisis.

### Credit boom and bust: a Transatlantic comparison

A steady increase in the ratio of debt to GDP was one of the major 'trends' in Europe until the crisis broke.<sup>5</sup> Total economy wide debt (defined here as all claims fixed in nominal value, excluding bank deposits<sup>6</sup>) increased in the euro area from about 250 % to over 330 % of GDP (between the start of EMU to the peak of the credit boom).

<sup>3</sup> See for example Adalid and Detken (2007) or Alessi and Detken (2009). According to Borio and Lowe (2002) a low inflation environment increases the likelihood that excess demand pressures show up in form of credit growth and asset *prices* bubble rather than in goods price inflation. If this is the case, inflation-targeting central banks with a 'myopic behavior' could contribute to financial instability (see de Grauwe, 2009) and de Grauwe and Gros (2009).

<sup>4</sup> See de Grauwe and Gros (2009) and Carmassi Gros and Micossi (forthcoming) on the reasons for this.

<sup>5</sup> We leave aside the question why the build up of the credit boom was ignored. Inflation targeting by central banks was probably one key reason. According to Borio and Lowe (2002) a low inflation environment increases the likelihood that excess demand pressures show up in form of credit growth and asset prices bubble rather than in goods price inflation. If this is the case, inflation-targeting central banks with a 'myopic behavior' could contribute to financial instability (see de Grauwe, 2009) and de Grauwe and Gros (2009).

<sup>6</sup> The leverage would be much higher if one included bank deposits, but this data does not exist for the US in a comparable form.

Table 2 provides some detail by sector. The last column shows the sum of the debt issued by all sectors (relative to GDP). But one has to look at the sectoral distribution of the leverage increase to understand the specificity of the crisis. Most of the increase in the euro zone came from the financial sector<sup>7</sup> whose leverage almost doubled from about 60 % to 112 % of GDP. Although the euro crisis is often considered a sovereign debt crisis this was not the key problem, least if one looks at the euro area average: Government debt actually declined slightly as a share of GDP (from 76 to 69 % of GDP). Other sectors (households and the non financial corporate sector) experienced also a rather moderate increase in leverage.

	Non-financial corporations	Financial sector	General government	Households	Total economy
1999	63	64	76	45	248
2007	92	112	69	62	334
2012	99	128	102	65	394
change 1999-2007	29	48	-7	16	86
change 2007-2012	7	16	33	4	59

*Table 2 – Euro Area leverage: Debt as percentage of GDP*  
 Source: CEPS calculations based on ECB data, ECB Statistical data Warehouse

Instead of trying to establish an absolute benchmark for leverage it is more useful to just make a transatlantic comparison. The increase in overall leverage, measured by the debt-to-GDP ratio, in the US (88 % points of GDP) was very similar to that of the EA (86 % points of GDP), only its distribution over different sectors differed as can be seen from a comparison of Table 2 and Table 3<sup>8</sup>. Moreover, the level reached by the US in 2007 was almost exactly the same as in the euro area.

Both the level and the increase in overall economy wide leverage were thus very similar in the euro area and the US. It is ironic that although 'Anglo Saxon finance' was initially identified as the main culprit of the crisis in reality the increase in leverage of the financial sector was somewhat smaller in the US than in the euro area.<sup>9</sup>

	Non-financial corporations	Financial sector	General government	Households	Total economy
1999	61	73	53	66	253
2007	76	113	56	96	341
2012	80	87	92	81	340
change 1999-2007	15	41	2	30	88
change 2007-2012	4	-26	36	-15	-1

*Table 3 – US leverage: Debt as percentage of GDP*  
 Source: CEPS calculations based on data from the Federal Reserve, Z1

<sup>7</sup> Note: The financial sector in the EA is defined as MFIs, insurance corporations and pension funds and other financial intermediaries including financial auxiliaries. MFIs debt is given by debt securities issued plus currency but excludes deposits. The financial sector in the EA is defined as MFIs, insurance corporations and pension funds and other financial intermediaries including financial auxiliaries.

Our data differ from those of the McKinsey Global Institute which have been used in other publications. However, the McKinsey data appear to be low to be plausible as they give the total debt of the financial sector at only 40 % of GDP for the US

<sup>8</sup> The sectoral differences appear in retrospect less important. In the US the contribution of households was somewhat larger than in the Euro Area, whereas that of the non-financial sectors was smaller. The sum of the increase in leverage resulting from these two sectors is the same across the Atlantic, they are just inversed in terms of relative importance.

<sup>9</sup> One reason for that is that the much maligned securitization of sub-prime mortgages actually results in securities (so-called RMBS) which are more like equity than debt, whereas the covered bonds much preferred in Europe do not have that quality. This implies that if there is a problem with the underlying mortgages the issuing bank is not threatened with bankruptcy (and the attendant disruption and cost).



A financial crisis can be said to be overcome when the increase in the level of leverage which build up during the boom has been at least partially turned back. It is on this key metric that one can observe the most relevant differences between the US and the euro area. These differences are illustrated in Figure 17, which uses the data from the last rows of Table 2 and Table 3. The key transatlantic differences are in the household sector and the financial sector. Households in the US have been paring down their debt by over 10 % points of GDP. Partially this was of course possible by the 'no recourse' features of mortgages in many US states which allow households to walk away from their mortgage debt when the value of the house falls below that of the mortgage balance still due.

But the key transatlantic difference is in the financial sector where leverage has fallen substantially in the US (about 25 % of GDP) but increased in the Euro Area (by about 15 % of GDP).<sup>10</sup> The stark difference in the financial sector is also the reason why overall leverage (see the last columns of Table 2 and Table 3) has continued to increase strongly (by almost 60 percentage points of GDP) after 2007 in the euro area, whereas it has been constant in the US (where the increase in government debt was counterbalanced by a fall in both the financial sector and households).

Given this continuing increase in economy wide leverage (from an already high level) it is not surprising that the financial crisis continues in Europe. The key question is now how the crisis will continue taking into account the specific 'euro' aspect, which is the fact that financial systems are not dominated by their 'nationality'.

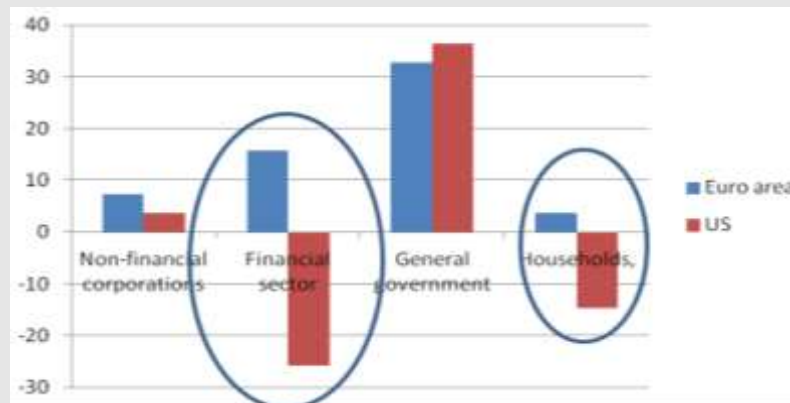


Figure 17 – Change in leverage by sector since the start of the crisis (2012-2007), US and Euro Area compared  
 Source: CEPS calculations based on ECB data, ECB Statistical data Warehouse

### Euro area versus national credit booms?

In this section we use a definition of debt which includes bank deposits. The totals are thus much larger than reported above. However, this more inclusive definition might be more appropriate for an intra-euro area comparison given that the question whether deposits are safe has arisen in a number of countries (and remains according to many a potential flash point for the euro). Table 4 below shows total leverage (debt as % of GDP) for the four large euro area countries plus the UK.

Total	Spain	Italy	France	UK	Germany
<b>1999Q1</b>	302%	328%	384%	544%	339%
<b>2007Q4</b>	564%	434%	470%	890%	365%
<b>2012Q4</b>	694%	546%	615%	959%	366%

Table 4 – Total debt as % of GDP  
 Source: CEPS calculations based on ECB data

<sup>10</sup> The financial sector comprises in both cases the central bank and this might affect the results as both central banks have increased their balance sheet considerably. However, as the increase in the balance sheets of both central banks has been of comparable size this aspect should not affect the comparison. Moreover, the ECB is been large amount to the banking sector (and it has been accorded de facto a preferred creditor status, thus making other debt less secure) whereas the Federal Reserve has been taking large amounts of deposits from the banking sector which it has invested in mostly government guaranteed securities.



It is apparent that in all euro area countries, except Germany, leverage has increased drastically not only up to the peak of the boom, but also since the bust in 2007. For all three 'non German' euro area countries (SP, IT and FR) the leverage ratio has increased by over 100 % of GDP between 2007 and 2012. In the case of France the increase in the five years following the bust the leverage ratio has actually increased by more than during the previous 8 years of the credit boom. Which sectors have contributed most to the increase in leverage? In all countries public debt has of course increased, but in Italy and Spain the biggest contribution has come from the banking system. In France all sectors contributed, whereas in Germany an increase of public debt was almost completely offset by a fall in private sector debt.

Financial Corporations (including deposits)	Spain	Italy	France	UK	Germany
<b>1999Q1</b>	147%	122%	214%	358%	150%
<b>2007Q4</b>	308%	201%	303%	640%	168%
<b>2012Q4</b>	382%	276%	343%	664%	159%

Table 5 – Total debt of financial corporations as % of GDP  
 Source: CEPS calculations based on ECB data

### Can debt be serviced in Europe?

A key issue raised by a high degree of leverage is the simple question whether the high level of debt can actually be serviced. The capacity to service debt (i.e. claims fixed in nominal terms) depends on the interest rates relative to the growth rate of nominal income.

The recession which is following the crisis is making it more difficult to service debt in the euro area (the UK is somewhat different given that nominal income has held up better due to higher inflation) for the simple reason that the difference between the growth rate of nominal GDP and the interest rate is less favourable (and has turned for the worse since the start of the crisis). Table 6 below shows the difference between the growth rate of (nominal) GDP and the (nominal) interest rate actually paid by governments and non financial corporations.

The first part of this table looks at government debt, which usually sets the benchmark for all other interest rates and for which a transatlantic comparison is easiest. The table shows that already before the crisis started this difference was already negative for the euro area average, indicating that interest was accumulating at a faster pace than the capacity to service the debt out of income (this implies that 'Ponzi units' in the parlance of Minsky (2009) would already have had a difficult life). After the crisis the difference worsened by about one full percentage point (to minus 2.1 %). By contrast, for the US the difference was slightly positive during the boom and has remained positive even after 2008, indicating that it remains much easier to service nominal debt in the US than in the euro area.

The second panel of this table shows the cost of debt service for the corporate sector (based on the interest paid on medium term loans to non financial corporations). Here the euro area average deteriorated by over two full percentage points, thus indicating the likelihood of considerable stress for the sector (which in Europe is much more leveraged than in the US).

Panel A: Government debt

	Boom (until 2008)	Bust (since 2008)	Change
EA	-1.1	-2.1	-1.1
US	0.4	0.2	-0.1

Table 6 – Can debt be serviced with growth? The interest rate growth differential  
 Panel A: Government debt

Source: CEPS calculations based on Eurostat data

Panel B: The cost of financing for the non financial sector

	Boom (until 2008)	Bust (since 2008)	Change
EA	-0.3	-2.7	-2.4
DE	-2.1	-2.1	0.0
ES	3.6	-3.9	-7.5
IT	-0.7	-3.6	-2.8

*Table 7 – Can debt be serviced with growth? The interest rate growth differential*

*Panel B: The cost of financing for the non financial sector*

Source: CEPS calculations based on ECB Statistical Data Warehouse data for new business of medium term loans to non financial corporations

But looking at debt service capacity the intra-area differences are again more important than the averages. This does not apply only to the corporate sector as is shown in the table above, but also for the sovereigns. Table below shows to what extent the sovereign debt crisis, even after its acute phase was over has led to a divergence in debt servicing capacity in the euro area. It is apparent that the average euro area is misleading as one country, Germany, has actually experienced an improvement in its debt service capacity whereas it has significantly deteriorated in the countries under financial stress.

	Boom (until 2008)	Bust (since 2008)	Change
EA	-1.1	-2.1	-1.1
DE	-2.7	-1.2	1.5
ES	2.0	-3.3	-5.4

*Table 8 – Can the sovereigns service their debt? The interest rate growth differential*

*Government debt (based on actual interest paid on outstanding debt)*

Source: CEPS calculations based on Eurostat data

One should keep in mind that Germany had the worst growth – interest rate differential during its slow growth period until 2005, but this improved after the crisis as interest rates fell in Germany while they increased elsewhere in the euro area.

The debt service capacity of non financial corporations confirms the broad picture of a generalised boom for the periphery followed by a bust: for the euro area average the interest rate – growth rate differential was actually close to zero during the boom, but worsens after the crisis (by almost two points). One finds again a stark difference between Germany (no change) and countries like Italy and Spain, where the interest rate now exceeds the growth rate by almost 4 percentage points. The deterioration is particularly stark for Spain (over 7 percentage points) given that during the boom Spanish interest rates had been lower than the euro area average and the growth rate (of nominal GDP) much higher. Both elements have now turned around. It is also interesting to note that the interest rate – growth rate differential for Germany before 2008 was not that different from that of Spain today.

**Long-term economic growth in Europe.** In the long-run, more usual drivers of the economic performance become central, such as labour force quality and quantity, capital accumulation and technological progress which is mainly driven by human capital. For EU, projections are relatively contrasted; some projections expect a smooth rebound after the recovery period, *i.e.* between 2018 and 2030 while others only project weak long-run GDP growth with large divergence among Members States. Conference Board and OECD expect low potential GDP growth in EU in the coming decade. Nevertheless, contrary to the Conference Board projections, OECD projects a moderated rebound between 2018 and 2030 in the countries the most affected by the actual sovereign debt crisis.

- **Long-term forecast by the Conference Board (*Global Economic Outlook, May 2013*).** The GDP growth in France, Italy or the United-Kingdom is estimated low during 2019-2025, with 1%, 0.9% and 0.8% respectively, resulting from a very weak growth of the Total Factor Productivity (TFP). At the opposite end, despite an

increasing scarce of the labour supply, the German GDP growth would remain relatively high with 1.3% between 2019 and 2025.

- **Long-term forecast by the OECD (OECD Economy Outlook, Long-run growth, May 2013).** Several European countries should potentially grow faster between 2018 and 2030 than between 2012 and 2013. It results from the European sovereign debt crisis which, in addition to a null or even a negative economic growth at the beginning of this period, has strongly affected the potential economic growth in some EU countries which is characterised by very weak TFP growth rates. High unemployment and weak capital formation during the European debt crisis, as well as physical (or even human) capital destruction will penalise potential economic growth in those countries in the medium-term. It is the case for France, Greece, Ireland, Italy, the Netherlands, Portugal or Spain.
- **Long-term forecast by the CEPII (The World economy in 2050, 2012).** The CEPII projections for EU (The World Economy in 2050, 2012) are a little bit less optimistic; the potential GDP growth is expected to grow at 1.5% between 2015 and 2030 and between 1.6% between 2030 and 2050. In fact, the economic growth in Germany is expected to be weak with 0.5% between 2015 and 2030 and 0.9% between 2030 and 2050. Similarly, Italy potential GDP growth is estimated at 0.3% during the first period and at 0.8% in the second.
- **According to the EC FIN (ECFIN, Ageing Report 2012)** the annual average potential GDP growth rate in the EU27 is projected to fall from 2,7% in the period 2000-2007 (the cumulated average growth rate for the 2009-2012 period according to IMF in 2013 was of zero percent), to 1,6% in the period 2015-2030 and to a 1,4% in the period 2030-2050. Growth rates are likely to differ substantially from country to country. The impact of the crisis on the long-run growth trends for the European Union is considered in the "Strong recovery", "Sluggish recovery" and "Lost Decade" alternative scenarios (see below).

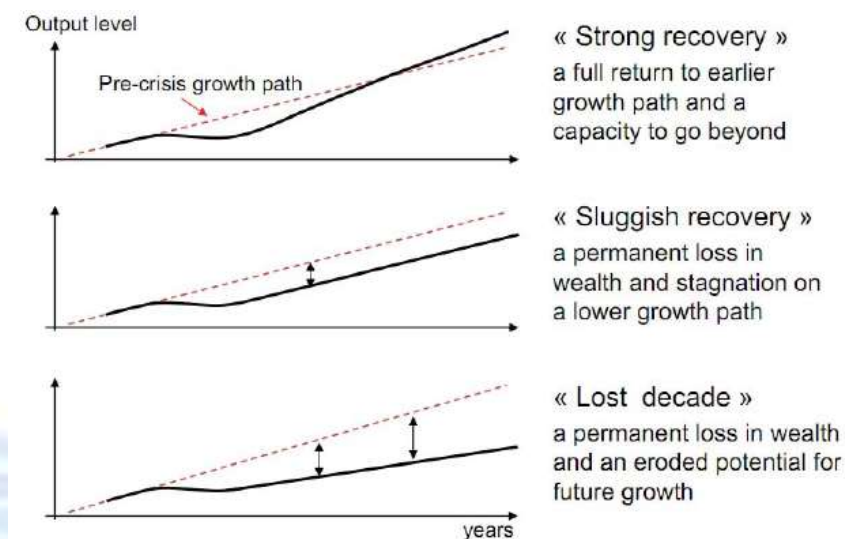


Figure 18 - Three scenarios for Europe in the EU2020  
 Source: JM Barroso, Informal European Council, February 2010

### BOX 3 – Post-crisis scenarios

An important uncertainty for the next years, is how the Eurozone will tackle its financial issue? Indeed, the current sovereign debt crisis has highlighted some weakness of the Eurozone. In reference with the economic theory, an optimum currency area is mainly characterised by the

following points (i) perfect capital mobility, (ii) perfect labour mobility and (iii) substantial supra-national budget. In the Eurozone, the capital is perfectly mobile but the labour is not mobile enough, even if the current economic divergences within the Eurozone have accelerated the migration flows (see e.g. Barslund & Busse, 2013), and finally there is a very weak common budget. In fact, the European Union budget represents only 1.1% of the Gross National Income (GNI), which is far from being enough to enable an economic stabilising mechanism in response to the current economic crisis. In comparison the US federal budget represents 24% of the US GDP (for expenditures).

Thus, as there is not a real common budget, the current adjustment within the Eurozone is taking place through a wage moderation in the peripheral countries which is not without social and political consequences. In this context, numerous economist and politicians are raising the idea of the end of the Eurozone. For instance, the book "Porque Devemos Sair do Euro"<sup>11</sup> of João Ferreira do Amaral, a Portuguese economist, is a best sellers in Portugal. In Germany, Oskar Lafontaine, former federal Minister of Finance (1998-1999)<sup>12</sup>, has expressed the idea of a return to national currency in the framework of the previous European Monetary System (EMS)<sup>13</sup>. Another example is the French economist Jacques Sapir who, for some years, foresees a collapse of the Eurozone and therefore recommends an organised end of euro currency.

Even if these views remain in minority, the success of the João Ferreira do Amaral' book in Portugal, shows that such scenarios cannot be excluded. Nevertheless, it is also important to note that, in the current European legislation, there is no possibility to exit the Eurozone without exit the European Union, which could also cause tremendous troubles due to border tariffs, labour mobility etc.

#### Friedrich Ebert Stiftung Scenarios

The Friedrich Ebert Stiftung institute, a German institute close to the SPD, has developed a set of scenario on the future of the Eurozone (Friedrich Ebert Stiftung, 2013). They have developed four different scenarios and they have presented them to experts in 15 European cities. The scenarios are:

- **"Muddling through the Crisis. The Eurozone remains a house without a protecting roof".** In this scenario, the current difficulties of the Eurozone remain, with the Southern countries still under financial assistance and the "*crisis management implemented so far continued to prevail*". This scenario is generally viewed by experts as unsustainable. However some of them related this scenario to the "Japanese scenario", i.e. a long period of weak economic growth with deflation and high indebtedness. Experts also view this scenario as a transitory situation towards other scenarios.
- **"Break-up of the Eurozone. The Euro house falls apart".** In this scenario, "*the European Economic and Monetary Union is split into different blocs and some countries have reintroduced their former currency*". For experts, this scenario could occur in two ways, either a violent separation with a kind of political laissez-faire or a more peaceful break-up where the separation is organised by policy-makers assuming that "*the cost of maintaining the Union would be much higher*".
- **"Core Europe: evolution of two-level integration with a smaller and stable, but exclusionary Euro house".** In this scenario, the European Monetary Union is only achieved by a restricted group of countries; this core group "*has implemented fiscal union and is moving towards a real political union, while some EU members on the periphery fall far behind these developments*". This scenario is recognised by experts as the most probable even if it could be associated with important risks.
- **"Completion of the Monetary Union by a fiscal and political union. The roof is repaired and construction completed".** In this last scenario, the European Monetary union is completed as well as a fiscal union i.e. a better convergence of corporate taxation and social

<sup>11</sup> Why we should leave the Euro.

<sup>12</sup> Oskar Lafontaine was also the former chairman of the German Social Democratic Party (SPD) that he left in 2005 to create the Left party (Die Linke) in 2007.

<sup>13</sup> <http://goo.gl/lgrM>.



contributions/benefits. Even if the European budget remains relatively weak, European instruments such as EIB loans, private project bonds, guarantees and bonds, financial transactions tax or Community programs are fully used to support employment and growth within Europe. This scenario has been considered, by the experts, as "*the most desirable*" but also "*the most difficult to achieve*".

The scenarios presented above display the insecure status of the Eurozone caused by the too weak current solidarity mechanisms and a strong fiscal consolidation especially in the southern states. This emphasises the need of reforms. Therefore, the risk of non-planned evolution of the European monetary Union should be considered as a possible option even if its consequences could be hardly evaluated. Thus, FLA should look at those different options for the future of the European Monetary Union because each option will have significantly different consequences in terms of future economic development in the EU.

### Centre for European Policy Studies (CEPS) scenarios, as a corollary of Box 2

The euro area seems currently in an unstable situation which combines a high level of overall leverage with a financial system which is only partially integrated. This partial integration constitutes a source of instability because cross border claims of banks are large enough to ensure that national shocks are transmitted to the entire system. But integration is not deep enough to ensure the same interest rate throughout the area. National banking systems are thus segmented along national lines and are in the end supported only by the national government. This had led to what has been officially called the 'doom loop' between sovereigns and banks which has destabilized the euro area financial markets.

The three different scenarios for financial markets in Europe presented next go along one axis, namely the degree of cross border integration. The CEPS scenario analysis reveals that the two 'corner' solutions of a full integration or a full renationalisation thus appear to provide a better hope for stabilisation than the status quo.

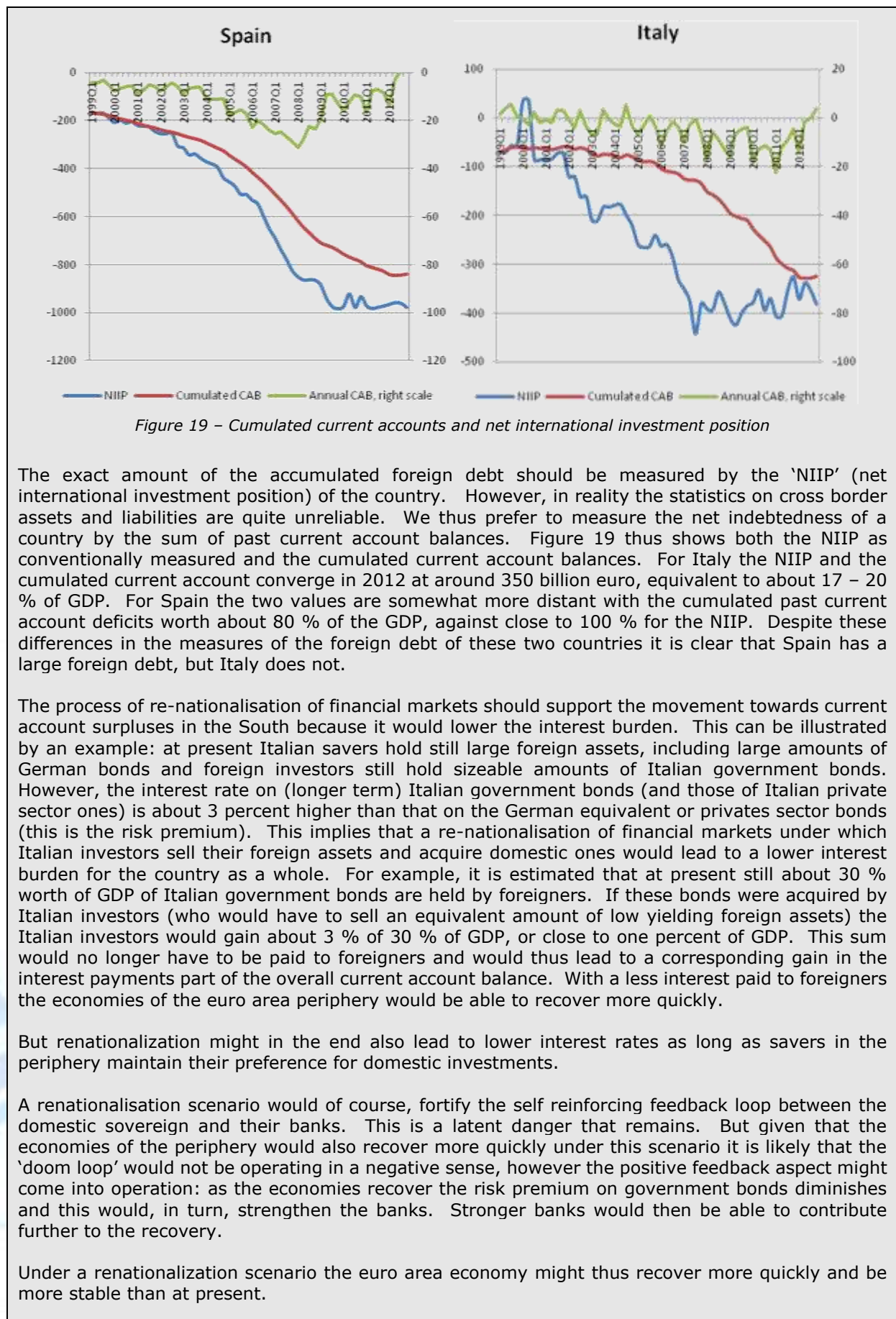
The first scenario could be called **Renationalisation**. It consists essentially of a continuation of a trend which has started when the euro crisis began, namely a reduction in cross border claims by banks. This trend might reach its logical conclusion, meaning that gross cross border claims diminish until only the net positions remain.

Figure 20 at the end shows that since the end of the credit boom in 2008 cross border claims within the euro zone have already diminished from about 2.5 trillion USD to about 1.25, one half of the previous level. This trend might well continue until cross border claims become so small that they are no longer systemically important; as before the introduction of the euro.

Under this scenario of segmented financial markets along national lines national shocks would have less of a system wide impact. A default of a bank or a large enterprise in any one country would no longer trigger a crisis elsewhere because any losses would be contained at the national level.

The key issue then remains the size of these net positions and whether they can be financed and serviced. The net cross border claims represent essentially the net foreign debt (or assets) of the country. Foreign debt arises essentially through a sequence of current account deficits and can be diminished only through current account surpluses.

The key for the evolution of the systemic stability of the euro would then be the current account balances of the periphery. All peripheral countries are already now in the process achieving a rough balance in their current account, which should turn into a small surplus in 2014 for all except Greece. This is important because it means that these countries will not need any additional capital inflows for the near future. Neither the status quo nor the renationalisation of financial markets would thus represent a near term systemic threat. However, in the longer run the sustainability of the financial system of the GIIPS countries will depend on the degree to which their economies can support the interest burden on the accumulated debt from the past.



**Status Quo Scenario.** Another scenario would be that the status quo continues. The drawbacks of this situation are well known. This would imply that the renationalisation movement stops with the result that the present level of gross cross border claims remain (at about 1.23 trillion), but the new flows would remain small in both directions. This would imply that, the remaining stocks are large enough to transmit national shocks to the entire system. Moreover, the recovery in the euro area periphery might be delayed as the doom loop continues to be present.

At the political level this might reinforce the inertia as policy makers in the creditor country would point to the continuing difficulties in the periphery as a sign that the adjustment efforts had not been sufficient and that moving towards greater integration would only imply a transfer from their taxpayers to banks and governments in the periphery.

**Banking Union Scenario (BU).** The opposite of the renationalization scenario would be one of complete integration. This could come about if policy makers get scarred by a recrudescence of the crisis and opt for a full Banking Union, which leads to an equalisation of interest rates and a resumption of cross border lending. Under a full integration scenario cross border lending is likely to increase strongly, but the size of cross border capital flows does not really matter since arbitrage will ensure that re-financing rates are equalised across countries.

The common low interest rates would have a number of beneficial effects for the peripheral economies. Lower refinancing costs for the governments would it make easier to stabilize public finances and lower interest rates should lead to higher investment spending. One has to keep in mind that this would be partially offset by the fact that savers would of course also receive lower interest incomes, which might mean lower consumption demand.

Moreover, under a BU scenario it would become much easier for the ECB to conduct unconventional expansionary monetary policy operations whose benefits in terms of lower interest rates and better availability of credit would be felt throughout the entire euro area. In other words, in a full integration scenario the transmission mechanism of monetary policy would work again everywhere. This should also contribute to a stabilisation of the economy and speed up the recovery.

All in all the recovery should be strongest under the BU scenario.

The three scenarios can be illustrated in terms of the evolution of cross border claims within the euro area. Figure 20 shows all cross border claims of euro area banks, both within and outside the euro area itself. The data underlying this figure thus include claims of German banks on the Netherlands within the euro area and claims on the UK or the US outside. However, for the financial market tensions in the euro area concern in reality mainly the claims of the core, or Northern euro area countries on the periphery (Greece, Ireland, Italy, Portugal and Spain = GIIPS).

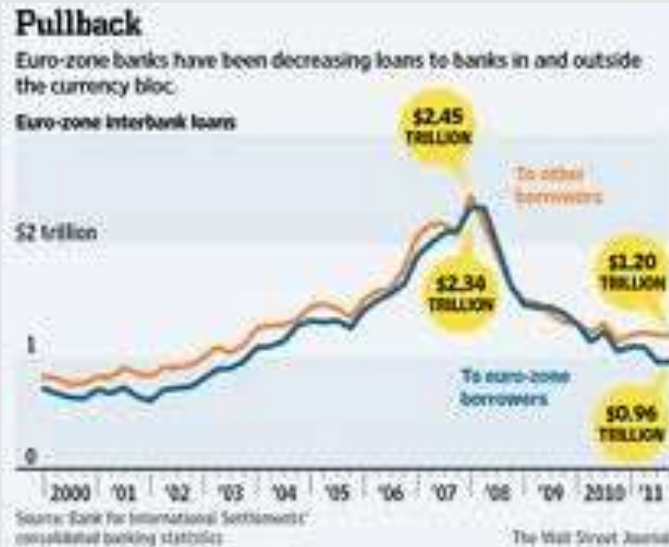


Figure 20 – Euro.zone Interbank loans. Euro-zone banks have been decreasing loans to banks in and outside the currency bloc  
Source: Wall Street Journal

The Figure 21 below therefore shows the consolidated claims of euro area core countries (Germany, Netherland, Finland and Austria) on the periphery (the GIIPS). It is apparent that these claims increased greatly during the credit boom, skyrocketing by a factor of almost 4 between the start of EMU and the peak of the boom. Since the start of the financial crisis in 2008 they have, however, fallen until the end of 2012 as quickly as they had risen beforehand.

The three scenarios would imply the following evolution until 2020 (represented by broken lines from 2012 onwards):

- a) Renationalisation: the fall in North-South intra euro area claims continues unabated (and would return to the level of the start of EMU by about 2016).
- b) Status quo or muddling through: the level of cross border claims remains at the present level.
- c) Banking Union: cross border claims would increase again.



Figure 21 – EA Core consolidated foreign claims vis-à-vis the Periphery  
Source: BIS



These different scenarios would have important implications for the stability of the financial system.

Table 6, Table 7 and Table 8 above have shown that so far the recession which has accompanied the euro crisis has diminished greatly the capacity of the non financial sector to service its debt in the euro periphery. This must have a negative impact on the stability of the financial system so far. But how about the future?

To create the status quo and renationalization scenarios we use the forecast of the IMF for nominal GDP growth in euro out to 2018. For the banking union scenario we assume that nominal GDP growth is given by the real growth rate predicted by the IMF but that inflation is exactly 2 % (and thus marginally higher than predicted by the IMF) because under a BU monetary policy becomes again effective throughout the area.

The scenarios for interest rates are the following:

- 1) Renationalisation: Interest rates fall as a function of the current account surplus of each country.
- 2) Status quo: interest rates remain at present levels.
- 3) Banking Union: interest rates at the same level as in Germany at present.

	Actual (since 2008)	Renationalisation	Status quo	BU
EA	-2.7	-0.19	-0.67	0.11
DE	-2.1	-0.18	-0.18	-0.18
ES	-3.9	-0.62	-2.78	-0.22
IT	-3.6	-1.12	-1.57	-0.32

*Table 9 – The squeeze on the non financial sector: three scenarios*

Source: CEPS calculations based on ECB Statistical Data Warehouse data for new business of medium term loans to non financial corporations and different assumptions as detailed in text

The table illustrates the impact of the three scenarios on the growth – interest rate differential. It is apparent that under the BU scenario the debt burden is much easier to bear for the periphery because they would face a much lower interest rate (and the deflationary impact of the crisis will abate, according to the IMF's projection). The interest rate will remain higher than nominal GDP growth, but only by a very small amount (0.22 % for Spain and 0.32 for Italy). These values represent the huge improvement with respect to the value of the last years (3.6 and 3.9 %) whose average is shown in the first column.

In case of a renationalisation interest rate differentials would improve due to current account adjustments, as forecasted by the most recent WEO publication. The Spanish economy is predicted to achieve a current account surplus of 3.6% of GDP in 2018 while Italy merely balances its current account. As previously elaborated the current account surpluses signal reduction in cross border interest payments and thus cross border risk. The interest rate conditions in the renationalisation scenario are not as favourable as under the BU scenario only for Spain they are virtually identical. The BU scenario remains the most favourable scenario, particularly for Italy, though renationalisation is a close second.

By contrast, under the status quo the interest burden would remain very difficult to bear as the interest rate would remain 2.8 % higher than the growth rate of nominal GDP. This would represent an improvement with respect to the average since 2008, but far too high to be sustainable in the long run.

**Increased exports sustaining economic growth.** From 2005 to 2007, the European GDP growth was driven by the increase of households' final consumption (contributing about 1.3 pt to GDP annual growth rate), (from 0.7 to 1.3 pt) and Government's final consumption (around 0.4 pt), while trade balance had no contribution to GDP growth. With the 2008 financial crisis, only the Government' final consumption contributed positively to GDP growth with +0.5 pt. Investments and changes in inventories contributed to -2.7 and

1 pt to the -4.3% fall of GDP, in 2009. External trade will be key to returning to economic growth of most economically affected countries (such as Spain, Ireland, Greece, Italy, Slovenia and Portugal) (IMF 2013)

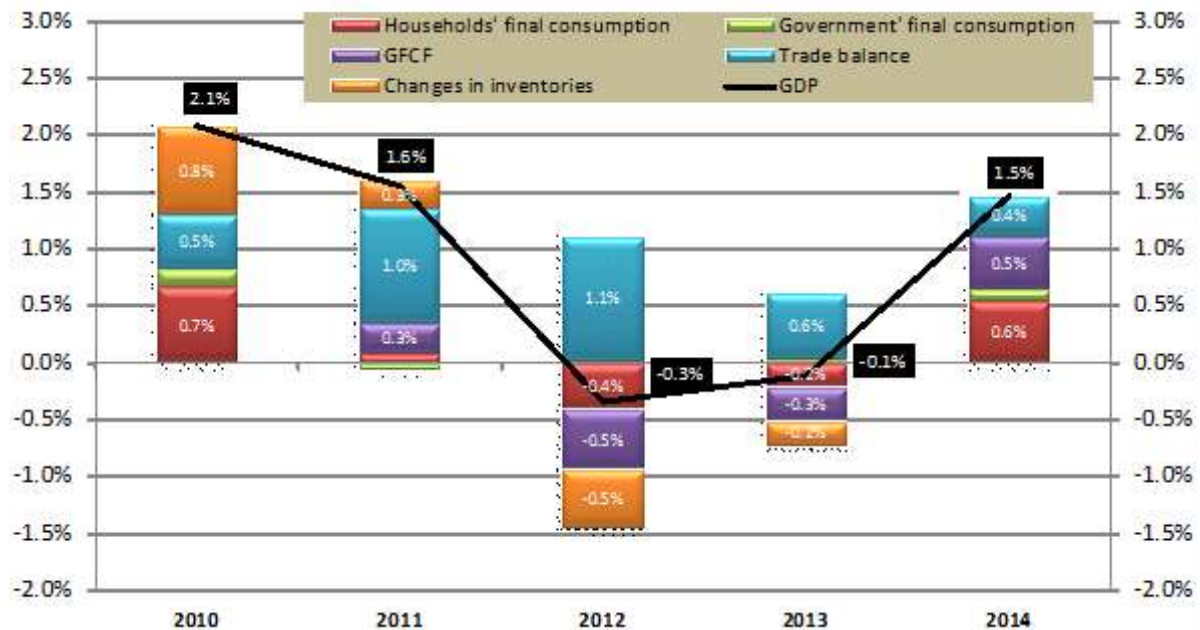


Figure 22 - EU real GDP growth rates and components contribution to GDP growth  
 Source: DG ECFIN, 2013

**Fall in consumption and investment.** With the 2008 financial crisis, only the Government' final consumption contributed positively to GDP growth with +0.5 pt. Investments and changes in inventories contributed to -2.7 and 1 pt to the -4.3% fall of GDP, in 2009. Thereafter, at European level, the major source of growth was the external trade which contributed from 0.5 to 1.1 pt from 2010 to 2012. This improvement of the European trade balance is also view as a positive contributor to GDP growth rate in the EC forecasts with 0.6 in 2013 and 1.5 pt in 2014 and even the unique source of GDP growth in 2013. For 2014, EC expects a return of positive contribution for all GDP components but with a moderated contribution, such as 0.6 pt from the households' final consumption and 0.5 pt from the GFCF.

**Structural adjustments force austerity policies.** The European adjustment to the 2008 financial crisis and more especially to the current sovereign debt crisis in EU is mainly characterised by a wage moderation that allows the re-balancing of external trade, especially in the Eurozone where change in exchange rates cannot be play this role. Nevertheless, this "unavoidable" external adjustment for imbalanced Eurozone countries, will probably durably penalised households' final consumption. Finally, Government' final consumption is expected to have a null contribution on GDP growth rate (figures for Government' final consumption are very different among Member States) while its contribution was about 0.4 pt up to 2009.

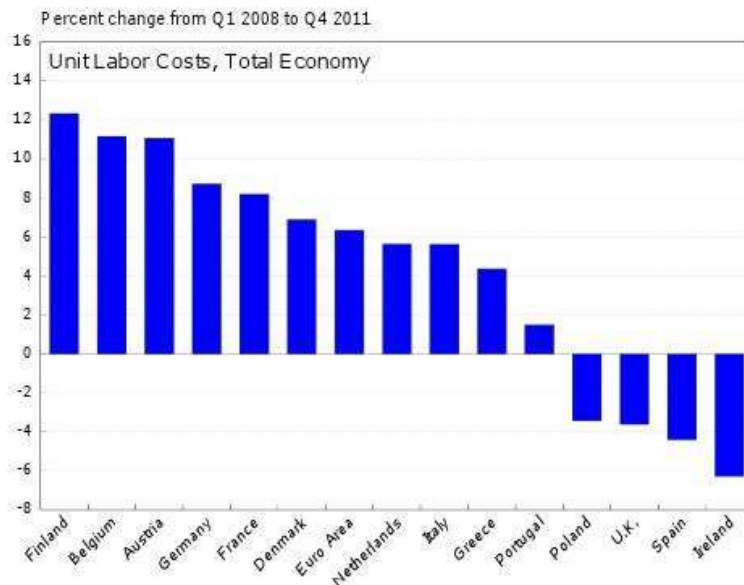


Figure 23 - Unit Labour Costs variation Q1 2008 to Q4 2011

Source: B.Colijn from AMECO, 2012

*ULC have decreased since 2008 in several EU countries (e.g. Ireland by 6,3%, Spain by 4,4% between 2008 and 2011), mostly driven by labour compensation decreases and increasing productivity. (B.Colijn 2012).*

**Impact of austerity.** The austerity policies implemented from 2011 have caused these evolutions and even if the comeback of economic growth will facilitate the fiscal consolidation in EU countries, the impact on economic growth will still probably be visible after some years. One of the main impacts of the austerity policies has been to depress internal demands in countries where those policies were deeply implemented (Greece, Spain, Portugal and Ireland). In the short term, this fall of the internal demand has strongly reduced the domestic firms' outlet. Thus the labour demand has dropped and the unemployment rates have reached unprecedented levels. And the EC forecasts do not expect a rapid improvement.

**Unemployment short-term forecasts.** All sources point towards high unemployment rates in almost all EU countries up to 2018. The ECFIN forecasts an unemployment rate about 11.1% in 2013 and 11% in 2014 (ECFIN 2013). The unemployment rates projected by OECD show, as for the European Commission, a stabilisation with 11.9% in 2013 and 12% in 2014. (OECD 2013). According to IMF, after 2014, the smooth recovery period will reduce the unemployment rate in EU, but none significant improvement is expected up to 2018, the Eurozone unemployment stands at 10.5% in 2018 compared to 11.4% in 2011. And unemployment rates remain very high in several European countries such as 22.9% in Spain or 16.3% in Portugal and 10.4% in France. Nevertheless, a significant improvement is projected for Greece with a reduction of the unemployment rates from 24.2% in 2011 (with a peak at 27% in 2013) to 16.2% in 2018. (IMF 2013)

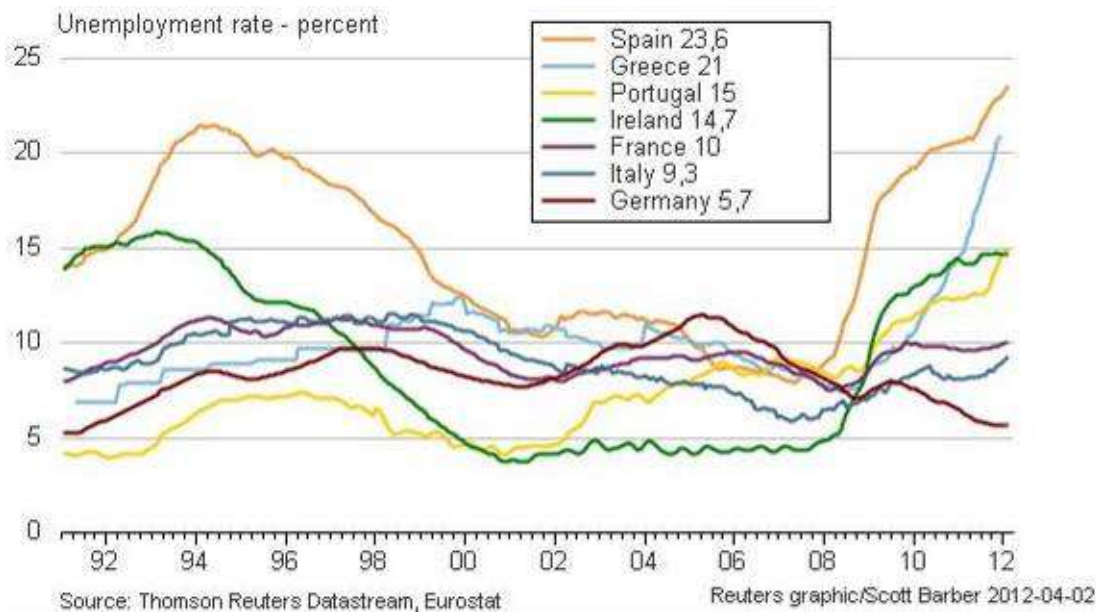


Figure 24 - Total Unemployment Rate 1990-2012 (top) and Youth Unemployment 1995-2012  
Source: EUROSTAT 2013

#### 1.1.1.6 Effects the financial crisis in Europe

**Increasing divergences among states and regional disparities.** The economic crisis has hit all countries of Europe but in much differentiated ways. Out of the 121 regions below GDP per capita average in 2000, 99 had improved their condition in relation to the European average by 2008 (82%); Out of the 138 regions below GDP per capita average in 2010, 84 are expected to experience further regression by 2030 (65%) according to interim results by ongoing ESPON ET2050 study. European economy will likely have a slow recovery from the present crisis, with moderate growth and more stable cycles, low productivity increases and persistent levels of chronic unemployment in Southern countries. Wide differences still exist among European countries in GDP using purchasing power parity, with the highest level in the Luxembourg at more than 270% and the lowest level in Bulgaria at less than 50%. There is still a dualism between the old 15 member states of the European Union and the New 12 member countries which have joined the EU in 2004 or 2007. None of the New 12 countries reaches the EU average.

#### BOX 4 - The end of the European convergence process?

(From ESPON ET2050 Interim Report 2, April 2013. Results based on Multipoles (International Organization for Migration, Poland) and MASST3 (Politecnico di Milano, Italy) models)

Since 2008, the growth and convergence process of the previous decade has suddenly being reversed. Southern countries, larger recipients of Cohesion and Structural Funds in the previous decade, have reduced GDP: around 10% in Spain and Italy, more than 20% in Greece; at the same time, Central and Northern countries remain stagnant or had small growth (e.g. less than 5% in Germany). Eastern European Countries had different evolutions, some of them growing at moderate level, like Poland, as well as other countries after carrying on drastic fiscal reforms, like the Baltic countries. At regional level, we see much faster growing disparities than before; while in new member states capital regions are the winners, while rural and eastern border regions are the losers.

Under the baseline assumptions, the MASST3 model projects a continuation of the present situation for the next 15 years: moderate economic recovery together with increasing national and regional



unbalances. The average annual grow for Europe<sup>14</sup> is about 1,89%, but 44 regions grow less than 1% or have negative growth. While more developed countries grow because of productivity increases, less developed countries growth is due to job creation, only possible because a reduction of salaries in real terms. MASST3 is therefore not delivering the conventional picture of the “slow economic decline of Europe”, but a picture of “overall growth with increasing disparities”.

Assuming that the general economic recession lasts until 2015, ESPON baseline results indicate that most Nordic and Central regions will have an annual growth above 2%, and most Southern European regions will have very low growth rates, below 1%, and some even negative average rates, particularly Greek regions and few Spanish inner regions. In most Eastern European regions average annual growth is not higher than the European average, and therefore the catching-up process of the previous decade does not continue<sup>15</sup>. Out of the 132 regions below GDP per capita average in 2010, 84 are expected to experience further regression (65% of total).

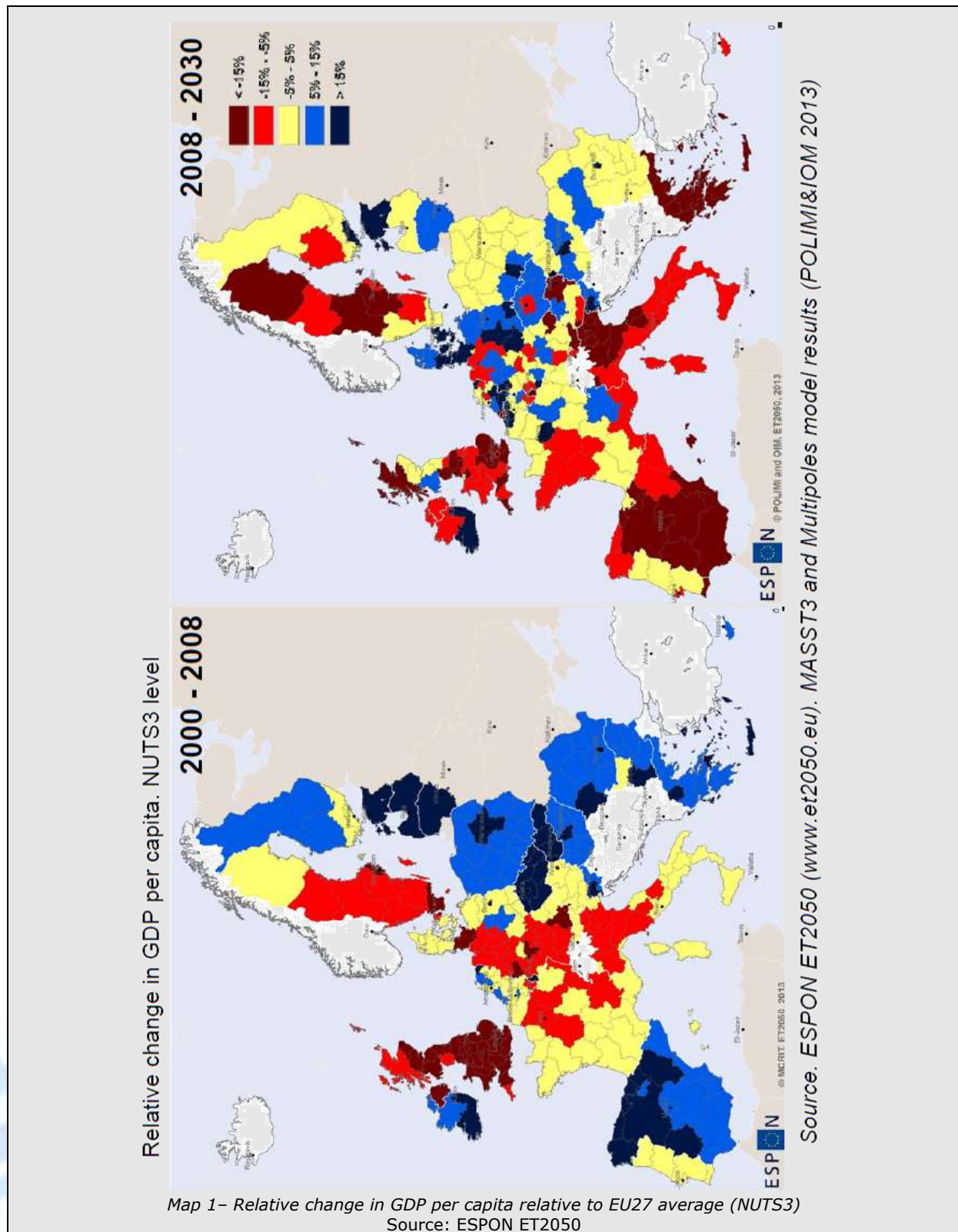
Results on Southern and, particularly, in Eastern regions are rather disappointing. The main reason for the results in Southern regions is due to the hard impact of the crisis, and the sluggish recovery projected afterwards; concerning Eastern European regions, demographic projections indicate a net decline in their active population mostly because continuous labour migration to Western countries; this relatively important population reduction would constrain the overall economic growth if there is no a high-enough increase in productivity, and will likely concentrate it only in large cities.

Long term forecasts and studies by public institutions, such as the International Monetary Funds, OECD and EC/ECOFIN, or by private consultancies and research institutes like PWC, do not always deliver more optimistic pictures than the ESPON Baseline modelled by MASST3, even if they do not necessarily consider the same assumptions and therefore are not exactly comparable. The IFM forecast for 2017, for instance, indicates smaller or negative growth for Southern countries and higher growth in Eastern regions, for 2017, fully consistent with the ESPON results for 2030 assuming an sluggish recovery for these regions; even if most economic forecasts indicate that the catching-up process of Eastern economies will continue to the next decade, many of them (e.g. the PWC for the world in 2050) also indicate that this process may slow down progressively later on, ending in 2030.

<sup>14</sup> “Europe” is in this note defined as the 31 countries integrated in the ESPON Program.

<sup>15</sup> Taking as a sample the evolution of just four countries, the results can be easily exemplified.

- Denmark is expected to grow at a sustained 2%, and hence above European average. This outcome is expected, since Denmark has a strong local economy well connected globally, a healthy, inclusive and well educated society, with good governance.
- Germany grows at European average, after restructuring its economy in the previous decade, with increasing exports to the rest of the world and assuming high immigration from the rest of Europe to balance its shrinking workforce.
- Spain grows at about 1%, therefore less than the European average, with many regions having negative annual economic growth. Spain's future evolution looks uncertain to most analysts, and there are both indications of a healthy recovery (e.g. the growing exports to emerging markets and the reduction of private debt, the public sector reforms) but also of a prolonged recession (e.g. the high unemployment, particularly among young people, the large hidden economy).
- Poland grows at the same ratio of Germany, so following the European average. The moderate overall growth in Poland, and other Eastern European countries provided by MASST3 is unexpected, but understandable assuming a continuous loss of population in Eastern European countries, with migration from rural sparsely populated areas to large cities, and to western regions. Unless productivity rises very high in these regions, above most expectations, the decreasing work force will likely mean lower economic growth in average and increasing disparities among large cities and rural peripheries.



**Widening North-South Structural Gap.** Still the Northern and Southern European regions have large differences on terms of their economic structures. After decades of transfers from northern to southern countries linked to Structural and Cohesion Funds, the North remains industrialised and technologically-oriented, while the South is even in a faster process of deindustrialisation. Employment in the industrial sector in Germany was reduced 10% in the latest ten years (mostly transferred to industrial-related business

activities) while it was reduced by 25% in Spain (mostly due to the industrial delocalisation process; industries coming in the late eighties and nineties leaving to Eastern European countries such as Poland and Hungary, or to China, and to a some extend also to Morocco). Salaries in the industry use to be higher than in the low service sectors (e.g. tourism) and therefore also the consumption level in Southern countries tends to be reduced, or compensated by a higher level of private debt that recently achieved unsustainable levels. Economic gaps among more developed and less developed regions may remain, because of the likely reduction of financial transfers and solidarity between regions and countries at EU level, as well as Cohesion Policies, due to the financial shortage of National administrations.

**European trade orienting towards the rest of the World: the next globalisation of EU Economies?** The European economies may become, after the crisis, increasingly more interdependent from the rest of the world economies, and foreign investments, trade, migrants, or tourism, that may grow more than in between European countries. This may have profound social and political implications. Extra-EU trade grows faster in Europe than intra-EU trade since the beginning of the crisis. FDI in 2008 was in many countries almost twice as large outside the EU than in other European countries. With the introduction of the euro, trade imbalances among euro area members widened considerably, even after allowing for permanent asymmetries in trade competitiveness within pairs of countries or in the overall trade competitiveness of individual countries. This is consistent with indications that pair-wise trade tends to be more balanced when nominal exchange rates are flexible. Intra-euro area imbalances also seem to have become more persistent with the introduction of the euro (Berger, Nitsch, IMF 2010).

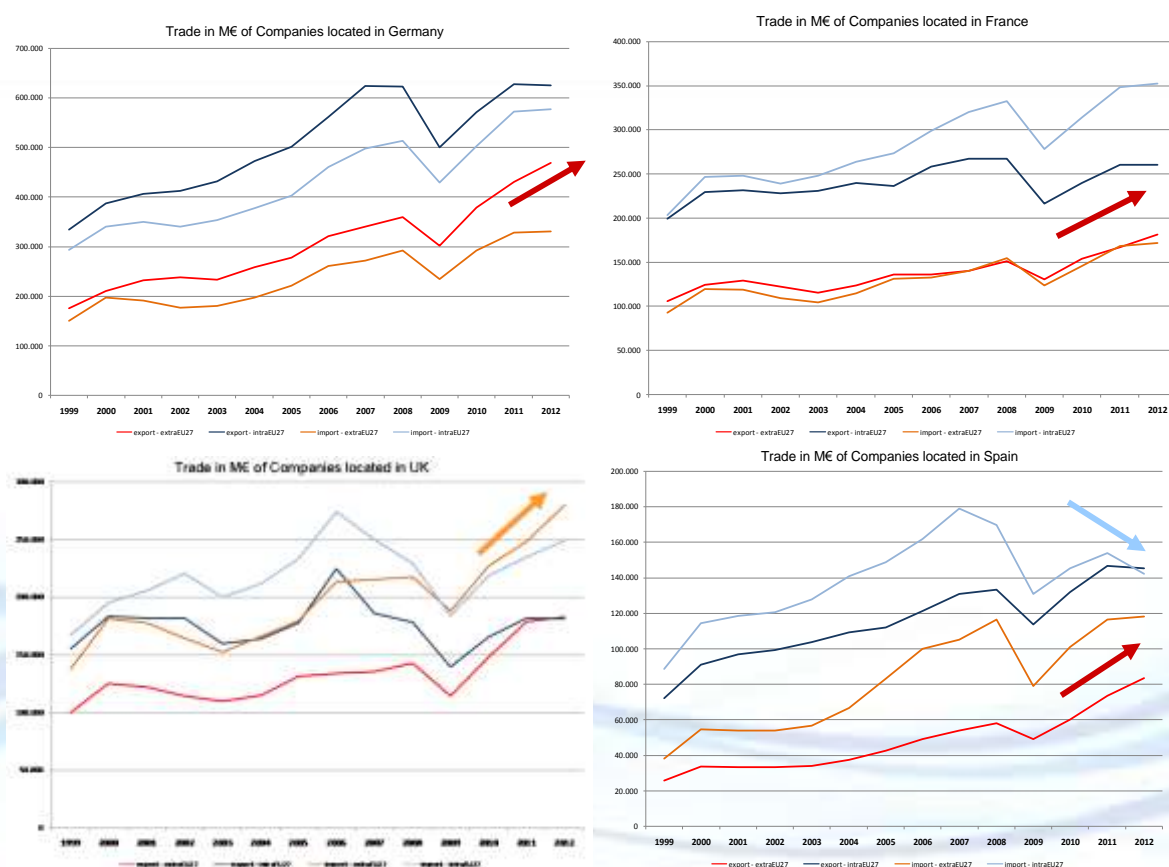


Figure 25 - Intra and Extra-EU imports and exports for Germany, France, the UK and Spain. 1999-2012 evolution

Source: ESPON ET2050 from EURSTAT, 2013

**More specialised trade markets.** In their way out of the crisis, European economies are moving to increase their trade with world emerging economies, although still at a relatively low pace. It is observed an increasing specialisation of European economies with regard to reference global markets where they place their investments (e.g. South America and Spain, China and Germany, Canada and the UK). Companies located in different European countries and economic sectors are taking advantage of the growth of emerging markets differently, based on pre-existing social, economic and cultural links (e.g. UK with US and Commonwealth countries, Spain with Latin America...). The relative reduction of imports from the rest of European countries, and the increase of exports to the rest of the world will make European foreign policy even more difficult, since global national interest may easily diverge.

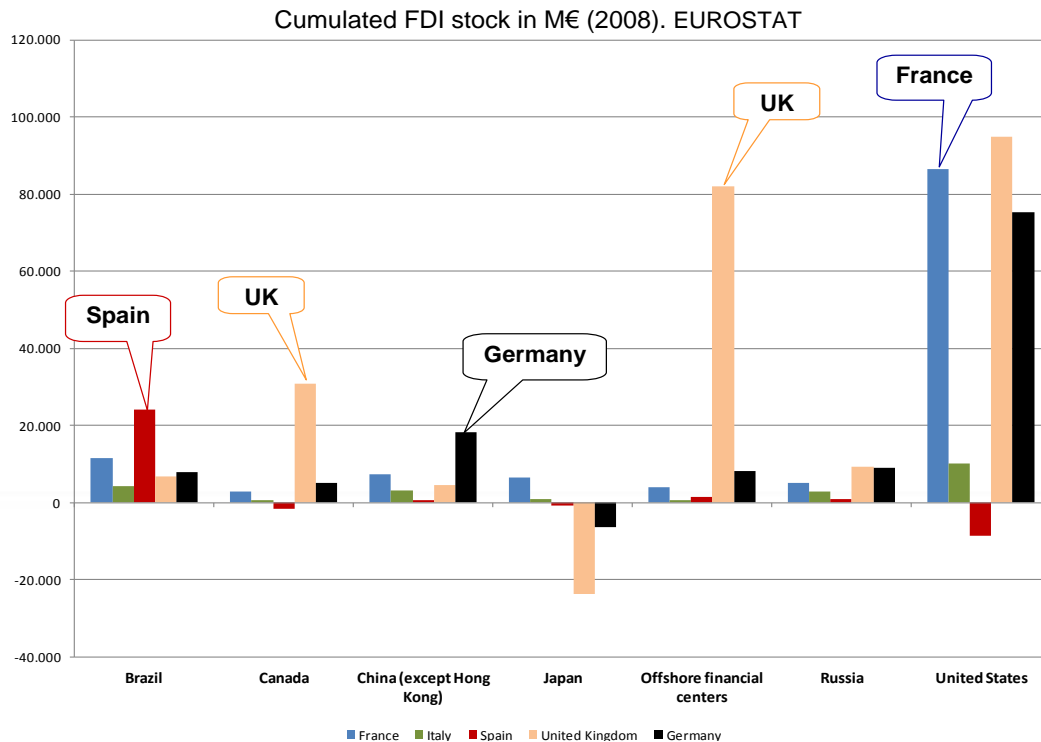


Figure 26 - Cumulated FDI stock in million euros by target regions and source countries  
 Source: EUROSTAT 2008

**Increased Public Debt.** In the 1990's the European nations that wanted to pursue a currency union, laid out the "European Stability and Growth Pact" which attempted to limit countries' budget deficits to 3% of GDP with a secondary goal of keeping total debt load below 60% of GDP. The level of public debts in European economies has rapidly grown after the 2008 crisis, largely due to the need to guarantee the stability of the financial systems and cover unemployment expenses. The ratio of debt in relation to GDP is expected to remain higher than in pre-crisis period in the mid term. Optimising the size of Public Administrations and improving their efficiency delivering added-value services remains as a key challenge for many countries. Greek debt is expected to reach 175% of GDP by the end of 2013, Italy's debt is continuing to rise up to 131% of GDP, and debt in Ireland and Portugal are forecasted to reach 123% (the Economist Jul'13).



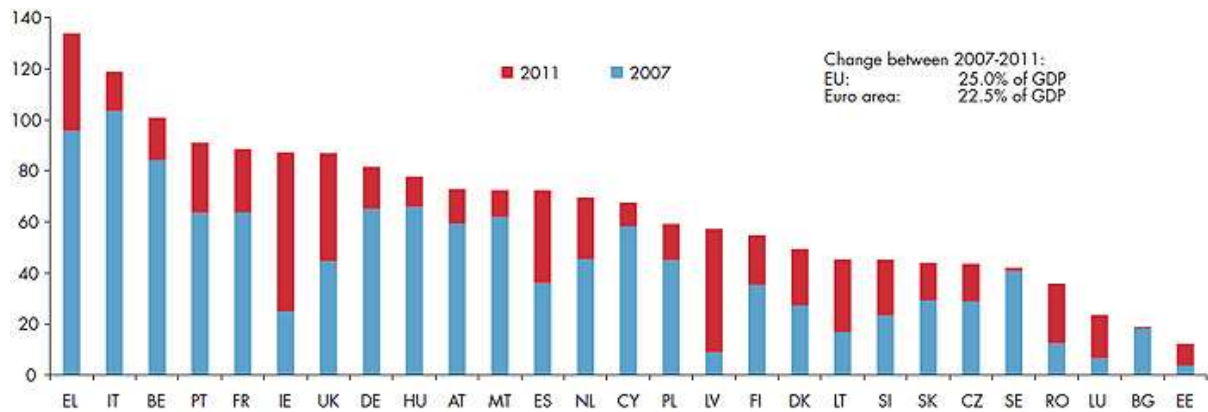


Figure 27 - Public debt growth in the EU 2007-2011, in % of GDP  
Source: European Commission autumn 2011 economic forecast and ECB calculations

**Private Debt.** Because salaries loose purchase power, consumption tend to be reduced for the majority of the population, except for the highest income group. The private debt accumulated during the latest years may tend to be reduced very slowly. After the introduction of the euro, largely because the monetary situation of Germany and the lack of proper common fiscal regulation in Europe, private debt grew from 120% of GDP to 225% in Spain, from 170% to 250% in Portugal, from 150% to 330% in Ireland, and from 55% to 120% in Greece.

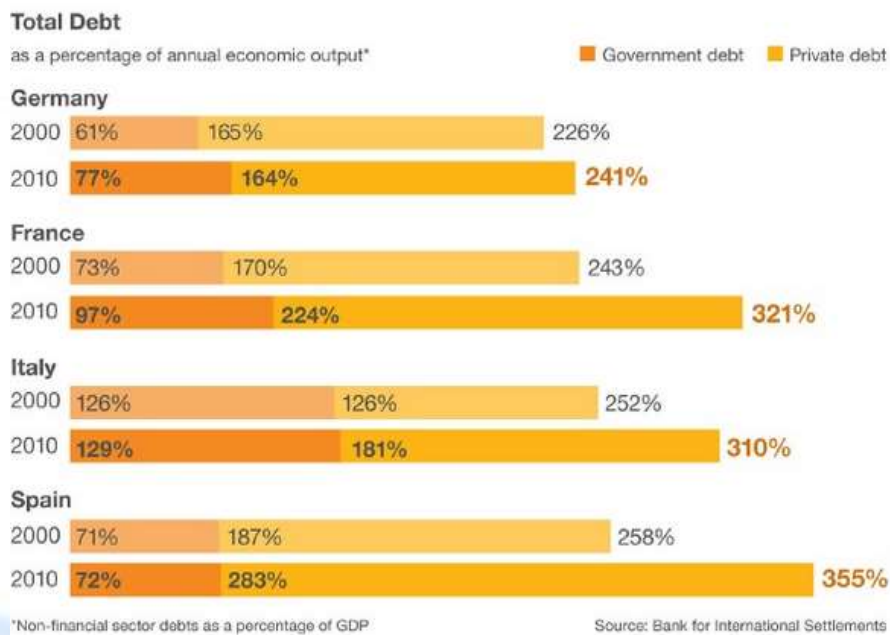


Figure 28 - Private and Public debt 2000 and 2010 for selected EU economies  
Source: Bank for International Settlements 2011

**Increasing spatial polarization in Europe.** Under prevailing globalization, high accessibility to intercontinental freight and passenger transport hubs will be determinant for the competitiveness of European regional economies. European major gateways for passengers and freight transport to the neighbouring countries and the rest of world will continue to expand their capacity to achieve even higher economies of scale, requiring specialised connections from the rest of the territory, either dedicated freight lines or High-Speed trains. In 2011, 4 ports concentrated the 60% of the total container traffic in Europe (Rotterdam, Hamburg, Antwerp, Bremen) and 4 airports concentrated 70% of the extra-

EU RPKs (Schiphol, Paris CdG, Heathrow and Frankfurt). In this context, some balancing of hub-and-spoke networks may be necessary to achieve a more efficient traffic distribution across Europe (e.g. promoting Mediterranean ports to capture maritime flows from Asia having as a destination the South of Europe, increasing the intercontinental flights from national airports) (ESPON ET2050, 2013).

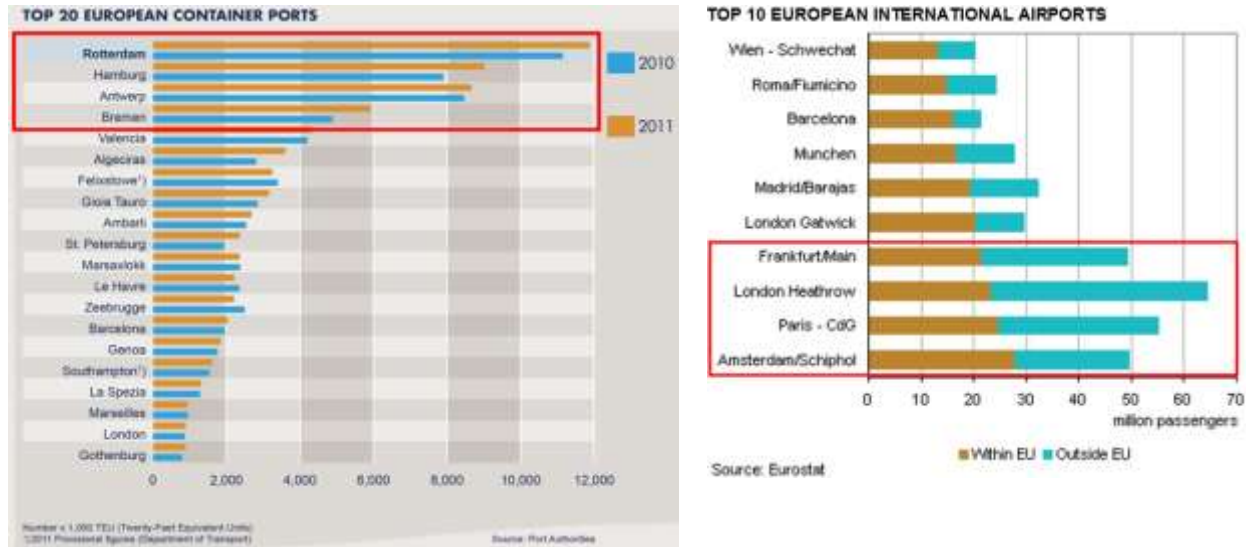


Figure 29 - TOP20 container ports (left) and TOP10 international airports (right)  
 Source: Port Authorities-left, Eurostat-right

### 1.1.1.7 Trends in the European Labour market

**Increasing labour participation mostly driven by women.** An aim of the European policies is the raise of the participation rate. For the EU as a whole, the participation rate (of people aged 15 to 64) is projected to increase by 3,5%, from 70,6% in 2007 to 74,1% in 2060 by the ECFIN (Ageing Report 2012). For the euro area, a similar increase is projected, from 70,8% in 2007 to 74,5% in 2060. Almost all of the increase is projected to materialise before 2020. Since 2002, labour participation in the EU28 has increased from 71.5% to 73.9% in 2013 (AMECO DB, EC FIN 2013), and increases are mostly due to increased participation of women in the labour market. Man and woman participation rates converge, but still there is a 6% difference on average with important geographical differences (e.g. Northern Europe and Southern). Since the 70s, the social ideal of women working at home has been replaced by a more flexible balance between work and family. Today, half of western women go to work. This development calls for new employment models and will have a significant influence on values in the years to come.

**Decreasing labour input.** Total number of hours worked per employee and year (labour input) has had a declining trend since decades ago. In 2010, Europeans worked on average 1.746 hours per year, while in 1980 they worked 2.000 hours. In most advanced economies, like Germany or France, people work today around 1.500 hours per year. Average yearly work hours per worker, however, include workers engaged in part-time work. If we look only at full-time hours, work-time more or less stagnated between 1992 and 2006 in Germany and between 2003 and 2008 in France. But there are remarkable changes within full-time hours. In Germany, for example, the proportion of male workers who put in between 36 and 39 hours per week decreased from 53% in 1995 to 21% in 2008, while the proportion of those working forty hours increased from 31% to 46% over the same period (Christopher Hermann, 2012).

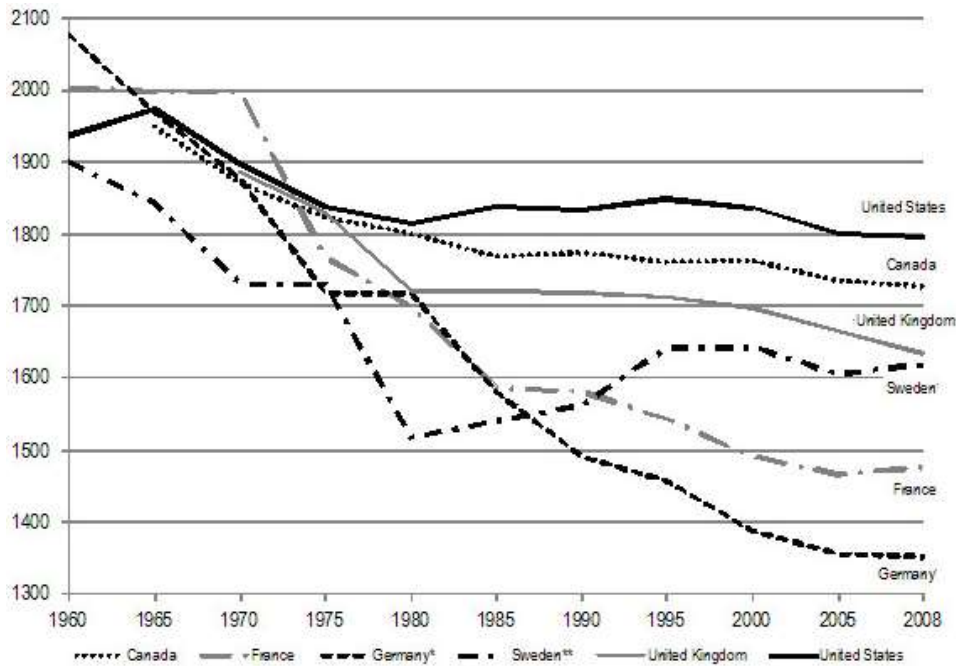


Figure 30 - Average yearly work hours per employed worker. \*Until 1990 West Germany; \*\* all workers  
Source: OECD

**Low productivity increases.** In average, between 1998 and 2011 productivity per capita grew 0,5% in the euro zone, against 2,5% in USA and 3,0% in Sweden. The total amount of worked hours by the European labour market is not significantly smaller than in the USA or Japan. Despite the fact that the number of hours worked per week and employee has dropped in Europe some 15% since 1980, the total labour input has remained stable. However, the level of investment on research and development and the training and professional qualification of the population is low, and the economic structure of many European countries is dominated by sectors providing low productivity, such as agriculture, construction, distribution or tourism. In countries like Spain, a large part of the GDP growth in the last 2 decades was mostly due to the increase on the number of workers, mostly immigrants, working on sectors with low productivity. In Poland, but also in some other countries in Europe, productivity in agriculture remains 20% below average.

**Retirement Age.** The legal retirement age is currently established at 65 in most European countries, but the average retirement age of European population is 61,2. More flexible work places and schedules in a more service-oriented and knowledge-based economy allow for longer careers in some cases, while pre-retirements on the other hand are applicable already in the mid 50s.

**Pre-crisis European convergence in labour costs.** Unit labour costs (ULC, ratio of compensation per hour to output per hour) in the European peripheries have grown at higher annual rates since 1995, than in central Europe. Using a 100 index for 1995, ULC grew in Greece up to 160 by 2008, in Portugal, Ireland and Spain up to 150, and up to 135 in Italy, while they were pretty much maintained in Germany (Paul Mason, 2012). This process was a continuation of a broader convergence process experienced since the 80s (J.Felipe and U.Kumar, 2011). Workers in Southern Europe became paid towards the mid 2000s roughly the same amount per unit of goods produced as their counterparts in Central Europe. Salaries of Southern European workers are still lower overall because they produce fewer or lower-value goods and services than in Northern and Central Europe. (Waldman, 2012).





Figure 1: Unit Labor Costs in the Eurozone

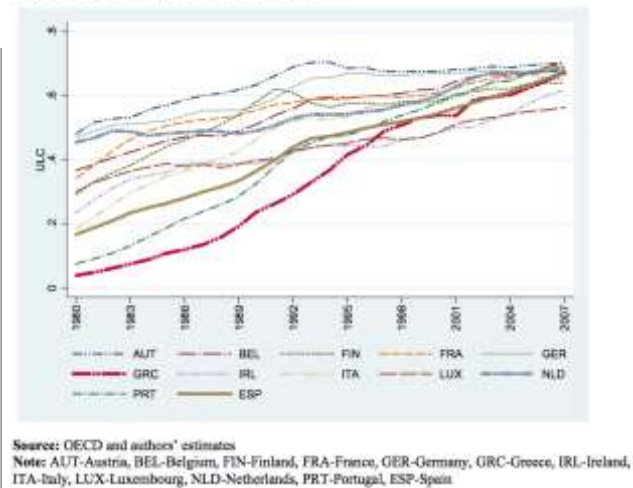


Figure 31 – ULC 1995-2008, with 1995=100 (left) and total Unit Labour Costs increases 1980-2007 (right)  
Source: J.Felipe and U.Kumar, 2011

**Decreasing labour share in ULC.** Despite increases in salaries in Europe before the crisis, productivity<sup>16</sup> growth has still been faster than the rise in real remuneration<sup>17</sup> of labour. The rise of the unit labour costs in Portugal, Italy, Ireland and Spain has only partially compensated for the steeply rising prices that attended EU convergence between 1980 and 2008. For all countries other than Greece, payments to capital providers per unit output have been growing faster than payments to workers. The share of profits grew faster than that of labour remuneration; workers have generally lost relative to capital across several European countries. (Waldman 2012, based on Felipe&Kumar 2011).

Figure 3a: Unit Labor Costs Decomposed

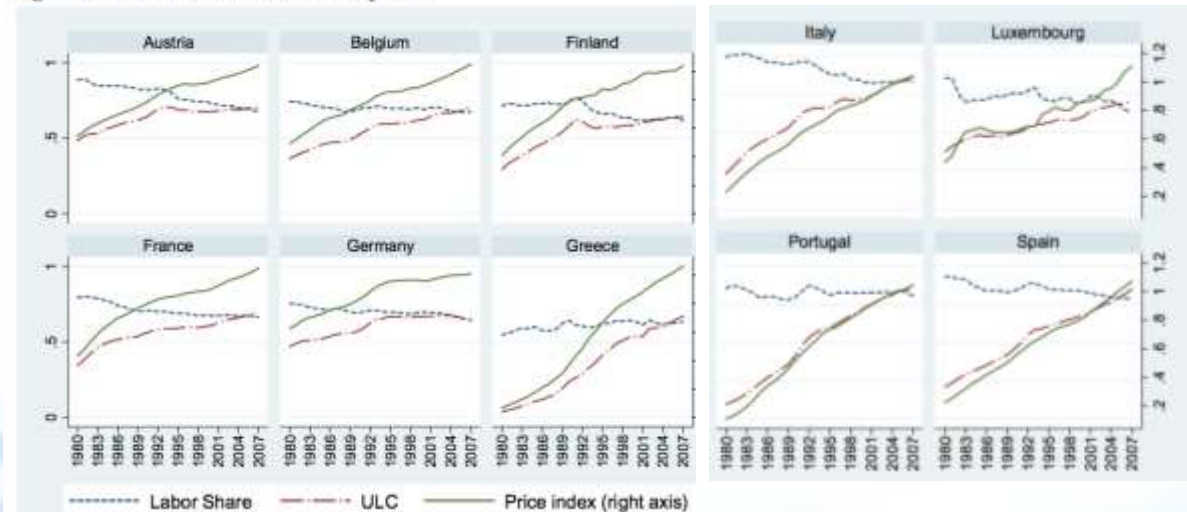


Figure 32 - Unit labour costs decomposed: decreasing labour share in ULC  
Source: J.Felipe and U.Kumar, 2011

<sup>16</sup>Peripheral countries in Europe have generally improved productivity. But the Lisbon Strategy has not succeeded in putting peripheral countries on a strongly rising path of productivity. There has been no real catching up with the more advanced economies of the Eurozone, with the partial exception of Ireland. Productivity increases have been respectable compared to countries like Germany (characterised by a lack of dynamism in the period 2000-2008), but that is because Germany has performed badly. (Waldman 2012, based on Felipe&Kumar 2011).

<sup>17</sup>Real remuneration is not the same thing as real wages, hiding a range of payments to managers and others in the form of wages and bonuses.

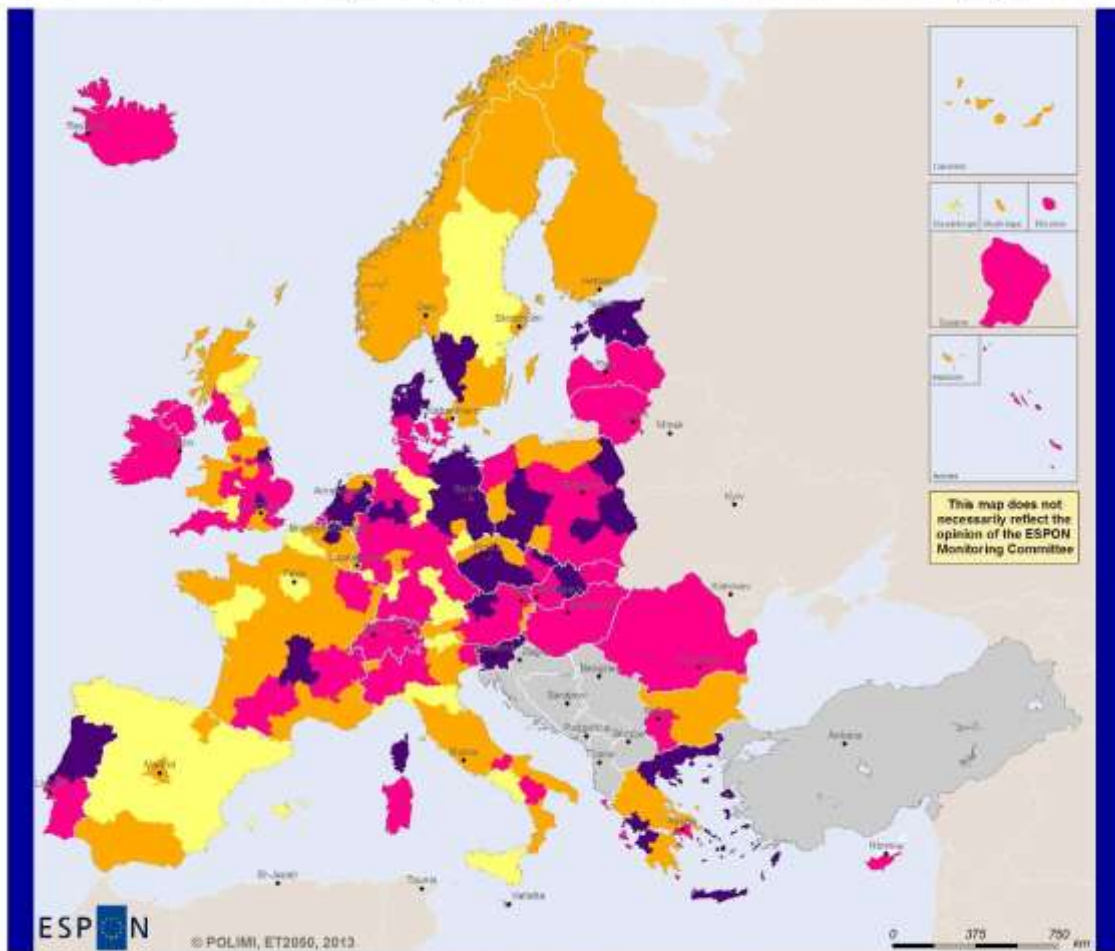


**Lower salaries since 2008.** The very large unemployment level in many European regions will keep driving salaries down in real terms for the years to come, and will also induce labour migrations towards more developed and ageing regions, with much higher salaries. As economies in the Euro Area cannot devalue their currencies, the way to regain competitiveness is through lowering their labour costs. Unit labour costs have decreased since 2008 in several crisis-hit countries (e.g. Ireland by 6,3%, Spain by 4,4% between 2008 and 2011), mostly driven by labour compensation decreases but in some countries also by increasing productivity. As Germany and other stronger European countries actually saw increases in ULC of around 8 to over 12%, a rebalancing seems to have started (B.Colijn 2012).

**More jobs and lower salaries.** One of the goals of the EU2020 strategy approved by the EU in 2010 is to increase the employment rate in the EU up to 75% of the 20-64 year population by 2020. Member States should create more and better jobs. Meanwhile, the employment rate for vulnerable groups - young people aged 15-25, older workers aged 50-64, unskilled women workers, people with disabilities and people with migrant backgrounds - should be increased by 10% by 2014. Today, employment rate in the EU is 68.5%, just half a point above 2005, with some important regional disparities. More jobs are expected to be created in Europe, overall, if the actual trend towards lower salaries will continue for the next decade (ESPON ET2050, 2013). Employment will therefore grow in most European regions, even in regions with low or negative economic growth, where growth will result for by an increased workforce rather than by higher productivity, similarly as it happened in many Southern regions with high immigration from 2000 to 2008. Jobs will be created in both the manufacturing and service sectors across Europe. A relative reindustrialisation is expected in traditional industrial areas in the centre of Europe, recentralising high-quality and technologically advanced production, as well as in Southern regions where salaries will remain low making already existing industrial investments profitable enough to remain there longer, delaying delocalisation plans towards Eastern regions, but to a less extend towards emerging markets. A net increase in the service sector is expected in Eastern regions, clustered in main cities.

## Service and manufacturing employment 2010 - 2030 (Baseline)

Measured as annual average employment growth rate related to EU average growth rate



ESPON © POLIMI, ET2050, 2013

EUROPEAN UNION  
Part-financed by the European Regional Development Fund  
INVESTING IN YOUR FUTURE

Regional level: NUTS2  
Source: POLIMI, 2013  
Origin of data: MASST3 Model  
© EuroGeographics Association for administrative boundaries

### Service and manufacturing employment growth

Results obtained by MASST3 forecast model

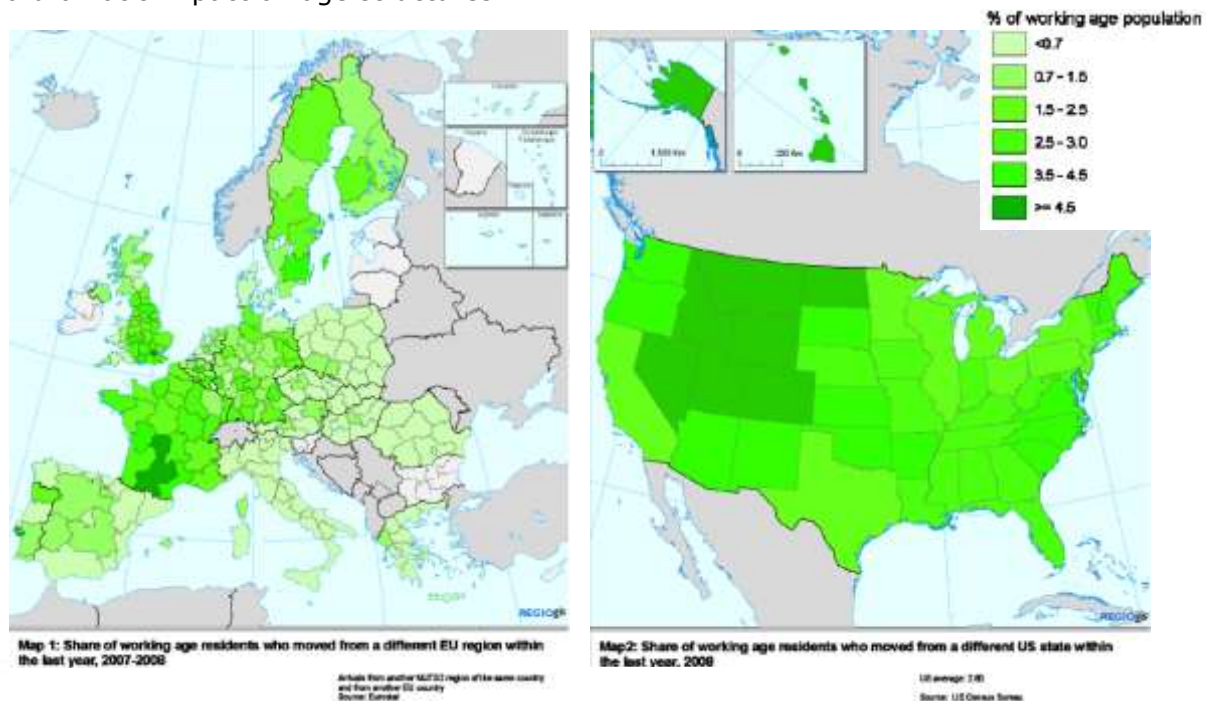
- Both rates below to EU average
- Manufacturing employment growth rate over to EU average
- Service employment growth rate over to EU average
- Both rates over to EU average
- No data (ESPON space)
- No data (No ESPON space)

Manufacturing employment grows at similar rates that services, in a reindustrialisation process. (ESPON space annual average of manufacturing employment growth is 1.49% and annual average of services employment growth is 1.69%). MASST3 is an econometric, macroeconomic, sectoral, social and territorial model. It has been upgraded to explicitly take into account the impact of the current economic crisis.

Map 2- Service and manufacturing employment growth  
Source: Politecnico di Milano, ESPON ET2050, 2013

**More Labour Mobility but regional drainage in some areas.** Migration is still low in Europe, among countries and within countries, as well as from other non-European countries, in comparison with the USA. Migration in Europe is expected to grow because of ageing, as well as because of economic reasons if lagging countries do not catch-up with more developed economies. Today only 1% of European citizens move within their own countries following labour opportunities, and below 0,2% move across-border, whereas in the USA, 2.3% annually move across states USA (EC 2008). Labour migration from less

developed Eastern rural regions to Central regions, and to the larger industrial and service sector in Eastern countries is therefore likely to happen unless a change on technologies (e.g. a significant increase in “robot sourcing”) or policies. The volume of the labour migration flows East-West and South-North can be a serious threat to societies and economies of a number of countries, for Lithuania for example, that can lose a significant part of their population. Since migrants are usually young people, migration will also have a dramatic impact on age structures.



Map 3– Labour mobility across Europe (left) compared to the USA (right)  
Source: EC 2008

#### 1.1.1.8 New social behaviours

**Consumption Patterns.** 55% of GDP is produced by household expenditures. Consumption is tending to be reduced and focused on low-cost products, for most people, but also to more luxurious products and services for the wealthier elite. More environmentally sensitive consumption is being perceived. Changes in consumption patterns often happen linked to new generations. Less consumption can imply a great change in consumption based economies.

**Proximity Consumption.** Proximity consumption is on the rise. Within the food sector, one important trend is the increase of local markets for agricultural products sensitive to ecological higher quality. This brings higher level of self-sufficiency at local and regional level.

**Green supply chain driving global economic growth.** As “Green” becomes a business and a consumption good, corporations, not governments, are now driving the push toward sustainability as they harvest increasingly significant profit growth through design and process innovations that cut production, delivery, packaging and disposal costs while also reducing a company’s/product’s environmental footprint (A.Bakas, 2006)

**Economics is becoming less about ownership and more about access.** Younger generations are becoming less interested in accumulating debt for the purchase of cars and housing. Renting and sharing are becoming more common arrangements for large physical assets. A growing portion of product value will come from informational content (design) rather than material content. (CSIRO 2012). Collaborative consumption increase



is happening, and can lead to more efficient resource use and cost savings (Botsman and Rogers, 2010). Collaborative consumption increasingly spreads into many areas: music and multimedia (P2P sharing), bike sharing, apartments (e.g. [www.airbnb.com](http://www.airbnb.com)), parking (e.g. [www.wesmartpark.com](http://www.wesmartpark.com)). Different car sharing formulas are popping up throughout Europe and the World (cooperative, centralised, grass-rooted). Collaborative consumption will be boosted by continued development of innovative online transaction platforms. (CSIRO 2012).

**Thinking in systems and cycles: The Blue economy<sup>18</sup>.** Promoted by ZERI foundation and Gunter Pauli, the “Blue Economy concept” is aimed at addressing the fact that the Earth’s limited resources pose “carrying capacities” for populations of species, requiring consequently an efficient use of resources and energy, and evolving clever mechanisms to adapt to and overcome environmental conditions and challenges. Nature constantly increases its efficiency and has proven to be the most economic actor of our planet. Numerous examples prove that it is possible to imitate nature’s designs, perfected over millions of years, in the production of goods –using the waste of one product as the input for another. These innovations are to revolutionize the industries they are applied in, making consumption of those products a positive action (<http://www.blueeconomy.eu>)

**Stable Genuine Progress Indicator (GPI)<sup>19</sup>.** While global Gross Domestic Product (GDP) has increased more than three-fold since 1950, economic welfare, as estimated by the Genuine Progress Indicator (GPI), has actually decreased since 1978. Kubiszewski et al synthesized estimates of GPI over the 1950–2003 time period for 17 countries for which GPI has been estimated, containing 53% of the global population and 59% of the global GDP. Results of the analysis have shown that GPI/capita does not increase beyond a GDP/capita of around \$7000/capita. If income was more equitably distributed around the planet, the current world GDP (\$67 trillion/yr) could support 9.6 billion people at \$7000/capita. Development policies need to shift to better account for real welfare and not merely GDP growth (Ida Kubiszewski et al. 2013)

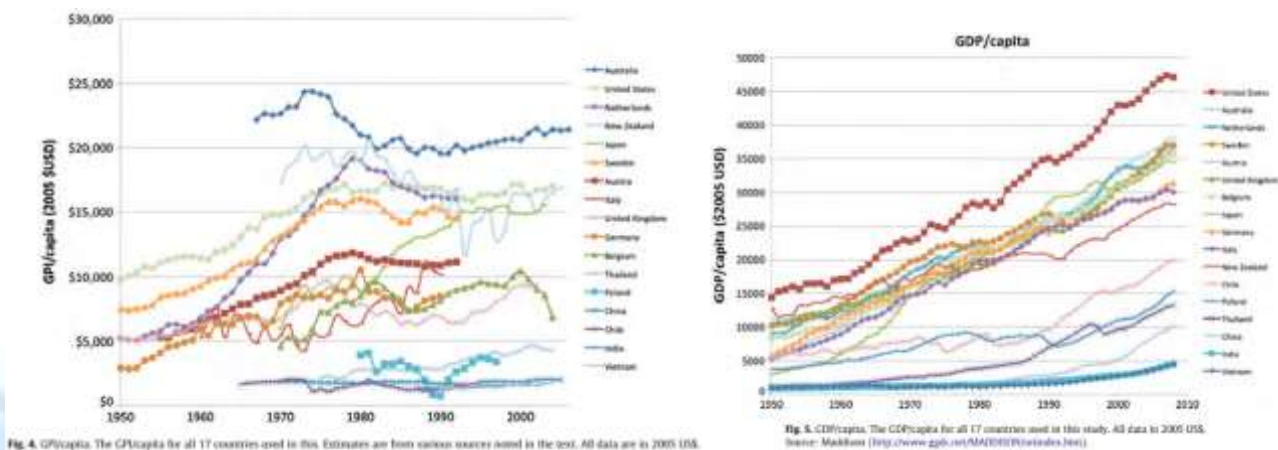


Figure 33 - GPI (left) and GDP (right) growth 1950–2010, for selected economies  
 Source: I. Kubiszewski et al, 2013

<sup>18</sup> The “Blue economy” concept from Pauli is to be distinguished from the “blue growth” concept used by the EC to mean a better exploitation of marine resources (discussed later, in chapter 5.1.2.3)

<sup>19</sup> Genuine Progress Indicator (GPI) is a metric that has been suggested to replace, or supplement, gross domestic product (GDP) as a measure of economic growth. The calculation of GPI can be presented in the simplified:

$$GPI = A + B - C - D + I$$

A is income weighted private consumption

B is value of non-market services generating welfare

C is private defensive cost of natural deterioration

D is cost of deterioration of nature and natural resources

I is increase in capital stock and balance of international trade



### 1.1.1.9 Innovation driving change

**Accelerating rate of technological development.** Some technologies like 3D printing, graphene, robotics, energy storage and polymer electronics will accelerate the improvement of development. Other technologies such as nanotechnologies will have a strong impact on health and life expectancy. While some hold that the increase of technological development is exponential (Kurzweil's singularity forecasted by 2030), others expect the ending of the Moore's law in the coming decades (Michio Kaku, 2011). Constant progress in ICT (faster and faster Internet, IoT, cloud, etc.) creates a wider and wider range of possible applications that has to be carefully taken into consideration by all those addressing innovation.

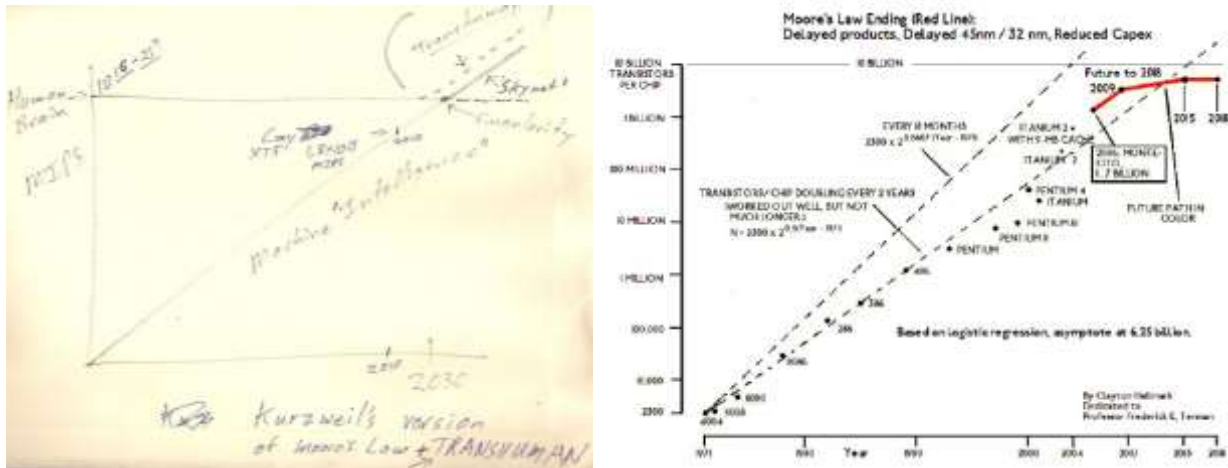


Figure 34 - Kurzweil's version of Moore's Law interpreted by Ansgar John (left) and the Collapse of Moore's Law by Michio Kaku (right)

Source: Sinaas 2010 (left) and K.Kress 2006 (right)

**Shrinking world.** Just as railways and airplanes reduced physical distance in the domain of transport, new communication technologies are making the World smaller than ever. The number of daily contacts and interactions any human being has today rises exponentially with email, social networks and peer-to-peer platforms. After WW1, it became obvious that due to technological advances in communications and travel, friendship networks could grow larger and span greater distances. As a result of this hypothesis by Frigyes Karinthy stated that any two individuals could be connected through at most five acquaintances. A 2007 study (J.Leskovec, E.Horvitz) examined a data set of instant messages composed of 30 billion conversations among 240 million people and they found the average path length among Microsoft Messenger users to be 6.6.

**Internet Users.** There are more than 250 million daily Internet users in Europe and virtually all Europeans own mobile phones. This has changed lifestyle. It will be challenging for business and other organizations to find new ways of work-life integration. The increasingly free production and access to information content will challenge the traditional business model in many sectors, particularly in the creation of added value.

**The rise of the digital world can change business models.** Between 1996 and 2011, Kodak's annual revenue downsized from US\$16 billion to US\$6.2 billion, and went from profit to net losses, despite the fact that Kodak had built one of the world's first digital cameras already in 1975 (the Economist 2012, Anthony 2012). As with digital cameras in the 1980s and 1990s the world of online retail and teleworking still represents a relatively minor share of total retail turnover and the labour market. The challenging question is how much bigger will it get in the next 5, 10 or 20 years? (CSIRO 2012)

**Research and Development.** Expenses on Research and Development are about 1,9% in the euro zone, against 2,6% in USA and 3,7% in Sweden. The relevance of sectors related new technologies is smaller in Europe than in USA (7% of GDP against 10%). The fragmented investments in Defense and Military-related fields by European countries, compared to the Chinese and USA integrated military programs, explain to a large extent the difference in publically financed research. The EU2020 strategy set up in 2010 the target of attaining a 3% GDP yearly investment in R&D by 2020. Today, the EU is spending 1,9% of its GDP for research and development compared with America's 2,6%, and the US has twice as many scientists and engineers per million people as the EU, and scientific brain drain from Europe to the US continues. China's will become the 2nd largest R&D power in the World in the mid-2010s well ahead of major EU Member States, and with efforts focussed in most promising cutting-edge areas. Overcoming the missing link between research and development-deployment in Europe is key to future development.

**Increasing competition in innovative sectors.** Under the pressure of growing scarcity and environmental needs, more and more natural resources (particularly fossil fuels) are being replaced with synthetic substitutes. Here lies the great opportunity for the old industrial countries to maintain some leadership in the global economy, mostly through innovation and technological advances. However, competition in the R&D business will be huge as new emerging powers such as the BRICs do also invest in key sectors where innovation is needed, such as materials (rare materials, superconductors...), energy and nanotechs.

**Regional Innovation.** Progressive convergence for public R&D expenditures in EU Member States (catching up in patent inscription by lagging regions), but industry based R&D increasingly concentrated in few selected locations (densely populated metropolitan areas in Western Europe). Some regions perform well at accessing, absorbing and diffusing knowledge even when they have limited knowledge creation capacities, while traditional regions are set to improve education to increase their absorption capacity.

**Local and social innovation** The increasing role that local innovation, and particularly social innovation (and not only digital social innovation - DSI) should play in the future to make things change globally should be taken into consideration.

**eLearning.** The education system remains to be adapted in many European countries to the requirements of the emerging economy, favouring more pro-active and collaborative, creative and entrepreneurial competences in students. Links between universities and corporations remain weak. Knowledge-based economies require lifelong education that hardly formal system can deliver. Education systems are currently adapting only slowly to the learning society. European systems have been slow to respond to the requirements of the knowledge society, failing to adapt curricula and programs to the changing needs of the labour market.

**Entrepreneurship** in Europe remains lower than in emerging economies, but the number of people working free-lance grows. Most new companies are started by individuals 25-44 years of age, and the shrinking share of this cohort will also mean less entrepreneurship and reduced innovation.

#### **1.1.1.10**      *Selected key innovations (seeds)*

**Healthcare technologies.** Progress in biotechnology, genetics, stem cell research, tissue engineering and nanotechnology, as well as personalised medicine, advanced prosthetics and anti-ageing medicine is expected to have a huge impact in human life span. A number

of adult stem cell therapies already exist, but applications are expected to grow in the future. Biomedical applications of nanotechnology are already contributing to develop cochlear and retinal implants, which will improve or restore hearing and eyesight. Electronic implants and physical modifications are to enhance our current human capacities.

**Personalised medicine.** High potential for increasing care efficiency is seen in moving from a generalised pharmacology to personalised medicine and a pharmacology that is tailored to individuals. Genomics may allow for the development of preventive medicines, follow-up treatments and support services such as lifestyle counselling. The pace of discovery of new chemical entities is expected to accelerate and the diversity of potential target applications of drugs is expected to increase.

**Food and water security.** Urban agriculture in the future can be developed in vertical structures thanks to techniques such as hydroponics or aeroponics. Desalination is one of the most obvious technological advances in relation to access to 'new' water resources, used mainly in arid and semi-arid areas.

**Progressive integration of physical and virtual realities.** Augmented reality results from the combination of virtual and real objects in real environment fully integrating virtual content with the real world. Telepresence combines software, video, audio, screen and networking technologies to create a collaborative experience close to a face-to-face physical meeting.

**Smart cities and housing.** Assistive technologies will become available to support everything from personal mobility to medication adherence as well as robotics and domotics to help with everyday activities. The new intelligence of cities resides in the increasingly effective combination of digital telecommunication networks, ubiquitously embedded intelligence, sensors and tags, and software. Digital telecommunications create new kinds of interdependencies among scattered global regions and settlements. The proliferation of nested smart cities and smart places connected to global networks will eventually produce new types of urban tissue which will reshape our cities.

**Digital networking.** The vision of "ubiquitous computing" defined by Weiser in 1993 is already real today in smart phones, and is expected to pursue. Social networking and virtual communities create bonds as important as those attached to the territory and geographic proximity. People in networked societies live and work in multiple sets of overlapping relationships.

**Governance and technology.** The rush by government agencies worldwide to embrace the technologies known as Web 2.0 has opened up a number of new ways citizens can participate in the public sector, and have enhanced governance transparency.

### 1.1.2 Critical uncertainties linked to economic and innovation megatrends

#### 1.1.2.1 Structural transformations of European Economies?

The current sovereign debt crisis has highlighted some weakness of the Eurozone. In reference with the economic theory, an optimum currency area is mainly characterised by the following points (i) perfect capital mobility, (ii) perfect labour mobility and (iii) substantial supra-national budget. In the Eurozone, the capital is perfectly mobile but the labour is not mobile enough, even if the current economic divergences within the Eurozone have accelerated the migration flows (see e.g. Barslund & Busse, 2013), and finally there is a very weak common budget. The current adjustment within the Eurozone is taking place through a wage moderation in the peripheral countries which is not without social and

political consequences. Numerous economist and politicians are raising the idea of the end of the Eurozone. Even if these views remain in minority such scenarios cannot be excluded. Furthermore, in the current European legislation, there is no possibility to exit the Eurozone without exit the European Union, which could also cause tremendous troubles due to border tariffs, labour mobility. The risk of non-planned evolution of the European monetary Union should be considered as a possible option even if its consequences could be hardly evaluated (See **BOX 3**)

#### **1.1.2.2 The End of Globalisation: back to local production?**

Data from the World Bank, Boston Consulting Group, OECD and the National Association of Software and Services Companies reflect the growth in offshoring of labour in the 2000s. The OECD estimated that US\$81.4 billion was offshored in 2005 and forecasted growth to US\$252 billion by 2010 (Gereffi and Fernandez-Stark, 2010). According to some, flows of capitals keep and will keep increasing in the globalisation, unrestrained despite attempts to regulate the international financial system (*Z\_punkt GmbH megatrends*). Others claim that eventually the classical model of free trade will fade out as a process of "regionalization" around each of the BRICs is developed. (W.Hankel & R.Isaak, 2011). Cost production increases expected in the BRICs and other emerging countries and the emergence of their large internal markets may change in the mid term their export oriented economies, with their priorities being fixed on infrastructure development and job creation. Decrease in production costs in crisis-hit Westerner economies dropping may eventually lead to the reindustrialisation of Europe and other developed countries.

#### **1.1.2.3 Crisis in China (or the BRICs)?**

China has faced a decrease of the international demand which has implied a significant reduction of its external trade surplus. While the households' final consumption remains weak with around 35% of GDP, economic growth is sustained thanks to huge investments. This situation is viewed, by several economists (e.g. Roubini, 2013 or Monan, 2013) as unsustainable in the medium-term. Without a raise of households' purchasing power and an increase of their consumption, these huge investments could be unprofitable, leading to a massive correction and could threaten the Chinese financial sectors. Even if the situations are not fully similar, the case of the Chinese economy reminds the 1997 Asian financial crisis, for the same economists. A collapse of the Chinese economic growth would have some major consequences for the economies in the rest of the World (see **BOX 1**).

#### **1.1.2.4 Debt Bubble Crash and Global Bankruptcy?**

Although the developed world today is considerably richer overall than it was in the 80s, creditworthiness has been steadily declining ever since then. The global supply of AAA-rated government bonds has shrunk by more than 60% since the financial crisis began. The debt-to-GDP ratios of the top 20 richest countries are twice as high as that of the 20 largest emerging markets. For how long will the emerging countries be forced to help pick up the tab? (W.Hankel, R.Isaak, 2011) Many claim this picture could go onto a vast bankruptcy subsidized by foreign creditors, who would themselves be bankrupted by the contraction of the debt pyramid sustaining the whole operation (L.Goldner)

#### **1.1.2.5 Broken culture of consumption?**

The World economy is based on personal consumption. In the last 30 years and up until the crisis, personal consumption in the US, for instance, went from approximately 50% of GDP to 80%, an increased sustained by borrowing, reduced savings, and asset inflation (e.g. real state bubble). During the boom, debt as a percentage of spendable income went from 68% in 1980 to 138% in 2007. Since 2007, a combination of assets depreciation (e.g.



US Nominal worth from \$63 trillion to \$50 trillion), fear and an uncertain future, consumer credit declining, diminishing wages, all these have a long-term impact on consumption considering that families still need to pay back their debt. People will spend less and save more. (<http://dailycapitalist.com/2009/09/15/economic-megatrends-that-will-drive-our-future/>)

#### ***1.1.2.6 Regulation of the financial sector?***

There appears to be consensus that financial global speculation and speculative investments in property development are the main reason for the financial turbulences responsible for the current financial crisis and that these are quite difficult to control (Klaus R. Kunzmann, 2010)

#### ***1.1.2.7 Europe taking advantage of demand from emerging countries?***

The US, which is still the largest buyer of European goods and services, may remain in a situation of weak demand for the years to come, so that the European economy, which cannot rely on the public sector to create demand, needs to diversify demand sources as much as possible. This could be found in emerging economies where the rise of disposable income of their citizens may be a target for European firms to try and find a way into these rapidly expanding markets. As labour costs in emerging economies increase and decrease in Europe, European firms become more competitive. However, uncertainty is high in this matter, and it may also be that the shale gas revolution orients US to specialize in energy intensive productions increasing their imports of other manufacturing products from Europe (e.g. more light/knowledge intensive products), whereas the emerging middle classes in emerging countries could increase the demand for domestic production rather than imports from Europe or elsewhere.

#### ***1.1.2.8 End of the European regional convergence?***

There is much evidence that Europe, despite all cohesion efforts, may become a two speed economy, where most metropolitan regions in response to economic pressure from globalization and technological change adapt their policies to the challenges of global competition, while other regions are left to mobilize the remaining regional territorial capital. The financial crisis in the last years of the first decade of the 21st century may force policymakers at all tiers of planning and decision-making to accept this two speed Europe, with different life spaces and reduced consumer expectations. (K.R.Kunzmann, 2010). (See **BOX 4**)

On the other hand, there is still very limited empirical evidence regarding the spatial implications of the financial crisis. Are the reasons for spatial decline directly linked to unexpected vigour of the economic crisis, or rather the consequence of geopolitical locations and a multitude of actions more and less linked to it? As the turbulences on the capital market are not yet over, there is very little evidence of spatial developments, which can be directly related to the crisis. (K.R.Kunzmann, 2010).

#### ***1.1.2.9 Downsized welfare systems in Europe?***

Dealing with World-wide competition without abjuring the European labour market model and welfare state. The European society is characterized by higher levels of public welfare with respect to almost all the rest of the world, which means higher services but also higher expenditure for health care and pensions. These costs translate into higher taxes on labour and capital. At the same time, the European labour market model is in many cases little flexible, with workers which either do the same job until the retirement age or fall into unemployment. Young people, in particular, find it difficult to find a regular job to enter

this protected labour market. In order to be able to sustain its welfare system and labour protection, European countries will need to foster labour productivity, otherwise production and services will be off-shored.

#### **1.1.2.10      *Increased labour mobility after the crisis?***

Many citizens are moving to other countries of the EU seeking for job opportunities and leaving labour depressed markets. Still, labour mobility in Europe is today substantially lower than in the US, where 2.3% citizens move each year across federal states driven by new job opportunities, whereas in Europe international labour mobility represents not more than 0.2% and intra-national labour mobility around 1.2% (with important differences among Member States). At the same time, the ageing of European population will reduce both the active population as well as the average rate of participation. External migration may be also necessary to maintain economic growth.

#### **1.1.2.11      *Financing Member States public debt?***

The expensive welfare state, as well as the poor efficiency of many public administrations together with an emerging political populism, already made Europe a relatively indebted continent, but this situation has worsened with the economic crisis, so that now almost all countries have a significantly larger burden of public debt on GDP. Some countries are already experiencing difficulties in re-financing maturing debt. For this reason tight public finances, better public management, and coordination between countries will be needed in order to maintain the debt sustainable.

#### **1.1.2.12      *Competition with emerging countries in high-value sectors?***

The European economy used to compete with their products against the firms of other OECD countries such as the US or Japan. The earlier competition from China and the Asian tigers but also from Brazil and India, was on the contrary based on cost competitiveness on lower value added products. This pattern has already changed. Emerging economies are increasingly active in high-tech sectors and products, and this will increase in the future so that European economies will need to compete against younger countries also in these sectors, by trying to maintain and renew the technological advantage they still have.

#### **1.1.2.13      *The green economy sector lead by the EU?***

Reducing emissions will probably entail higher costs for European firms, which will make them less competitive in the short-term, *ceteris paribus*, with respect to countries where regulations are less ecologic. At the same time, this challenge could bring long-term opportunities if Europe could establish itself as a forerunner in green technology.

#### **1.1.2.14      *Oil price evolution?***

Oil price has been anticipated to keep growing in the future by most forecasts. Some analysts argue that real oil price (in constant currency) is today not higher than during the 70s energy crises, or early in the 20<sup>th</sup> century. Other claim the shale energy revolution may shift the tectonic plates of global power in ways that are largely beneficial to the West and reinforce U.S. power and influence during the first half of this century. Shale gas — a resource that has grown significantly in just the last few years to one-quarter of the domestic gas supply — is cheaper and involves fewer emissions than traditional coal or oil. Shale gas offers the means to vastly increase the supply of fossil fuels for transportation, which will cut into the rising demand for oil that has dominated energy policy making over the last decade. The Obama Administration announced in May 2013 that the USA will exploit shale gas resources at large scale to the extent of becoming a net exporting gas

power by 2020. The aim is “to facilitate lower costs in the [western] hemisphere and in Central America.” (the Economist).

## 1.2 Challenges for Europe in the World Context: SWOT Analysis

### 1.2.1 Economic targets in force in Europe

The following targets have mostly been set on over the last decade, with the aim of increasing environmental preservation, resource efficiency, and addressing climate change issues. Each target is accompanied by the temporal horizon associated to it, and the policy document where target was established.

The successful accomplishment of targets in force is a major challenge for Europe.

Sector	Year	Target	Source
Inflation (Eurozone)	always	Maximum 2%	ECB
Inflation (Member States in the eurozone)	always	Maximum 1,5% above that of, at most, the three best performing MS in terms of price stability	Convergence criteria
Government deficit (Member States in the eurozone)	always	Maximum 3% of GDP	Convergence criteria
Government debt (Member States in the eurozone)	always	Maximum 60% of GDP	Convergence criteria
Interest rate (Member States in the eurozone)	always	Maximum 2,0% above that of, at most, the three best performing MS in terms of price stability	Convergence criteria
Employment	2050	75% of the 20-64 year-olds to be employed	EU2020
R&D / innovation	2020	From 1.8% to 3% of the EU's GDP (public and private combined) to be invested in R&D	EU2020



## 1.2.2 SWOT Analysis

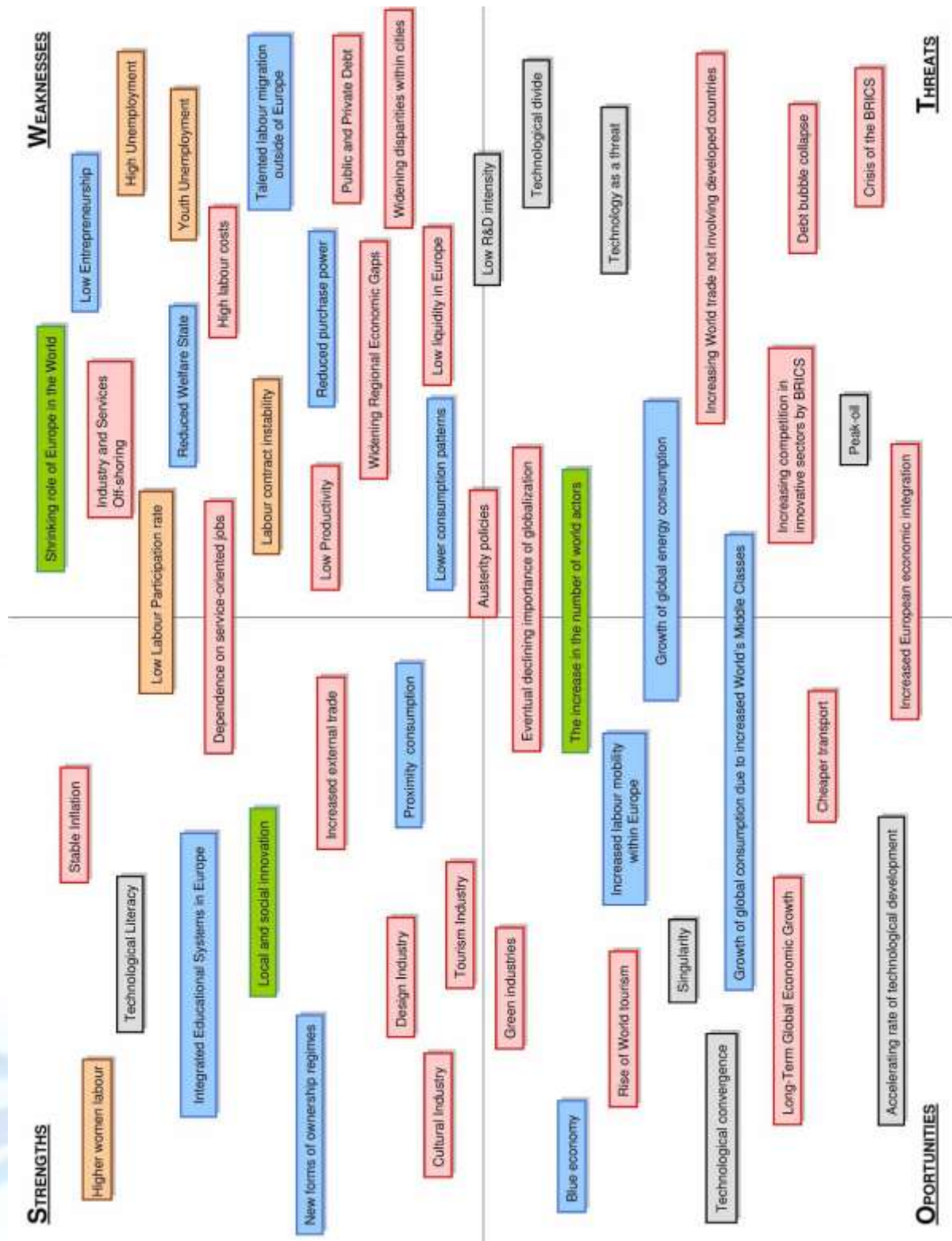


Table 10 –SWOT table of the Economy, Finances and Innovation area

## 2.- D1.b “Demographic and Social Change Trends and Challenges”

*This report has been prepared in the context of the FLAGSHIP project, financially supported by the Seventh Framework Programme of the European Commission. As large parts of this report are based on forthcoming review papers, we would like to thank Guy Abel, Bilal Barakat, Stuart Basten, Graziella Caselli, Sven Drefahl, Rachel Durham, Marc Luy, Fernando Riosmena, Nikola Sander, Tomas Sobotka, Christian Wegner, and Krystof Zeman for their willingness to share their papers with us. We also are grateful to Peter Ekamper for preparing the maps*

### 2.1 Megatrends at Global and European level

#### 2.1.1 Population development

The world population is growing rapidly. Whereas the global population totaled approximately 2.5 billion people in 1950, this number had grown to about almost 7 billion in 2011. According to the medium estimates of the United Nations World Population Prospects (2010 revision), this number is expected to grow further to more than 9 billion people in 2050 (Table 11). Most of these people live in the so-called “less developed countries”. The share of the “most developed countries”, including the countries of the European Union decreased from 32 per cent in 1950 to 18 per cent in 2011 and is expected to further decrease to 14 per cent in 2050 (United Nations, 2011).

Europe’s role in world population growth is limited. Between 1950 and 2011 Europe’s population increased from 547 to 739 million people, a total growth of 35 per cent while in the same period the world population grew by 175 per cent. According to the medium estimates of the UN 2010 revision of the World Population Prospects, Europe is expected to number 719 million persons in 2050. Past and future population growth varies greatly between different parts of the world, with most divergent patterns for Europe and Africa (Figure 35). While the population of Africa is expected to continue to grow substantially until 2050, the population of Europe is slightly declining. This population decline is mainly caused by a shrinking population in the countries of Eastern Europe (Figure 36).

	Population x 1,000			Growth index		% in the world		
	1950	2011	2050	1950-2011	2011-2050	1950	2011	2050
World	2,532,229	6,974,036	9,306,128	275	133	100	100	100
More developed	811,187	1,240,380	1,311,731	153	106	32	18	14
Less developed	1,721,042	5,733,657	7,994,397	333	139	68	82	86
Africa	229,895	1,045,923	2,191,599	455	210	9	15	24
Nigeria	37,860	162,471	389,615	429	240	1	2	4
Asia	1,403,389	4,207,448	5,142,220	300	122	55	60	55
China	550,771	1,347,565	1,295,604	245	96	22	19	14
India	371,857	1,241,492	1,692,008	334	136	15	18	18
Indonesia	74,837	242,326	293,456	324	121	3	3	3
Pakistan	37,542	176,745	274,875	471	156	1	3	3
Bangladesh	37,895	150,494	194,353	397	129	1	2	2
Japan	82,199	126,497	108,549	154	86	3	2	1
Europe	547,287	739,299	719,257	135	97	22	11	8
EU28	376,996	506,032	514,173	134	102	15	7	6
Russian Federation	102,702	142,836	126,188	139	88	4	2	1
Latin America	167,368	596,629	750,956	356	126	7	9	8
Brazil	53,975	196,655	222,843	364	113	2	3	2
Mexico	27,866	114,793	143,925	412	125	1	2	2
Northern America	171,615	347,563	446,862	203	129	7	5	5
USA	157,813	313,085	403,101	198	129	6	4	4
Oceania	12,675	37,175	55,233	293	149	1	1	1

Table 11 – Total population estimates according to the United Nations  
 Source: UN World Population Prospects, 2010 revision medium estimates

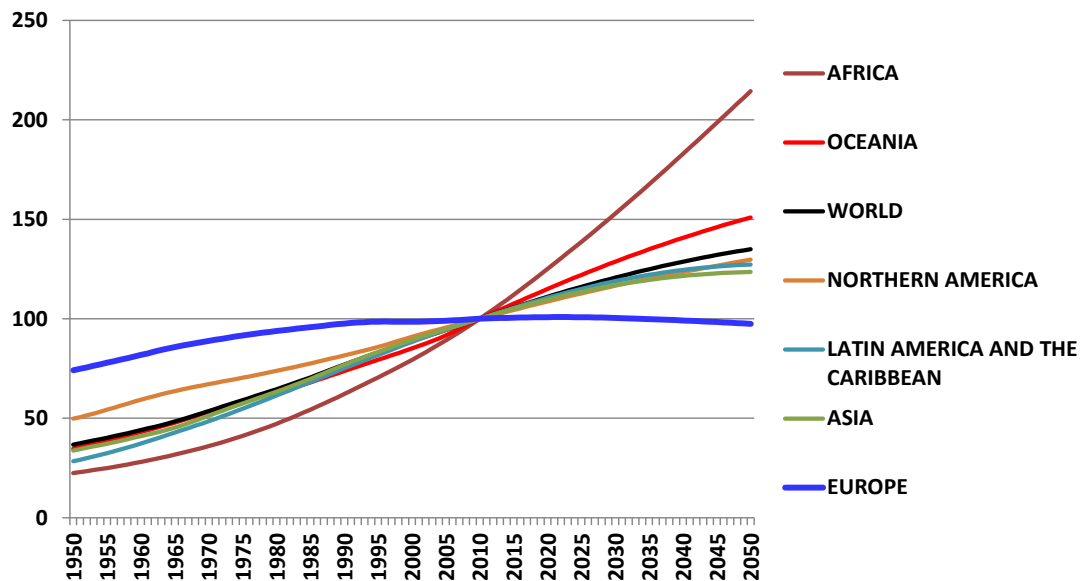


Figure 35 - Population growth 2010=100, regions in the World; UN medium estimates  
Source: United Nations

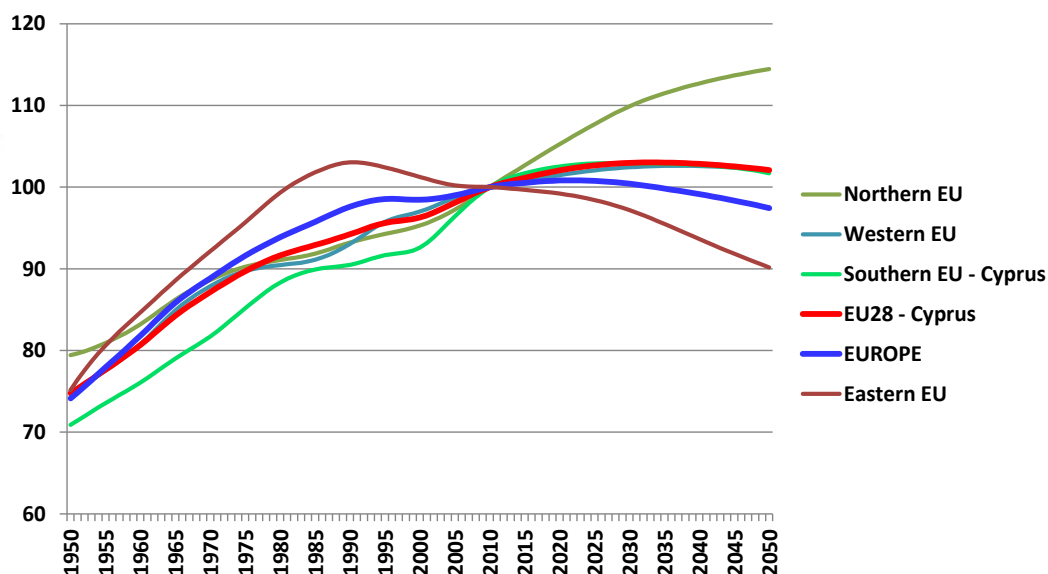


Figure 36 - Population growth 2010=100, regions in Europe; UN medium estimates  
Source: United Nations

The population of the 28 countries of the European Union<sup>20</sup> is expected to continue to grow from 506 million inhabitants in 2011 to 514 million in 2050. This increase, however, is fairly small. Apart from several countries in Europe, also Japan and China will face a declining population. In all other major regions of the world, the population in 2050 will outnumber the one in 2011. As a result, the share of Europe and the EU28 in the world population will decline considerably. Whereas in 1950 Europe accounted for 22 per cent of the world population, this number decreased to 11 per cent in 2011 and will probably drop further, to 8 per cent in 2050. The share of the EU28 will fall from the current 7 per cent to 6 per cent in 2050. Within the EU28 population prospects vary from a continuation of

<sup>20</sup> As of 1 July 2013 Croatia will join the European Union. In this report EU28 refers to EU27+Croatia.

growth by 40 per cent in Luxembourg to a declining population of more than 20 per cent in Bulgaria (Figure 37).

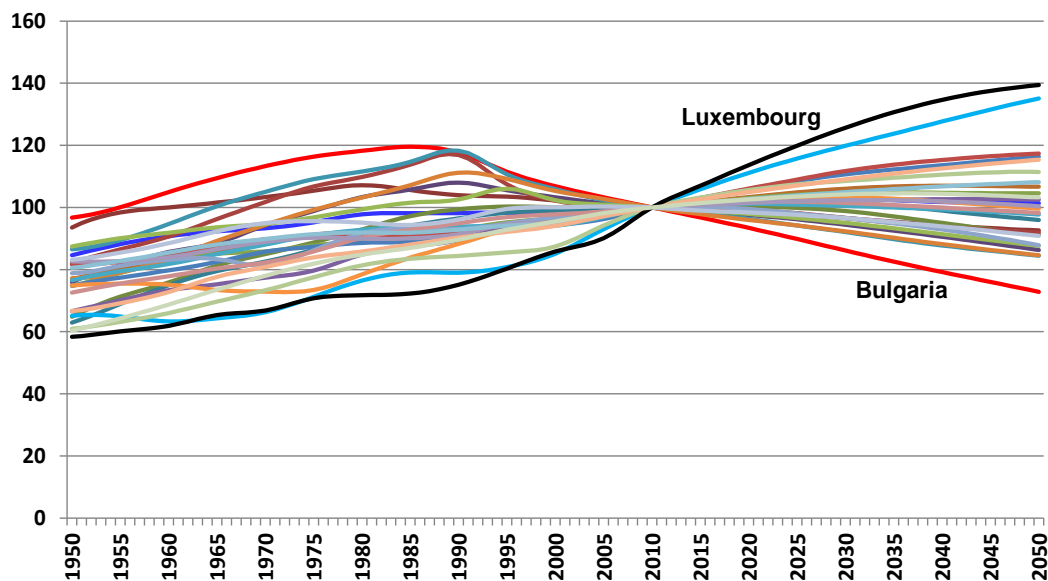


Figure 37 - Population growth 2010=100, countries in Europe; UN medium estimates  
 Source: United Nations

In 2012 the population of the EU28 totalled 508 million people (source: Eurostat). More than 300 million, or 62 per cent of the population, lived in the five largest member states: Germany, France, the United Kingdom, Italy and Spain (Table 12). With the exception of Germany in the period 2005-2009, average annual population growth in these countries was positive. Average annual population decline was most severe in Bulgaria and the Baltic States Latvia and Lithuania. The populations of Cyprus and Luxembourg, on the other hand, two of the smallest countries of the EU, increased sharply in the first decade of this century. At the subnational level in the period 2005-2009, 78 regions faced a declining population (Map 4). These regions are mainly found in eastern Europe, Germany, Sweden and Greece. As current trends will continue, many regions may follow and in the future regional population declines will no longer be an exception.

### 2.1.2 Fertility<sup>21</sup>

Decreasing population growth is partly caused by declining fertility levels. Worldwide total fertility fell from 5.0 children per woman in 1950-55 to 2.5 children in 2005-10. Europe's fertility has always been among the lowest in the world: nowadays European women have an average of 1.5 children, compared to 2.0 children in North America and 4.6 children per woman in Africa (Table 13).

Low fertility is spreading across the world and is reshaping global population. Since the early 2000s, more than half of the world population lives in countries with below replacement fertility (TFR below 2.1 children per woman). The phenomena started in Europe in the 1970s. In the 1990s, more than half of Europe's population was living in countries with lowest low fertility below 1.3 children (Billari and Kohler 2004). Since around 2000, however, fertility declines halted in Europe and the TFR increased again in many countries (Goldstein et al. 2009; Figure 38 and Table 14).

<sup>21</sup> This section is largely based on Basten, Sobotka, Zeman (2013, forthcoming) with contributions from M. Jalal Abbasi-Shavazi, Alicia Adsera, Jan van Bavel, Caroline Berghammer, Minja Kim Choe, Henri Leridon (to be confirmed), Wolfgang Lutz (to be confirmed), Melinda Mills, S. Philip Morgan Ron Rindfuss, Louis Rosero-Bixby, Anna Rotkirch, Warren Sanderson, Maria Rita Testa, Olivier Thévenon, Zhongwei Zhao.



	Total population	Annual population change (%)		
	1-1-2012	2000-04	2005-09	2010-11
Austria	8,443	0.49	0.42	0.40
Belgium	11,095	0.40	0.74	1.17
Bulgaria	7,327	-1.07	-0.51	-1.58
Croatia	4,398	-0.24	-0.08	-0.31
Cyprus	862	1.64	1.80	2.58
Czech Republic	10,505	-0.11	0.55	-0.01
Denmark	5,581	0.30	0.45	0.41
Estonia	1,340	-0.36	-0.11	-0.02
Finland	5,401	0.25	0.43	0.46
France	65,328	0.73	0.59	0.52
Germany	81,844	0.08	-0.17	0.03
Greece	11,290	0.33	0.40	-0.07
Hungary	9,958	-0.24	-0.17	-0.28
Ireland	4,583	1.71	1.68	1.28
Italy	60,821	0.53	0.63	0.40
Latvia	2,042	-0.64	-0.51	-4.71
Lithuania	3,008	-0.50	-0.57	-4.95
Luxembourg	525	1.24	1.71	2.24
Malta	418	1.15	0.57	0.38
Netherlands	16,730	0.55	0.33	0.47
Poland	38,538	-0.05	0.00	0.48
Portugal	10,542	0.65	0.21	-0.45
Romania	21,356	-0.72	-0.18	-0.25
Slovakia	5,404	-0.05	0.15	-0.19
Slovenia	2,056	0.10	0.49	0.21
Spain	46,196	1.45	1.34	0.23
Sweden	9,483	0.34	0.72	0.76
United Kingdom	63,256	0.42	0.65	0.99

Table 12 – Total population in the countries of the European Union (x 1,000)

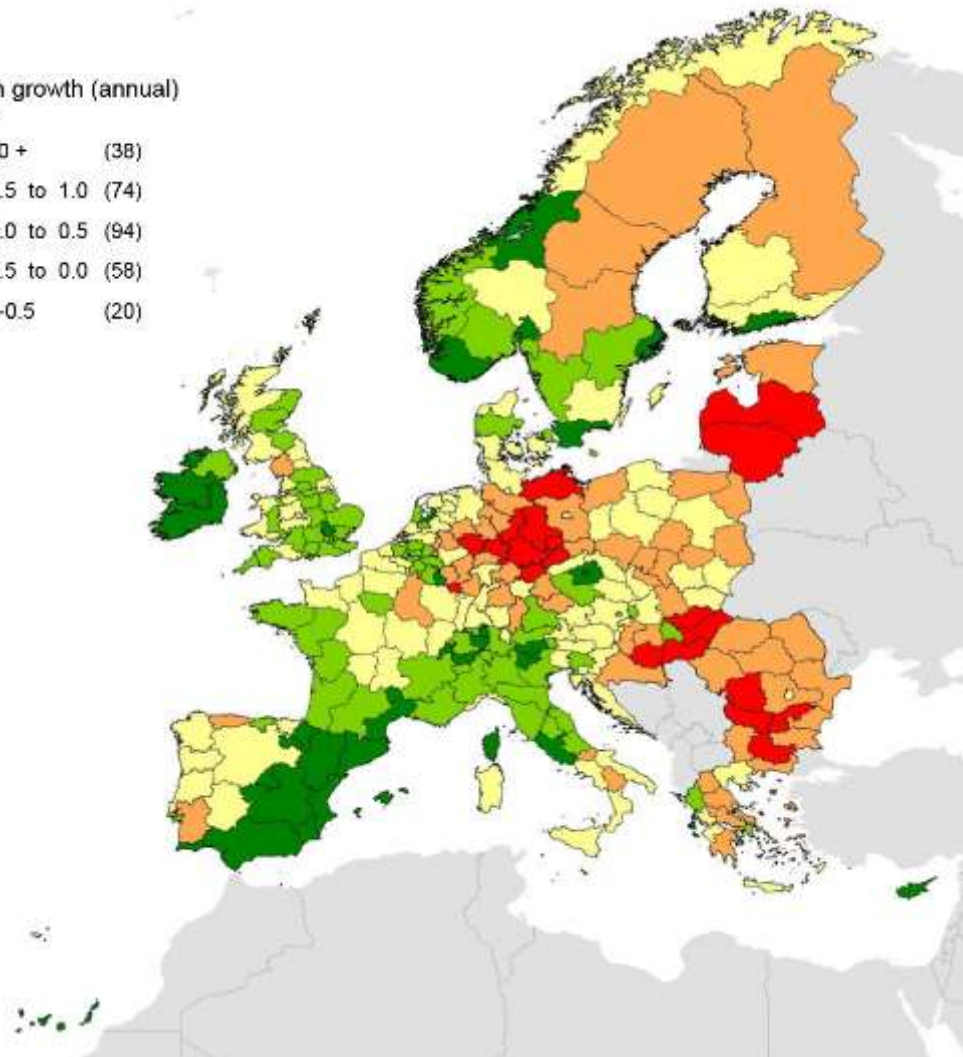
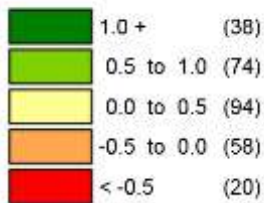
Source: Eurostat

### Global theories

Many countries in Europe and other places have had fertility levels below replacement levels for many years, and the explanations and views on the future differ greatly.

- Some researchers think the phenomenon is temporary and that fertility will increase again (Esping-Andersen, 2009; Myrskylä and Margolis 2012), especially if the predominant family size ideal remains fixed at around two children, as exemplified by the Nordic countries who were at the forefront of the fertility decline in Europe in the 1960s-1970s.
- Some researchers think that low fertility could persist according to the “Second demographic transition” framework (Lesthaeghe and Neidert 2006). This theory links dramatic changes in family behaviour, including sustained below-replacement fertility, massive postponement of marriage and childbearing, and the rapid rise of cohabitation, to the transformation in values, increased individualisation, emphasis on individual self-fulfilment, as well as the massive rise in higher education, changing gender roles and the spread of modern contraception.
- According to some other researchers, fertility could decline to even lower levels envisaged by the “second demographic transition” following the “low fertility trap” hypothesis (Lutz et al 2006) and reversal would prove difficult.
- Other researchers see a scenario where sub-regions in Europe follow different paths: high fertility in northern and western Europe and low in Central and south-eastern Europe.

Population growth (annual)  
2005-2009



Map 4– Average annual population growth at NUTS 2 level, 2005-2009  
Source: Eurostat

### Trends in Europe

Period and cohort fertility levels in Western Europe<sup>22</sup> have been remarkably stable and, relatively to the rest of Europe, high in the last decades despite changes in the main determinants of fertility (increase in age at childbearing, economic recession, rising female education and participation to the labour force). By 2011 between 34% (Ireland) and 55% (France) of births took place outside marriage, mostly in cohabiting unions. There are at present four main fertility regimes in the countries of Western Europe. It is 'egalitarian' in France with low childlessness and relatively low social status differentials (Rendall et al. 2009) contrary to the regime in United Kingdom which is more "polarised" with high childlessness (around 20%, especially among women with university education) and a higher share of women with four or more children (Shkolnikov et al. 2007) among low social status women (Ekert-Jaffé et al. 2002). Ireland exhibits still strong preferences for larger families (Testa et al. 2011) and in Benelux countries, the possibility to combine work and family life has resulted in a reversal of declining fertility, especially among tertiary educated women (Neels and De Wachter 2010).

<sup>22</sup> Belgium, France, Ireland, Luxembourg, the Netherlands, and the United Kingdom

	TFR			Mean Age
	1950-55	1975-80	2005-10	2005-10
World	5.0	3.8	2.5	27.2
More developed regions	2.8	1.9	1.7	28.7
Less developed regions	6.1	4.5	2.7	27.1
Africa	6.6	6.6	4.6	29.0
Nigeria	6.4	6.8	5.6	29.7
Asia	5.8	4.1	2.3	26.7
China	6.1	2.9	1.6	26.2
India	5.9	4.9	2.7	25.3
Indonesia	5.5	4.7	2.2	28.2
Pakistan	6.6	6.6	3.7	29.7
Bangladesh	6.4	6.6	2.4	26.3
Japan	3.0	1.8	1.3	30.2
Europe	2.6	2.0	1.5	28.8
EU28	2.5	2.0	1.5	29.7
Russian Federation	2.9	1.9	1.4	26.8
Latin America and the Caribbean	5.9	4.5	2.3	27.0
Brazil	6.2	4.3	1.9	26.1
Mexico	6.7	5.3	2.4	26.9
Northern America	3.3	1.8	2.0	28.1
USA	3.4	1.8	2.1	28.0
Oceania	3.8	2.7	2.5	29.4

Table 13 – Total Fertility Rate (TFR)  
Source: United Nations

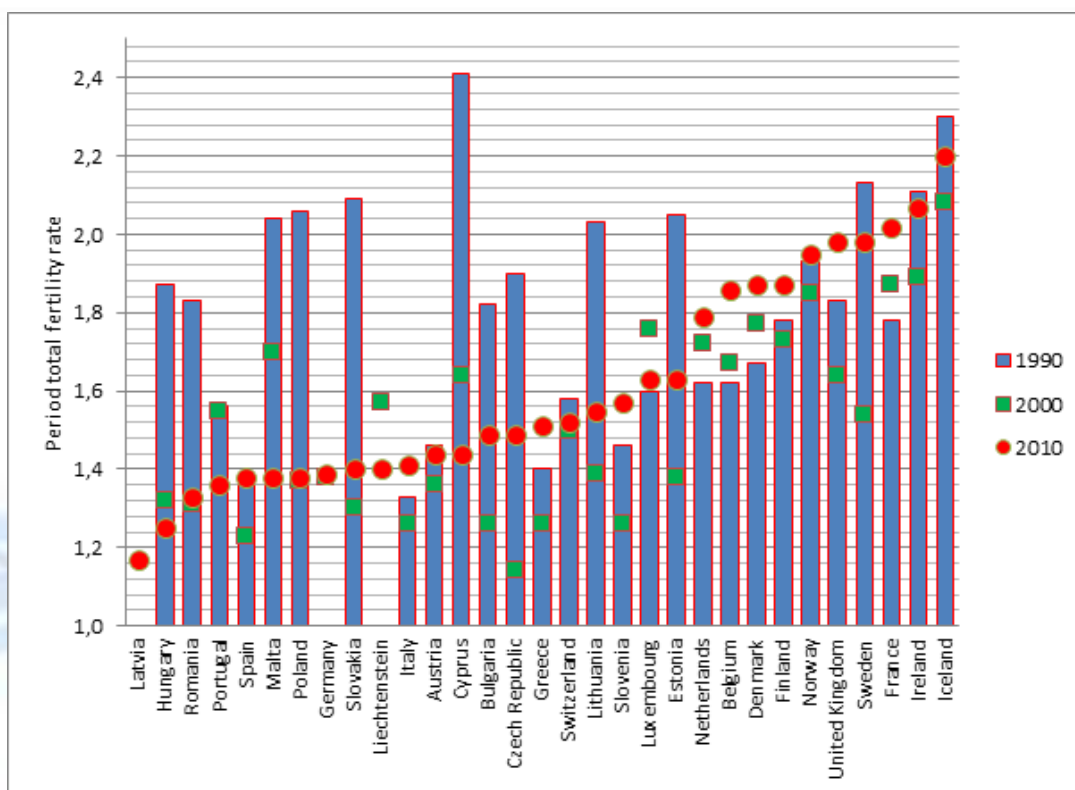


Figure 38 - Period total fertility rates in Europe, 1990, 2000, and 2010 (sorted by 2010 values)  
Source: Eurostat

	TFR		
	2000-04	2005-09	2010-11
Austria	1.38	1.40	1.43
Belgium	1.67	1.81	1.84
Bulgaria	1.24	1.43	1.50
Croatia	1.33	1.43	1.43
Cyprus	1.54	1.45	1.40
Czech Republic	1.17	1.41	1.46
Denmark	1.75	1.84	1.81
Estonia	1.39	1.59	1.58
Finland	1.75	1.84	1.85
France	1.90	1.99	2.02
Germany	1.35	1.36	1.38
Greece	1.27	1.43	1.47
Hungary	1.30	1.33	1.24
Ireland	1.94	2.00	2.06
Italy	1.28	1.37	1.41
Latvia	1.25	1.36	1.26
Lithuania	1.29	1.39	1.66
Luxembourg	1.67	1.62	1.58
Malta	1.50	1.40	1.44
Netherlands	1.73	1.74	1.78
Poland	1.28	1.32	1.34
Portugal	1.46	1.36	1.36
Romania	1.28	1.33	1.29
Slovakia	1.23	1.29	1.43
Slovenia	1.23	1.40	1.57
Spain	1.27	1.39	1.37
Sweden	1.64	1.87	1.94
United Kingdom	1.68	1.88	1.98

Table 14 – TFR in the countries of the European Union

Source: Eurostat

Germany, Austria, and Switzerland (the 'German-speaking' countries) have in common that their fertility was already lower than in other Western European countries in the 1970s and that fertility has remained at similar low levels since the mid-1970s (Dorbritz 2008, Prskawetz et al. 2008). In 2011 the period TFR ranged from 1.36 in Germany to 1.52 in Switzerland. High levels of childlessness are prevalent among the highest educated and fertility ideals entail low fertility levels.

The region of Central and Eastern Europe (CEE) experienced substantial fertility declines in the 1990s after the collapse of communism. Since 2000, fertility rates in CEE countries have partially recovered but still remain relatively low: with a period TFR ranging between 1.1 in Latvia and 1.5-1.6 in Estonia, Belarus, Lithuania, Russia, and Slovenia in 2010. Fertility and family have changed profoundly, with marriage and fertility trends best characterized by later, fewer, less universal, and also more heterogeneous with respect to social status differentials.

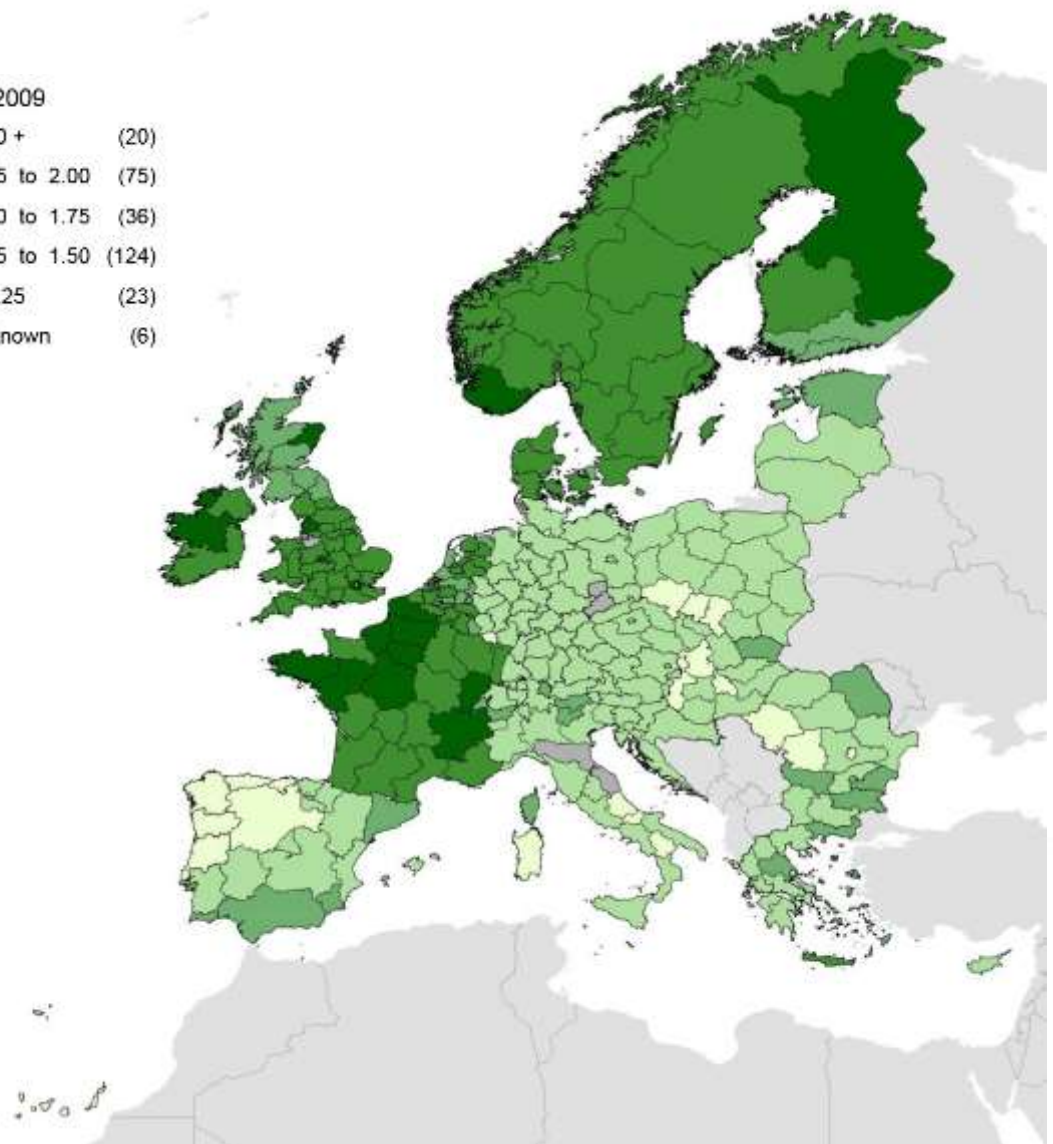
The Nordic countries Denmark, Sweden, Norway, Finland and Iceland have similar patterns to those observed in Western Europe, i.e. stable and relatively high fertility, comparable mostly to the French example with generous family policies.

Southern Europe is the region that has undergone the largest changes during recent decades. At the time of the decline in other parts of Europe in the 1970s, fertility was still very high. The fall happened abruptly in the 1980s from levels way above replacement fertility as exemplified by Spain: from 2.8 in 1975 to 1.3 in 1993. The mean age at 1st birth in Spain and Italy, around 30, is now among the highest in Europe. Childlessness has been rising rapidly as well as non-marital births e.g. 43% of all births in Portugal.

Differences between NUTS 2 regions highly reflect the differences at the national level (Map 5).



TFR 2005-2009



Map 5– TFR at NUTS 2 level; average 2005-2009  
Source: Eurostat

### Fertility postponement

In western and northern Europe, the mean age at first birth is between 28-30 years (Figure 38). As a consequence, the frequency of childbearing has increased most rapidly at advanced reproductive ages; including women aged over 40 years (Sobotka et al. 2007). The roots of postponement are multiple: the most important factors are the expansion of higher education and the resulting later age for entering the labour market. Other factors include the spread of hormonal contraception, rising economic and employment uncertainty in young adulthood, decline of marriage and the rise of more unstable forms of partnerships, and the spread of new values incompatible with parenthood (Mills et al. 2011).

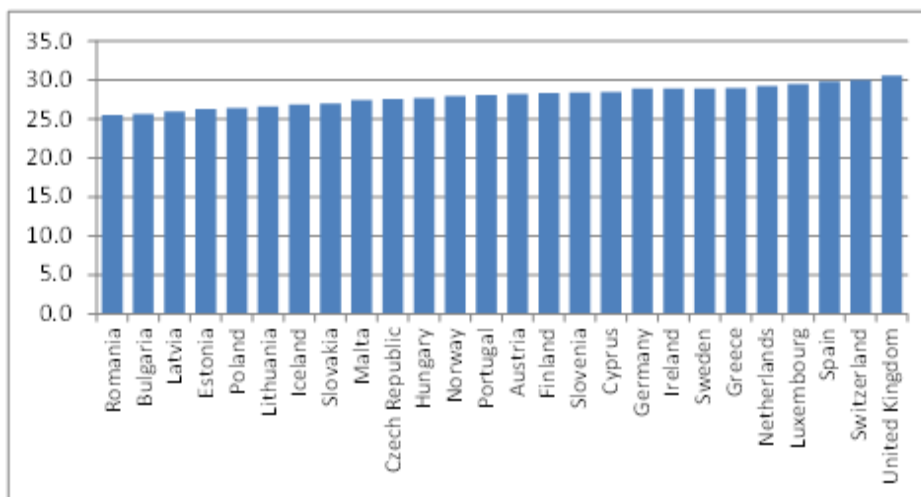


Figure 39 - Mean age at birth of first child in 2010, sorted from low to high  
Source: Eurostat

A main effect of rising age at childbearing (Figure 40) is that couples face an increased risk of not realizing their childbearing plans through problems associated with conception at higher ages. This implies an increase in the demand for assisted reproduction (AR) as well as elevated multiple birth rates (Schmidt et al. 2012) plus increased risk of pregnancy complications and adverse reproductive outcomes. However, positive influences of rising childbearing ages have also been pointed out, including psychological maturity, lower income loss for the mothers, as well as higher level of happiness among the parents (Myrskylä and Margolis 2012). Fertility trends will continue being affected by changes in the timing of births in the future.

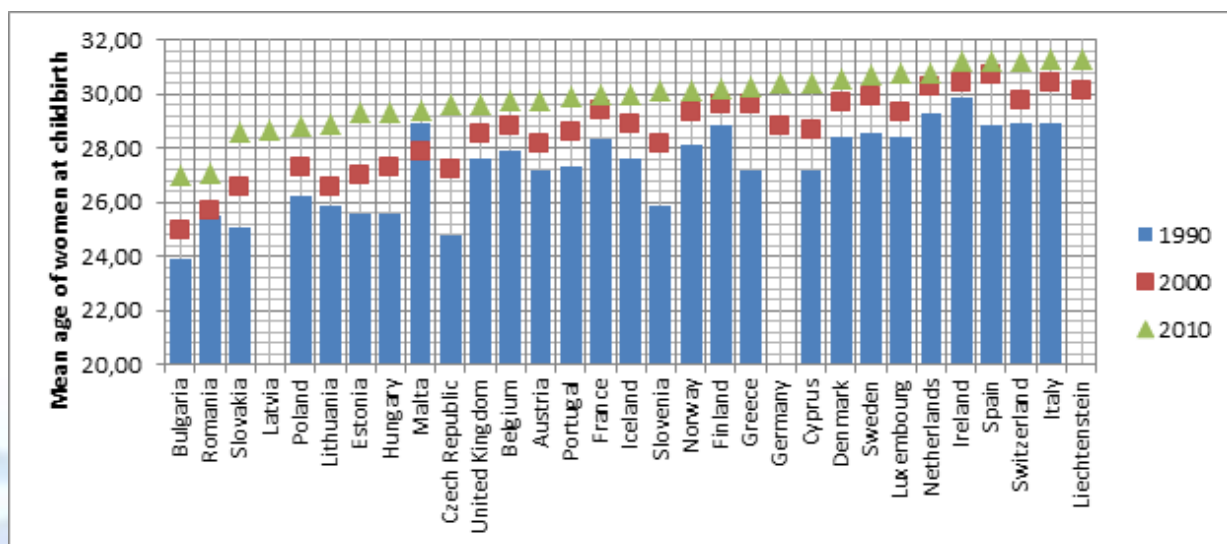


Figure 40 - Mean age of women at child birth, 1990, 2000, and 2010 (sorted by 2010 values)  
Source: Eurostat

### Fertility intentions

A two-child family appears to be the dominant and stable ideal of Europeans, according to the Eurobarometer surveys conducted in 2001, 2006, and 2011. Exception are Austria, and most recently Greece and Portugal, most likely due to the recent economic recession (Testa 2012). However, more than one third of Europeans stop childbearing with fewer children than those initially desired (Testa 2012). Another 10-15% reports a family bigger

than the size actually desired. Hence, the use of fertility intentions for the measurement of future fertility is highly questionable.

#### Religion

Marked fertility differences by religious affiliation had by-and-large disappeared by the 1970s (Van Poppel and Derosas 2006), but until today often a gap to the non-affiliated persists (Hackett 2008). However, religious intensity measure by church attendance or self-assessed religiosity clearly influences fertility differences.

#### Gender equality

Sustained gender inequality in the household is considered as a core underlying determinant of very low fertility (McDonald 2000). "When women are, at face value, offered similar educational and employment opportunities as men but these opportunities are severely restricted by having children, they react by having fewer children and having them later in life." (Basten et al 2013 forthcoming). This phenomenon is sometimes referred to as the 'incomplete gender revolution' (Esping-Andersen 2009).

#### Migrants' fertility

In most low-fertility countries migrants have higher fertility than the "native" women (e.g., Sobotka 2008). Migration has contributed to population increase in many low-fertility countries that would otherwise experience declining population (Coleman 2010). In 2011, around one out of ten residents in the EU was born in another country (Eurostat 2013). High shares of immigrants, typically combined with their younger age structure and often also higher fertility, imply that migrants contribute significantly to the number of births in the country. Around 2005 births to immigrant women accounted for 15-25% of all births in many Western European countries including the Netherlands, France, United Kingdom, and Sweden (Sobotka 2008). However, despite having on average higher fertility rates, migrant women in many low-fertility countries have achieved sub-replacement fertility. According to recent data for 2007-2011, all migrant or foreign women combined had a period TFR below 2.0 in Austria, Germany, the Netherlands, Spain, as well as Denmark (Figure 41). In contrast, migrant fertility remained around or slightly above replacement (2.0-2.3) in Italy and Greece (Tsimbos 2008), Norway, Sweden, and the United Kingdom (national statistical offices and Tromans et al. 2009), whereas it approached the high level of three births per woman in France in 2008 (Pla and Beaumel 2012). In most low-fertility countries fertility of migrants has declined considerably since the early 1980s, contributing to a gradual fertility convergence between migrant and "native" women. Moreover, the recent economic recession negatively affected fertility rates of migrants more than those of the "native women" and in several countries including Denmark, Spain, and the United Kingdom, migrant fertility fell sharply between 2008 and 2011.

#### Economic uncertainty, employment and education

Economic events and economic uncertainty alter current and future demand for children among couples. The recent economic recession from 2008 onwards has brought a renewed postponement of births (Sobotka et al. 2011). However, the effect is small and difficult to identify since most recessions have been short-lived and fertility developments were often dominated by stronger and longer-lasting shifts. The association between unemployment and fertility is complex and heterogeneous across age, parity, institutional frameworks like unemployment benefits, and the length and acuteness of economic shocks, as they mediate opportunity costs of having children. However, most analyses have found a negative relationship between different measures of unemployment and first births both in long time series (Rindfuss et al 1988) and for most recent periods (Adserà 2011, Neels et al. 2013). In addition, with persistent unemployment, partnership formation is delayed (and with it, childbearing), particularly in Southern Europe or East Asia where fertility outside marriage was, and still is, relatively rare. Likewise, parents may invest more per child and reduce their family size to improve their future outlook (Easterlin 1976). Furthermore, young adults may prolong their educational training (Kohler et al. 2002).



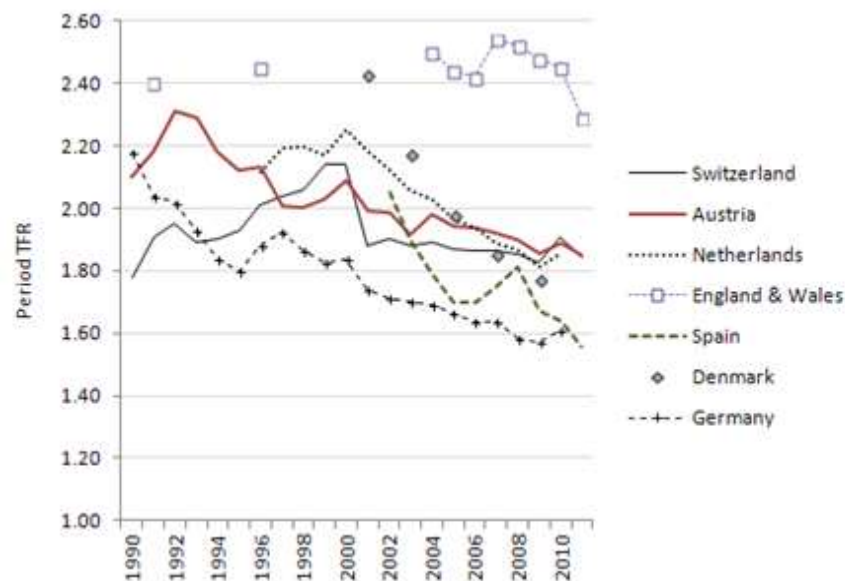


Figure 41 - Period TFR among immigrant (or foreign) women in selected European countries, 1990-2011

Source: Pew Research Centre 2012

Notes: Data pertain to immigrant women in Denmark, England and Wales, Netherlands and Austria since 2002. Other data pertain to women with foreign citizenship. Data for Denmark are for five year period centred in a given year and exclude migrants of Danish origin.

The link between employment and fertility is mitigated by the institutional frameworks i.e. the availability of permanent public employment, and support towards working mothers through flexible work schedules, generous leaves or abundant and affordable childcare (Matysiak and Vignoli 2008). In Nordic countries, family trade-offs are small and hence fertility is not hindered by employment. Conversely, in Southern Europe, where short-term low-paid contracts predominate and support to family and women at work are meagre, further depression of fertility can be expected (Adserà 2011).

In low fertility countries, the education-fertility association is more varied than in high fertility countries where it is primarily negative (Cohen et al. 2011). Postponement due to later entry into parenthood, higher opportunity costs of childrearing, and stronger career orientation should lead to lower levels of completed fertility. Empirical support for this has been found for the Netherlands, Austria, Germany, and Switzerland (Kohler et al. 2002, Sobotka 2012) who have the least developed institutional support for a combination of motherhood with employment. However, women with higher levels of education are also more likely to be able to afford the costs associated with raising children – even more so if they are partnered with a highly educated male (which is usually the case). This is the case in the Nordic countries, where the fertility gradient by level of education has almost disappeared for women and parity progression ratios to a second and third child are positively associated with women's education level (Tesching 2012), and in Belgium (Neels and De Wachter 2010). A key factor here is the practical availability and cultural acceptability of non-family childcare, both of which differ dramatically between countries with regard to children below age three (OECD 2011).

#### Infertility, male reproductive health and assisted reproduction

The on-going trend towards delayed parenthood lead to rising numbers of women and couples having difficulties to conceive. Boivin et al. (2007) showed that in selected rich countries current prevalence of infertility ranged from 3.5% in Australia (1988) up to 16.7% in Russia (1998) and lifetime infertility varied even more from 6.5% in Norway (1985-95) up to 26.4% in the United Kingdom (1993). The variation is partially due to differences in the definitions of infertility, but also because infertility is affected by different



age patterns of childbearing across countries as the key factor in infertility is age. Very few women experience infertility from an early age on. Also while infertility prevalence is often computed for women, male-factor infertility strongly contributes to observed infertility of couples e.g. in France among infertile couples 20% of the cases was due to male infertility (Thonneau et al. 1991). When examining infertility trends over time, there were no strong shifts globally between 1990 and 2010, especially when age-standardized data were used.

Regarding reproductive health of men, some studies have shown a decline in semen quality over the past 50 years. These results have been challenged by others so that overall, there is no emerging consensus on this issue. Decline in semen quality is the result of chemicals and the impact of obesity and stress. This combined with increased aged at fatherhood, male sub-fecundity may be important in affecting the spacing of births rather than fertility levels (Leridon and Slama 2008).

According to assisted reproduction (AR) registries in European countries, about 1.6% of children born in Europe in 2009 were conceived via AR (ESHRE 2010). Therefore assisted reproduction has a minor positive effect on aggregate fertility rates in rich countries (ESHRE 2010). At the moment two sorts of AR are available. The preferred one with the own women's oocytes is costly (Maheshwari et al 2010) and uncertain, especially at later reproductive ages. In the United States in 2009 only 18.1% of AR cycles at age 42 resulted in pregnancy and 8.6% resulted in live birth (CDC 2011). Hence researchers see little evidence that AR could compensate for infertility linked with postponing childbearing to higher reproductive ages. Success rates are higher using donor oocytes of healthy young women and is unaffected by recipients' age up to about age 48 (Toner et al. 2002) and remains high even among post-menopausal women in their 50s (Grossman et al. 2012). One drawback is that offspring then do not carry the genetic material of their mother. Therefore, recently, oocyte cryopreservation (OC), or "egg freezing" could be a solution to help women planning their fertility timing.

### Family policies

The main change contributed by family policies is that fertility rates are now higher in countries with high rates of female employment (OECD 2011), while the opposite situation prevailed thirty years ago. Family-related policies, especially those helping people to balance their work and family life and achieve the number of children they desire are central to mobilising female labour supply and thereby promoting gender equity, increasing labour income of couples and ensuring the financial sustainability of the welfare states (OECD 2011). Most family policies in Europe have three main instruments of action: financial assistance, entitlements to leave work after giving birth, or the provision of childcare services (OECD 2011). The Nordic countries (Denmark, Finland, Iceland, Norway and Sweden) provide comprehensive support for working parents with very young children (under age three) through a combination of generous leave arrangements after the birth of a child and widely available childcare services (Björklund 2006). While English-speaking countries (Ireland and United Kingdom) provide much less support in time and in-kind for working parents with very young children, financial support is more generous – if primarily targeted to low-income families and preschool children (McDonald and Moyle, 2010). Western and eastern European countries form a more heterogeneous group occupying an intermediate position. Among these countries, France and Hungary stand out by offering rather generous support for working parents as compared to the other countries in their respective groups. The evidence on the effect of family policies on fertility is rather inconclusive (Gauthier, 2007) and they show no sign of convergence across Europe.

### **2.1.3 Mortality<sup>23</sup>**

<sup>23</sup> This section is largely based on Caselli, Drefahl, Luy, and Wegner (2013) with contributions from Michel Guillot, France Meslé, Arodys Robles, Richard G. Rogers, Edward Jow-Ching Tu, Zhongwei Zhao

Another major distinction between the developed and the developing world is life expectancy at birth. In the more developed regions of the world, including the countries of the European Union, life expectancy today is approximately 73 years for men and 80 years for women. In the less developed regions, life expectancy is slightly less than 10 years lower for men and slightly more than 12 years lower for women (Table 15). In general, life expectancy at birth has been rising between 1950 and 2010 in all parts of the world.

	E0 men			E0 women		
	1950-55	1975-80	2005-10	2005-10	2005-10	2005-10
	1950-55	1975-80	2005-10	1950-55	1975-80	2005-10
World	46.7	58.7	65.7	48.7	62.6	70.1
More developed regions	63.4	68.3	73.4	68.4	75.7	80.4
Less developed regions	41.9	56.6	64.2	42.7	59.1	67.8
Africa	36.9	47.1	54.0	39.5	50.1	56.3
Nigeria	34.0	43.7	49.5	37.3	46.2	51.0
Asia	42.8	58.7	67.2	43.1	61.0	70.9
China	44.6	64.8	71.1	44.6	67.8	74.5
India	38.7	54.3	62.8	37.1	54.1	65.7
Indonesia	37.7	54.7	66.3	40.0	58.0	69.4
Pakistan	41.0	56.7	63.8	41.5	57.3	65.4
Bangladesh	46.3	53.6	67.4	44.2	52.2	68.3
Japan	60.4	72.6	79.3	63.9	77.9	86.1
Europe	62.9	67.3	71.4	68.0	74.9	79.3
EU28	64.0	69.2	75.9	68.6	75.9	82.0
Russian Federation	60.5	61.9	61.6	67.3	73.1	74.0
Latin America and the Caribbean	49.6	60.5	70.2	53.1	65.8	76.7
Brazil	49.2	59.2	68.7	52.6	63.9	75.9
Mexico	48.8	62.3	73.7	52.6	68.5	78.6
Northern America	65.8	69.5	75.6	71.7	77.1	80.7
USA	65.8	69.4	75.4	71.7	77.0	80.5

Table 15 – Life Expectancy at birth (E0)  
 Source: United Nations

In 1950, Europe was divided between the North-Western regions that had higher life expectancies than the South Eastern regions. Until 1960, the South-East region was on its way to catch up with the North-Western regions. From 1965 onwards, however, the countries of Eastern Europe were struck by a health crisis that caused life expectancy to decline. At the same time life expectancy in Southern Europe kept converging to the levels prevalent in North-Western Europe, which it finally managed to reach in the early 1970s. From then on, those three regions, thanks to new treatments of cardiovascular diseases and some forms of cancer, as well as advances in preventing “man-made” diseases such as alcoholism, smoking and accidents, life expectancy continued to rise. In eastern European countries, on the contrary, life expectancies did not increase resulting in almost the same average life expectancy for males in 2005 as in 1955 (Figure 42 and Figure 43).

Despite similar general trends, today’s low mortality countries are very heterogeneous in various aspects, including medical standards, access to health care, and behavioural risk factors like smoking prevalence. These diversities are strongly related to the populations’ stage of economic development and contribute to a broad variance of life expectancy levels. Within the European Union, huge diversities in life expectancy exist, mainly between men and women, and between Eastern Europe and the rest of the region. Among men, life expectancy at birth for the years 2005-09 ranges between 65.8 in Lithuania and 79 in Sweden. Among women, the range is between 76.7 in Bulgaria and Romania and 84.6 years in France (source: Eurostat; Table 16). The latest trends show progress toward longer life spans has been re-established and most central and eastern European countries have benefitted from the cardiovascular revolution and are converging again (Vallin and Meslé 2004). At the very beginning of the 1990s the Czech Republic was the first of these countries to re-establish, followed by Poland, Slovakia, Hungary, and some other countries

(Meslé 2004). In recent years, some progress has appeared in Russia, but it is too early to say if it will be sustainable. Southern European countries have continued to progress and are now the leaders of life expectancy in Europe. According to national statistics, Spanish women were the first ones to pass a life expectancy of 85 years, followed by French and Italian women.

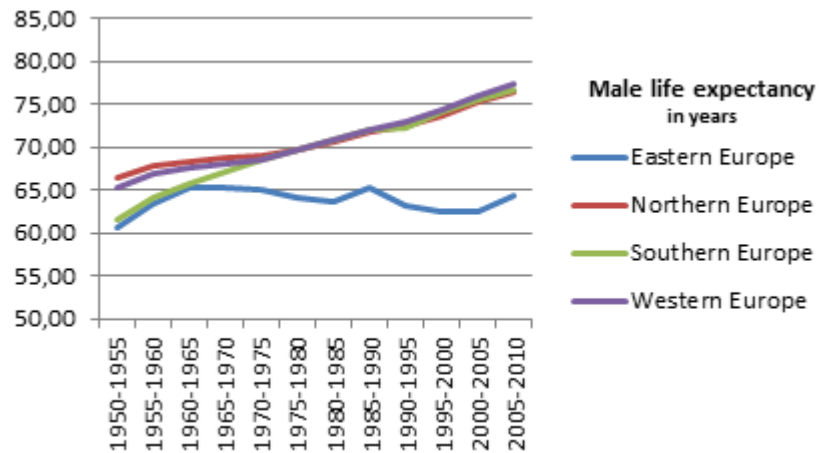


Figure 42 - Changes in life expectancy in European regions, men, 1950-2010  
 Source: United Nations 2011

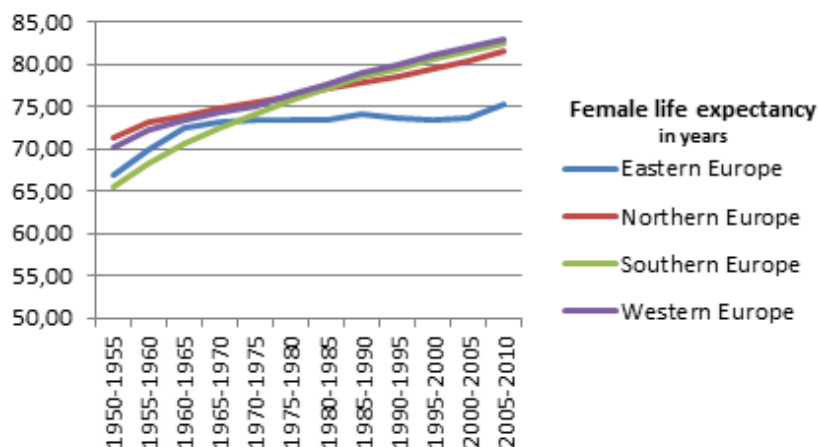


Figure 43 - Changes in life expectancy in European regions, women, 1950-2010  
 Source: United Nations 2011

Men and women are not equal when it comes to mortality. On average, women in the European Union live 6 years longer than men. The elderly population is therefore predominantly female. The main cause of this difference is a rather unfavourable trend in cardiovascular diseases, lung cancer and other lung diseases among men. In this respect, smoking is the main risk factor. Differences in smoking habits between men and women may be important in explaining differences between life expectancies of both sexes. Working conditions appear to be another important factor: in contrast to men, women with a low socioeconomic status have a death rate which is only slightly higher than that of other women. The gender gap differs between countries, ranging from about 4 years in the Netherlands, Sweden and the United Kingdom (2010-11) to more than 10 years in the Baltic States. The trend towards greater convergence may be a result of the fact that men and women now have more similar lifestyles. At age 65 the gender difference in the numbers of remaining life years varies from 2 for Greece to slightly more than 5 for the Baltic States (Table 17). While the gender gap between life expectancy at birth consistently favours women, this is not the case if we look at the number of years to be spent in good

health (Figure 44 and Figure 45). That means that the additional years women may expect to live, are often years with limitations or in a weak state of health.

	E0 men			E0 women		
	2000-04	2005-09	2010-11	2000-04	2005-09	2010-11
Austria	75.8	77.3	78.1	81.6	82.9	83.7
Belgium	75.2	76.8	77.7	81.3	82.4	83.1
Bulgaria	68.7	69.5	70.5	75.6	76.7	77.6
Croatia	71.4	72.4	73.7	78.4	79.4	80.2
Cyprus	76.4	78.0	79.3	81.1	82.4	83.5
Czech Republic	72.1	73.7	74.7	78.7	80.1	81.0
Denmark	74.9	76.3	77.5	79.6	80.8	81.7
Estonia	65.5	68.1	70.9	76.9	79.0	81.1
Finland	74.8	76.1	77.1	81.8	83.1	83.7
France	75.8	77.5	78.5	83.1	84.6	85.5
Germany	75.7	77.3	78.2	81.4	82.5	83.1
Greece	76.1	77.3	78.5	81.0	82.1	83.0
Hungary	68.2	69.5	71.0	76.7	77.9	78.7
Ireland	75.2	77.5	78.5	80.3	82.2	83.0
Italy	77.3	78.7	80.0	83.1	84.2	85.2
Latvia	65.4	66.3	68.5	76.0	77.0	78.5
Lithuania	66.3	65.8	68.0	77.6	77.6	79.1
Luxembourg	75.0	77.3	78.2	81.3	82.6	83.6
Malta	76.6	77.3	78.9	81.0	82.1	83.3
Netherlands	76.1	78.0	79.2	80.9	82.3	83.1
Poland	70.2	71.1	72.4	78.6	79.8	80.9
Portugal	73.9	75.8	77.2	80.7	82.2	83.4
Romania	67.7	69.4	70.6	75.0	76.7	77.9
Slovakia	69.7	70.7	72.0	77.7	78.6	79.6
Slovenia	72.6	74.9	76.6	80.4	82.0	83.2
Spain	76.4	78.0	79.3	83.3	84.4	85.4
Sweden	77.8	79.0	79.8	82.3	83.2	83.7
United Kingdom	76.1	77.6	78.9	80.6	81.8	82.9

Table 16 – Life Expectancy at birth (E0) in the countries of the European Union  
 Source: Eurostat

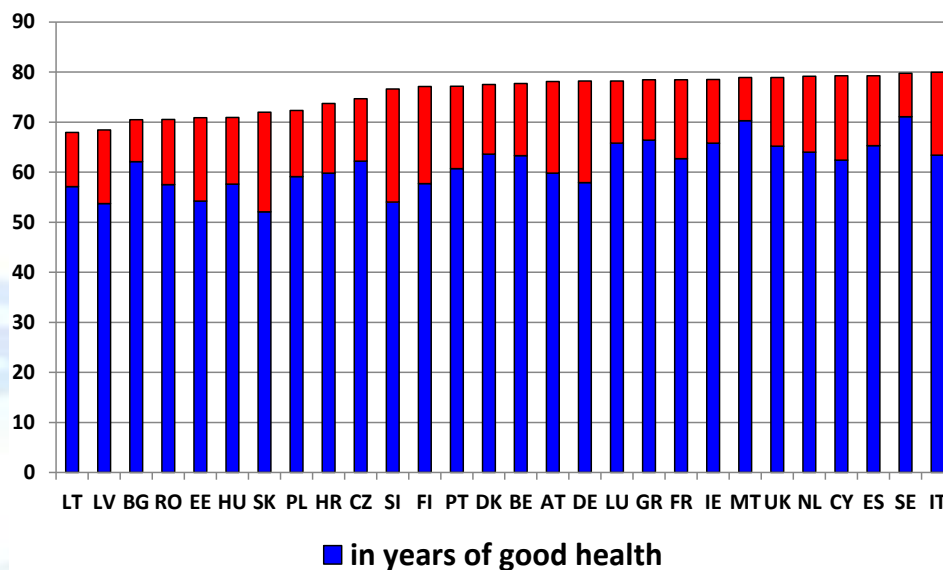


Figure 44 - Life expectancy and healthy life years (2011), men  
 Source: Eurostat



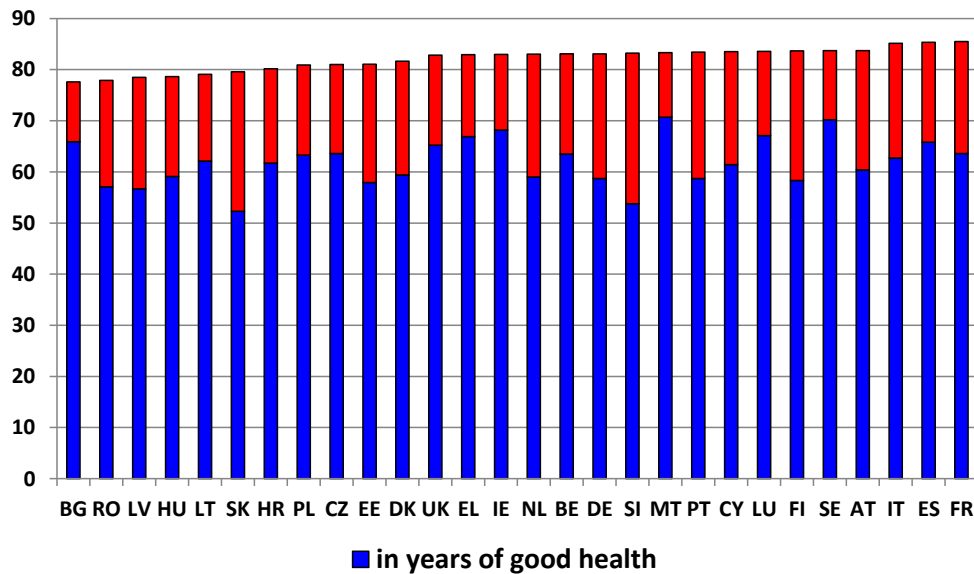


Figure 45 - Life expectancy and healthy life years (2011), women  
 Source: Eurostat

	E65 men			E65 women		
	2000-04	2005-09	2010-11	2000-04	2005-09	2010-11
Austria	16.4	17.4	18.0	19.9	20.9	21.6
Belgium	15.9	17.1	17.7	19.8	20.8	21.4
Bulgaria	13.0	13.4	13.8	15.7	16.5	17.2
Croatia	13.4	14.2	14.8	17.0	17.7	18.4
Cyprus	16.4	17.5	18.3	19.0	19.9	20.7
Czech Republic	13.9	15.0	15.6	17.3	18.4	19.1
Denmark	15.5	16.4	17.2	18.5	19.3	19.9
Estonia	12.7	13.4	14.5	17.4	18.6	19.7
Finland	15.9	17.1	17.6	20.0	21.2	21.6
France	17.1	18.3	19.1	21.5	22.8	23.6
Germany	16.2	17.3	18.0	19.7	20.6	21.1
Greece	16.6	17.6	18.5	18.7	19.6	20.5
Hungary	13.2	13.7	14.2	17.0	17.8	18.3
Ireland	15.4	16.9	18.0	18.8	20.2	20.9
Italy	17.0	18.0	18.7	21.0	21.8	22.5
Latvia	12.6	12.9	13.4	17.0	17.6	18.5
Lithuania	13.4	13.1	13.8	17.9	17.9	18.8
Luxembourg	15.8	17.0	17.6	19.8	20.7	21.6
Malta	15.6	16.6	18.0	18.8	20.0	21.0
Netherlands	15.7	17.1	17.9	19.5	20.6	21.1
Poland	13.8	14.6	15.3	17.9	18.9	19.7
Portugal	15.8	16.7	17.6	19.2	20.1	21.2
Romania	13.2	13.8	14.2	15.9	16.8	17.4
Slovakia	13.1	13.6	14.3	16.9	17.5	18.2
Slovenia	14.5	15.9	16.9	19.0	20.1	21.1

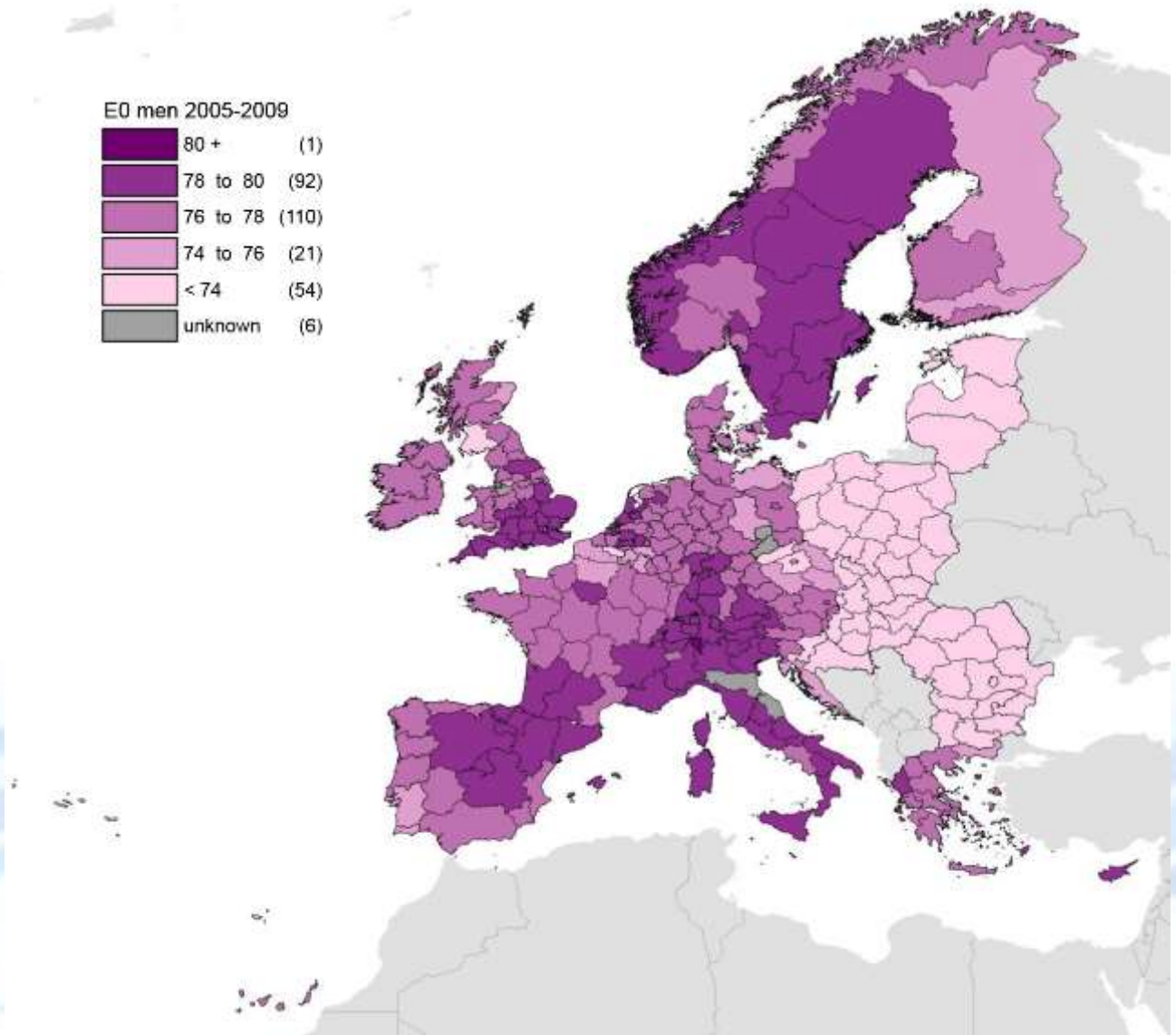
	E65 men			E65 women		
	2000-04	2005-09	2010-11	2000-04	2005-09	2010-11
Spain	17.0	17.9	18.7	21.0	22.0	22.8
Sweden	17.0	17.8	18.4	20.3	20.9	21.3
United Kingdom	16.2	17.6	18.5	19.2	20.2	21.1

Table 17 – Life Expectancy at age 65 (E65) in the countries of the European Union  
 Source: Eurostat

Though less prominent than in the past, there are still regional differences in life expectancies in the European Union. Map 6 and Map 7 present the regional pattern of life expectancy at birth for the period 2005-09 for males and females, respectively. Although female life expectancy is higher, the regional pattern is similar. As for fertility levels, the regional pattern of life expectancy is more or less a reflection of the national pattern. Low values are found in all regions in eastern EU countries, whereas high values are mainly found in France, Spain and Italy as well as in several regions in Scandinavian countries, Greece and southern England. Within countries, differences are relatively small.

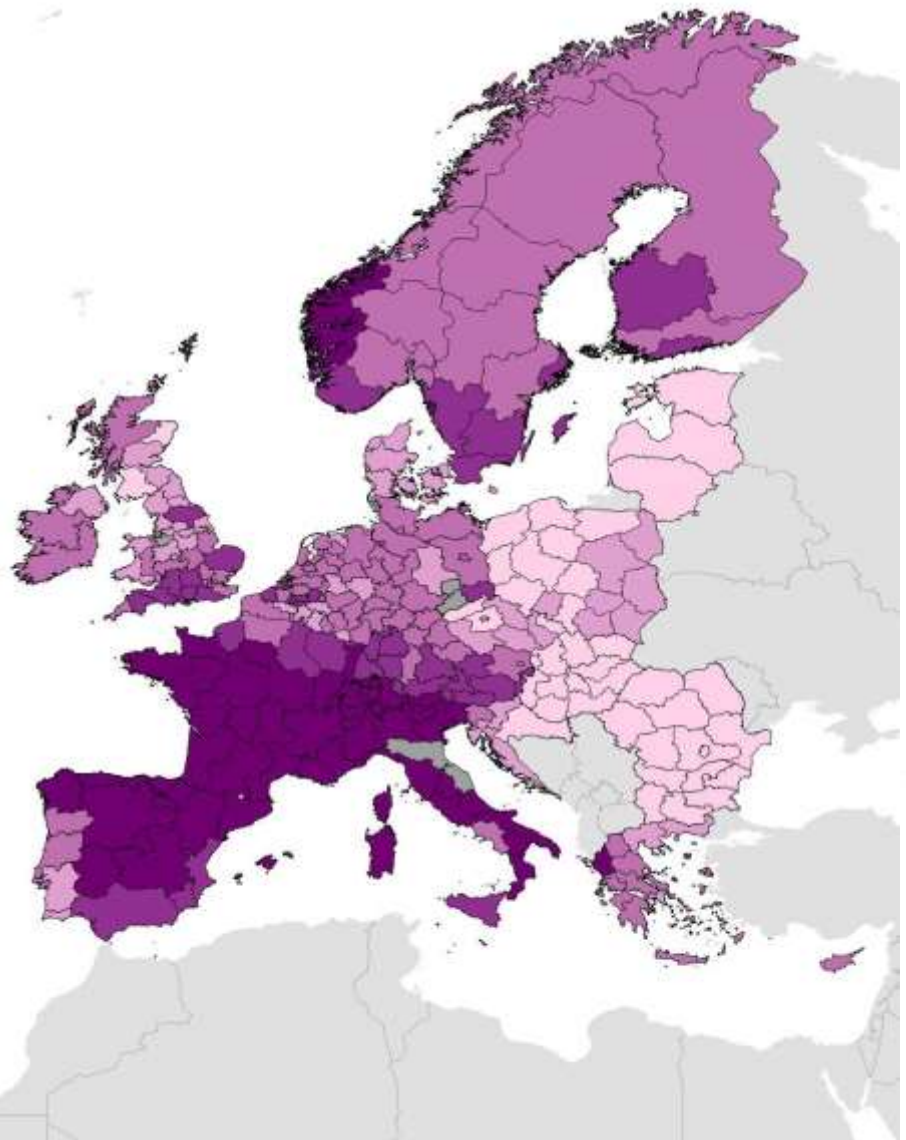
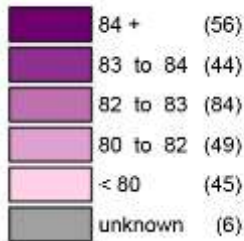
E0 men 2005-2009

80 +	(1)
78 to 80	(92)
76 to 78	(110)
74 to 76	(21)
< 74	(54)
unknown	(6)



Map 6– Life expectancy at birth at NUTS 2 level, men; average 2005-2009  
 Source: Eurostat

E0 women 2005-2009



Map 7- Life expectancy at birth at NUTS 2 level, women; average 2005-2009  
Source: Eurostat

#### Different views and determinants of future life expectancy

European countries are now facing the challenging issue of degenerative diseases that come with advanced age, especially neurodegenerative conditions like Alzheimer's disease. Future progress in life expectancy will depend on the ability of societies to efficiently manage the increasing medical burdens of people who live into very old age. Regarding future life expectancy, two different views may be held. A more pessimistic view is represented by S. Jay Olshansky and colleagues who argue that future progress in life expectancy is likely to be much smaller than in the past. According to them, future increases in life expectancy are more difficult to achieve than in the past since further improvements cannot be expected at young and early adult ages, but only at older ages. Likewise, any future increase must be fuelled by mortality reductions in the elderly population. Saving an elderly life, however, has a smaller impact on life expectancy than saving the life of a newborn, which is why life expectancy is becoming less sensitive to changes in death rates (Olshansky et al. 1990). Thus extrapolations of past trends of life



expectancy are flawed because mortality of today's cohorts is fundamentally different from that of earlier cohorts (Carnes and Olshansky 2007). The third line of reasoning refers to the emergence of new threats to further increases in life expectancy: obesity (Olshansky 2005), re-emergence of infectious diseases, and global pandemics, such as influenza. A fourth line of reasoning is based on the fundamental evolutionary theory, arguing that the duration of life of human bodies is finite. On the basis of these considerations, Olshansky and colleagues conclude that life expectancy for both sexes combined will unlikely exceed age 85 (Fries, 1980). They argue that life expectancy gains will become increasingly difficult in the future and will likely "be measured in days or months rather than years" (Olshansky et al. 2001: 1492).

The optimistic view on future life expectancy is represented by James W. Vaupel and colleagues, who argue that there is no convincing evidence that life expectancy is approaching a limit or that the increase in life expectancy is decelerating (Vaupel 2010). Based on evidence derived from available empirical data on past trends in mortality, they show that mortality rates at older ages and extreme ages have decreased for several decades for all developed countries that have reliable data, indicating that survival rates even at the highest ages can be modified (e.g. Kannisto 1994, Kannisto et al. 1994; Rau et al. 2008, Robine and Saito 2003). A second set of evidence, first published by Oeppen and Vaupel (2002) and recently modified by Vallin and Mesle (2009), refers to female period life expectancy in the country where women live the longest. The so-called "record life expectancy" has increased for more than 170 years, most of its time at an almost linear pace with an increase of approximately 2.5 years per decade (Shkolnikov et al. 2011). Vaupel and colleagues reason that if a limit of life expectancy was being approached—either a limit that could not be overcome with medical technology or an absolute limit on the human body's lifespan—the pace of increase in the record holding country would begin to slow down. A third set of evidence is based on findings in non-human species showing the age trajectory of mortality in medflies, other insects and worms could reach a maximum and then decline (Carey et al. 1992, Curtsinger et al. 1992). For them it is reasonable to assume that future progress in life expectancy will continue to be similar to the progress of the past and that extrapolating the observed life expectancy trends yield impressive results. Median cohort survival time, which is the age until which half of the cohort will survive, will be above 100 years of age for recently born cohorts in many developed countries (Christensen et al. 2009).

At present stage, there seem to be five main determinants of future levels of life expectancies: trends in smoking, obesity, biomedical progress, environmental changes, and socioeconomic diversities. Smoking has been identified as a major health hazard and contributes importantly to mortality differences between individuals and populations. The trends in smoking in the population follow the spread pattern of an epidemic and involve a diffusion process across socioeconomic strata (e.g. Lopez et al. 1994): The emergence of smoking has first been observed among groups of high socioeconomic status, and then spreads to the rest of the population. Similarly, the decline in smoking has been first observed among groups of high socioeconomic status, who are typically the first to become concerned with the harmful effects of smoking (Pampel 2005). Today, smoking is much more common among groups of low socioeconomic status. A similar diffusion process has been observed in sex differences in smoking. Recent studies identified the major role of this process in the widening and narrowing of the sex gap in life expectancy (e.g. Pampel 2002, 2005; Preston and Wang 2006). The onset and peak of smoking prevalence in women has been considerably later than for men in almost all developed countries, which first contributed significantly to the widening in the sex gap in life expectancy and then to the narrowing of the sex differences in recent decades. Regarding the future development of sex differences in life expectancy, smoking is expected to contribute to a further narrowing in the gap between men and women (e.g. Preston and Wang 2006). The changes toward lower smoking prevalence incentivized by intensive anti-smoking campaigns could possibly lead to a faster mortality decline than anticipated by most experts (King and Soneji, 2011; Bongaarts, 2006).



Increases in obesity<sup>24</sup> rates have been observed for all developed countries, although variations in levels and trends are considerably by country (Alley et al. 2010). The rise and prevalence is higher in Anglo-Saxon countries, and lower in some other countries, particularly in the south of Europe. Preston and Strokes (2011) argue that the high prevalence of obesity in the U.S. contributes substantially to its bad performance in terms of life expectancy as compared to many other developed countries. However, the consequences of increased obesity on a population's life expectancy have been a matter of debate and some authors suggest that results showing an impact have been confounded by smoking (Alley et al. 2010). A closer look shows that the difference depends on levels of obesity: there seems to be no relationship between moderate obesity (BMI 30.0–34.9) and mortality (Mehta and Chang, 2011).

The largest uncertainty about future life expectancy is the contribution of biomedical technology to the biology of aging and extending life spans. Several ways are being explored and tested in human such as caloric restriction. Genetic manipulation of humans in order to extend lifespan seems unlikely in the foreseeable future (Sierra 2009). However it is clear that complex biological mechanisms will be studied for many years to come, and may lead to advancement in the middle to long term for the treatment of degenerative diseases and syndromes, such as dementia although it is unlikely that knowledge of these mechanisms will significantly contribute to increases in life expectancy in the near future.

The assessment of the impact of climate changes on mortality in developed societies has just begun. The injuries and deaths caused by extreme events (heat waves, storms, fires, and floods) as direct effect of climate change impact, rarely have a direct impact on a population's life expectancy, especially not on long-term trends. Indirect pathways of climate change may increase population displacement and migration to the less affected countries. Consequently, even recent pessimistic projections for the impact of climate change on US mortality yield only a modest increase in age-adjusted mortality of about 3% by the end of the 21st Century (Deschênes and Greenstone 2011). However, such projections do not take into account the adaptive capacity of humans to the new climatic situation.

The four principal components of socioeconomic status are educational attainment, occupation, income, and wealth. The respective role for determining mortality levels of any of these components of the socioeconomic status of persons is still unclear although the influence of variables such as occupational status and social class on cardiovascular mortality, hypertension, and hypercholesterolemia has been long established. The societal, political, and disease environment in which an individual lives is likely an important mediator between socioeconomic status and individual health outcomes which could explain why socioeconomic status has different effects in different populations at different times. Most studies consider educational attainment a mediating factor that helps individuals to acquire, develop, and use a set of resources, such as health behaviors, social psychological resources, access to and utilization of healthcare, and other types of socioeconomic attainment. The 20th Century saw revolutionary improvements in educational attainment and these ongoing changes are important when considering the impact of socioeconomic factors in the future. However the inverse relationship between educational level and mortality is complex and the importance of different explanatory pathways has changed over time. The other principal components of socioeconomic status -- occupation, income, and wealth -- are central to the stratification of society and represent the degree to which individual characteristics and resources can be converted into other, often material, resources. Individuals with more material resources are able to pay for medications and better health care, food of better quality and other health-promoting goods and services.

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<sup>24</sup> According to the World Health Organization (WHO), a person is considered obese if he or she has a Body Mass Index (BMI) of 30 or more.

To sum up, it seems more likely that the positive influences on human mortality and life expectancy will outweigh the negative risk factors. It cannot be excluded that new risk factors and/or new diseases will occur in the future as outlined by the views of the pessimists. However, the experience of people in the past dealing with such impacts provides many reasons to believe that future societies will be able to adapt to coming threats and challenges. Most experts support the optimistic view of the Vaupel School and believe that life expectancy in Europe will continue to increase if (1) reductions in smoking continue, and (2) further medical advancement are discovered and implemented. In Eastern Europe people would also have to decrease their alcohol consumption and countries in the region would have to improve their health care systems. Moreover the experts expect that the differences between countries will further decline in the future.

#### 2.1.4 Migration<sup>25</sup>

After being a continent for emigrants for a long time, immigration became dominant in Western Europe after the 1960s. At first most immigrants came from former colonies, selected recruitment countries and Eastern Europe (as refugees). However, starting from the 1980s, immigrants from all over the world come to Europe in significant numbers, e.g. expatriates working for international organisations, skilled workers from various countries, refugees and asylum seekers from Africa, the Middle East and Asia, the Balkan states and former Soviet Union countries, students from China and Korea and undocumented workers from African and Asian countries (Borkert and Penninx, 2011). Furthermore, while formerly migration usually resulted in permanent resettlement, recent migration increasingly leads to consecutive stays in different countries, known under the concept of transnationalism.

International migration is typically measured through stocks or flows. A migrant stock is defined as the total number of international migrants present in a given country at a particular point of time. A migration flow is defined as the number of persons arriving or leaving a given country over the course of a specific period of time. Flow measures reflect the dynamics of the migration process and are typically considered less tractable than stock measures (Bilsborrow, 1997). Information on migration patterns from studying stocks can potentially provide a poor indication of contemporary international migration flows. In countries where there are significant return migrations or mortality among foreign population, migrant stock data can yield a misleading portrait of the current migration system (Massey et al., 1998). Net migration flows are often used to measure the impact of migration on population growth. Net migration flows, however, provide no detail on the scale of movements in and out of a country.

Migration represents an increasingly important component of population growth (Zlotnik, 2004) and global migration levels are likely to increase unless current economic problems remain unsolved. Populations in Europe and North America show the weakest growth under zero migration scenarios. While only 2.9% of the world's population lives outside of their country of birth, this percentage is above 10% for nationals of countries like Mexico and El Salvador. Foreign-born shares are also substantial relative to the population of countries of destination, with levels above 10% in North America, most of Western Europe and Oceania, and parts of South East Asia. Furthermore, the origins and destinations of international migrants have become more diverse in the last four decades (Özden et al., 2011).

Today, international migration is by far the most important force behind European population change (Figure 46). Europe is the only world region in the last decade where there are more deaths than births per 1000 inhabitants. Overall population in Europe is

<sup>25</sup> This section is largely based on Abel, Riosmena, Sander (2013, forthcoming) with contributions from Ayla Bonfiglio, Graeme Hugo, Siew-Ean Khoo, Lori Hunter, Douglas Massey, and Phillip Rees.

still increasing, however, because the positive effect of net migration to Europe is larger than the negative effect of natural increase (the difference between the numbers of births and deaths). Figure 46 and Table 18 show contrasted pictures across European countries. Some countries loose population due to both net migration and natural change, like for instance Lithuania and Latvia, while other countries, mostly western and northern European countries, gain population due to both components of population growth. While on average net migration has been positive in Ireland in the period 2000-2010, in 2011 substantial more people left the country than entered. This negative net migration, however, still was compensated by positive natural increase. Most migration flows in past decade were the consequence of the enlargement of the European Union to Central and Eastern European countries: about 250,000 persons per year. If the existence of welfare systems attracts migrants across the countries of the European Union, unemployment rates and labour wages seem to play a bigger role in the migrant's decision to move to a European country (De Giorgi and Pellizzari 2009). Researchers have shown that migration is not a remedy to problems related to an aging population (Wilson et al., 2013). Public opinions towards migration varies in Europe and is split between a majority of sceptic who think it is a challenge and a minority of optimist who think it is an opportunity (Besharov et al., 2013) .

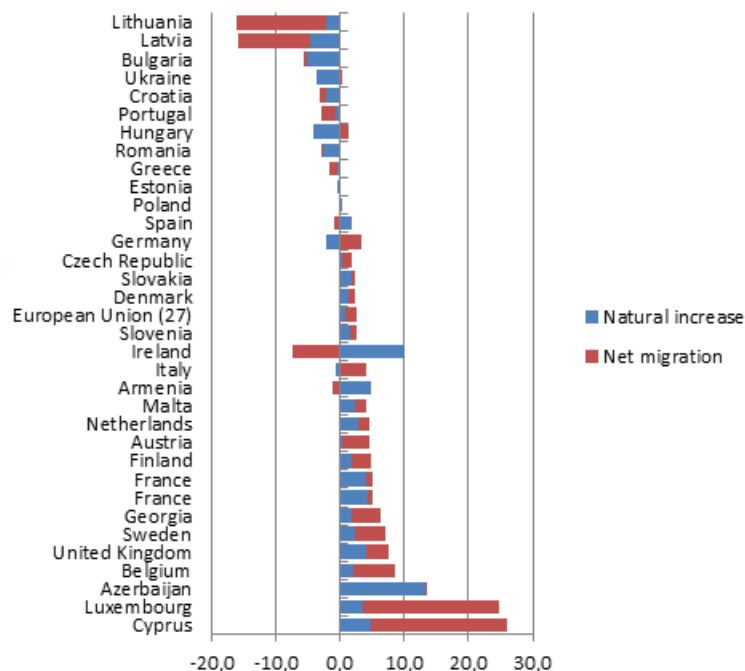


Figure 46 - Net migration and natural increase, 2011  
Source: Van Nimwegen and van der Erf (2010); Data: Eurostat

	Annual net migration (%)		
	2000-04	2005-09	2010-11
Austria	0.47	0.40	0.38
Belgium	0.30	0.54	0.95
Bulgaria	-0.53	-0.05	-1.10
Croatia	-0.03	0.12	-0.10
Cyprus	1.22	1.34	2.05
Czech Republic	0.04	0.49	-0.06
Denmark	0.16	0.28	0.27
Estonia	0.01	0.01	0.00
Finland	0.10	0.24	0.28
France	0.31	0.15	0.08
Germany	0.22	0.02	0.25
Greece	0.33	0.34	-0.07
Hungary	0.13	0.17	0.12
Ireland	0.95	0.69	0.25
Italy	0.56	0.65	0.46
Latvia	-0.12	-0.10	-4.24
Lithuania	-0.23	-0.25	-4.75
Luxembourg	0.86	1.33	1.86
Malta	0.89	0.38	0.14
Netherlands	0.17	0.02	0.19
Poland	-0.04	-0.04	0.42
Portugal	0.57	0.21	-0.40
Romania	-0.52	-0.01	-0.01
Slovakia	-0.06	0.09	-0.34
Slovenia	0.15	0.41	0.04
Spain	1.31	1.09	0.02
Sweden	0.31	0.55	0.51
United Kingdom	0.28	0.34	0.58

Table 18 – Net migration in the countries of the European Union  
 Source: Eurostat

At the regional level, migration can be split into two components: internal migration between regions within each country and international migration from and to other countries. Although many of the processes shaping internal and international migration are similar (King and Skeldon, 2010) the rates of internal migration are greater than international movements. The influence of the different migration components varies considerably from region to region. Van der Erf et al. (2010) showed that in almost three-quarter of the NUTS 2 regions of the European Union the total migration balance for the period 2000-2007 was positive. In about half of these regions the impact of internal migration was negative, but these net outflows of migrants were compensated by positive net international migration. The reverse pattern, i.e. negative international migration compensated by positive internal migration, is rare. In 10 per cent of the regions both internal and international migration contributed to population loss. These depopulation regions are mainly found in Bulgaria, Romania and Poland (Van der Erf et al. 2010).

A further distinction can be made between international migration to and from countries within and outside Europe (Figure 47 and Figure 48). A negative international migration balance is almost exclusively the result of migration outflows to other countries within Europe. Almost all regions experience population growth due to immigration from outside of Europe. The directional mix of international migration varies between Western European countries (Czech Republic, France, Spain, UK) whose main exchanges are with the world outside Europe, countries whose main exchanges are within Europe (Central Europe, Eastern Europe, Nordic countries, except Sweden) and countries whose main emigration is to Europe and main immigration from outside Europe (Portugal, Italy, Greece and Sweden). This pattern is related to former imperial history and to geographical position in the interior of Europe or on its Mediterranean littoral. It is estimated that more than half of the total number of international immigrants in Europe arrives from outside the area, while somewhat less than half of the international emigrants departs to a country outside Europe. These proportions vary strongly between countries. For example, only 5 per cent



of all immigrants in Luxembourg arrived from a country outside Europe in 2007, against around 70 per cent of the Italian immigrants (Van der Erf, 2010).

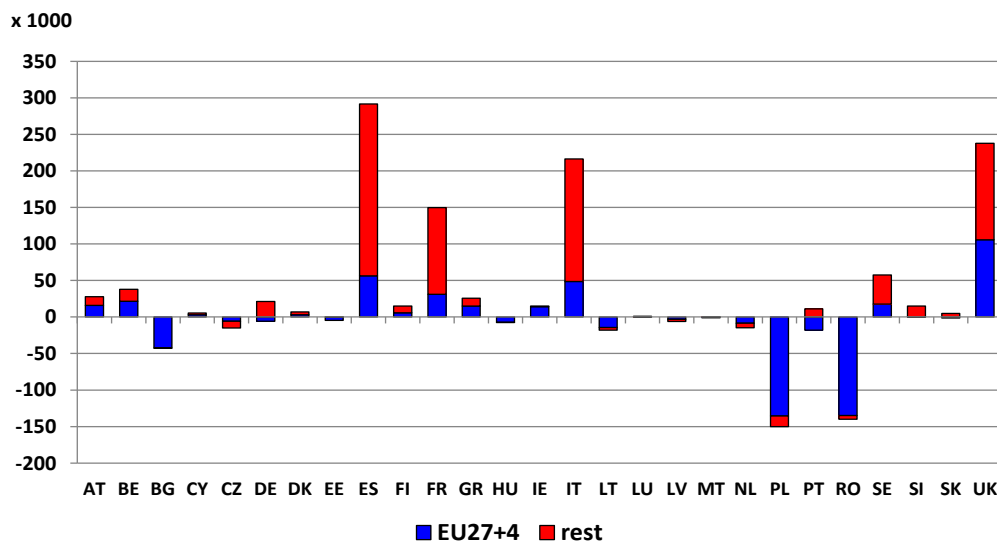


Figure 47 - Origin of net migration, absolute numbers, 2008  
 Source: IMEM medium estimates

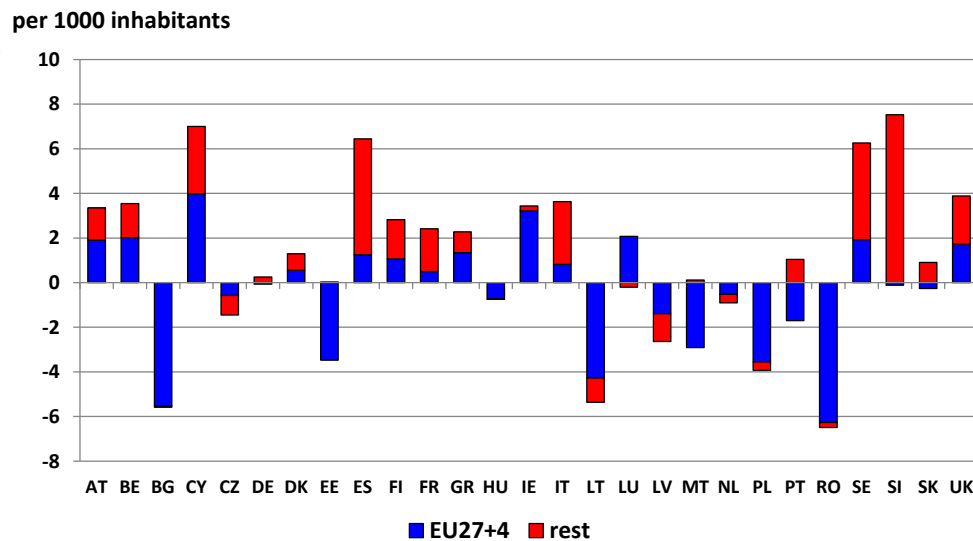


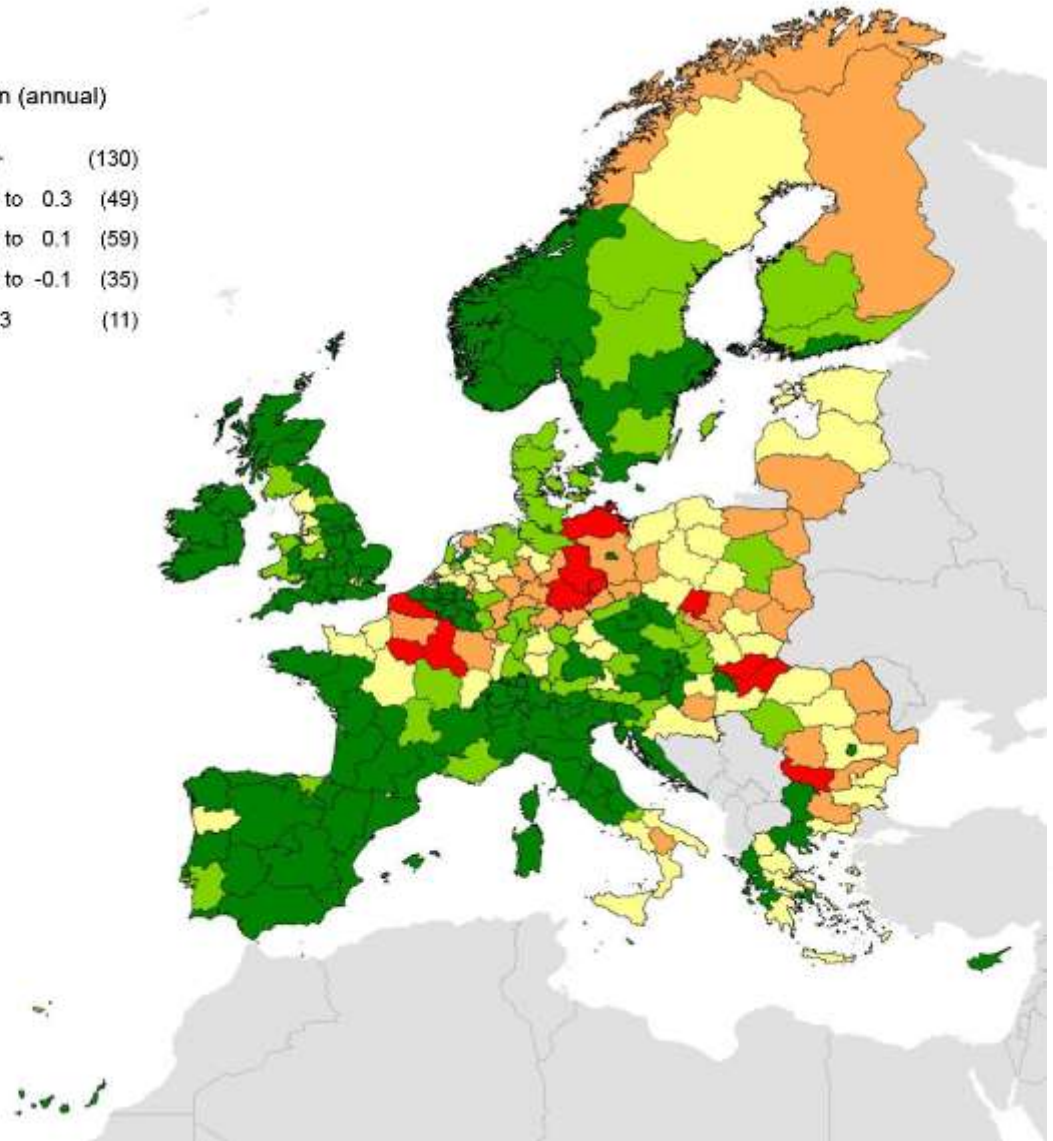
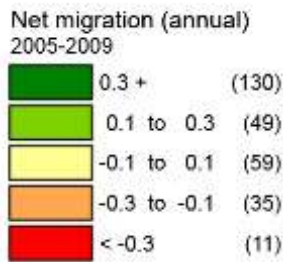
Figure 48 - Origin of net migration, per thousand inhabitants, 2008  
 Source: IMEM medium estimates

Map 5 presents net international migration per thousand inhabitants for NUTS 2 regions in the period 2005-2009. In almost 75 per cent of all regions net migration has been positive. In this period net migration has been high in several southern regions, especially in south-eastern regions in Spain and northern regions in Italy. Moreover, Ireland has had high positive net migration. About one quarter of European regions has experienced negative net migration. This applies to many regions in eastern Europe, but also to several regions in France, northern Scandinavia and southern Italy. The regional distribution of net international migration flows depends on several factors. International migrants are often attracted by regions of strong economic growth, in particular by the availability of jobs. In most countries job opportunities for international migrants are most favourable in and around the capital cities. The existence of networks of relationships between migrant

populations and their families or relatives at home, may trigger migration flows as well. The environment may also play a role: 'Sun-belt regions', such as the Canary Islands in Spain and Madeira in Portugal, attract migrants, especially retired people (Van der Gaag et al., 1999). Relatively unattractive destinations are predominantly agricultural regions. These regions offer few job opportunities and often face high levels of unemployment. Moreover, the absence of networks further contributes to the low popularity of these regions. Map 8 refers to net migration mostly prior to the economic crises, i.e. the global banking, credit and employment crisis and the sovereign debt crisis. Economic developments, however, do affect migration patterns. In more recent years, several shifts have taken place. In Spain for example net immigration decreased significantly, while in Poland several regions that were outmigration regions in 2005-2009, became immigration regions in 2010-11 (Map 9). While migration was affected in several countries, people kept arriving in the UK at roughly the same level despite the severe downturn in economic activity.

#### Drivers of migration

Migration results from the combined interaction of several factors that are economic, policy, environmental and demographic-related. Economic forces such as differences in living standards between sending and destination countries or areas are the main motivation for emigration (Clark et al., 2004; Massey et al., 1998), but not a sufficient one as many other economic and non-economic factors play a role in influencing the timing and geography of international migration. In many examples in the past, several kinds of active private and public recruitment efforts jumpstarted migration flows, like for Turkish in the case of Germany (Abadan-Unat, 1995). The recruitment space was not defined arbitrarily as it followed historical links, whether colonial like between France and Algeria, or cultural like in the Middle East. Other factors can jumpstart migration flows, just as military actions.

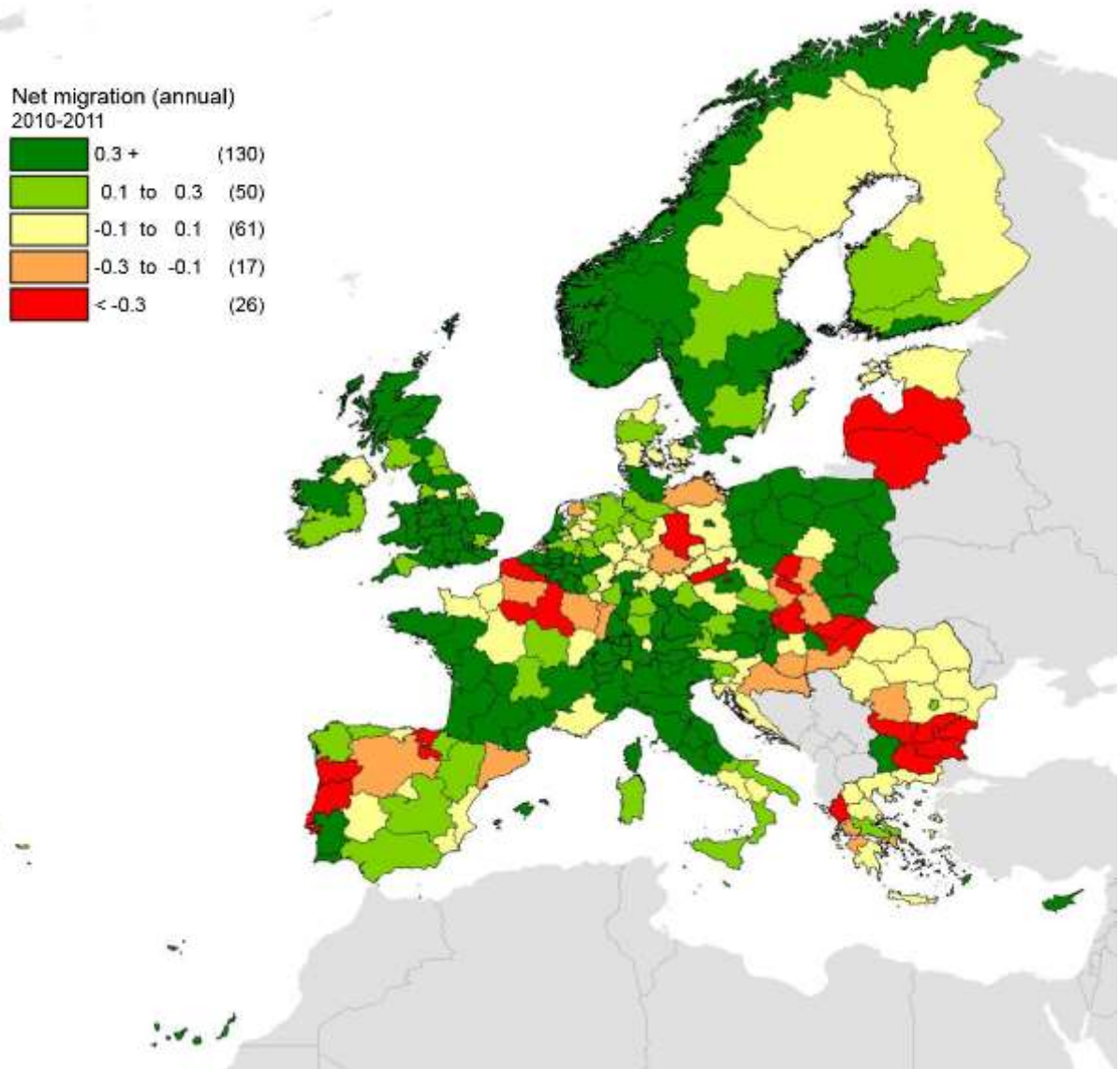


Map 8– Net migration at NUTS 2 level; average 2005-2009  
Source: Eurostat

The disturbances associated with wars can cause vast population displacements and a large number of refugees. The UNHCR (2012) estimated that at the end of 2010 there were an estimated 33.9 million people “of concern”. The flows tend usually to follow more traditional migration patterns. The wars in the 1990s in Croatia, Bosnia, and Kosovo resulted in large flows of refugee migrants to other European countries.

The effect of migration policies can be described as the ability of a policy to influence the size or composition of a migration flow. Migration flow composition refers to the gender, nationality, age, education, and skill level distribution of the individuals within a migration flow. There are also ‘non-migration’ policies that can impact the size or structure of migration flows as they may be linked to structural determinants of migration, such as macro-economic and political conditions (Czaika and De Haas, 2011). Migration policies can also affect migration flows in unintended ways. De Haas (2011) outlines four types of unintended migration policy effects: spatial (migrants diverting to another country), categorical (using other unauthorized channels like tourist visas), inter-temporal (migrating en masse for anticipation of a closing up), and reverse flow (when return migration flows decrease as a result of increasing migration restrictions). It is important to acknowledge that migration policies are, to some degree, endogenously determined by

prior migration flows and can reflect existing migration patterns, which are in turn affected by the effectiveness of past migration policies.



Map 9—Net migration at NUTS 2 level; average 2010-2011  
Source: Eurostat

Restrictive immigration policies generally affect migration flows in the intended “direction”, rather than in the fully intended way (Czaika and De Haas, 2011; see also Green and Green, 1995; Mayda, 2010; Ortega and Peri, 2009). Additionally, the effects of structural migration determinants in sending or receiving countries in constraining or promoting migration exhibit a greater impact when coupled with more restrictive or open immigration policies, respectively. Hence, the positive effect of increasing GDP per capita on immigration flows is more pronounced during times of relatively open immigration policies. Compared to macro-level migration determinants, such as economic growth, labour demand in receiving countries, conflict, or youth cohort size in sending countries, immigration policies appear to have a small effect (Angelucci, 2012; Cornelius and Salehyan, 2007; Czaika and De Haas, 2011; Spilimbergo and Hanson, 1999).

Established in the Universal Declaration of Human Rights in 1948, this right allows any non-citizen to enter a territory, either through authorised or unauthorised channels, and apply for asylum without the threat of being forcibly returned to his or her country of origin



before a status determination is made and before it can be established that the non-citizen would not return to cruel or inhuman treatment. It is possible to observe the effects of different asylum policies on migration flows. For example, some studies have found that increasingly restrictive asylum policies in Europe have reduced immigration flows (Hatton, 2004; Holzer et al., 2000; Thielemann, 2005).

Compared to immigration policies, there is relatively a small amount of emigration policymaking and only a few studies explore the effects of policies designed to control emigration issued by sending countries usually targeting specific groups of individuals, based on gender, skill level, education, or ethnic affiliation (De Haas and Vezzoli, 2011; Kureková, 2011).

There are of two sorts of migration to adapt to climate and environmental change: environmental migrations initiated by dramatic and sudden environmental events such as the Asian Tsunami of 2004, and those of slow onset, with gradual but cumulative environmental forces. Sudden disasters can be very destructive and cause major displacement of population but that displacement is usually temporary. In contrast, migration associated with slow onset environmental change can be much more varied: for instance, food shortages due to droughts or floods can lead to movements to areas not affected, especially to cities, and can become permanent if the situation is prolonged. However, the link between environmental conditions and population displacement has been oversimplified (Hugo, 1996) assuming that all people in areas severely impacted by climate change will move (Christian Aid, 2007). Environmental change is most likely to result in internal migration.

Demographic factors that can affect the level of migration include population size and growth rate, age structure and fertility and mortality trends. High population growth rates from high fertility rates lead to a young population and excess labour supply. A large cohort of people in the mobile young adult ages e.g. in India and China is a potential source of supply of migrants, particularly when sending nations face challenging economic or political conditions (e.g. Coleman, 1993), although the lack of development per se does not necessarily yield the highest emigration rates. Fertility decline and slower population growth lead to fewer young people in the mobile age groups, thus reducing the supply of potential emigrants. Some (former) migrant-sending nations, mainly in East and Southeast Asia and South and Western Europe, have undergone this kind of demographic transition while also having solid social, political, and economic institutions and experiencing high economic growth and expansion due to investments in human capital and infrastructure (Bloom and Canning, 2008; Paldam, 2003). This prosperity might have not only led them to reap fiscal and economic benefits of having a population heavy in the middle-age groups, but also could explain their transition from sending to receiving nations.

The demography of labour demand and supply may also drive migration. Population and labour force ageing can result in a shortage of workers, which is most likely to be felt in the service sectors. As suggested by Piore's (1980) dual labour market theory, labour supply issues arising from a population's demography and economy can be important drivers of migration. Countries experiencing a short supply of either skilled or unskilled labour have turned to importing labour from other countries with a more abundant supply of workers. The likelihood of population decline in industrialised countries with very low fertility rates have led the UN Population Division to project the scale of migration needed to prevent it, to maintain a constant population in the working ages, and to maintain a constant ratio of older persons to persons of working age (United Nations, 2000). These projections are illustrative of the role of demographic factors as drivers of migration if countries decide to consider migration as a policy instrument to address the issue of future population and labour force declines.

Demographic factors can also affect the availability and choice of marriage partners, stimulating cross-border marriage migration. In most societies, men usually marry

younger women. In a population experiencing declining fertility rates, the size of younger cohorts of women would be smaller than those of older cohorts of men and some older men may have difficulty finding a spouse in the “appropriate age group”. Demographers refer to these circumstances as a “marriage squeeze”. Advances in female education and other social and cultural factors affecting people’s preferences in the choice of a marriage partner can exacerbate the problem. The increase in sex ratios at birth in recent years in some Asian countries also has the potential to exacerbate the problem in future. A marriage squeeze can lead to men looking abroad for potential marriage partners, although cross-border marriage migration is also facilitated by cheaper means of transport and communication.

In newly established migrant or ethnic communities that may have an unbalanced sex ratio in the marriage age groups – for example, an excess of young single men – marriage migration can develop with the country of origin if there is a preference for a marriage partner of the native ethnic origin rather than intermarriage with local residents. The formation of new ethnic communities in Australia, Europe and North America has resulted in marriage migration from the country of origin where there is strong preference in the first or second generation for marriage partners of the same ethnic background. Countries with high fertility and population growth rates are more likely to be sources of marriage migration since there is a larger supply of young women and men available as marriage partners.

#### EU migration policy

Post-war European cooperation started with the creation of the European Coal and Steel Community by the Treaty of Paris (1951) and was followed by the formation of the European Economic Community and the European Atomic Energy Community (Treaties of Rome, 1957). These European Communities focussed mainly on economic issues leaving other policies, e.g. migration policies, as the sole prerogative of the member states (Kraler et. al., 2006). But even on the national level it was only in the late 1960s that immigration policies came on the agenda and states increasingly sought to restrict or at least control the immigration of third-country nationals (Huysmans, 2000). In this context formal intergovernmental cooperation on migration policy towards third-country nationals was seriously considered for the first time at the European Summit of Paris in 1974 (Klos, 1998).

Today there are two very separate legal regimes relating to migration. On the one hand there is a highly developed EC legal framework regarding the right of nationals of the member states to migrate and seek employment in any one of the other member states. On the other hand there is a much less clear legal regime relating to third-country nationals (Guild, 2004).

Immigration became an issue of common interest for the EU by the Treaty of Maastricht (1992). This treaty established the ‘three pillar’ structure of the EU. The first comprises the European Communities, now called the ‘European Community’ (EC), placing a number of issues under the jurisdiction of supranational EU bodies. The second pillar comprises ‘Foreign and Security Policy’, while the third pillar is ‘Justice and Home Affairs’. In both the second and third pillar, cooperation is largely intergovernmental (Kraler et. al., 2006). EU’s common policies towards third-country nationals are initiated by the Amsterdam Treaty of 1997. This agreement stipulated that in May 2004, five years after its ratification, asylum and migration should become subject to communitarian policymaking, being thus shifted from the third, intergovernmental pillar of the EU to its first pillar. The Tampere, Laeken, Seville and Thessaloniki Councils resulted in the adoption of a large proportion of the Community measures called for in the Amsterdam Treaty (Kraler et. al., 2006):

- the criteria and mechanisms for determining which Member State is responsible for considering an application for asylum;
- minimum standards for the reception of asylum seekers in the EU;

- minimum standards for nationals of non-member countries to qualify as refugees, and the criteria for awarding refugee and subsidiary protection status;
- minimum standards on procedures in EU Member States for granting or withdrawing refugee status;
- minimum standards for giving temporary protection;
- promoting a balance of efforts between EU Member states in receiving and bearing the consequences of receiving refugees and displaced persons;
- conditions of entry and residence, and standards on procedures for the issue by EU Member states of long-term visas and residence permits, including those for the purpose of family reunion;
- illegal immigration and illegal residence, including repatriation of illegal residents;
- provisions defining the rights and conditions under which nationals of non-member countries who are legally resident in a Member State may reside in another Member State.

Apart from the greater coordination and harmonisation in asylum and migration matters already pursued by existing EU policies, further communitarisation of asylum and migration policy is currently endeavoured. However, Elizabeth Collett, Director of the Migration Policy Institute Europe, states that the central policy tool upon which the EU has based policy development has become limiting. She concludes that “the successive five-year plans that have been the centrepiece of the Union’s migration strategy since 1999 are no longer up to the challenge. The European Union will need to work with national policymakers to shape policies consistent with the new landscape of constantly changing global economic and demographic conditions, fluctuating labour demand, and evolving patterns of immigrant settlement and mobility”. Isolated immigration targets and goals should be avoided. Any future agenda should consider immigration policies alongside other relevant policies (Collett, 2013).

#### National immigration policies

Despite the interest of common EU migration policies, they cannot and should not replace national and even subnational migration policies. Generally, four distinctively assigned migration policies may be distinguished, focussing on third-country nationals: on labour, on family, on asylum and on account of other motives (e.g. study and medical treatment). Often these policies are related to different institutions/authorities. Besides, the nature of these policies may vary considerably in terms of place and time. E.g. countries like France, the Netherlands and the United Kingdom had to develop special policies in redefining their relations with former colonies while countries such as Italy and Spain were confronted with a sudden shift from emigration to immigration country. Meanwhile new EU Member States, like Poland and the Czech Republic, had to form migration policies with an EU acquis (Borkert and Penninx, 2011)<sup>26</sup>.

### **2.1.5 Urbanization**

Today, more than half of the world population lives in urban areas (United Nations, 2012). Urbanization levels, however, differ significantly across different regions in the world. The more developed regions reached the highest levels of urbanization: in 2011, 78 per cent of the inhabitants of the more developed regions lived in urban areas. In the less developed regions this was only 47 per cent, a share that already was reached by the more developed regions before 1950. Compared to Australia, New Zealand and Northern America, with levels of urbanization surpassing 80 per cent, Europe is the least urbanized major area in the developed world, with 73 per cent of its population living in urban areas. Apart from the United States of America also Japan and Brazil are among the highest urbanized

<sup>26</sup> For purposes of illustration for a selected number of EU countries a short outline of the actual immigration policies is presented in Annex 1, by means of the available country factsheets provided by the European Migration Network (EMN).

countries (Table 19). From the less developed regions, Latin America and the Caribbean has an exceptionally high level of urbanization, while Africa and Asia remain mostly rural. According to the United Nations World Urbanization Prospects, the 2011 Revision (United Nations, 2012), urbanization is expected to continue in both the more and less developed regions in the world. Globally, the level of urbanization is expected to increase to 67 per cent in 2050. The proportion urban population in more developed regions is expected to rise to 86 per cent, while the level of urbanization in the less developed regions will likely increase to 64 per cent. In spite of the expected continuation of urbanization, in several countries overall population decline may lead to a reduction of the size of the urban population. This may be for instance the case in Ukraine, Bulgaria, Japan and the Russian Federation (United Nations, 2012).

Historically, urbanization has been driven by the concentration of investment and employment opportunities in urban areas. Productive activities in industry and services cluster in cities. Policies aimed at modifying the spatial distribution of a population often focus on ways to reduce urbanization. In recent year, 72 per cent of the developing countries reported having implemented policies to reduce migrant flows to large cities. The same applied to about one third of the developed countries. (United Nations, 2009).

	1950	1975	2000	2011
World	29.4	37.7	46.7	52.1
More developed regions	54.5	68.7	74.1	77.7
Less developed regions	17.6	27.0	40.1	46.5
Africa	14.4	25.6	35.6	39.6
Nigeria	10.2	25.5	42.4	49.6
Asia	17.5	25.0	37.4	45.0
China	11.8	17.4	35.9	50.6
India	17.0	21.3	27.7	31.3
Indonesia	12.4	19.3	42.0	50.7
Pakistan	17.5	26.3	33.1	36.2
Bangladesh	4.3	9.8	23.6	28.4
Japan	53.4	75.7	78.6	91.3
Europe	51.3	65.2	70.8	72.9
EU28	56.6	67.2	71.4	73.8
Russian Federation	44.1	66.4	73.4	73.8
Latin America and the Caribbean	41.4	60.7	75.5	79.1
Brazil	36.2	60.8	81.2	84.6
Mexico	42.7	62.8	74.7	78.1
Northern America	63.9	73.8	79.1	82.2
USA	64.2	73.7	79.1	82.4
Oceania	62.4	71.9	70.4	70.7

Table 19 – Percentage of the population living in urban regions  
Source: United Nations

Cross-country comparisons of urban and rural regions are hampered by the use of different criteria for urban-rural classifications (Hugo et al., 2003). Some countries use administrative units and other built-up areas; some countries focus on population size or density, others on land use. Due to suburbanization and urban sprawl as well as to transport and information technology the distinction between urban and rural areas has become more diffuse. As commuting has increased greatly, more people divide lives between urban and rural areas (Bengs and Schmidt-Thomé 2006, Hugo et al., 2003). Furthermore, Hugo et al.(2003) state that an urban-rural dichotomy is overly simplistic, instead urban and rural could be considered as two opposite ends of an urban-rural continuum. Alternative classifications have been proposed, taking into account detailed regional characteristics, among which for instance population size, population density,

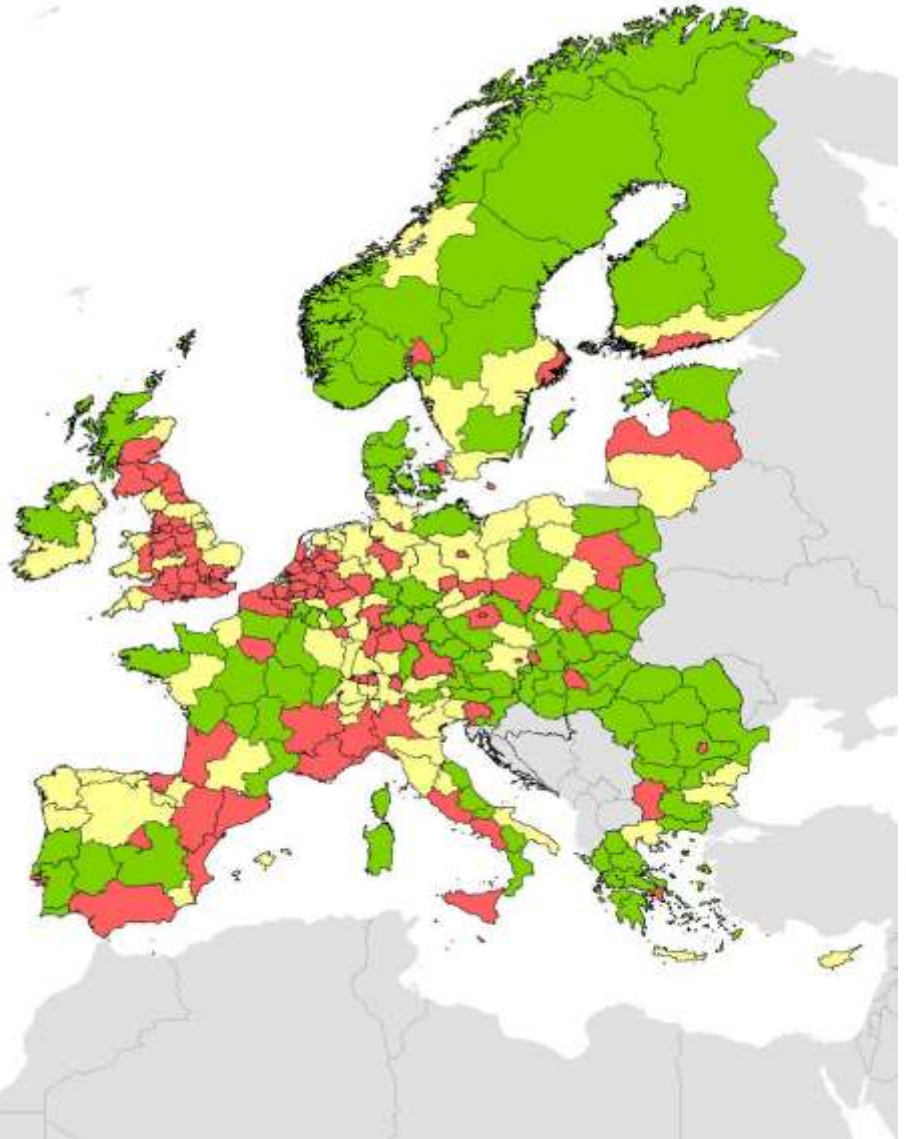


commuting patterns, and accessibility, and classifying regions into various categories (e.g. Butler and Beale 1994, Cromantle and Swanson 1996, Coombes and Raybould 2001, Coombes 2004, Hugo et al. 2003, Bengs and Schmidt-Thomé 2006). Such detailed classifications, however, make it more difficult to obtain internationally consistent classifications than distinguishing two or three categories based on simple criteria.

In the 1990s the OECD developed a classification using the same criteria for all OECD countries based on population density and the size of urban centres located within a region (OECD, 2010). The OECD distinguished three types of regions: "Predominantly Urban", "Intermediate" and "Predominantly Rural" areas. Brezzi et al. (2011) extended the OECD definition by distinguishing two types of rural areas, viz. remote rural areas and rural areas that are close to a city. They find that remote rural areas have a stronger decline in population and faster ageing than rural areas close to a city. The remoteness is a significant factor explaining outflow of working age population. Rural areas that are close to large urban centres can benefit from access to services, educational opportunities and logistics for firms (Dijkstra and Poelman, 2008). The OECD uses low level administrative units for the classification of rural areas (OECD, 2010). The effect of suburbanization and the enlargement of the size of local units by merging municipalities has made the division in town and country in many regions blurred (Champion, 2007). For that reason Bengs and Schmidt-Thomé (2006) argue that urban-rural differences should not be examined in terms of very small regional zones. Therefore they propose to use a classification at NUTS 3 level. In 2010 Eurostat published an urban-rural typology for NUTS 3 regions (Eurostat, 2010), following a similar approach as the OECD (2010). Thus, regions are classified by the share of the population living in urban and rural areas rather than on the basis of territorial characteristics, such as land use. De Beer et al. (2012) go one step further. Based on the Eurostat typology for NUTS 3 regions they developed an urban-rural typology for NUTS 2 regions, classifying all NUTS 2 regions into urban, intermediate and rural regions (Map 10). As this typology distinguishes three types of regions, the share of urban population according to this typology differs greatly from the one published by the United Nations in their World Urbanization Prospects (United Nations, 2012).

Type of region

intermediate	(83)
rural	(100)
urban	(99)



Map 10– NUTS 2 urban, intermediate and rural regions; NUTS2006 classification  
Source: NIDI

While on average in the European Union 51 per cent of the population is living in urban NUTS 2 regions, and 24 per cent in rural regions, there are large differences between countries (Table 20). Disregarding the countries for which the NUTS 2 level coincides with the country level, the most urban countries are the Netherlands, Belgium and the United Kingdom, with about 80 to 90 per cent of their population living in predominantly urban NUTS 2 regions. In Spain and Italy the percentages are higher than the European average, but in Northern Europe they are lower. At NUTS 2 level, Ireland does not have an urban region. Even the NUTS 2 region Southern and Eastern Ireland which includes Dublin is not classified as an urban region since two thirds of the population of that region lives in rural NUTS 3 regions. Again disregarding the countries including only one NUTS 2 region, one country has no rural population at all (Netherlands) and six countries have a small rural population: four in Western Europe (Netherlands, Belgium, UK, and Germany) and two in Southern Europe (Italy and Spain). Eastern European countries have large rural populations. Romania and Slovakia are the most rural countries in the EU with almost 90 per cent of its population living in rural NUTS 2 regions. During the last two decades the distribution of the total population over the three types of regions has changed slightly. In most countries there has only been moderate urbanization.

	1990			2010		
	Urban	Intermediate	Rural	Urban	Intermediate	Rural
Austria	23.8	27.1	49.1	24.7	27.6	47.7
Belgium	80.2	13.2	6.6	79.8	13.4	6.8
Bulgaria	25.3	14.5	60.2	27.9	14.8	57.3
Croatia						
Cyprus		100.0			100.0	
Czech Republic	22.6	39.4	38.0	23.8	38.6	37.6
Denmark	n.a.		n.a.	30.4		69.6
Estonia			100.0			100.0
Finland	47.0		53.0	49.9		50.1
France	47.7	19.7	32.6	48.1	19.9	32.0
Germany	50.0	28.7	21.2	50.8	29.3	19.9
Greece	34.9	21.9	43.2	36.4	22.7	40.9
Hungary	28.6		71.4	29.5		70.5
Ireland		n.a.	n.a.		73.0	27.0
Italy	53.9	32.4	13.7	53.8	33.0	13.3
Latvia	100.0			100.0		
Lithuania		100.0			100.0	
Luxembourg		100.0			100.0	
Malta	100.0			100.0		
Netherlands	86.7	13.1		87.4	12.6	
Poland	42.1	25.0	32.9	42.0	25.0	33.0
Portugal	28.4	37.6	34.0	28.9	37.5	33.5
Romania	10.0		90.0	10.5		89.5
Slovakia	n.a.		n.a.	11.5		88.5
Slovenia		45.0	55.0		47.0	53.0
Spain	68.6	24.4	7.0	70.7	22.5	6.8
Sweden	19.1	50.8	30.0	21.6	51.5	26.9
United Kingdom	79.7	19.6	0.7	79.3	19.9	0.7

Table 20 – Percentage of population in urban, intermediate and rural NUTS 2 regions

Source: NIDI

Urban regions often face a negative internal migration balance as a result of migration to settlements outside the urban areas. At the same time, urban regions usually attract international migrants because of the availability of cheap housing and jobs and the presence of a resident migrant population. In more attractive regions on the other hand, the available housing tends to be occupied primarily by internal migrants, restricting the possibilities for international migrants to settle in these regions. Urban regions, especially those that encompass big cities, also often attract young populations (students, young active and foreign immigrants) and expel older active ones. A clear example is Inner London. During the period 2000-2004 the population aged 20-39 increased by 24 per cent through migration, while the population 40-64 decreased by 23 per cent through migration. On the other hand, there are regions too that either attract both young and older migrants (e.g. various regions in Spain) or expel both (e.g. various regions in Poland) (Van der Erf et al. 2010).

For the comparison of settlement patterns in the member states of the EU we distinguish between 1) urbanization, i.e. a higher percentage of the population in urban areas to the expense of the percentages in intermediate and/or rural areas, 2) peri-urbanization, i.e. increasing percentages of the population in intermediate regions, coming both from urban and rural regions, and 3) counter-urbanization, i.e. a declining percentage in urban and/or intermediate regions and increasing percentages in intermediate and/or rural regions. The most common pattern is comparable to that of the overall pattern for the EU: urbanization of the young (about 15 to 40 years of age) together with peri- or counter-urbanization of the higher age groups (Van der Gaag et al. 2012).

### 2.1.6 Household positions

Demographic processes are to a large extent dependent on the household situation of the individuals involved (Van Imhoff et al. 1995). Fertility for instance is much lower among women living alone than among women living with a man, and mortality is lower for individuals living with a partner compared to persons living alone. Furthermore, for many social, economic or cultural processes, the household rather than the individual is the relevant unit for decision making. Therefore, not only the size and age and sex composition of populations is important to understand societal trends, but also its structure by household position. Examples of such societal trends are labour force participation and demand for services such as social security and health care. Developments in household position may change over time and may vary across countries. As a result of ageing for example, the mix of household positions may change as the share of persons living alone may increase as many seniors tend to live alone. Several household positions may be distinguished. Figure 15 shows a classification for the Netherlands, distinguishing six types of household position: child living at home, living alone, living with a partner without children, living with a partner with children, lone parent, and other. This figure clearly shows that the percentage of the population living alone strongly increases by age. While of all persons aged 45 less than 20 per cent is living alone, for persons aged 90 and over this is more than 70 per cent.

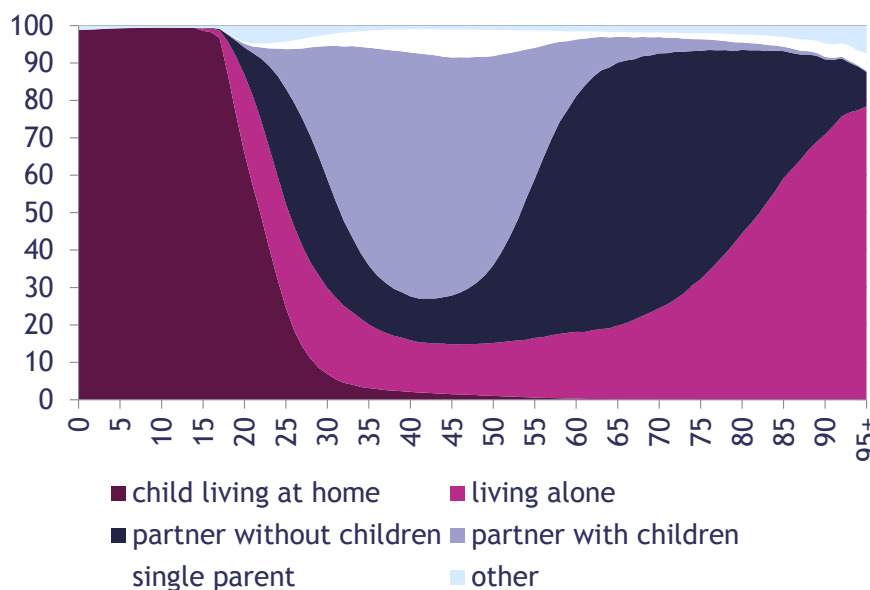


Figure 49 - Household positions in the Netherlands, 2010  
 Source: Statistics Netherlands

Household positions vary not only by age, but also by gender and level of educational attainment. The percentage of singles among young highly educated women is for example considerably higher than among women with a low levels of education as highly educated people tend to postpone living together with a partner. At older ages the percentage of women living alone is considerably higher than that of men because women live longer than men and most women tend to marry with a man who is a couple of years older (Huisman et al. 2013).

Iacovou and Skew (2011) distinguish different clusters of household structure in Europe. In the 'Nordic' cluster including Sweden, Denmark, Finland and the Netherlands, there are relatively many one-person and lone-parent households. Many young people live alone before they start cohabitation or marriage and relatively many elderly women live alone



when they have become widow. In the 'Southern' cluster including Italy, Spain, Portugal and Greece, there is extended co-residence of parents and their adult children and of elderly people with their adult off-spring. As a result the share of people living alone is low and there are less lone-parent families. The 'North-Western' cluster including the UK, France, Germany, Belgium, Luxembourg and Ireland, has an intermediate position between the other two groups. To a lesser extent this also applies to the Czech Republic and Hungary. The 'Eastern' cluster including Bulgaria, Romania, Slovakia, Poland and Slovenia, has relatively large households and a virtual absence of solo living individuals among the young. In these countries there is also extended inter-generational co-residence and a relatively low share of lone-parent families. The Baltic states, finally combine high levels of extended families with a very high rate of lone parenthood.

## 2.2 Key challenges for Europe in the World context

### 2.2.1 Population ageing

The ageing of Europe's population is a long running continuing process. The ageing process is associated with three demographic transitions. The first saw a mortality decline followed by a fertility decline which reduced the share of the younger population and which kept the older population larger for longer. The second took fertility rates in Europe to new lows below replacement TFRs (van de Kaa 1987). In between these transitions was a 1950s and 1960s baby boom which will result in "super-ageing" as the baby boomers cross into old age from 2010 onwards. The third demographic transition sees gaps in the labour forces of Europe being filled by new migrants, who change the ethnic composition of the population (Coleman 2006). As a result of these transitions, the age composition of the population has changed. The youthful share decreased; the working age share first rose and then fell and the old age share rose steadily through all transitions.

Age dependency ratios serve as indicators of the pressure placed on the working-age population to take care of the young and the old. A distinction is usually made between people under 15 (the young), people between 15 and 64 (the working-age population) and people over 64 (the old). Although ageing is a worldwide process, it is taking place at different paces in different regions of the world. Ageing is much more pronounced in the more developed countries than in the less developed countries (Table 21). In the more developed countries, the old age dependency ratio (OADR) in 2011 was 23.6, i.e. against every 100 people of working age there were 23.6 persons aged 65 or over. In the less developed countries the OADR was 8.9. Developments since 1950 differed considerably across the different regions in the world. Due to differences in the timing of ageing and dejuvenation, the old age dependency ratio rose dramatically in some regions (Japan and Southern Europe), moderately to significantly in most regions, but even remained constant (Bangladesh), or declined (Pakistan) in others. Up to 2050 the old age dependency ratio will rise sharply in all regions of the world.

Within the countries of the European Union, the age dependency ratio of the old is relatively high in Italy, Germany, Greece, Portugal and Sweden. Slovakia, Ireland, Cyprus, Poland and Luxembourg have relatively low ratios (Figure 50). In the vast majority of regions in the European Union the age dependency ratios of the old were between 25 and 35 in 2012 (Map 11). Higher values were mainly found in the southern countries, in Germany, the United Kingdom and Sweden, while lower values were mainly found in eastern countries and Ireland.

	OADR (*)			Growth index	
	1950	2011	2050	1950-2011	2011-2050
World	8.5	11.6	25.7	136	221
More developed	12.2	23.6	44.6	194	189
Less developed	6.6	8.9	22.9	134	258
Africa	5.9	6.3	10.5	106	167
Nigeria	5.4	6.3	8.1	117	128
Asia	6.9	9.9	27.8	145	279
China	7.4	11.3	41.9	154	370
India	5.3	7.6	19.9	144	261
Indonesia	7.0	8.2	30.0	118	364
Pakistan	10.3	7.1	15.2	69	212
Bangladesh	7.1	7.2	23.3	100	326
Japan	8.3	35.5	69.6	428	196
Europe	12.5	23.7	47.1	189	199
Northern Europe	15.8	24.9	40.6	158	163
Eastern Europe	10.0	19.3	41.8	193	216
Southern Europe	11.6	26.8	58.5	231	218
Western Europe	15.3	27.7	49.5	181	179
Russian Federation	9.5	17.7	38.5	186	217
Latin America	6.2	10.6	30.0	169	284
Brazil	5.4	10.4	35.8	193	345
Mexico	6.4	9.8	31.3	153	319
Northern America	12.7	19.6	36.1	154	184
USA	12.8	19.5	35.4	153	181
Oceania	11.7	16.4	30.0	139	184

Table 21 – Old Age Dependency Ratio (OADR)

Source: United Nations

(\*) OADR: Total number of population aged 65+ / Total number of population aged 15-64 \* 100

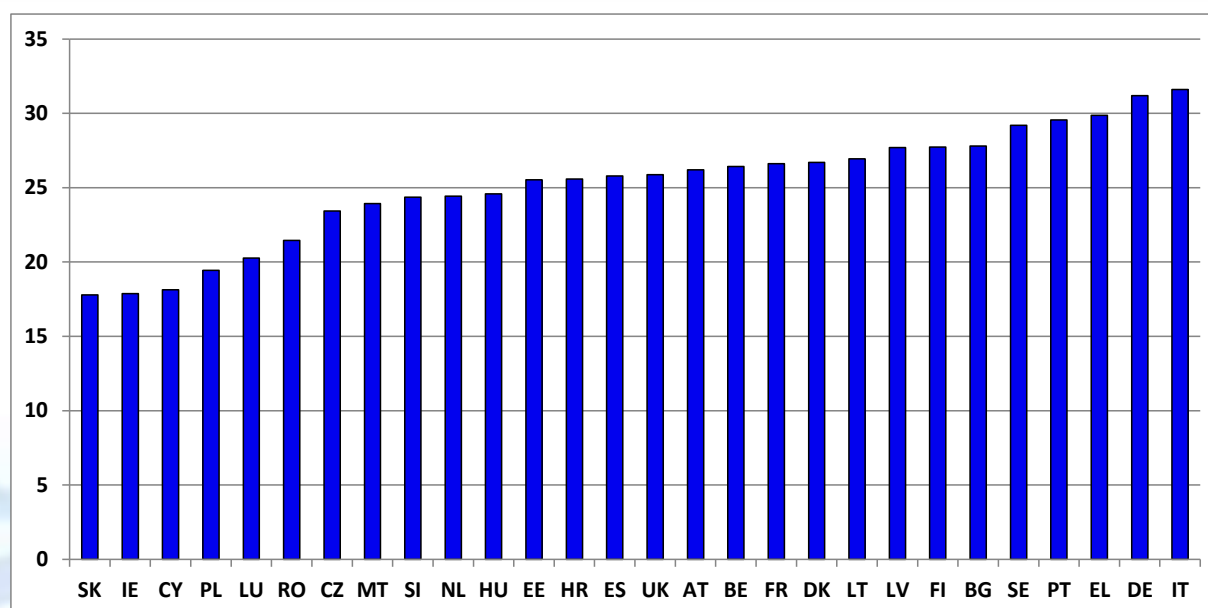
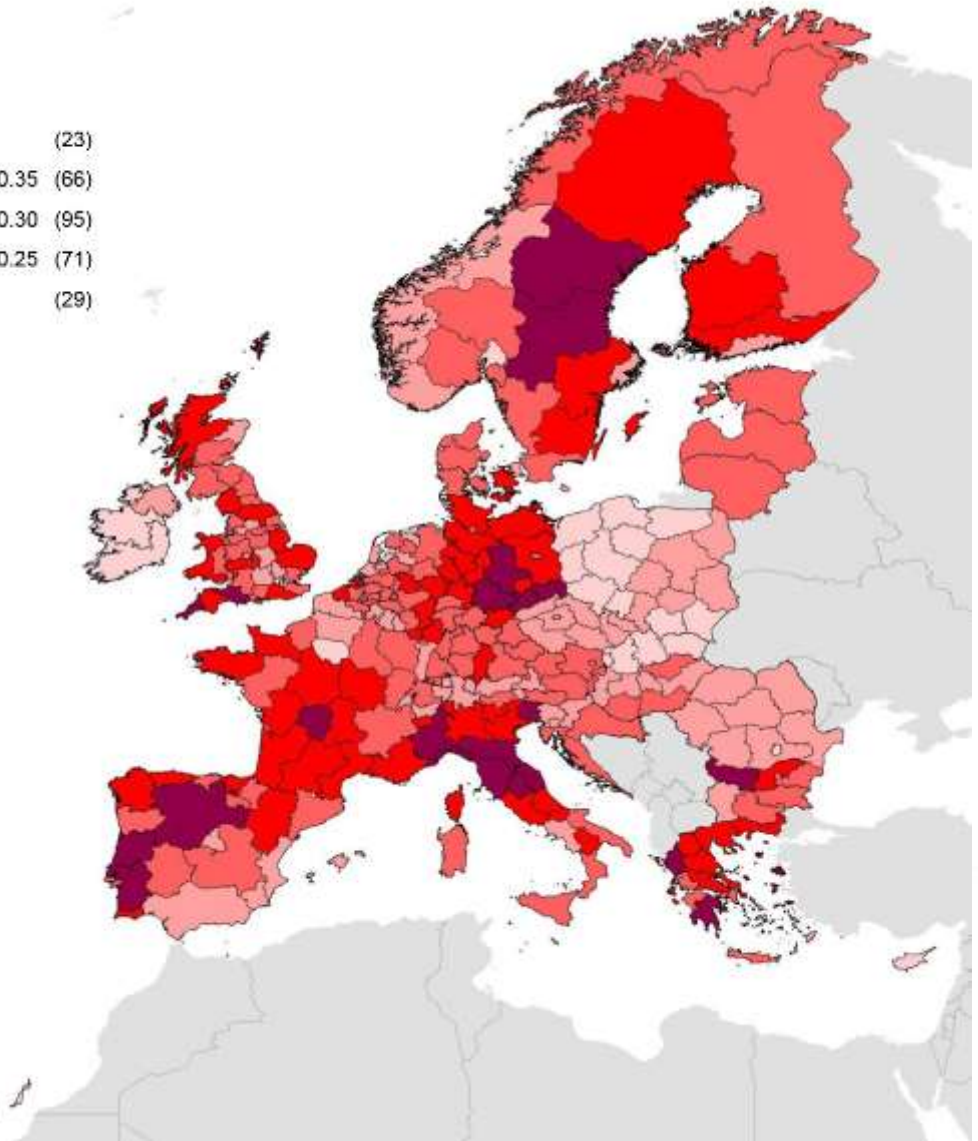


Figure 50 - Old Age Dependency Ratio in the countries of the European Union, 2012

Source: Eurostat



*Map 11- Old age dependency ratios at NUTS 2 level*  
Source: Eurostat

### 2.2.2 Labour force challenges

Changes in the age composition of the population may have severe effects on the development of labour supply. In periods with rising shares of the population in their working ages, their contribution to economic growth can be regarded as demographic dividend (Bloom et al., 2001 and 2003). Headey and Hodge (2009) showed that growing working-age populations have a positive effect on economic growth. In times of decreasing shares of the population in their working ages, on the other hand, GDP per capita growth has to come from higher levels of productivity, higher numbers of working hours or increasing employment rates.

While demographic dividend still may offer opportunities for economic growth to many countries in the developing world, today for most European populations this demographic dividend is almost spent, except for migrant sub-populations from outside Europe (Rees 2011).

While the majority of the countries in the European Union saw their population grow in the past decade, the population of most of the Eastern European countries, Hungary and also Germany started to decline (Figure 51, left graph). With an average annual population decline of 0.8 per cent, the drop was most severe in Bulgaria. A similar pattern was found for changes in the working-age population, although a relatively stronger growth of the working-age compared to total population was found in the countries with population growth, and a relatively smaller decline of the working-age population in the countries with population decline (Figure 51, middle graph). There are a few exceptions, however. The most striking example is Germany, with a very small annual average population decline, but one of the most severe declines in working-age population (-0.34 per cent). According to the latest Eurostat population scenarios (EUROPOP2010, Lanzieri, 2011) by 2020 in most EU countries the total population is expected to outnumber the current population, but the opposite applies to the working-age population (Figure 51, left and middle graphs). A larger working-age population is only foreseen for Austria, Belgium, Cyprus, Italy, Luxembourg, Spain, Sweden and the United Kingdom.

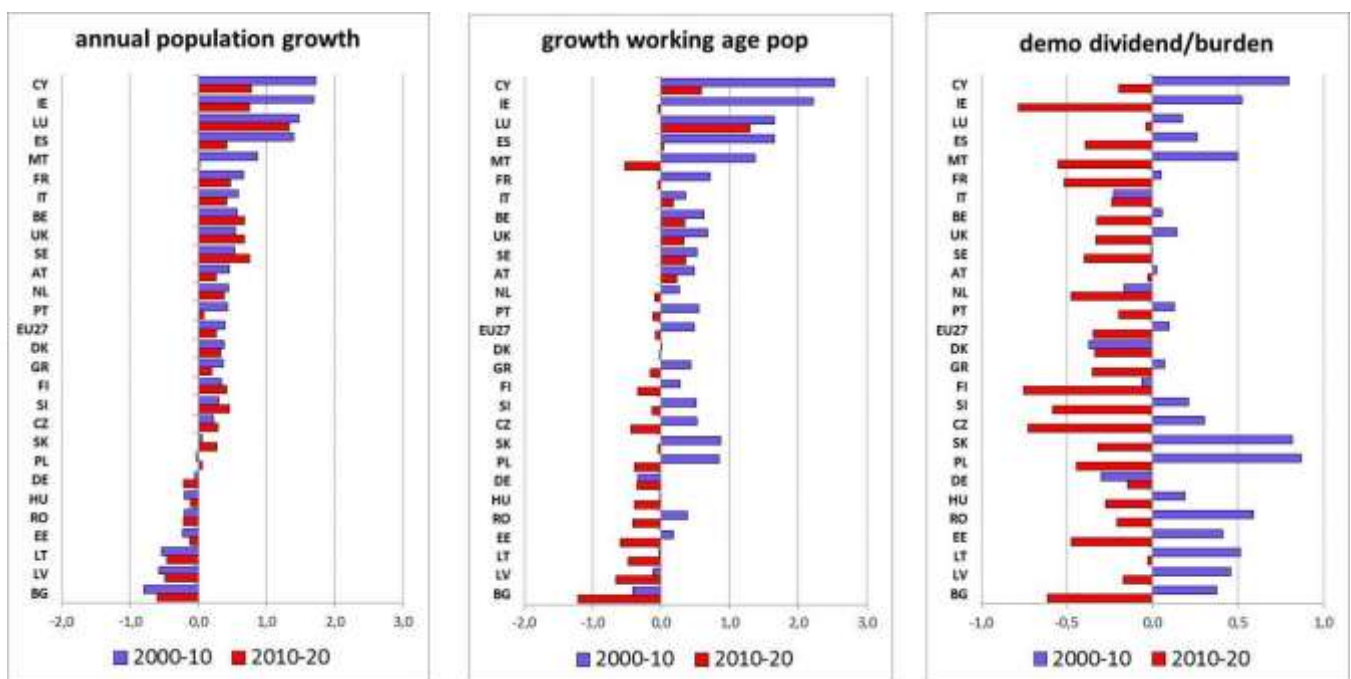


Figure 51 - Developments of the working age population in the countries of the European Union, 2000-20  
 Source: Eurostat

The share of the working-age population will sooner or later start to decline in all EU countries. As a result, demographic dividend will turn into demographic burden. Demographic burden is one of the most direct impacts of population ageing, and will negatively impact GDP per capita growth, all other things remaining equal. From 2000 to 2010, the contribution of demographic dividend to economic activity in the EU27 varied from on average 0.03 per cent per year in Austria to 0.87 per cent per year in Poland (Figure 56, right graph). The most sizeable effect was found for the member states that entered the European Union in 2004 and 2007. Sweden, Denmark, Finland, Germany, the Netherlands and Italy, on the other hand, already experienced demographic burden. In the years to come, the share of the working-age population in the total population is expected to start to decline in all member states, varying from declines of on average less than 0.1 per cent per year in Austria, Lithuania and Luxembourg to more than 0.7 per cent per year in the Czech Republic, Finland and Ireland. This downward trend is expected to continue until 2060. For several decades therefore, economic growth in the EU will need to come from increasing employment rates and/or increasing productivity (output per worker).



### 2.2.3 Education or human capital development<sup>27</sup>

Education is an inherently long-term endeavor mostly supplied by the State. Formal schooling involves an investment of years, perhaps decades, with the return on the investment coming in the form of benefits that last a lifetime. This is true at both the individual and societal level. Levels of education are highly correlated with individual and societal well-being.

Qualifications have increased strongly in recent decades with a noticeable convergence towards similar levels of educational attainment across most European and OECD countries. This can be shown both at the European and individual country levels. All cohorts are significantly higher educated than the preceding one. There are still some people with no education although compulsory education is in place in all countries since many decades pointing to pockets of illiteracy/low education in the population. The overall increase hides many disparities in the levels of educational attainment. Most disparities today are related to the quality of educational outcomes, as measured by skills. The gender gap has been reversed as women are becoming more educated than men.

Convergence of educational levels seems to be happening at least in considering the proportion of the working age population with a primary or secondary education. Looking at tertiary education, Belgium, Finland, France, Ireland, and the United Kingdom seem to have increased substantially their share of their working age population with completed tertiary level studies. Considering enrolment, on average the time spent in education for all pupils is longer than the length of compulsory education: compulsory education lasts on average 9-10 years whereas the school expectancy is about 17 years. This is the result of more and more young children enrolling in pre-primary education as well as increased participation in post-secondary studies.

Since the proportion with secondary education is close to being universal in most European countries, it is expected that tertiary education will be the level where most changes occur in the near and mid-term future, and where divergence may again appear in the speed at which the transition to higher-level studies increases. At the moment, one of the key elements is that many young people have a highest qualification that would not allow them to move onto tertiary studies, because they have graduated at primary, lower secondary or upper-secondary 3C level that leads directly to the labour market without easy bridges to tertiary education. The European Union is in need of scientists and one important objective of the Lisbon strategy is to increase the number of students in mathematics, science and technology. Figures 18-20 demonstrate that the share of the European population with a tertiary education has changed dramatically along cohorts. In most countries, the share of the older cohort (55-64) with a tertiary education was between 20 and 30 per cent. The spread of countries for the 25-34 age group is much wider, between 20 and 48 and this is mostly explained by different patterns of increase. Figure 18 shows that three countries, Germany, Austria and Hungary experience little increase in proportion with a tertiary education across cohorts, particularly when comparing the 25-34 with the 35-44 age group. For other countries in Northern Europe, such as Finland and Denmark, the trend is not clear and is subject to ups and downs which could be explained by different patterns of graduation for men and women in these countries. The increase was substantial (10 and 15 percentage points) in some countries that had either low shares of tertiary educated in older cohorts e.g. Slovak republic, and Greece or for others that increased the level following the main trend of the OECD like Sweden and the Netherlands. The same pattern repeats itself but with higher intensity as the difference in shares with a tertiary education between age group 25-34 and 55-64 is above 15 percentage points and, as

<sup>27</sup> Based partly on Barakat and Durham (2013, forthcoming)

shown in Figure 54, the shares tertiary educated in the 25-34 population is already above 45 per cent in Ireland, Norway and the United Kingdom. It is worth noting that the share is much higher in Canada, Russia and especially South Korea.

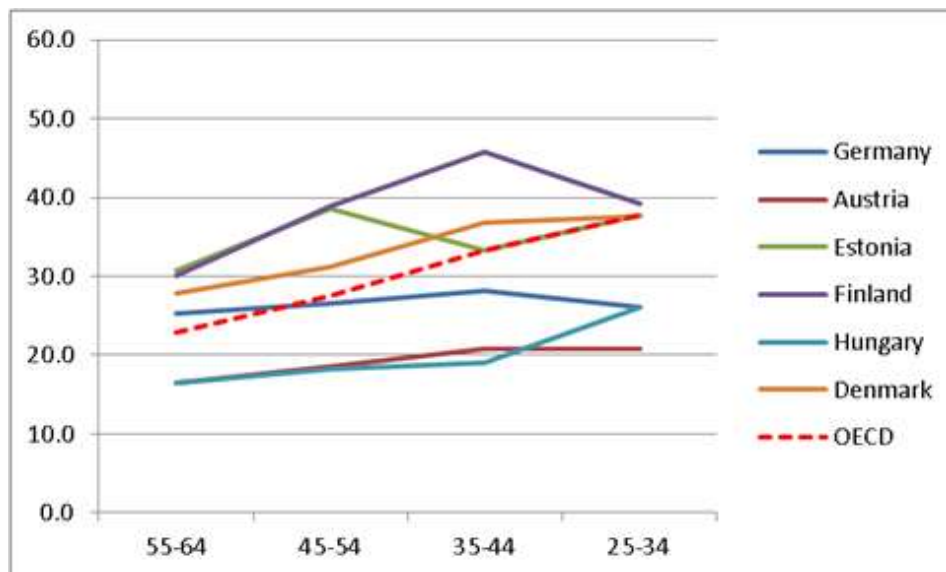


Figure 52 - Increase in proportion tertiary educated across cohorts, 2010, Group A  
Source: OECD 2013

Countries with an increase between 0-10 percentage points between age groups 55-64 and 25-34

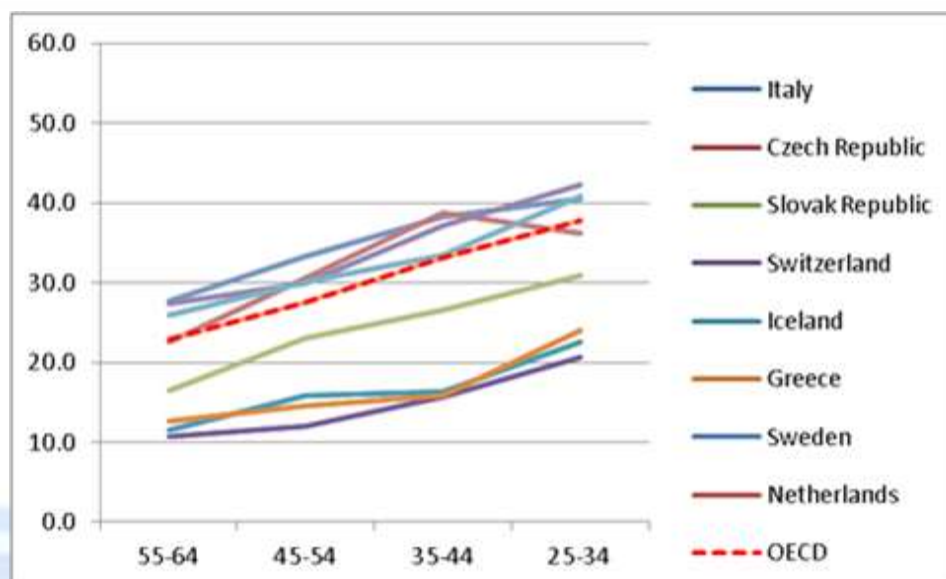


Figure 53 - Increase in proportion tertiary educated across cohorts, 2010, Group B  
Source: OECD 2013

Countries with an increase between 10-15 percentage points between age groups 55-64 and 25-34

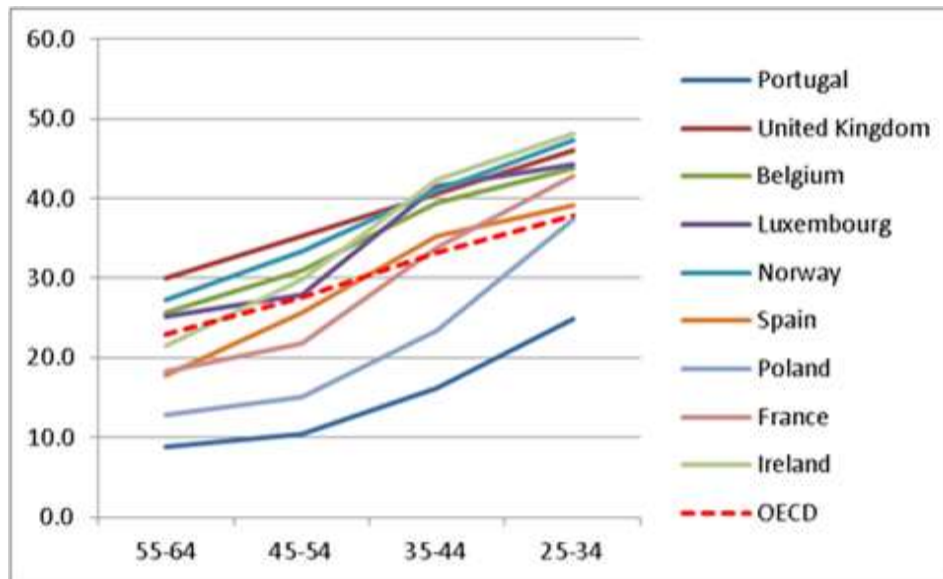


Figure 54 - Increase in proportion tertiary educated across cohorts, 2010, Group C

Source: OECD 2013

Countries with an increase of more than 15 percentage points between age groups 55-64 and 25-34

#### Determinant of educational attainment

Most of an individual's educational attainment continues to be his or her parents' educational attainment (Clemens 2004) and overall socioeconomic background, e.g. it is very strong in France and Austria when comparing reading skills across children's background (OECD 2011). Parents' education is an essential determinant of family socioeconomic status, and in turn determines a child's educational and occupational aspirations (Sewell and Hauser 1980). Countless studies emphasize how important family background is to academic performance, as well. Not only does the home environment created by more educated parents stimulates higher cognitive ability, it also conditions children's attitudes toward schooling and beliefs about the inherent value of education.

#### Do increases in educational enrolments lead to economic growth?

The process whereby education inevitably leads to improved economic conditions is not well understood and is widely debated. Increasing amounts of education within a population might seem clearly related to a country's economic growth potential, but there are many correlates of both higher enrolment rates and economic development, suggesting the relationship is not straightforward. Employment rates have been stable across different education categories in the recent past in the EU, although the 2008 crisis is visible particularly for low educated men (Figure 55).

Education quality as measured by cognitive ability matters more for economic growth than enrolment or attainment shares (c.f., Barro and Lee 2001; Hanushek and Kimko 2000). However the correlation between quantity of education (educational attainment) and quality of education (effective skills) is predominantly positive although the measurement of quality -- Programme for International Student Assessment (PISA), Trends in International Mathematics and Science Surveys (TIMSS) and Progress in International Reading Literacy Study (PIRLS) -- suffers from several drawbacks: These studies are limited in scope as they only measure literacy, mathematics and sciences, and IT skills among the population in-school. The fact that adults improve their competencies and acquire new skills notably in the labour market should not be ignored, especially if their levels of educational attainment are high. This is particularly relevant in Nordic countries.

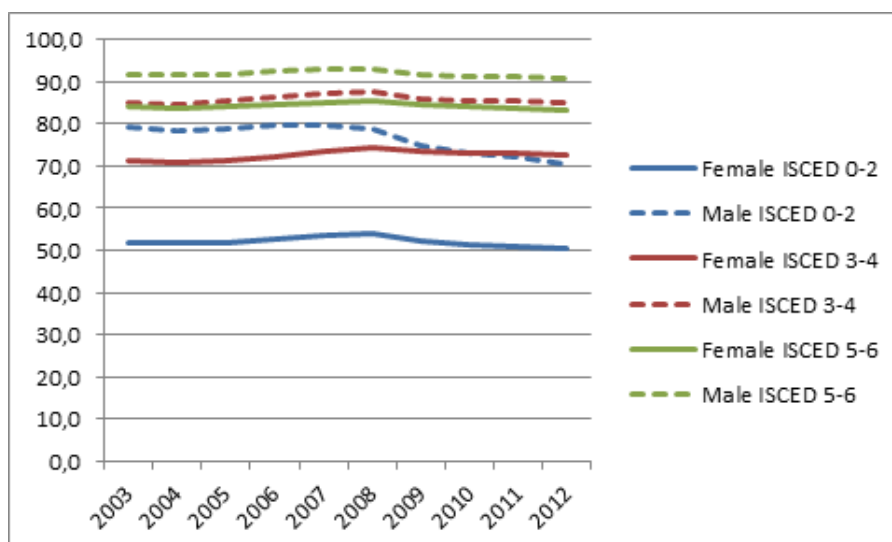


Figure 55 - Employment rates by highest level of education attained (%), EU-27, 2003-2012  
Source: Eurostat

### Reversed gender gap

The general level of educational attainment of women is in general improving to the point that more young women are actually qualifying from general upper secondary and tertiary education than men in Europe (and in other OECD countries). This is particularly true in Southern (Greece, Italy, Portugal, Spain) and Northern Europe (Denmark, Finland, Sweden). Figure 56 clearly shows that the increase in post-secondary education (including non-tertiary post-secondary education) was much stronger for women between 2003 and 2012 in most European countries. Romania and Croatia are the two last countries in Europe where men have still higher educational attainment compared to women.

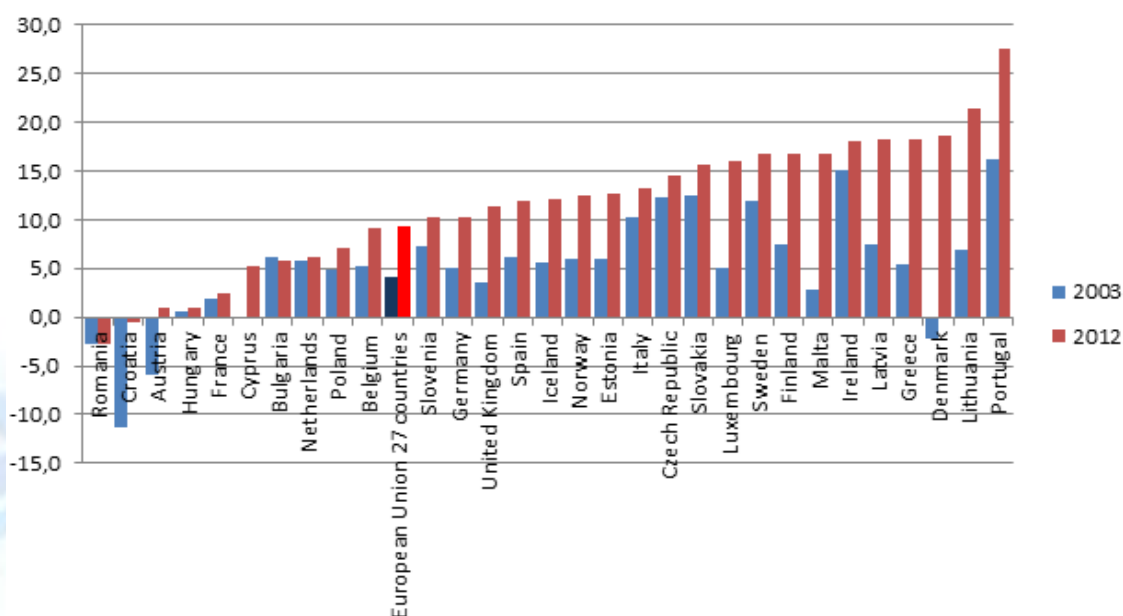


Figure 56 - Population share with post-secondary education (age 25-34; females – males), 2003-2012  
Source: Eurostat

Note: Data for Poland refers to 2004 instead of 2003

## 2.2.4 Demographic and social targets in force in Europe



The following targets have mostly been set on over the last decade, with the aim of increasing environmental preservation, resource efficiency, and addressing climate change issues. Each target is accompanied by the temporal horizon associated to it, and the policy document where target was established.

The successful accomplishment of targets in force is a major challenge for Europe.

Sector	Year	Target	Source
Education	2020	Reducing school drop-out rates below 10% by 2020	EU2020
Poverty / Social exclusion	2020	At least 20 million fewer people in or at risk of poverty and social exclusion by 2020	EU2020
Employment	2050	75% of the 20-64 year-olds to be employed	EU2020
R&D / innovation	2020	From 1.8% to 3% of the EU's GDP (public and private combined) to be invested in R&D	EU2020

## 2.2.5 SWOT analysis

### Strengths

1. In general in Europe, people are not only growing older but are also staying healthy for a longer period of time, contributing to the general well-being of the population.
2. Increasing human capital: Levels of educational attainment has increased strongly across most European countries. As a result younger cohorts are significantly higher educated than preceding ones. Higher levels of education and better qualified populations have several advantages, both for the individuals as for the societies. In general higher educated persons adopt healthier life styles and live longer than less educated persons. They have better labour force prospects and will contribute more to productivity and economic growth.
3. Europe has several strong metropolitan areas that are less vulnerable to the consequences of ageing because of the mitigating effects of migration. In these regions, international migration of relatively young workers could make up for high levels of internal outmigration of people in their forties and fifties, preserving a relatively young age structure. Although migration is not a permanent solution to the challenges of a declining working age population, it does fill specific gaps in the labour market. Strong metropolitan areas are mainly benefiting from migration.

### Weaknesses

1. Persistently low birth rates and declines in the size or the share of the working age population may result in declining labour forces which hamper economic growth.
2. Notwithstanding that life expectancy in Europe is among the highest in the world, in a number of eastern European countries, low life expectancy and large gender gaps in life expectancy remain a problem.
3. Ageing populations put pressure on the sustainability of welfare systems.
4. Population diversity and growing disparities between majority and minority groups within countries may cause societal turmoil.
5. Postponement of partnering and rising age at childbearing may result in fewer children than desired and increases the age gap between generations. This negatively impacts intergenerational support as grandparents are older when their children become parents, and children are still active on the labour market and taking care for their own children when their parents reach the age they may need support.

## Opportunities

1. As people live longer and healthier, this makes it possible for many persons to remain active in society also after they reach retirement age. It is an opportunity for societies to utilize the potential of older people, not only in the labour market, but also in other fields like voluntary work and informal care.
2. Good education is one of the strengths of the European Union, to further improve its human capital is one of its opportunities.
3. Improving human capital at the global level may have several advantages. It can reduce gender inequalities and narrow the gap between countries as productivity and economic growth may increase with increasing levels of education in less developed countries. Furthermore, it can contribute to high skilled migration to countries with labour shortages and to a reduction of unemployment in countries with a labour surplus.
4. Declining fertility levels will result in decreasing pupil and student populations which may give countries the opportunity to put more effort in raising the quality of education.
5. Another global opportunity is to fully utilize demographic dividend in those countries where increasing shares of the youth or working age persons in the total population lower the dependency ratio. If successfully utilized this can raise per capita income as well as living standards significantly.
6. In past decades increasing participation has been an important factor leading to growth of the work force and economic growth, however, there is still room to further raise participation of women, the elderly and migrants.
7. While intergenerational conflicts may be a threat, fostering intergenerational solidarity may be an opportunity. If we can achieve a society where on the one hand people of all ages can benefit from economic and social progress on an equal basis and at the same time can contribute to society and provide mutual support, this will be beneficial for society as a whole as well as for its inhabitants.
8. Rural areas with population decline may have advantages in terms of living environments and quality of life. To maintain and enhance these qualities could help these regions to turn their weakness into a strengths.

## Threats

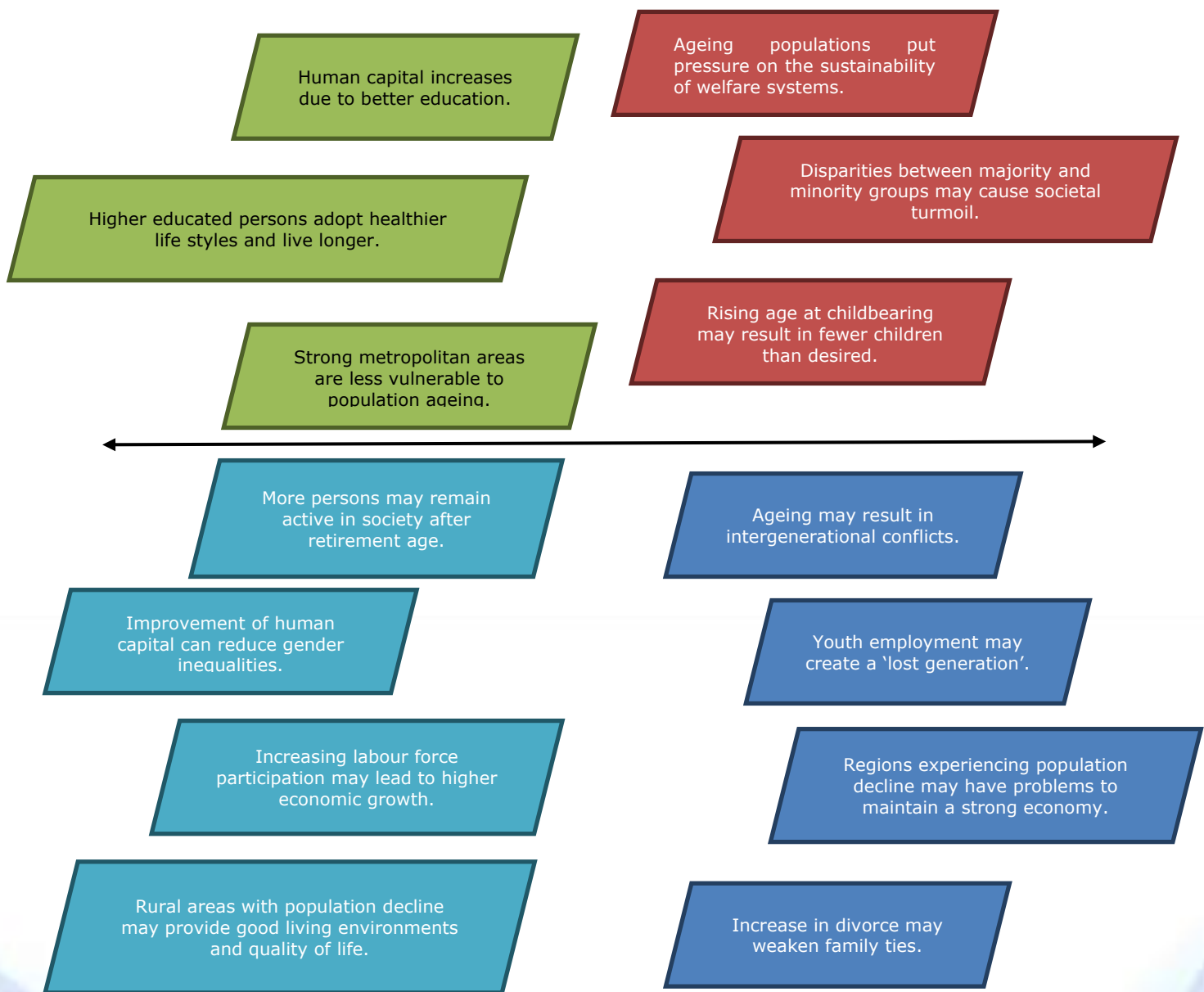
1. Ageing and the related pressure on the social welfare systems may result in intergenerational conflicts on taxes and expenditures to take care for the elderly and thus be a threat to social cohesion.
2. A global growing population may create great environmental and economic challenges.
3. If growing numbers of young people entering the working age will not find jobs, this may create a 'lost generation'.
4. Regions experiencing population decline may have problems to maintain a strong enough economy to be able to continue to provide good quality services and to continue to offer their inhabitants a pleasant living and working environment.
5. Increase in partnership dissolution and so-called patchwork families (new families made up from members of divorced families) may weaken family ties and may negatively affect the financial situation of households and well-being of children.

## Strengths

People are staying healthy for a longer period of time.

## Weaknesses

Declining labour force hampers economic growth



## Opportunities

## Threats

Table 22 –SWOT table of the Demography and Society area

## **3.- D1.c “Environmental Trends and Challenges”**

### **3.1 Megatrends at Global and European level**

#### **3.1.1 Introduction**

Life in the Earth would not be possible in the absence of minimum environmental standards. Conditions like temperature, radiation or air and water quality are critical for the preservation of life, and some species are essential for the viability of others. In addition, live beings need a continuous flow of energy and resources to maintain their metabolism. This is especially relevant for the case of human beings, which, besides their basic needs, demand resources for sustaining a certain level of quality of life. In this sense the change of environmental conditions and the depletion of resources represent two of the major challenges of humankind.

Human being, like other live beings, interacts with the environment through an exchange of energy and resources. Human beings take materials and energy, which are metabolised and returned to the Nature in the form of heat and wastes. During the last centuries the size of these flows has increased dramatically due to increase in population and economic expansion, up to the point of altering global environment and depleting natural resources.

Many scientists have shown their concerns regarding this situation, since there are a series of “planetary boundaries” that must not be transgressed in order to prevent human activities from causing unacceptable environmental change. These scientists assert that once human activity has passed certain thresholds or tipping points, defined as “planetary boundaries”, there is a risk of “irreversible and abrupt environmental change”. Some authors have recognised nine planetary boundaries: climate change, rate of biodiversity loss, biogeochemical flows (both nitrogen and phosphorus), stratospheric ozone depletion, ocean acidification, global freshwater use, change in land use, atmospheric aerosol loading and chemical pollution. Moreover, human activity appears to have already transgressed three of these nine boundaries: climate change, rate of biodiversity loss and changes to the global nitrogen cycle (Rockström, J. et al., 2009).

Further findings suggest that humanity may soon be approaching the boundaries for interference with the global phosphorous cycle, global freshwater use, ocean acidification and global change in land use. Climate scientists suggest that the boundaries are strongly interlinked, so that crossing one may shift others and even cause them to be overstepped. The growth in population and the increasing trends in resource consumption have a significant impact on all the nine boundaries.



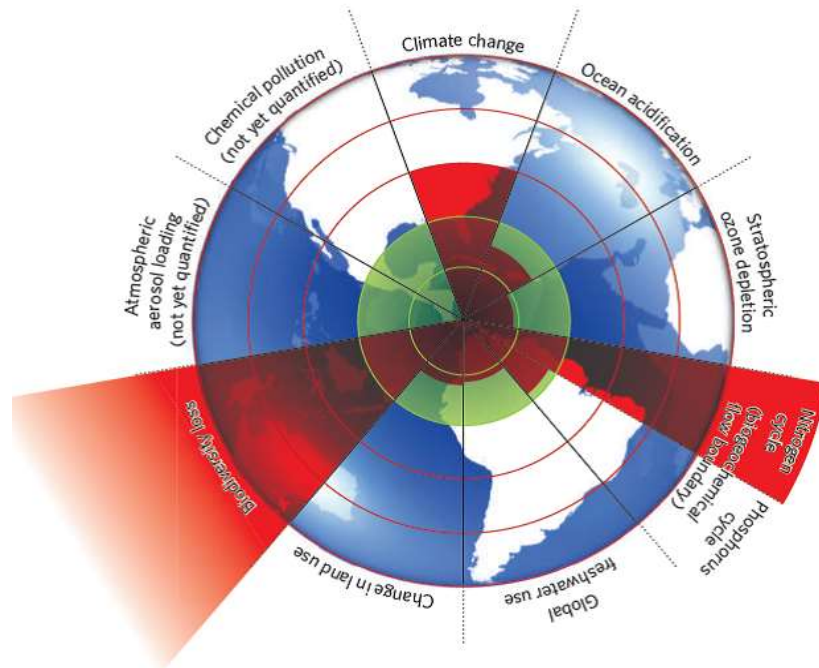


Figure 57 - Beyond the boundaries

Note: Green shade represents the safe operating space, where red shaded area represents the current position.  
Source: Rockström, J. et al., (2009)

According to the US National Intelligence Council, four megatrends will shape the world in 2030<sup>28</sup>. These are individual empowerment, diffusion of power, demographic patterns, and growing nexus among food, water, and energy in combination with climate change. Demand for food, water, and energy will grow owing to an increase in the global population and the consumption patterns of an expanding middle class. The increasing nexus among these three vital sources —in combination with climate change and other environmental issues— will have far-reaching effects on global development over the next 15-20 years.

### 3.1.2 Megatrends and Drivers

This section identifies several environmental megatrends, drivers and future environmental challenges. The proposed megatrends are evaluated at global and European Union level, providing information on the driving forces and main uncertainties.

The environmental megatrends have been grouped into seven different areas:

1. Climate change and global warming
2. Biodiversity loss
3. Air pollution
4. Ocean acidification
5. Water management
6. Land use
7. Decreasing the stock of natural resources

#### 3.1.2.1 Climate change and global warming

Climate change and global warming are affecting the functioning of ecosystems and have become a threat to human society (Anil Markandya et al., 2011). Several studies of

<sup>28</sup> Global Trends 2030: Alternative Worlds, The National Intelligence Council, December 2012.

different institutions such as the UN International Panel for Climate Change, the US Environmental Protection Agency, and European Environment Agency have already identified the sources of climate change and global warming. Global warming is caused by excessive quantities of greenhouse gases (GHGs) emitted into near-surface atmosphere. This increase in the Earth's temperature is triggering changes in climatic patterns.

There is enough evidence that global temperatures are rising. Figure 58 presents the trends of the global mean surface temperature for the period 1880-2010 (base period 1951-1980) produced by National Aeronautics and Space Administration (NASA). According to these data, in the last century alone, the global temperature has climbed 0.6°C to 0.9°C, roughly ten times faster than the average rate of ice-age-recovery warming.<sup>29</sup>

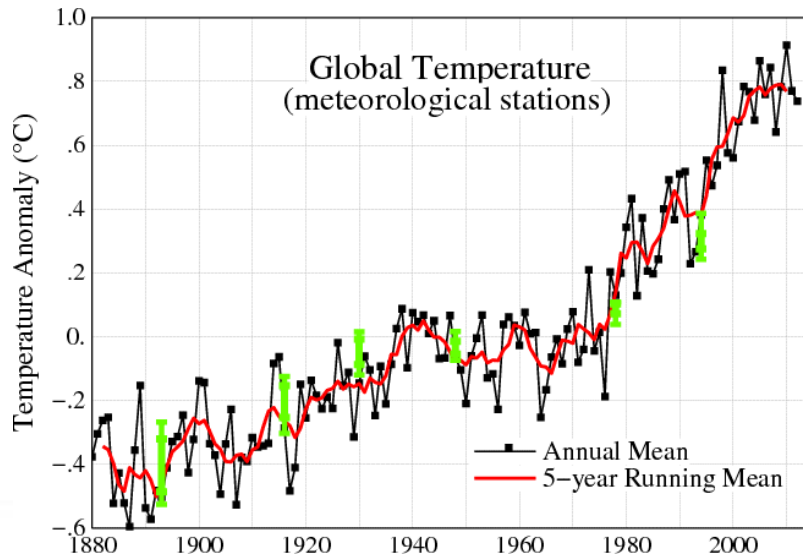


Figure 58 - Global annual-mean surface air temperature change (1880-2012)  
Source: NASA, reproduced from NASA webpage

The raising temperature has a direct impact on the climate change, which is already affecting the world in the form of several extreme weather events like severe floods, droughts, heat waves, tornadoes or tropical storms. In general, the terrestrial part of the Earth have warmed up by 1-3°C (Dai, 2011). The northern part of the North America and northern Asia have experienced more extreme temperatures. At the same time, precipitation in Africa, southern Europe, South and East Asia, eastern Australia, Central America, central Pacific coasts of North America, and some parts of South America has decreased. The Amazon region, East China or the US-Midwest states have experienced severe droughts in the recent years, while Europe, the US and Southwest China have faced extreme floods.

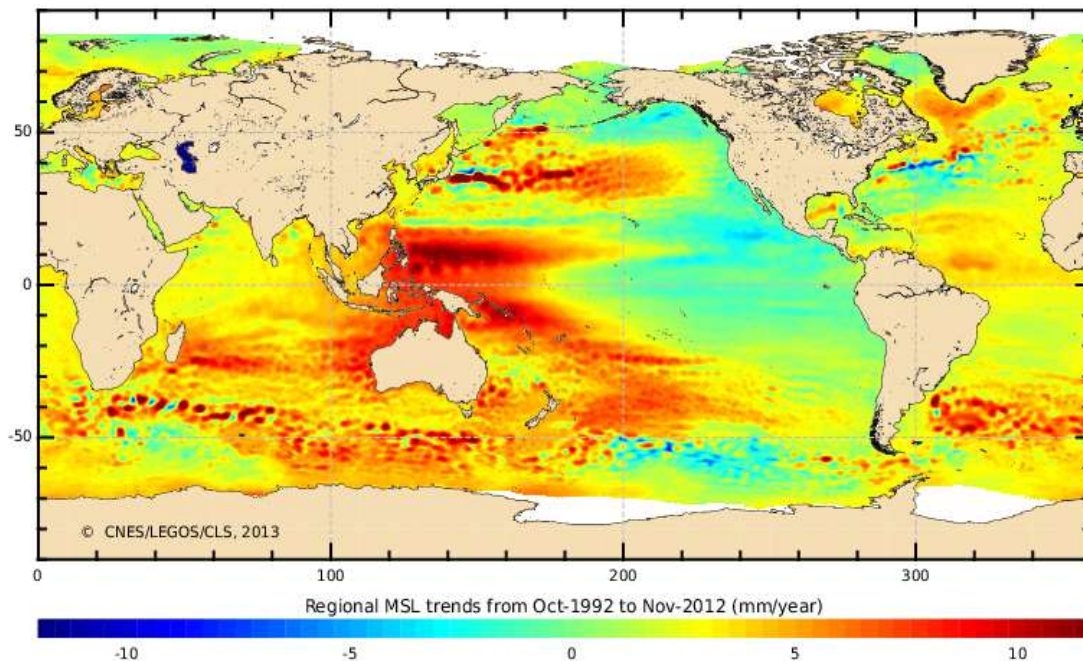
Sea levels are rising across the globe. According to a report of the NASA, due to melting of the ice sheets in the Arctic, global sea level is rising around 3mm/year. Moreover, if the melting process continues, the Arctic Ocean would be ice-free in 30 - 40 years from now and by 2100, the expected sea rise will be in between 0.9 to 1.6 meter (Holli Riebeek, NASA Earth Observatory, 2011, retrieved on 6th May 2013).<sup>30</sup>

The following map provides the change in the sea level since 1993. Changes are contoured by colour, light green indicates regions where sea level has been relatively stable; yellow, orange, and red show areas of rising; blue and purple indicate areas of sea-level fall. The

<sup>29</sup> [http://data.giss.nasa.gov/gistemp/graphs\\_v3/](http://data.giss.nasa.gov/gistemp/graphs_v3/)

<sup>30</sup> <http://earthobservatory.nasa.gov/blogs/earthmatters/2011/06/14/arctic-melt-raises-sea-levels-and-reinforces-global-warming/>

most noticeable region on the map is the western Pacific. The countries in this region are facing a serious threat of rising sea levels, exceeding in some cases 10 mm/year.



Map 12– Map of sea level change 1993-2010 (mm/yr) as measured by satellite altimeter  
Source: <http://www.aviso.oceanobs.com/en/news/ocean-indicators/mean-sea-level/>

In relation to the driving forces of climate change, according to the IPCC (2007), the increase in the combustion of fossil fuels is historically the main source for the growth in the emissions of GHG. Moreover, if these trends continue in the future the global temperature will rise by several degrees. IPCC (2007) report on "Climate Change 2007: Synthesis report" projected that the global mean temperature may rise to 1.8-4.0° C by year 2100.

Recent Copenhagen Accord has stressed the relevance of the problem of rising temperature and proposed to limit the global warming to no more than 2.0°C above pre-industrial levels. However, the final version of the Accord does not include long-term reduction goals, such as a global reduction target for 2050. To meet this target, developed countries (Annex I Parties) would commit to economy-wide emissions targets for 2020, while developing nations (non-Annex I Parties) would implement mitigation actions to slow growth in their carbon emissions. The different targets should be submitted to the UNFCCC by 31 January 2010<sup>31</sup>.

In recent years GHG emissions of industrialised countries have flattened or even reduced, as in the case of the EU. Technological improvements, changes in trade patterns or reduction in population growth rates and economic slowdown are among the main drivers of these trends. On the other hand, emerging economies such as, China, India, Brazil, Indonesia and other fast growing regions are trying to catch up with industrial countries, and as a consequence are leading the growth in global GHG emissions. In some cases, they show a gap in terms of environmental performance with respect to developed

<sup>31</sup> A set of countries have committed to reduce their emissions *i)* compared to 1990: EU: 20% - 30% Japan: 25% Russia: 15% - 25% Ukraine: 20%, *ii)* compared to 2000: Australia: 5% - 25%, *iii)* compared to 2005: Canada: 17% US: 17%; *iv)* compared to business as usual: Brazil: 36.1% - 38.9% Indonesia: 26% Mexico: 30% South Africa: 34% South Korea: 30%. For China and India the target is defined in terms of reduction of the carbon intensity compared to 2005: China: 40% - 45% India: 20% - 25%



countries. In this sense, technological transfers from developed nations could play a critical role for GHG emissions reduction in emerging economies.

The climate change is a global problem which is currently impacting Europe. EEA has reported that EU's average temperature for the past decade was 1.3° C warmer than the preindustrial level. Europe has experienced drastic changes in the period 1990 and 2010. The increase in the precipitation in northern region is provoking floods, while the decrease in the rainfall in southern regions has been accompanied by heat waves and forest fires.

Climate change has significant effects on the quantity and quality of European rivers. River flows depend on seasonal variation, but in the recent years, the river flows have been decreasing irrespective of the season. Climate change also impacts on water temperatures, affecting fluvial ecosystems. According to the EEA (2012), southern and south-eastern Europe are facing severe droughts and project that it will lead to more extreme droughts. At the same time, other parts of the EU are facing severe floods: a total of 325 major floods occurred in between 1980 and 2010, and 200 of these floods occurred after year 2000.

### **3.1.2.2 Loss of biodiversity**

According to the Article 2 of Convention on Biological Diversity, "biodiversity" means "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems". Biodiversity is essential to the continuation of the human species, since it is essential for the provision of fundamental ecosystem services such as climate and air quality regulation, water purification or pollination.

Scientists have projected that a large number of species may disappear by the next century if the current extinction rate, which is estimated to be 100 to 1000 times faster than in historical times, continues (Pimm et al. 1995, Barbier and Markandya, 2012). The FAO (2010) reports that during the period 1990-2010, each year more than 13 million hectares of tropical forest have been used for commercial purpose. The largest net loss of forest occurred in South America and Africa. Forests store 289 giga tonnes of carbon in the form of biomass. Moreover, during this period, 75% of fish stocks and agriculture crops have been lost or depleted and 20% of coral reefs have disappeared worldwide.

Changes in biodiversity and in ecosystems are usually caused by multiple, interacting drivers. On the one hand, direct drivers, such as land use, climate change, over exploitation or environmental pollution have a direct influence on ecosystem processes that bring about species to extinction. On the other hand, indirect drivers include changes in variables like human population, income or lifestyles which have an effect on direct drivers.

At the international level several programs have been initiated to protect biodiversity and ecosystem services. Recently, Rio+20 United Nations Conference on Sustainable Development identified the importance of biodiversity and ecosystem services in promoting sustainable development and poverty eradication, and enhance the institutional framework for sustainable development. The Summit prepared a strategic plan for biodiversity 2011-2020. At the 2010 10th Conference of Parties (COP) to the Convention on Biological Diversity (CBD), the Nagoya Protocol was adopted. A total of 1,500 organisations across 191 governments, 388 non-governmental organisations and 21 United Nation agencies agreed to support and help the biodiversity. The CBD started focusing on issues related to inland waters biodiversity, marine and coastal biodiversity, mountain biodiversity,

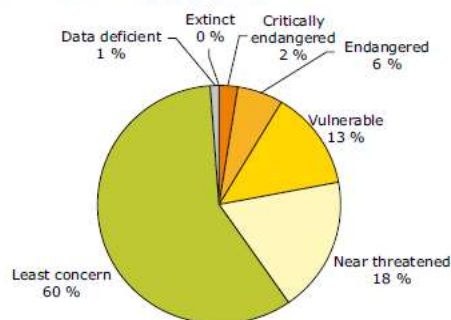


protected areas, sustainable use of biodiversity, and biodiversity and climate change (CBD, 2013<sup>32</sup>; Bloomfield, 2013<sup>33</sup>)

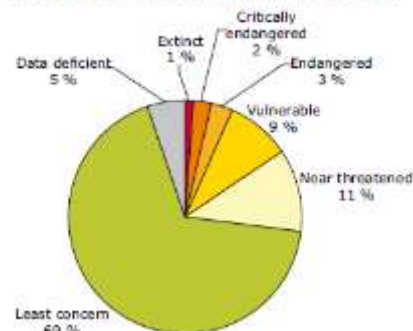
The main threats to biodiversity in Europe according to the EEA (2010) are habitat loss and degradation, invasive alien species, pollution, nutrient load, overexploitation and unsustainable use, and climate change. Over the past decades, pollution from agriculture in freshwater systems has decreased in Europe, but this has to some extent been replaced by other types of pollution. As agriculture occupies 47% of the territory in the EU, intensified agriculture is seen as the main threat to biodiversity in agricultural ecosystems. In addition, overexploitation of fish stocks is a matter of great concern in the EU.

In the case of the EU, extinction is not as rapid as in other parts of the world. However, there are enough evidences that some species may be or already are in a stage of extinction in the EU. According to EEA "EU 2010 Biodiversity Baseline" the percentage of threatened species in the EU is 25% for marine mammals, 15% for terrestrial mammals, 22% for amphibians, 21% for reptiles, 16% for dragonflies, 12% for birds and 7% for butterflies (see Figure 59). The main driving forces behind this situation, are habitat loss and fragmentation due to the soil artificialisation, and pollution (EEA 2010). The European Commission has recognised the urgent need to protect and restore biodiversity and has launched the EU biodiversity strategy 2020 to support the protection of biodiversity and ecosystem services.

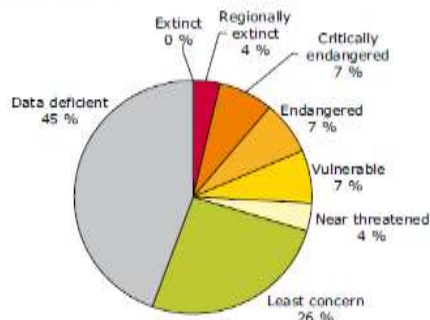
Red list status of amphibians in EU-27



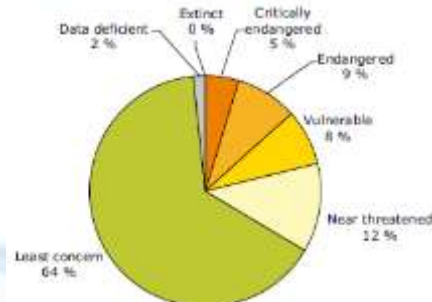
Red list status of terrestrial mammals in EU-25



Red list status of marine mammals in Europe and the EU-25



Red List status of reptiles in EU-27



<sup>32</sup> <http://www.cbd.int/cop10/>

<sup>33</sup> <http://bio-diverse.org/2013/02/03/why-biodiversity-loss-and-climate-change-are-equal-threats/>

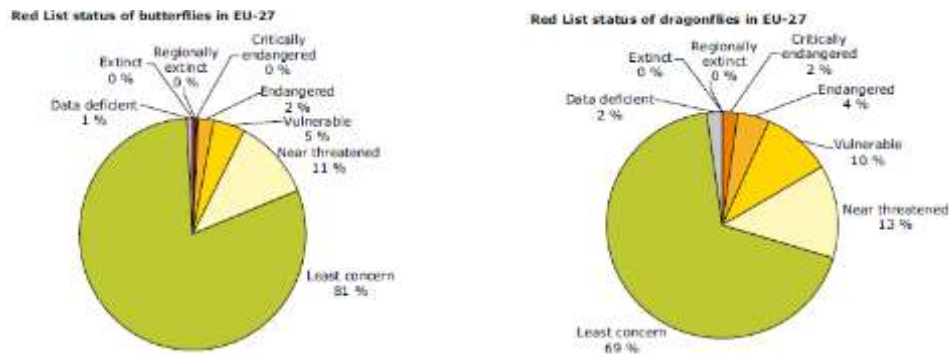
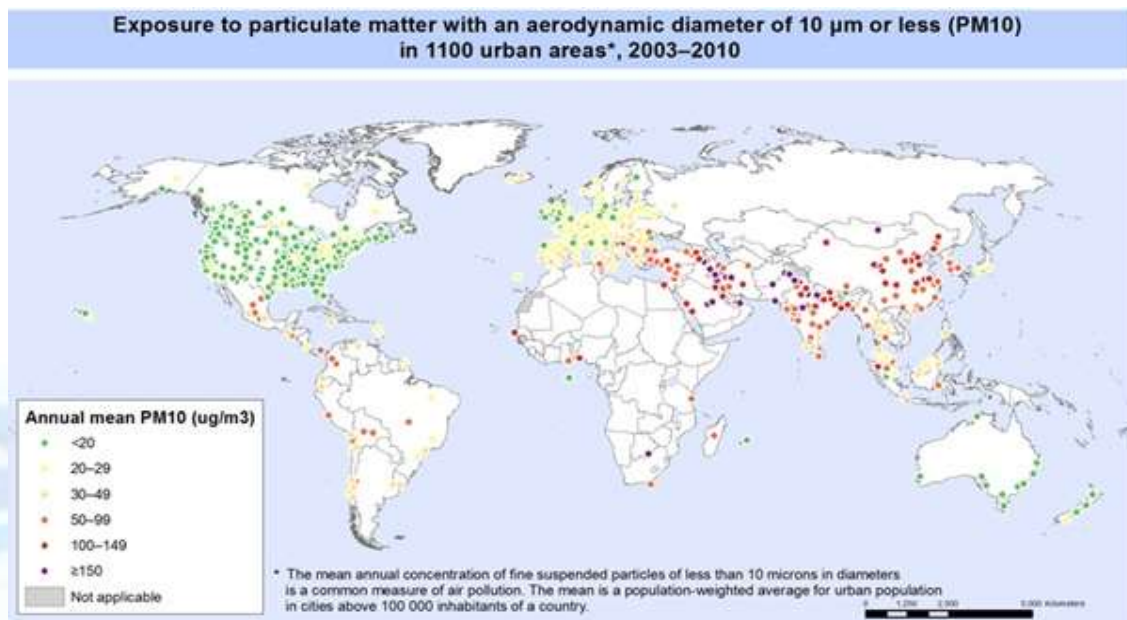


Figure 59 - Red list status of different species across EU 27/25 region. Source, IUCN 2007, 2009a, 2009b, 2010, reproduced from: EU 2010 Biodiversity Baseline

### 3.1.2.3 Air pollution

Air pollution has become a major current threat both to human health and environment. The combustion of fossil fuels in stationary sources (e.g. in industries or households) and mobile sources (transport sector) is the major source for air pollutants. Other major sources of air pollution are the emission of different substances in industrial activities like quarrying, cement production or chemical industry, and in agriculture.

According to World Health Organization, Particulate Matter (PM) is one of the most relevant air pollutants in terms of health damage. High concentrations of PM can cause respiratory diseases with serious consequences for human health. Health impacts due PM emissions are mainly located in urban areas, where the exposure of people to the emissions (especially from vehicles, households and industries) is high. The figure below shows how the inhabitants of cities in China, India and the Middle East are exposed to high concentrations of PM



Map 13- Outdoor air pollution in the cities  
Source: WHO, 2013

Ground-level and tropospheric ozone (O<sub>3</sub>) is also a harmful air pollutant. Elevated levels cause health problems, premature deaths, reduced agricultural crop yields, changes in ecosystem species composition and damage to physical infrastructure and cultural

heritage. This pollutant not directly emitted to the atmosphere but formed in complex photochemical reactions from O<sub>3</sub> precursor gases, and its formation depends strongly on meteorological conditions (e.g. solar intensity and temperature). The nitrogen oxide (NO<sub>x</sub>) regime is the main factor determining whether O<sub>3</sub> is produced or removed in the troposphere. The major precursors emitted due to human activities (mainly transport) are NO<sub>x</sub>, non-methane volatile organic compounds (NMVOC) and carbon monoxide (CO) (EEA, 2009).

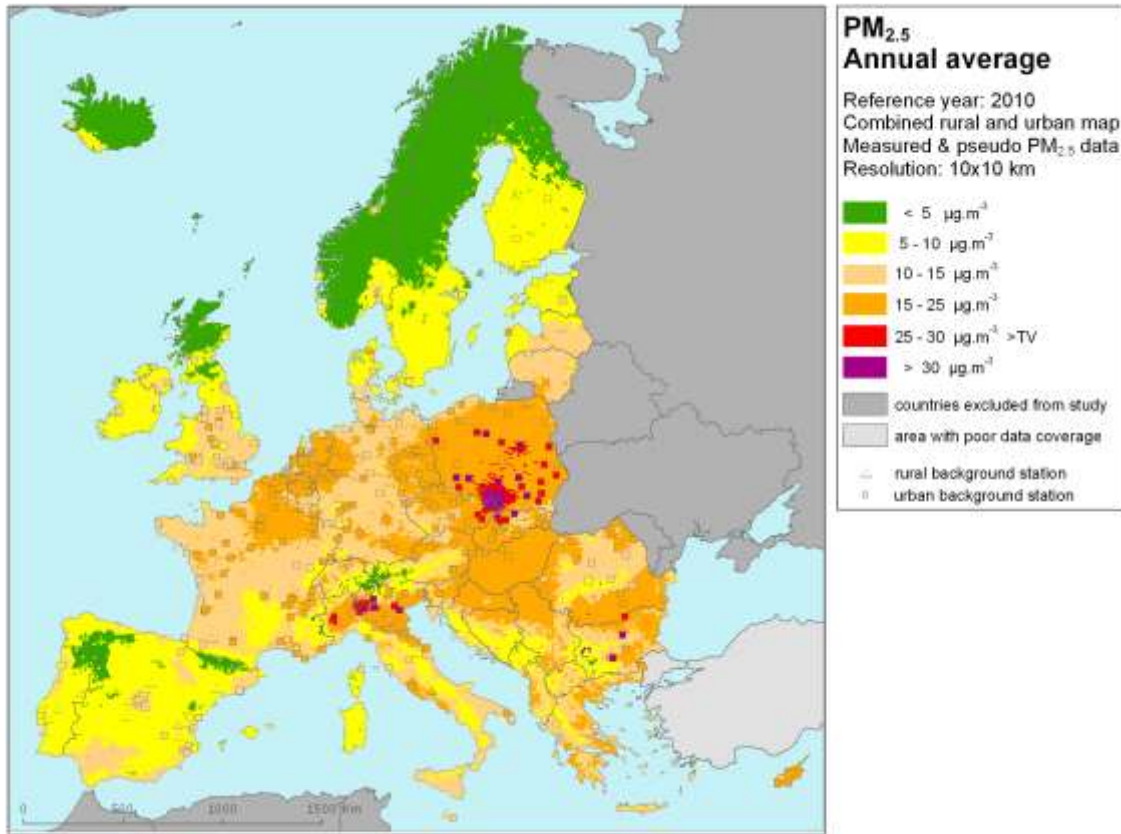
Atmospheric emissions of acidifying substances such as sulphur dioxide (SO<sub>2</sub>) and NO<sub>x</sub>, mainly from the burning of fossil fuels, can persist in the air for up to a few days and thus can be transported over thousands of kilometres, when they undergo chemical conversion into acids. The primary pollutants SO<sub>2</sub>, NO<sub>x</sub> and ammonia (NH<sub>3</sub>), together with their reaction products, lead after their deposition to changes in the chemical composition of the soil and surface water. This process interferes with ecosystems, leading to what is termed 'acidification'. The decline of forests in Central and Eastern Europe and the many 'dead' lakes in Scandinavia and Canada are examples of damage which are, in part, due to acidification. Modern forestry and agriculture contribute to but can also be affected by acidification. Acidifying substances also play a role in the greenhouse effect and, as pointed before, NO<sub>x</sub> contribute to the O<sub>3</sub> problems, and, together with NH<sub>3</sub>, contribute to the nitrogen fertilisation of natural terrestrial ecosystems; with phosphate they contribute to eutrophication in water.

The total amount of some of these pollutants as NO<sub>x</sub> and NH<sub>3</sub> is expected to increase further in line with food production and fossil fuel use. In a baseline projection, total inputs of reactive nitrogen to agricultural land are expected to increase by about 20 % by 2050, with the highest absolute levels in Asia. The global quantity of reactive nitrogen exported by rivers to coastal marine systems is projected to increase by about 4 % by 2030, with a decrease in OECD countries of about 5% overshadowed by an 11 % increase in the BRIC (Brazil, Russia, India, China) countries (EEA, 2010).

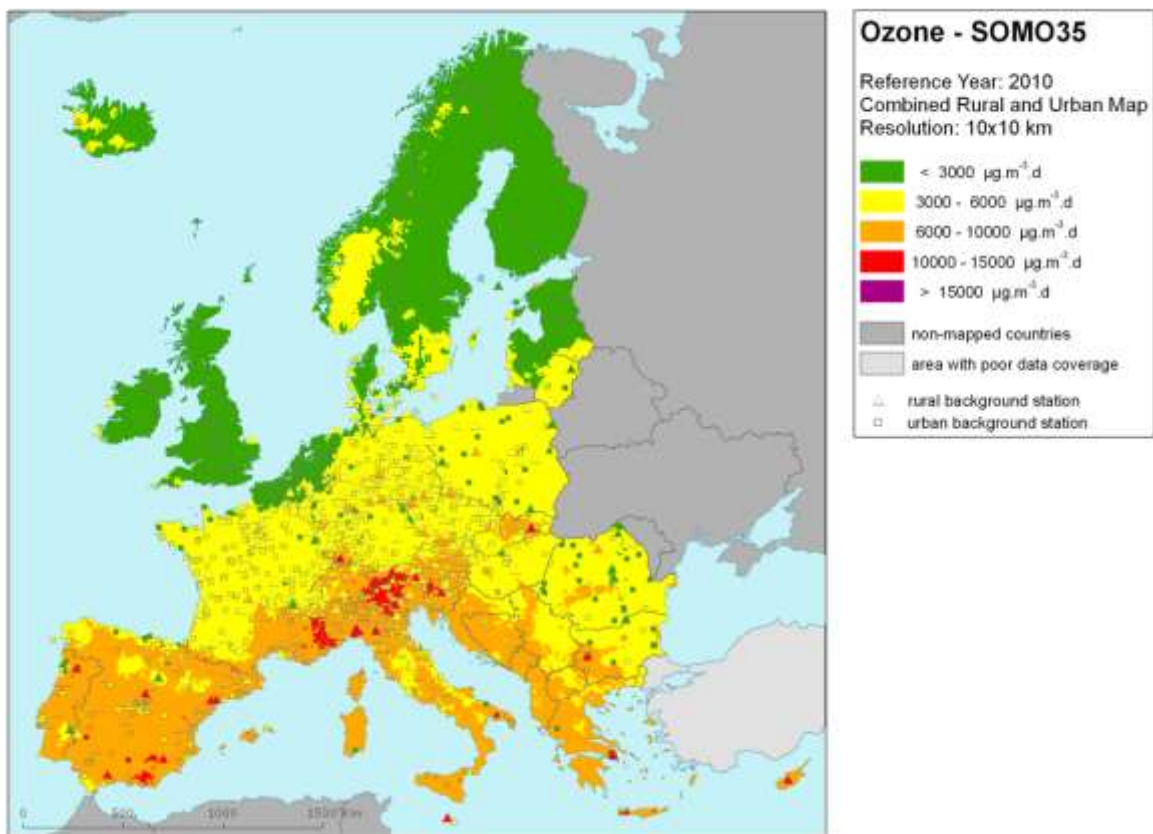
In the EU, the concurrence of air policies and structural changes has contributed to an improvement on the quality of air. However, in some areas the concentration of some specific pollutants is still high and constitutes a risk for health safety. This is the case PM and ground-level ozone (see maps bellow). According to EEA, 40% of EU's urban population is exposed to PM and over 80% of Europeans are exposed to PM levels above the 2005 WHO Air Quality Guidelines<sup>34</sup>. When it comes to the ground-level ozone, over 50% urban population is exposed to ozone.

<sup>34</sup> [http://europa.eu/rapid/press-release\\_IP-13-72\\_en.htm](http://europa.eu/rapid/press-release_IP-13-72_en.htm)





Map 14- PM<sub>2.5</sub> annual average concentrations, 2010. Source: EEA.





Map 15– Ozone concentrations accumulated dose over a threshold of 35 ppb, annual average concentrations, 2010. Source: EEA.

Thus, one of the main targets of the current EU air pollution policy is the reduction of PM and ground ozone concentrations. According to the background documents of the review of the EU Thematic Strategy on Air Pollution (TSAP), the loss of life expectancy from exposure to PM can be reduced from 9.6 to 5 months if the emission trajectories proposed in the strategy are achieved. It is also estimated that the reduction in the emissions of ozone precursors could reduce the number of premature deaths attributable to short - term exposure of ground - level ozone by about 30% (Amann, 2012).

The excess of nitrogen deposition due to the emissions of NO<sub>x</sub> and the acidification of freshwater and forest soils are also of major concern for the EU. In this sense, the European Commissions has proposed the reduction of the emissions of NO<sub>x</sub> and other acidifying pollutants.

### 3.1.2.4 Ocean acidification

Ocean acidification is the name given to the process of decrease in the pH<sup>35</sup> of the oceans, caused by the uptake of anthropogenic CO<sub>2</sub> from the atmosphere. Several studies (Royal society, 2005; Turley et al., 2006, Solomon et al., 2007; Doney et al., 2009) have reported the impact ocean acidification on different marine ecosystems and on fish stocks. According to these studies, the current pH level has changed by 0.1 units compare to the pH level 200 year ago<sup>36</sup>, which corresponds to an increase of CO<sub>2</sub> concentration from 280 ppmv (parts per million volume) to nearly 384 ppmv. In these 200 years, sea water has experienced an increase of 30% in hydrogen concentration; further, these studies argue that a drop of 0.15 pH units (i.e. 560 ppmv) would increase hydrogen concentration by 40% and an increase of 0.3 units (i.e. 840 ppmv) would double the hydrogen concentration. Drastic changes in the chemical composition of oceans can halt the growth of corals, plankton and marine snails. Corals are very important nursery grounds for fishes, plankton and snails are the main sources of the food for species like salmon, mackerel and baleen whales.

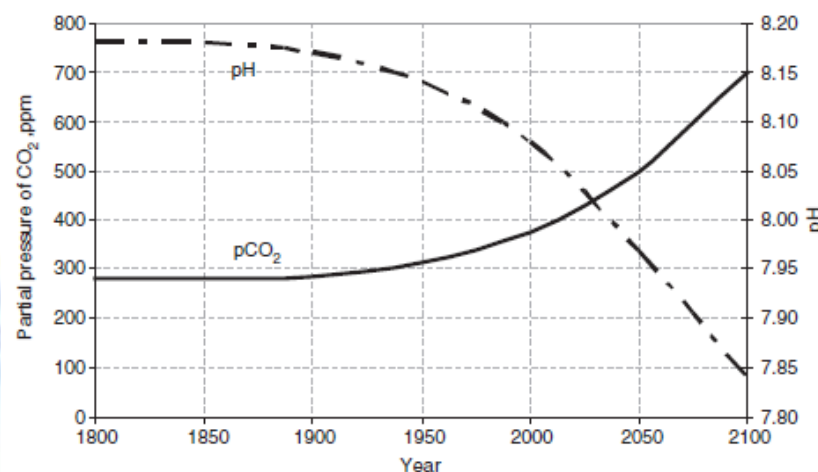


Figure 60 - The projected seawater pH in relation to CO<sub>2</sub> concentration  
 Source: Turley et al., 2005.

<sup>35</sup> a measure of acidity and hydrogen ion H<sup>+</sup> concentration

<sup>36</sup> According to Royal Society, 2005, pH has decreased 8.21 to 8.10, and expected a further decrease by 2050

The EEA (2012) has estimated on the basis of the current and projected emissions of CO<sub>2</sub> that the average surface-water pH will decline further to 7.7 or 7.8 by the year 2100. This decline represents a 100 to 150 % increase in acidity. It has been estimated that if the atmospheric CO<sub>2</sub> concentration increases to 450 ppm, few parts of the Southern Ocean will start becoming corrosive to calcium carbonate, during winter (McNeil and Matear, 2008), 10 per cent of the Arctic Ocean may become corrosive to calcium carbonate already by 2020 (Steinacher et al., 2009), and surface waters of the Baltic Sea will still become corrosive well before the end of the century.

In the Black Sea and Mediterranean Sea there is no danger of surface waters becoming corrosive to calcium carbonate before 2100, but they will suffer sharp reductions in carbonate ion concentrations (Med Sea – 37 %; Black Sea – 45 %). These rapid chemical changes are an added pressure on marine calcifiers and ecosystems of the European seas that are already heavily suffering from other anthropogenic influences.

### 3.1.2.5 Water management

As of 2010, over 780 million people worldwide lacked access to clean drinking water and 2.6 billion to improved sanitation services. Data show a reduction on both indicators and, in the case of drinking water, the Millennium Development Goal was met in 2010 (UNICEF /WHO 2012). However If current trends continue, more than 600 million people will still lack access to safe drinking water in 2015 and 2.4 billion people will lack access to improved sanitation facilities. Sub-Saharan Africa and Oceania are not on track to meet the MDG drinking water target, and globally the MDG target on sanitation is unlikely to be met by 2015 (UNICEF/WHO 2012).

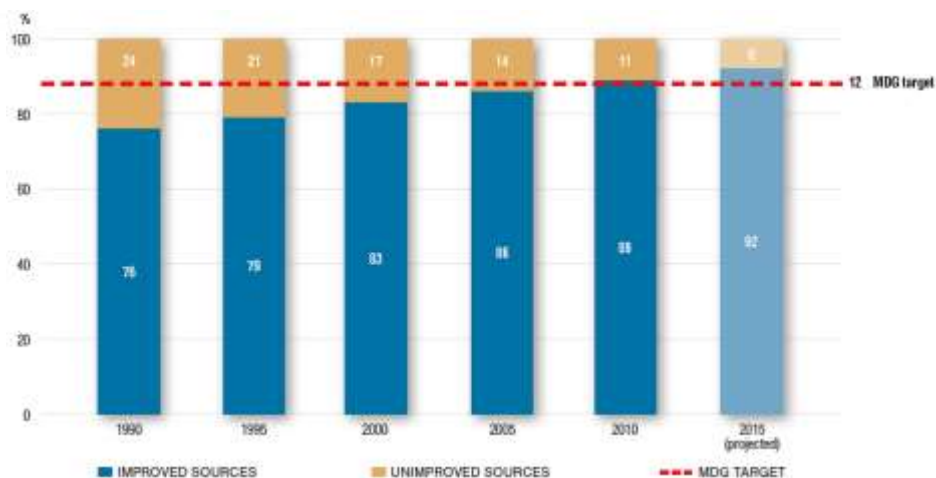


Figure 61 - Trends in global drinking water coverage, 1990-2010, projected to 2015  
 Source: UNICEF, 2012

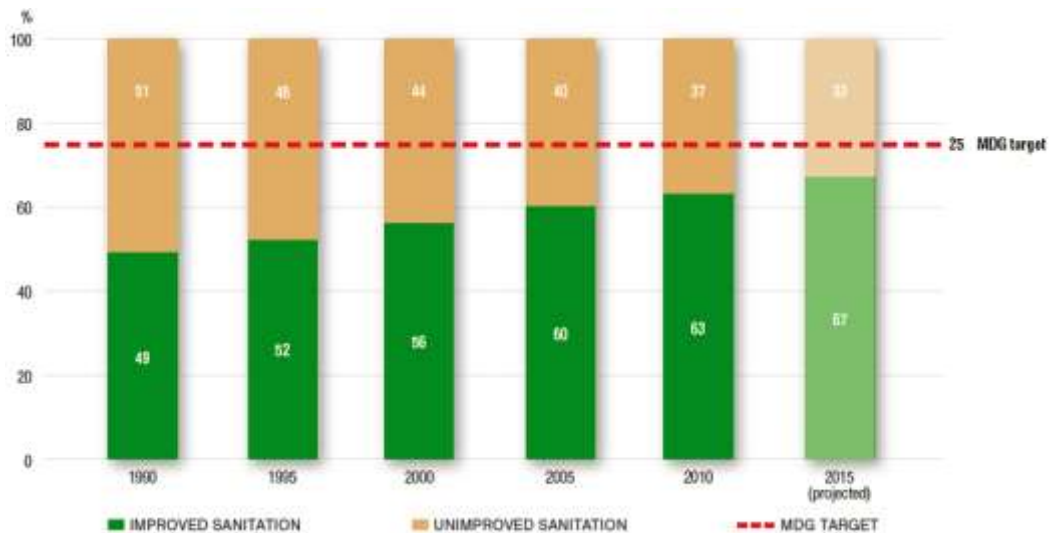


Figure 62 - Trends in global sanitation coverage 1990-2010, projected to 2015  
Source: UNICEF, 2013.

Almost one billion people who experience water scarcity has less than the minimum 50 litres a day recommended by the UN. In Europe, the average water use is around 300 litres per day and the average US citizen consumes twice that. With 20% of the population but only 7% of global water supplies, China is particularly vulnerable (EC 2011).

Human water demand is increasing. Agricultural, industrial and domestic water withdrawals have steadily increased to meet the demands of a growing population with increasing wealth and consumption levels. Most of the estimates indicate a large global net increase of water withdrawals (UNEP 2012). The Water Resource Group (2009) estimates that in 2030 global water requirements will be 40% higher than current supply and that one-third of the world's population, mostly in developing countries, will live in basins where this deficit is larger than 50%. Increases in water withdrawals lead to an increase in water stress and water conflicts. As water scarcity increases, some regions will be forced to rely more on energy-intensive desalination technologies (UNEP 2012). Similarly, the global water demand under the OECD baseline scenario (OECD 2012) is projected to increase by some 55%, due to growing demand from manufacturing (+400%), thermal electricity generation (+140%) and domestic use (+130%).

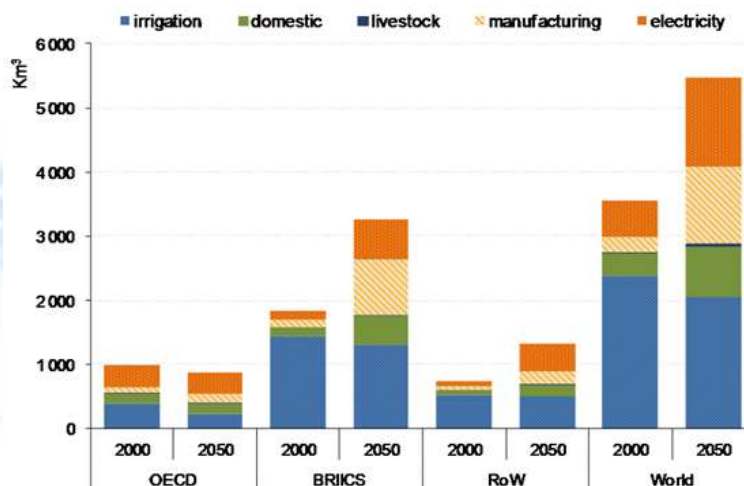


Figure 63 - Global water demand: Baseline scenario, 2000 and 2050

Note: this graph only measures blue water demand and does not consider rain-fed agriculture. BRIICS: Brazil, Russia, India, Indonesia, China, South Africa. RoW: Rest of the world. Source: OECD 2012

Humanity may soon be approaching the boundaries for global freshwater use: the current status of global consumption of freshwater by humans is 2,600 km<sup>3</sup>/yr while the proposed boundary is 4,000 km<sup>3</sup>/yr (Rockström et al 2009).

The per capita availability of fresh water is declining globally. This trend is expected to continue in the future and the impacts will be felt more intensely between 2025 and 2050 (UNEP 2012). This situation will be worsen by climate change. Poor countries will be specially affected and water scarcity will be one important factor in the increase of illness and death rates in developing countries (UNEP 2012). In many river basins under severe water stress, there will be competition between different water uses and regions (UNEP 2012). The increase in population and food demand will contribute to increase the pressure on water resources.

Water quality is another relevant challenge for water management, especially in developing countries. On the one hand, the growth in food production will probably be accompanied by an increase in the use of fertilizers, affecting the nitrogen and phosphorus load of hydric resources. On the other hand, other processes such as urbanization or industrialisation can contribute to increase the release of pollutants to water.

Compared with the global situation, water stress in Europe may be easier to manage. The Water Exploitation Index (WEI), the percentage of the total freshwater abstracted annually compared to the total available renewable resource, has decreased in 24 European countries, representing a decrease about 15% in total water abstraction (Figure 64). Most of the decrease occurred in the eastern EU member states, as a result of the decline in abstraction in most economic sectors (EEA 2010). Demand for water is expected to be stable or to decrease, driven by more efficient use of water by all sectors together with a generally stable population and the projected limited change in the area of irrigated land (EEA 2010).



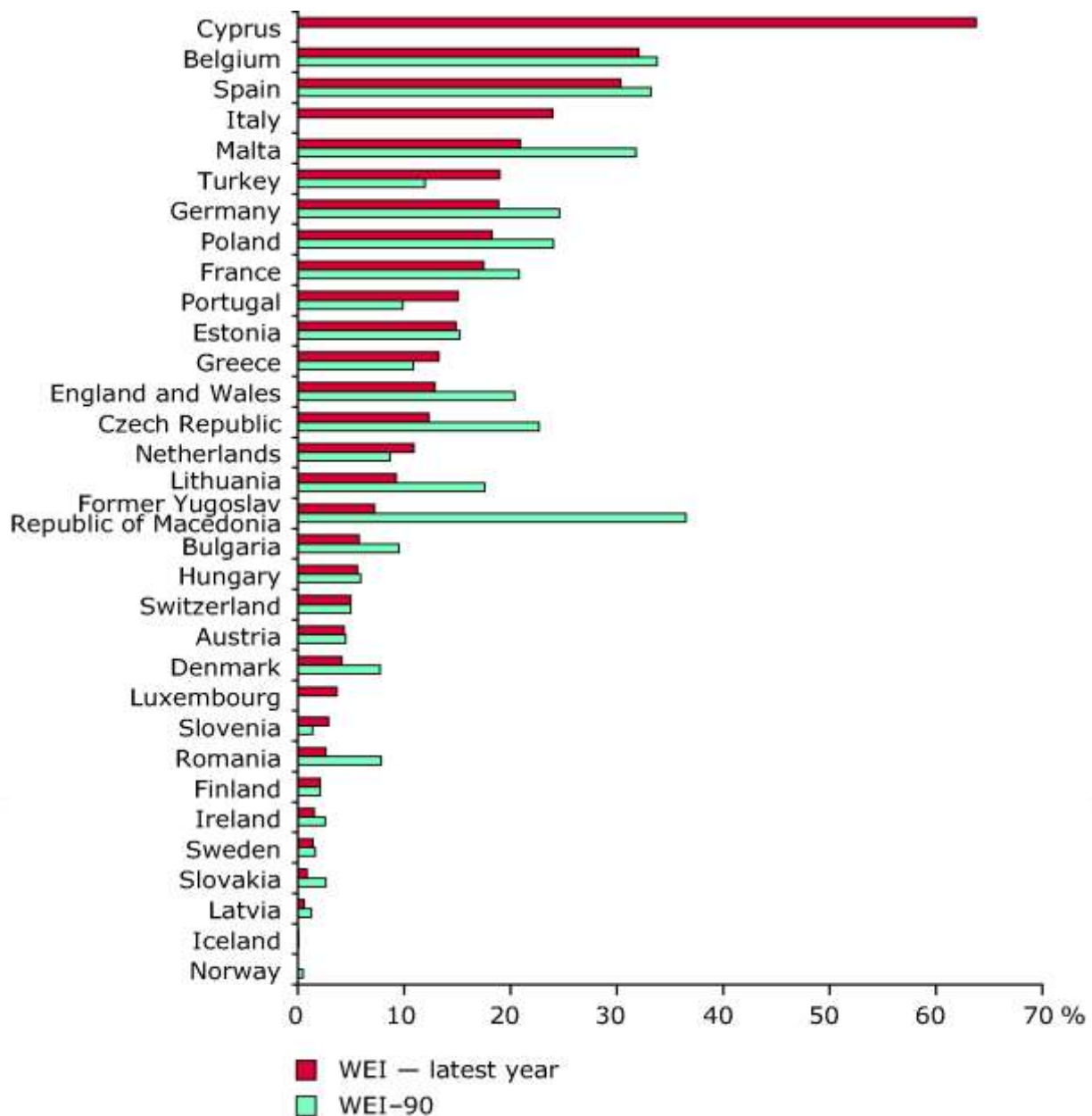


Figure 64 - Water exploitation index (WEI) — in late 1980s/early 1990s (WEI-90) compared to latest years available (1998 to 2007). Source: EEA.

During the last 30-40 years, droughts have increased in number and severity. More than 20% of the EU population has been affected by these droughts and economic cost was approximately 100 billion euros. In the years 2011 and 2012, most of the EU regions have suffered droughts. Infact, the drought occurred in the year 2011 has been widely referred as the worst in the century: during that year the rainfall was 40% below the normal rainfall. During these two years of time, the water availability was significantly reduced Water scarcity is incresing, especially during the summer and in the Southern region of Europe. This situation is slowly extending to the Northern regions, especially in UK and Germany (European Water Scarcity and Droughts Policy, 2012).

### 3.1.2.6 Land use

Two key processes drive the changes in land use. Firstly, the growing world population that, on the one hand, expands the urban areas at the expense of agricultural land and, on the other hand, increases the demand for food promoting the expansion of agricultural area at the expense of forests. And secondly, the climate change, that indirectly affects

land use change through different ways such as bioenergy production for emissions reduction or reduction of crop yields.

While the majority of world population still lives in rural settlements, the urbanisation process is a growing phenomenon all over the world. The UN has named the 21st century “a century of cities”. It is estimated that the share of urban population in developing countries will exceed the rural population by 2020. New mega-cities (with population greater than 10 million people) are expected to emerge by 2025 in Asia (5), Africa (2) and Europe (1) (UN, 2012b). In 2050, two out of every three people in the world would live in a city (UN, 2012b). Overall, the world population is expected to be 67% urban by 2050 (UN, 2012b). In 2011, 23 urban agglomerations qualified as mega-cities because they had at least 10 million inhabitants. Despite their visibility and dynamism, mega-cities account for a small though increasing proportion of the world urban population: 9.9 per cent in 2011 and 13.6 per cent in 2025. At the same time, over half of the urban population lives and will continue to live in small urban centres with fewer than half a million inhabitants (UN, 2012b).

The extension of urban areas offers social and economic benefits, allowing people access to services and jobs provided by cities. However but it also has negative sides: it contributes to generate environmental pressures by increasing energy and water demand, or increasing the load of pollutants in air and water.

In the future, the combined pressures of a larger population and climate change will generate changes in the land use. In addition, new uses can appear, such as reforestation and nature conservation projects, and energy cropping for bioenergy. The Food and Agriculture Organization (FAO) and International Energy Agency (2008) have estimated that the global area devoted to bioenergy crops could grow from around 13.8 million hectares in 2004 to between 34.5 and 58.5 million hectares in 2030, depending on scenario assumptions. Meanwhile, den Biggelaar and others (2004 a,b) estimate that around 2 to 5 million hectares of land continue to be lost each year due to land degradation, mostly related to soil erosion.

Although artificial cover accounts for just 4% of the EU’s land area, more than a quarter of EU territory is directly affected by urban land use (EEA, 2011). Between 2000 and 2006 artificial land cover increased by 3.4 % in Europe (EEA, 2011). According to EEA (2011), by 2020, approximately 80% of Europeans will be living in urban areas. This expansion will probably occur at the expense of agricultural areas. Population is not expected to grow as fast as in other regions, and thus this is not expected to be a key driver for land use change. However, climate change will contribute to change the distribution of land in Europe.

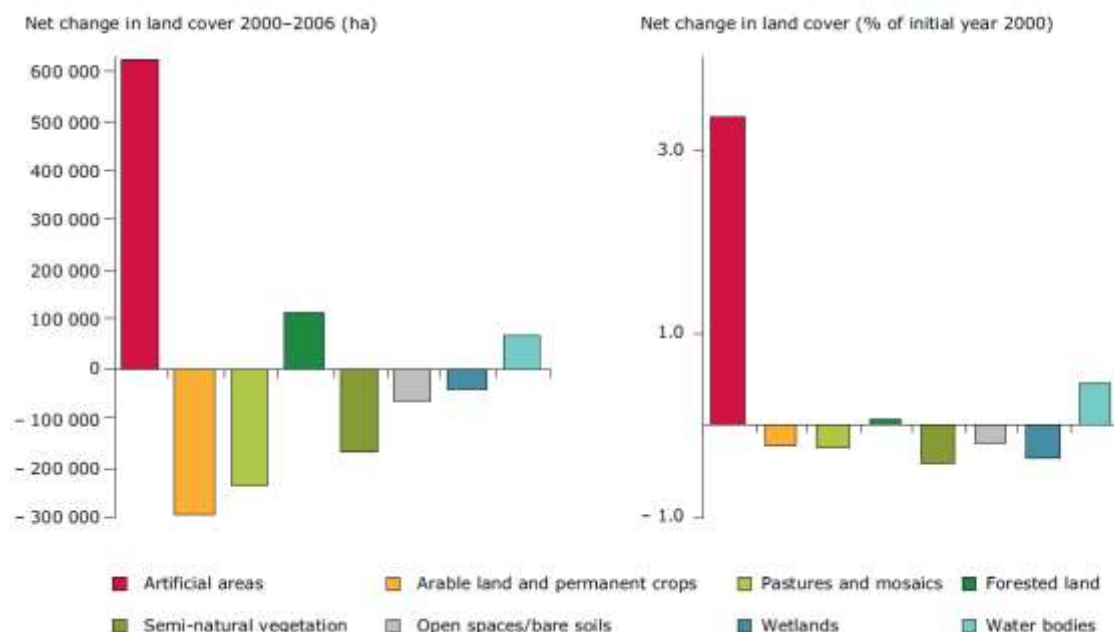


Figure 65 - Net land-cover changes 2000–2006 in Europe: total area in hectares (left) and percentage change from 2000 (right). Source: EEA, *The European Environment State and Outlook 2010*.

### 3.1.2.7 Decreasing the stock of natural resources

The Global Energy Assessment (GEA) study of the IIASA, argues that energy is central to addressing major challenges of the 21st Century including climate change<sup>37</sup>, economic and social development, human well-being, sustainable development, and global security. The GEA demonstrates that energy system change is a key element for addressing and resolving these challenges, and claims that energy transformations need to be initiated without delay, gain momentum rapidly, and be sustained for decades. They require the rapid introduction of policies and fundamental governance changes toward integrating global concerns, such as climate change, into local and national policy priorities, with an emphasis on energy options that contribute to addressing all these concerns simultaneously.

The evolution of energy consumption can be assessed as a combination of three factors: population, income per capita, and energy efficiency. On the one hand, for a given technology and income per capita a growth in population generates and increase in the use of energy; similarly, for a given technology and population level, an increase in income per capita boosts consumption and energy use. On the other hand, technological change, *ceteris paribus*, contributes to reduce the use of energy by improving efficiency. Historically, the first two factors have dominated and global energy use has steadily increased for decades. The evolution of these three variables will determine the demand for energy in the future and will affect GHG emissions. Population growth and better living standards (i.e. income per capita) will keep the demand for energy increasing, especially in developing countries. The growth in energy demand is expected to be mostly due to increases in electricity use. A decoupling between electricity use and GDP per capita is not likely, whereas thermal energy in industry, building and transport are expected to follow an inverted U-shape in relation to GDP per capita.

<sup>37</sup> Energy production and consumption contributes over 80% of global GHG emissions. In the next two decades carbon emissions from energy use is expected continue to grow, they may increase by about 25%.

More than 80% of the energy consumed worldwide comes from non-renewable resources, mostly fossil fuels. The reserves of these resources are limited and extraction will peak somewhere in the future. In the last decades some researchers have been speculating with the idea of a peak in the extraction of conventional oil in the near future (the so called "peak oil"). This idea has been reinforced by recent evidence including the peak of oil extraction in the North Sea and Mexico, the depletion of some of the biggest oil fields, the rise in oil prices, and the "plateau" of conventional oil production. In addition to this issue, in the last decades oil consumption has increased in oil exporting countries, reducing the amount of oil exported and contributing to threaten energy security in importing countries.

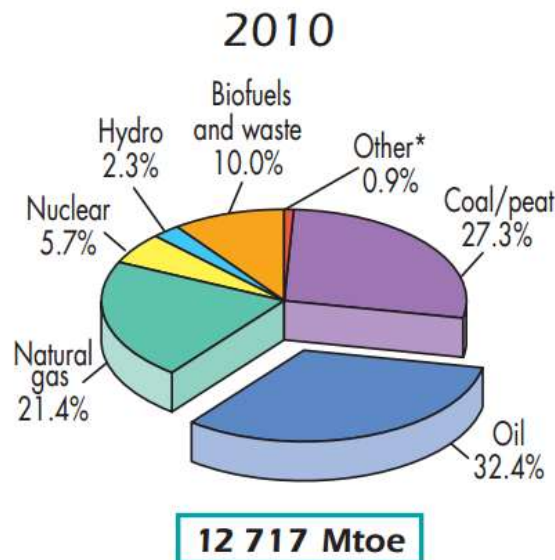


Figure 66 - World primary energy consumption, 2010. Source: IEA, Key World Energy Statistics 2012.

It has been argued that unconventional oil reserves are huge and can replace the role of conventional oil. However there are reasonable doubts as to whether these reserves can be transformed in resources able to offset the depletion of conventional oil at reasonable economic and environmental costs.

The question of "peak oil" could be one of the most important challenges for the Humankind in the future. Oil plays an essential role in the economy: one third of global energy use comes from oil and more than 90% of transportation worldwide is fuelled by oil. The latter is especially relevant in the actual context of globalisation, since in the short run there are not many chances to the transform the transport system to run with other energies. The high oil dependency of the EU makes the region vulnerable to constraints in energy availability. In this context, energy efficiency and innovation are destined to play a crucial role in a context of scarcity and high prices. In addition, there will be an increasing need for developing other energy sources (inc. biofuels, synthetic-oil, hydrogen,...) and transport modes (e.g. public transport, electric car), and for reducing mobility.

Gas extraction could also peak by 2040, reinforcing the trends for investing in efficiency and alternative energy sources like coal, nuclear, renewals, etc.

Electricity will play a much greater role in the future than now, almost doubling its share in 2050. Renewable power could account for 25% of the European energy mix by 2030, and around 50% in 2050 (EC Energy Roadmap 2050). The EU has a significant potential for the production of biofuels but it is estimated that between 4% to 18% of the total agricultural land in Europe would be needed to produce the amount of biofuels to reach



the level of liquid fossil fuel replacement required for the transport sector in the Directive 2003/30/EC.

Grid energy storage refers to the methods used to store electricity during times when production exceeds consumption and the stores are used at times when consumption exceeds production. The use of grid-connected intermittent energy sources such as photovoltaics and wind turbines can benefit from grid energy storage.

Nuclear fusion is an attractive long-term energy solution, although it is unlikely that the technology will be ready for commercial power generation in the near future. Nevertheless, fusion energy has made significant progress over the last few decades and is now considered as a credible option for clean, large-scale electricity generation.

In urban environments, smaller and cleaner vehicles will spread to guarantee very high levels of personal mobility at low costs and impacts. Before people drive advanced electric cars, hybrid vehicles using a combination of fossil fuels and other sources are helping to bridge the gap between conventional gasoline engines and the cleaner hydrogen vehicles of the future. Hydrogen vehicles built on fuel cells are potentially highly energy efficient, but technical obstacles still exist. In the long run, electricity could provide around 65 % of energy demand by passenger cars and light duty vehicles by 2050, according to the EC Energy Roadmap 2050

Carbon Capture and Storage (CCS) is a group of technologies for capturing the CO<sub>2</sub> emitted from power plants and industrial sites, compressing CO<sub>2</sub> and transporting it to suitable permanent storage sites such as deep underground. CCS can curb emissions from heavy industrial sectors which currently account for around 15% of Europe's CO<sub>2</sub> emissions.

#### **BOX 5 - Resource scarcity and global warming**

Another important point generally avoided in the "mainstream" literature is the environmental/ecological uncertainty which could have very important consequences on the future economy development all around the World.

The environmental problems could be viewed through two different issues: the Global Warming and the resource scarcity. Of course, there are also numerous other environmental issues such as the ecosystem and biodiversity conservation, the ocean acidification, the nitrogen surplus, the wastes management, *etc.*, but through these (inter-related) two examples, it is possible to illustrate the environmental problems.

Since the 18<sup>th</sup> century, the economic science has discussed about the issue of economic development and growing population, wondering its sustainability. Indeed, the problem of feeding a growing population has been firstly analysed by Malthus, and even if its expectations have been invalidated, the underlying problem remains similar. The economic activities are consuming important natural resources, which are free but limited (or become exhausted when the extraction rate is superior to the replenishment rate), and these human activities are growing, increasing the rate of extraction. Thus, this economic development is sustainable in the long-run if the technological progress is enough important to avoid a disappearance of the natural resources - what was precisely wrong with Malthus expectations on agricultural yields. Nevertheless, nowadays, these issues have been risen up as a result of the rapid economic development of the emerging economies (80% of the World population). In this context, the sustainability problem of the economic development is more and more investigated, with the most growing concerns for water managing and energy resources.

Similarly, the Global Warming, for which a large part of the scientific community agrees on its anthropogenic origin, has also become a hot topic in international negotiations. According to the IPCC, a sustainable situation would be to limit the rise of temperature at 2°C, since a higher increase of the global temperature is assumed to have tremendous and unforeseeable ecological, social and economic consequences. Thus, according to the IPCC, there is 50% chance to keep the global mean temperature rise below 2°C (relatively to the pre-industrial levels) by stabilising the GHG emissions

concentration below 450 ppm (CO<sub>2</sub> equivalence). And to reach this target, it is generally assumed that the GHG emissions should be more than halved by 2050 compared to 1990.

The Kaya equation allows a good illustration of the challenges that the World would face to tackle the 2°C objective. Starting from the CO<sub>2</sub>=CO<sub>2</sub> equality, the Kaya equation is developed as follows:

$$CO_2 = \frac{CO_2}{TEP} \cdot \frac{TEP}{GDP} \cdot \frac{GDP}{POP} \cdot POP$$

Where,  $\frac{CO_2}{TEP}$  is the CO<sub>2</sub> concentration, i.e. the World CO<sub>2</sub> emissions divided by the World total Energy consumption,  $\frac{TEP}{GDP}$  is the energy intensity and  $\frac{GDP}{POP}$  is the GDP per capita.

Figure below displays the historical evolution of these three components from 1965 to 2011. In 1965, the World CO<sub>2</sub> emissions were about 11.7 Gt, passing at 22.6 Gt in 1990 to reach finally 34 Gt in 2011. During the same period, the primary energy consumption has more than tripled, from 3.75 Gtep in 1965 to 13.3 Gtep in 2011. Similarly the GDP has been multiplied by 4.5 and the World population has doubled reaching 6.8 billion people in 2010.

Between 1965 and 2011, the CO<sub>2</sub> concentration has decreased by -11% i.e. -0.25% per year in average, and the energy intensity has decreased by -27%, i.e. -0.7% per year, whereas GDP per capita has grown at 1.7% per year in average.

Therefore, assuming that the GDP per capita will grow at a slightly lower rate up to 2050 (1.4% per year) and assuming an increase of about 2.4 billion people i.e. multiplied by 1.35 (according to the UN projections), the two last right parts of the Kaya equation will be multiplied by 2.35 by 2050 compared to 2010. Now assuming the CO<sub>2</sub> emission should be divided by 2 in 2050 compared to 1990 level, i.e. divided by almost 3 compared to 2010 level, then the energy intensity and the CO<sub>2</sub> concentration should be divided by 7 compared to 2010.

Thus, the simple calculation shows how important is the challenge for the World to achieve the stabilisation of the GHG concentration at 450 ppm, a level for which experts assume that human systems could be adapted at an acceptable economic, social and environmental cost. Furthermore, the Kaya equation emphasises one important issue: the reduction of CO<sub>2</sub> emissions (which is sure in the long-run, at least due to fossil energy depletion) could be achieved either by technological shift, i.e. an improvement of energy efficiency and a reduction of the fossil energies in the energy mix, or by a reduction of GDP or population. So, it appears unavoidable to tackle this problem by supporting innovation in new technology, promoting energy saving or avoiding waste in order to avoid the second solution which could not occur without huge social problems.

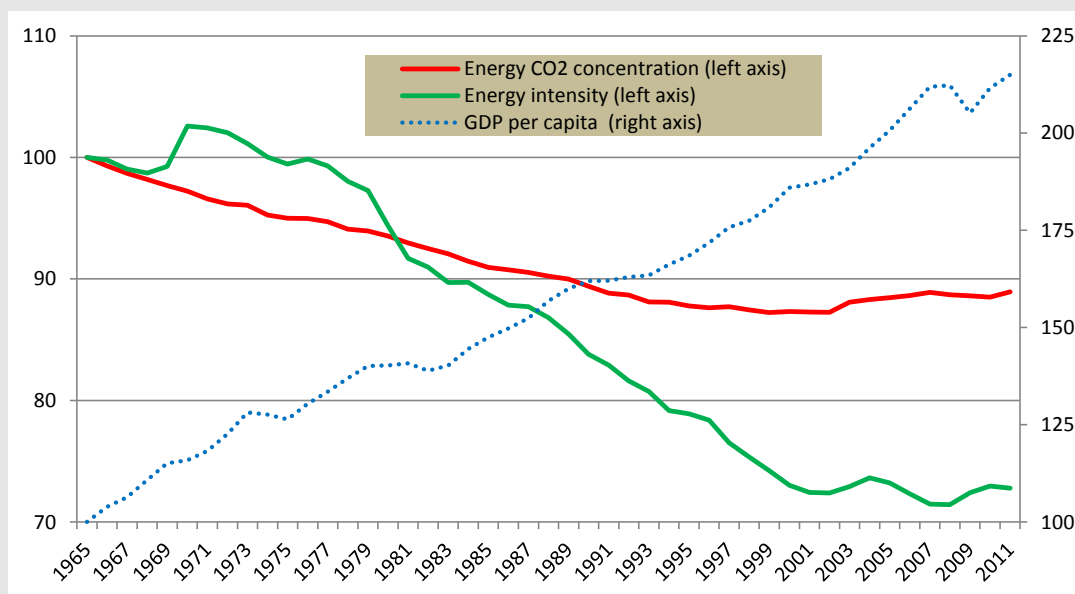


Figure 67 - World GDP per capita, energy concentration and energy intensity (1965=100)  
 Source: BP 2012 & World Bank 2013

In this context, we could summarise the future evolution of the environmental concern as follows:

- A case where there is no consciousness on environmental issues, the global trends of economic development remain the same, hoping that technological solutions could emerge by themselves. Nevertheless, if this last condition is not satisfied, the economic and social consequences could imply some major troubles. It can be viewed as a “passive” scenario.
- A case where there is a worldwide consensus or agreement on the limits of the current economic development model. And large part of policy efforts would be devoted to support research and development of new “green” technologies and resource efficiency, allowing a sustainable long-run economic development. It can be viewed as a “pro-active” scenario.
- And a last case in which the current economic development model is totally replaced by a new one. This scenario could be viewed as “new welfare” scenario, a paradigm shift. However, its probability remains weak and its consequences in terms of society organisation remain unclear.

Such scenarios have been developed for the 7<sup>th</sup> FP project NEUJOBS<sup>38</sup> (Fisher-Kowalski, et al., 2012). These scenarios are based on the concept of the socio-ecological transition which is a “*transition between two different societal energy regimes*”. In a first step, two global contexts are defined:

- **Friendly:** “*A friendly future includes rather moderate changes which are less challenging for European policy making. It focuses on incremental global changes in the lower ranges of change found in the literature*”.
- **Tough:** “*Our sketch of a tough global future is based on still quite likely rather severe changes which would be highly challenging for European policy making, using the higher ranges of change found in the literature, including possible abrupt changes*”.

Furthermore, these both contexts are drawn using different set of global megatrends (see Table in the Economic & Innovation Annex for the example of energy transition) which are natural conditions (energy transition, resource security and climate change impacts) and societal (population dynamics, economic and political centres of gravity and ICT and knowledge).

Thereafter, both scenarios are sub-divided into three scenarios according to the European response strategies. Fisher-Kowalski, et al. (2012) distinguish three kinds of EU response:

1. No policy change: “*No additional policy with reference to the socio-ecological transition*” are implemented, “*status-quo in terms of level of resource consumption without major changes in distribution*”
2. Ecological modernisation and eco-efficiency: policy aims to reach more eco-efficient production and consumption through market based instruments
3. Sustainability transformation: “*smart, lean and fair societal metabolism optimizing human welfare*”, “*efforts to stay within a safe operating space for humanity globally*” and “*taking into account European and global social justice*”.

The two first sets of scenario, “Tough” and “Friendly” with no policy response have been quantified recently (Boitier, et al., 2013), the four other cases will be done later. Nevertheless, this first quantitative assessment has already revealed several impact points:

<sup>38</sup> [www.neujobs.eu](http://www.neujobs.eu)

- The 'desindustrialisation' and 'tertiarisation' processes of the European economy remains but at a lesser extent
- The employment dynamics comes from high-skilled workers, confirming the 'skillisation' of the European employment whereas the low-skilled jobs destruction process appears non-reversible
- Furthermore, none "Europe 2020" targets could be reached without additional policy except the GHG emissions reduction of 20% compared to 1990. Nonetheless, after 2020, the GHG emissions reduction goes away from the European Road Map for attaining a low-carbon economy in 2050.
- Therefore, these falls to tackle these challenges emphasise the need of support policy at European: (i) financial regulation policies and (ii) innovation, research or competitiveness policies.

These first results seem to confirm the insight that the "no policy change" scenario is not reasonable in any case.

These illustrations of the ecological/environmental problems display the necessity for forward-looking analysis to consider these issues, not only regarding the pure environmental aspects. The potential economic consequences of several ecological challenges such as the Global Warming, the water management, waste management or the fossil energy scarcity could be very substantial. Indeed, physical limitations could probably have more serious impacts on the future economic development than current financial crisis.

Even if each environmental challenge has its own characteristics and cannot be tackling by uniform actions, it is sure that a large part of the solution will come from technological development and innovation (technical as well as social). Thus, FLA should take care on emerging technologies and innovation that could be able to reduce these environmental problems (green energies, environmental-friendly agriculture, efficient resource use, reduction of waste production, recycling, etc). At the opposite end, FLA should also regards new technologies that could reinforce these problems or introduce new ecological uncertainties (electric car' battery, GMO, etc). However, these environmental problems could only be treated if the environmental consciousness emerges in society through sobriety, changes in behaviours, etc. And it could also favour political action.

Therefore, FLA should be able to, when the changes are no drastic, to quantify the economic and social impacts of these innovative changes, in terms of economic development but also in terms of change in the structure of the economies.

Historically, economic growth has been based on the availability of plentiful and cheap resources. However, the supply of resources is limited, and the natural resource base is being eroded. Growing global demand is adding to the pressure on the environment, and competition for many resources is increasing. Many natural resources are fundamental to human health, well-being and quality of life, so it is essential to respect the natural limits of the planet.

In the last decades the prices of some key commodities show a growing trend. This makes clear when we observe the evolution of the price indices of metals and energy for the last decade. During the period 2003-2008 energy prices increase by 4 times and metals increase by 3.5 times. Commodity prices crashed after de financial crisis; however, since then, they have been growing steadily. The increase in the demand of raw materials by emerging countries, together with supply constraints, geopolitical issues and speculation are the main factors behind these trends.



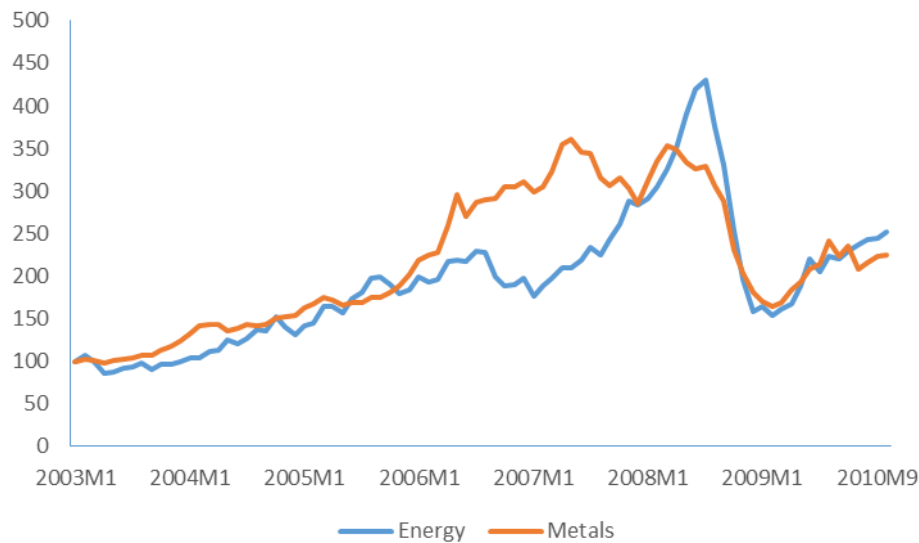


Figure 68 - Price Indices of Energy and Metals. Source: IMF Energy Outlook (2012)

The global economy is already suffering the effects of rising costs for essential raw materials and mineral, and it is expected that these trends will continue in the future generating tensions and intensifying global competition for resources.

The increase in resource efficiency is one of the cornerstones for reducing the vulnerability to resource scarcity. The World Business Council for Sustainable Development (WBCSD) estimates that by 2050 we will need a 4 to 10 fold increase in resource efficiency, with significant improvements needed already by 2020. Some dynamic businesses have recognised the benefits of a more productive use of resources, yet many enterprises and consumers have not yet realised the scale and urgency of the required transformations.

The availability of water is already taken to be a limiting factor in many agricultural areas. Another possible limiting factor is phosphorus, which is a critical fertilizer input to modern agriculture. The remaining lifetime of worldwide phosphorus reserves is being hotly debated, as noted in a recent UNEP report (2011). Although, reserves might last for 300 years at current production rates, the supply of cheap and easily accessible phosphorus is ultimately limited, raising questions about the sustainability of world fertilizer supplies. Apart from food security, food safety is also an essential aspect of a sustainable and secure food system, and is of concern to both consumers and industries. Furthermore, Miraglia and others (2009) estimate that global warming could, under some circumstances, increase food contamination and lead to more rapid spreading of diseases.

### 3.1.3 Critical uncertainties

#### 3.1.3.1 Climate change science

Finally, although climate science has progressed significantly in recent years in establishing causal connections between human activities and climate change, it still has many uncertainties. One of these uncertainties is the measurement of the climate sensitivity parameter (i.e. the global mean surface temperature response to the radiative forcing). Other uncertainties are derived from the non-linearities of climate system which make it difficult to investigate the relation between GHG emissions and changes in the climate. On the other hand, climate models are not complete, in the sense that they do not incorporate some important elements of Earth's climate system such as clouds or the carbon cycle. Due to these and other uncertainties it has been argued that it is not possible to predict

the true probability of extreme events with the current assessment models Weitzman (2009).

Regardless of the uncertainties of the climate science, a key source of uncertainty is the path that the emissions of GHG will follow in the future. The evolution of this parameter depends on different variables such as demography, economic growth or the climate policy. While it is expected that global population and economy will continue expanding in the future, there is uncertainty on the possibility of reaching a global agreement on climate change.

#### **3.1.3.2 Links between biodiversity loss and ecosystem services**

Although there is a consensus among scientists on the relevance of biodiversity conservation, at the same time there are still some uncertainties related to the link between biodiversity loss and ecosystem services. According to Cardinale et al. (2012) these uncertainties are related to the insufficient level of detail of the links between ecosystem functions and services, the limitation to explore more realistic scenarios of diversity change reflecting how human activities are altering biodiversity, and the need of developing models and statistical tools allowing to up-scale from experiments that detail local biological processes to landscape-scale patterns where management and policy take place.

#### **3.1.3.3 Energy and resource reserves**

There is a high level of uncertainty in relation to the availability of some key resources. This issue is of especially interest because the peak in the extraction of a resource is related, among other parameters, to the Ultimately Recoverable Reserves (URR). Over the years many studies have assessed the global endowment of different resources. For instance, in the last century more than 300 studies have estimated the URR of fossil fuel. In the case of conventional crude oil, the different estimates range between 1,840 and 28,764 Exajoules (Dale, 2012).

## **3.2 Key challenges for Europe in the World context**

### **3.2.1 Introduction**

This section shows the main environmental challenges facing the EU over the rest of this century. For each environmental challenge we describe not only the implications for the EU, but also the interconnections with the other environmental challenges. These interconnections are further summarised in a matrix of inter-linkages. Finally, an analysis of the Strengths, Weakness, Opportunities and Threats to the EU in relation to these environmental challenges is also presented.

Five main environmental challenges have been identified for the EU:

1. Climate change mitigation and adaptation
2. Biodiversity conservation
3. Clean air
4. Water management
5. Resource efficiency

### **3.2.2 Climate Change mitigation and adaptation**

Climate change mitigation and adaptation will become one of the major environmental challenges for Europe. On the one hand, given its self-imposed targets, the EU is leading the fight against climate worldwide and has committed to reduce its GHG emissions to 20% below 1990 levels by 2020. Europe is also offering to step up this cut to 30% if other major economies agree to do their fair share of a global reduction effort. In addition, "A Roadmap for moving to a competitive low-carbon economy in 2050" (EC, 2011) suggests that, by 2050, the EU should cut its emissions to 80% below 1990 levels.

On the other hand, the EU is already suffering the impacts of climate change in terms of extreme events and in the future further efforts on adaptation will be necessary. The EEA has projected that the land temperature in Europe will increase by 2.5°C to 4.0°C by year 2100. Winter temperatures of eastern and northern Europe and summer temperatures of southern Europe will increase drastically.

The sea level rise may change the frequency and intensity of the storm surges<sup>39</sup>, which would lead to floods and coastal erosion, threatening low lying coastal areas. Storm surges increase the risk of coastal floods, when we look back, the 1953 severe storm surge claimed more than 2000 lives and destroyed more than 40,000 properties in the region of Belgium, the Netherlands and the United Kingdom. The damages of such a storm would be probably higher today, with approximately a total of 200 million people living in the coastal region (Gaslikova et al., 2011). A recent study estimates that more than 5 million people living across the coastal regions of the EU will have high risk of having marine floods and coastal erosion, and predicted that it will generate a significant economic loss, ecological damage and societal problems (EEA 2012).

Figure 69 summarises the expected impacts of climate change in the EU. It can be seen that each region shows some specific problems and, therefore, the climatic challenge will be location-specific and multi-dimensional. Climate change will impact all the EU countries to a greater or lesser degree; the only positive effects would be the increase in crop yields in Northern Europe.

<sup>39</sup> A storm surge is a temporary deviation in sea water level from that of the astronomical tide caused by changes in air pressure and winds (EEA 2012).

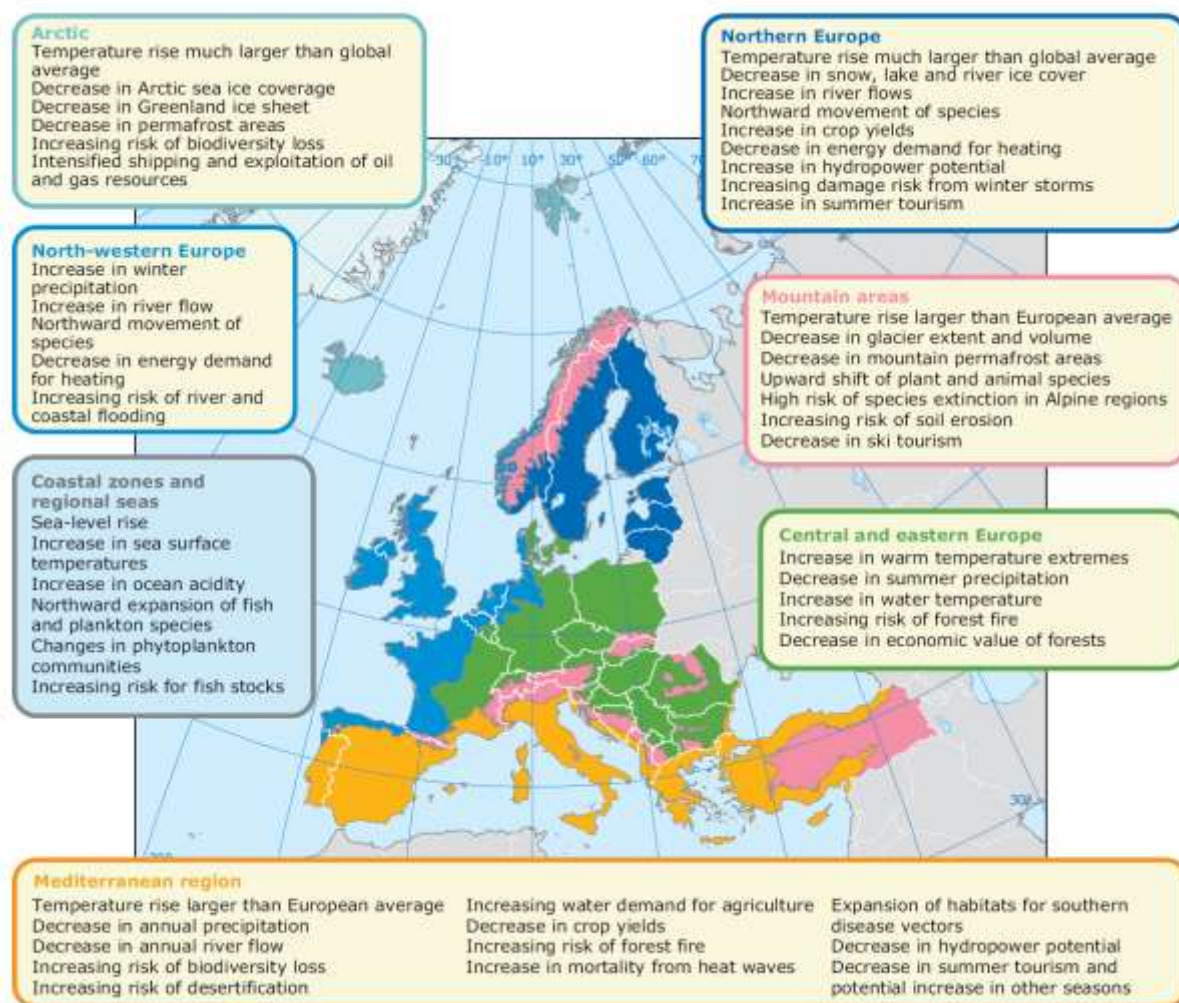


Figure 69 - Climate change, impacts and vulnerability in Europe 2012, Source: EEA.

In the case of the EU, climate change could be considered as the one the main environmental challenges; as we will show in the next sections, the evolution of global warming as well as the mitigation and adaptation policies will have a deep impact on all the other environmental challenges. However, this relation is not unidirectional: the evolution of the other challenges will also affect climate change. For instance, resource efficiency or clean air policy can contribute to mitigate GHG emissions.

### 3.2.3 Biodiversity conservation

Biodiversity loss is an enormous challenge in the EU, with around one in four species currently threatened with extinction and 88% of fish stocks over-exploited or significantly depleted. Furthermore, biodiversity loss is a global problem and, therefore, the evolution of biodiversity worldwide will impact the EU. Following this global approach to biodiversity preservation, the EC has identified the following specific objectives in relation to biodiversity: *i)* conserving and restoring nature, *ii)* maintaining and enhancing ecosystems and their services, *iii)* ensuring the sustainability of agriculture, forestry and fisheries, *iv)* combating invasive alien species *v)* addressing the global biodiversity crisis (EC, 2011).

The evolution of biodiversity challenges will be closely linked to other challenges such as climate change and clean air and vice versa. On one hand, climate change and air pollution has the potential, over a period of a few decades, to undermine the efforts for the conservation and sustainable use of biodiversity. Moreover, some climate mitigation



policies can affect biodiversity by altering land uses. On the other hand, biodiversity can help us cope with the impact of climate change in many ways and to improve the quality of air. Protecting biodiversity can, for instance, help limit atmospheric concentrations of air pollutants. Furthermore, healthy ecosystems can also help mitigate climate change impacts, by absorbing excess flood water or buffering us against coastal erosion or extreme weather events.

#### 3.2.4 Clean Air

In the future, it is expected that the implementation of the revised Thematic Strategy on Air Pollution will contribute to mitigate air pollution in EU. Moreover, the decrease in the use of fossil fuels promoted by climate policy can contribute to reduce not only GHG but also other air pollutants. However, climate policy may also have drawbacks in terms of air quality. For instance, the rise in the use of biomass for heating may contribute to increase the emissions of PM.

On the other hand, as stated by the IPCC (1997), projected climate changes could lead to exacerbation of respiratory disorders associated with reduced air quality in urban and rural areas and effects on the seasonality of certain allergic respiratory disorders. For example, warmer temperatures can accelerate production and increase concentrations of photochemical oxidants in urban and rural areas and thus contribute to increase the exposition of European citizens to ground level ozone.

#### 3.2.5 Water management

Water availability in the EU is not currently an issue. However, this situation could change in the future due to climatic change (see EC (2009) for a detailed description). The main medium term impact will come from a higher frequency of extreme weather events such as very hot summers with risks of water shortages, heavy rainfalls with subsequent flooding, heavy storms with damages and risks for floods and coastal erosion. These events will challenge existing water infrastructure and significantly increase the need for new ones.

Some biological functions may be also altered by changes in climate conditions affecting water quality. In the recent years, European fresh water ecosystems are experiencing early phytoplankton<sup>40</sup> and zooplankton<sup>41</sup> blooms and biological invasions of species (toxic plants).

In addition, climate change could also favour an increase in nutrients levels of water bodies. This situation will be linked to the changes in the water flows changes: during the summer, the flow will be lower and there is a less chance to dilute nutrients in the water; with extreme precipitations, and increase in the flows leads to an increase in the nutrient loads (Whitehead et al., 2009; Fraser et al., 1999; Battarbee et al., 2008). In addition, higher temperatures will stimulate mineralisation of soil organic matter, leading to an increase in nutrients, especially nitrogen and phosphorus (EEA 2012, Battarbee et al., 2008; Feuchtmayr et al., 2009; Futter et al., 2009). This increase in water stress may also affect the load of other pollutants such as heavy metals. In order to overcome these challenges new solutions in terms of water treatment and management will be required.

<sup>40</sup> Photosynthetic or plant constituent of plankton; mainly unicellular algae

<sup>41</sup> Animal constituent of plankton; mainly small crustaceans and fish larvae

### 3.2.6 Resource efficiency

Europe relies on the rest of the world for resources like fuel and raw materials, and these resources are also embedded in products imported from outside the EU. Scarcities and volatile commodity prices can bring about instability in many regions of the world, which may affect the EU.

The EU is especially vulnerable to resource scarcity, since it is the top importer of raw materials worldwide: in the year 2007, the Union imported more than 5 billion tonnes of raw materials equivalents (Arto et al., 2012). The EU is very dependent on foreign energy resources: in the year 2012 more than 50% of the Gross Inland Consumption of energy was imported. Moreover, the EU is also highly dependent on the imports of some key resources like rare earths; these materials are essential for the development of high-tech products and green technologies, as is the case of rare earths, which are expected to play a central role in the future structure of the European economy. These resources are located on very specific places around the world (Figure 70).

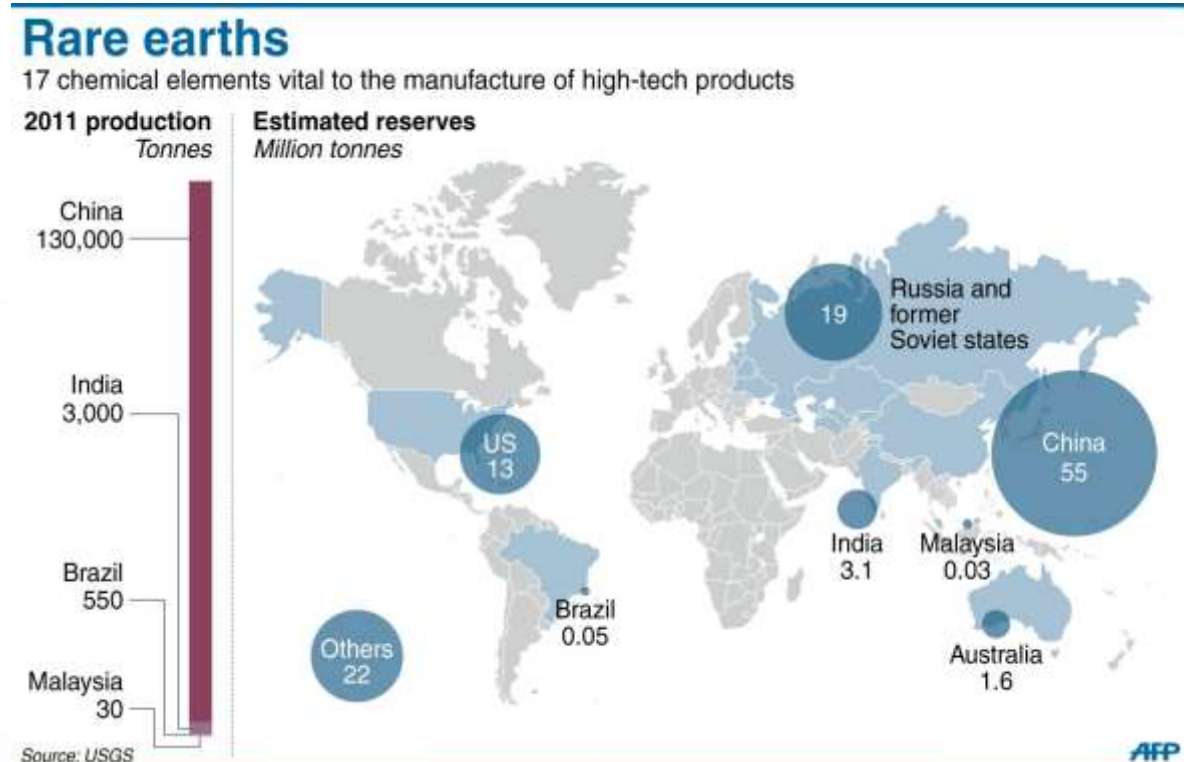


Figure 70 - Global rare earths reserves. Source: USGS.

In the last decades the European Commission has been promoting the reduction of energy dependency and the increase of efficiency. The last effort in this direction is the Energy Roadmap 2050 (EC, 2012). Recently, this policy has extended to other resources and in 2011 it was launched the Roadmap to a Resource Efficient Europe (EC, 2011).

Energy and resource efficiency are destined to become a critical issue for Europe in the future. The depletion and scarcity of some key resources, together with the economic expansion of emerging economies will increase the competition for access natural resources. Some countries like China have already initiated contacts with some extracting regions to ensure the future supply of resources. The EU and other importing regions will be impacted by increasing prices and tensions and conflicts between nations may appear. In this context, one of the key challenges for the EU will be the increase in the use of

natural resources. On the other hand, climate change mitigation policies would decrease the demand for fossil fuels in the EU and, therefore, would reduce the vulnerability to fossil fuels depletion.

It is important to highlight that the progresses in terms of energy and resource efficiency may have positive feedbacks with the other environmental challenges. For instance, increasing energy efficiency can contribute to reduce the emissions of GHG and other air pollutants contributing to the climate change mitigation and air quality improvement. Resource efficiency can help to reduce waste streams affecting directly to soil, air and water quality and indirectly to ecosystems and biodiversity.

### 3.2.7 Environmental targets in force in Europe

The following targets have mostly been set on over the last decade, with the aim of increasing environmental preservation, resource efficiency, and addressing climate change issues. Each target is accompanied by the temporal horizon associated to it, and the policy document where target was established.

The successful accomplishment of targets in force is a major challenge for Europe.

Sector	Year	Target	Source
Total GHG emissions	2020	Total greenhouse gas emissions 20% in 2020 (or even 30%, if a satisfactory international agreement can be achieved to follow Kyoto) lower than 1990	EU2020
	2050	Total greenhouse gas emissions 80% - 95% in 2050 lower than 1990	A Roadmap for moving to a competitive low carbon economy in 2050
Energy sources	2020	20% of total energy from renewables in 2020	EUROPE 2020
	2020	10% of transport energy from renewables in 2020	Renewable Energy Roadmap Communication by the EC, 2007
	2020	10% of transport energy from biofuels in 2020	(European Council, 2007)
Energy consumption	2020	20% increase in energy efficiency by 2020	EUROPE 2020
	2030	50% increase in energy efficiency by 2030	EUROPE 2030 report by the Reflection. Group on the Future (F.González)
	2020	20% decrease in primary energy consumption by 2020	20-20-20 targets
Transport emissions and energy consumption	2020	10% of transport energy from renewables in 2020	Renewable Energy Roadmap Communication by the EC, 2007
	2020	fuel suppliers reduce greenhouse gas emissions from fuel across its life-cycle by 10% by 2020	Energy Policy, 2007
	2020	10% of transport energy from biofuels in 2020	Energy Policy, 2007
	2030	Transport emissions (including CO <sub>2</sub> aviation, excl. maritime), 20% lower in 2030 in relation 2008	Transport White Paper 2011
	2050	Transport emissions (including CO <sub>2</sub> aviation, excl. maritime), 60% lower in 2050 in relation 1990's	Transport White Paper 2011
Air pollution	2020	47% reduction in loss of life expectancy as a result of exposure to particulate matter	Thematic Strategy on Air Pollution
	2020	10 % reduction in acute mortalities from exposure to ozone	Thematic Strategy on Air Pollution
	2020	reduction in excess acid deposition of 74% and 39% in forest areas and surface freshwater areas respectively	Thematic Strategy on Air Pollution
	2020	43% reduction in areas or ecosystems exposed to eutrophication	Thematic Strategy on Air Pollution

Sector	Year	Target	Source
	2020	Reduction of air emissions: SO <sub>2</sub> by 82%, NO <sub>x</sub> by 60%, volatile organic compounds by 51%, ammonia by 27%, and primary PM <sub>2.5</sub> (particles emitted directly into the air) by 59%	Thematic Strategy on Air Pollution
Water	2015	Restore degraded surface and ground waters to "good status"	Water Framework Directive
Biodiversity	2020	100% more habitat assessments and 50% more species assessments under the Habitats Directive show an improved conservation status; and 50% more species assessments under the Birds Directive show a secure or improved status.	EU Biodiversity to 2020
	2020	ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15 % of degraded ecosystems	EU Biodiversity to 2020
	2020	maximise areas under agriculture across grasslands, arable land and permanent crops that are covered by biodiversity-related measures under the CAP	EU Biodiversity to 2020
	2020	Forest Management Plans are in place for all forests that are publicly owned and for forest above a certain size	EU Biodiversity to 2020
	2015	Achieve Maximum Sustainable Yield	EU Biodiversity to 2020
	2020	Invasive Alien Species and their pathways are identified and prioritised, priority species are controlled or eradicated, and pathways are managed to prevent the introduction of new ones.	EU Biodiversity to 2020
	2020	the EU has stepped up its contribution to averting global biodiversity loss	EU Biodiversity to 2020

*Table 23 – European environmental policy targets currently in force*  
 Source: MCRIT 2012 (FP7 ORIGAMI<sup>42</sup>) and Basque Centre for Climate Change (BC3) 2013

### 3.2.8 Interactions between environmental challenges

Environmental challenges are mutually inter-connected through different cause-effect relationships. In the previous sections we have presented the main linkages between the different challenges; in this section we present a summary table of these interactions.

Table 24 provides an overall view of the linkages between the different environmental challenges of the EU. The challenges are displayed in a 2 dimensional matrix showing the impact of each challenge in the others. Driving challenges (causes) are depicted in rows and impacted challenges (effects) in columns. Changes have been arranged according to their relevance for the EU.

<sup>42</sup> ORIGAMI 7<sup>th</sup> FP EU RTD (2012) See [www.origami-project.eu](http://www.origami-project.eu)



		EFFECT				
		Climate change mitigation and adaptation	Resource efficiency	Water management	Biodiversity conservation	Clean air
CAUSE	Climate change mitigation and adaptation		Reduction of the demand for fossil fuels and the vulnerability to fossil fuels depletion. Increase in the demand of key resources for the development of low-carbon technologies	Need of new water infrastructures to cope with climate change-related extreme hydric events and water quality issues. Biofuels production may boost water demand	Changes in climate conditions can affect ecosystems and undermine conservation efforts. Some mitigation policies can affect biodiversity by altering land uses.	The reduction in the use of fossil fuels can contribute to reduce other air pollutants. The rise in the use of biomass may contribute to increase PM emissions. Warmer temperatures can contribute to increase the exposition of European citizens to ground level ozone.
	Resource efficiency	Reduce the emissions of GHG. Scarcity of key resources may become a bottleneck for the development of low-carbon technologies.		Reduce water use and waste water.	Biodiversity and ecosystems conservation through the reduction of resource extraction and waste flows.	Reduce air emissions and improvement of air quality.
	Water				Improvement of water management can contribute to biodiversity conservation	
	Biodiversity conservation	Protecting biodiversity can help limit GHG concentrations through carbon storage. Healthy ecosystems can help mitigate climate change impacts (e.g. absorbing excess flood water).		Healthy ecosystems can help to improve water quality.		Biodiversity and ecosystems conservation is essential for improving air quality, since air quality regulation is a key function of ecosystems.
	Clean air	Clean air policies can contribute to reduce GHG emissions		The reduction of air emissions can contribute to improve water quality	Air quality directly affects ecosystems health and biodiversity loss	

Table 24 – Interactions and linkages between environmental challenges  
 Source: Basque Centre for Climate Change (BC3), 2013

### 3.2.9 SWOT Table

#### Strengths

The EU has already deployed a wide range of policies to face many of the challenges described above. The European Commission has adopted thematic strategies and policies on different issues such as biodiversity conservation<sup>43</sup>, air pollution<sup>44</sup>, water management<sup>45</sup>, resource<sup>46</sup> and energy<sup>47</sup> efficiency, or climate change<sup>48</sup>. Moreover, the EU is leading the promotion of global agreements in climate change, sustainable development or biodiversity conservation.

In order to support the development of solutions to face environmental challenges, the EC has launched a series of funding programs on different fields such as eco-innovation<sup>49</sup>, low-carbon technologies<sup>50</sup>, etc. In addition, many EU Member States have set plans to promote the transition to a green/low-carbon economy. As a consequence, the EU has been considered as one of the leading regions worldwide on the development of hard and soft solutions towards sustainability.

### **Weaknesses**

Although clean technologies are spreading throughout European society, conventional ones still dominate. Furthermore, the incentives for the development of green technologies coexist with benefits to the traditional ones, contributing to delay the transition to a green/low carbon economy.

In addition, whereas the commitment of the European Commission in relation to the green economy is firm, this is not the case for all the Member States. Some European countries are progressing rapidly while others are moving slowly. This two-speed transition is also contributing to delay the progress towards a greener economy.

The shift to a new economy and the adaptation to the environmental challenges will require a huge economic effort. The EU will have to invest in clean technologies, resource efficiency, transportation, alternative energies, adaptation, etc. However, current financial situation is very tight: private credit is constrained as is the public budget. If this situation continues in the future, the transition could be delayed.

### **Opportunities**

The necessary transformation and adaptation processes will require many structural transformations around the world. In the process of facing the environmental challenges new opportunities will emerge (e.g. clean technologies) and will generate welfare and employment, particularly in those regions able to lead the eco-innovation sector worldwide.

Many of the environmental challenges are closely related to the energy system, thus the efforts in the transformation of the energy system can contribute to improve several environmental dimensions.

Facing environmental challenges will require deep transformations of the European socio-economic systems. These transformations may also contribute to overcome other social, economic and institutional challenges described in this report.

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<sup>43</sup> [http://ec.europa.eu/environment/nature/index\\_en.htm](http://ec.europa.eu/environment/nature/index_en.htm)

<sup>44</sup> [http://ec.europa.eu/environment/air/review\\_air\\_policy.htm](http://ec.europa.eu/environment/air/review_air_policy.htm)

<sup>45</sup> [http://ec.europa.eu/environment/water/index\\_en.htm](http://ec.europa.eu/environment/water/index_en.htm)

<sup>46</sup> [http://ec.europa.eu/environment/resource\\_efficiency/about/roadmap/index\\_en.htm](http://ec.europa.eu/environment/resource_efficiency/about/roadmap/index_en.htm)

<sup>47</sup> [http://ec.europa.eu/energy/index\\_en.htm](http://ec.europa.eu/energy/index_en.htm)

<sup>48</sup> [http://ec.europa.eu/clima/policies/brief/eu/index\\_en.htm](http://ec.europa.eu/clima/policies/brief/eu/index_en.htm)

<sup>49</sup> <http://ec.europa.eu/environment/eco-innovation/>

<sup>50</sup> [http://ec.europa.eu/clima/policies/lowcarbon/index\\_en.htm](http://ec.europa.eu/clima/policies/lowcarbon/index_en.htm)

### **Threats**

Many of the environmental challenges pointed in this assessment are global. Thus, although the EU is trying to reduce its environmental pressures, the future will depend on the environmental behaviour of other key stakeholders, and there are not many reasons to be optimistic in this regard. On the one hand, economic growth in emerging countries has been accompanied by an increase in their environmental pressures and it seems that this trend will continue in the near term. On the other hand, other developed economies have made weak efforts to reduce global environmental impacts. This situation can become especially dangerous if we take into account that the world could be very close to overstepping some environmental boundaries and, as a consequence, the possibility of reaching a non-turning point in increasing

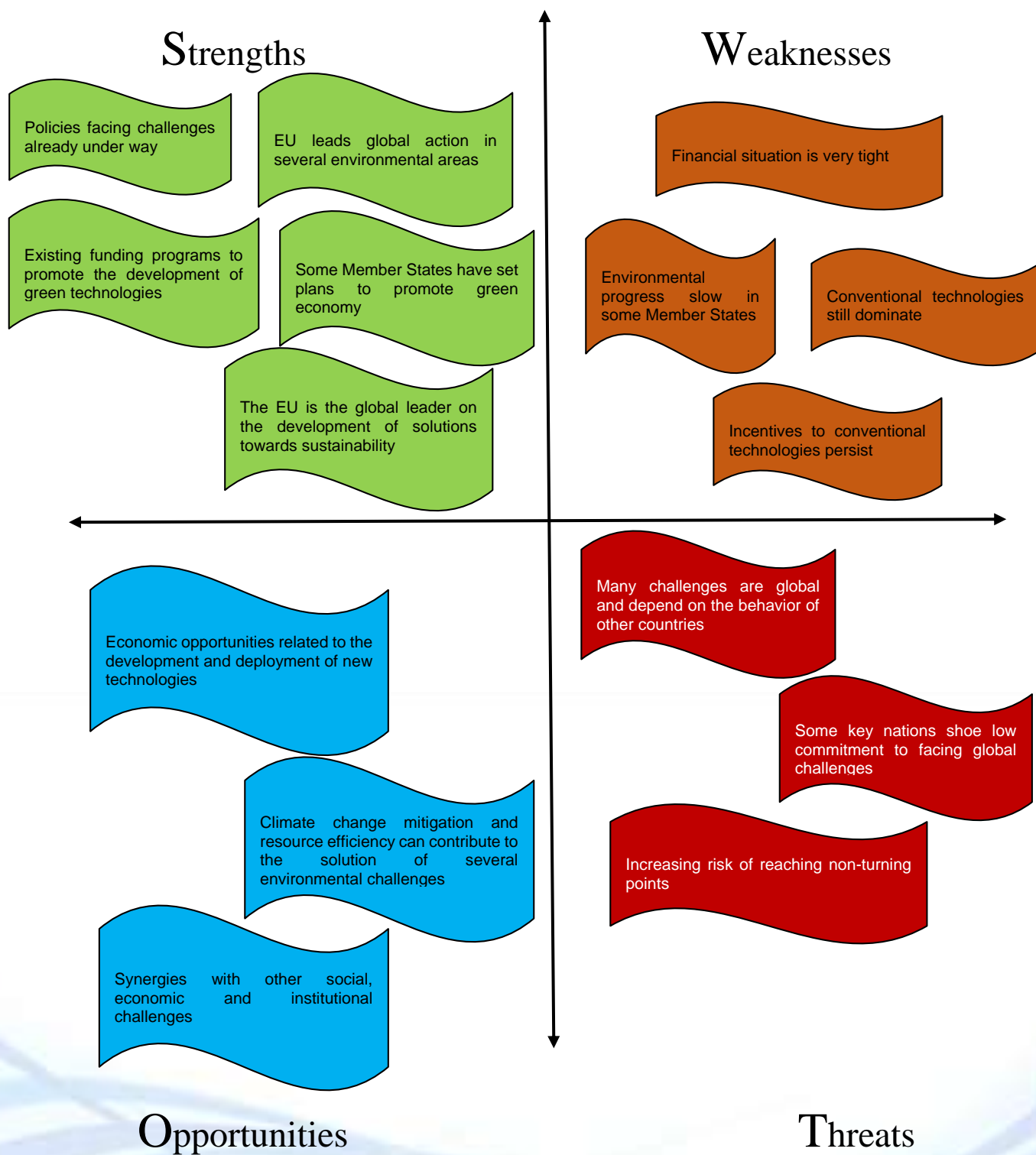


Table 25 –SWOT table of the Environment thematic area



## 4.- D1.d “Global Governance Trends and Challenges”

### 4.1 Megatrends at Global and European level

#### 4.1.1 Introduction

This report summarizes the findings of the stocktaking process in the realm of law and governance. Our points of reference for stocktaking have been the critical uncertainties and scenarios with regard to the global legal environment presented by Hiil in 2012. The actor defined for these scenarios has been called the *national legislator*. The national legislator refers to the *institutions responsible for any national legal order*, such as parliaments and governments. Constitutional courts or highest courts usually also have a responsibility for law formation. The national legislator may be the US congress, but it may also be the Egyptian government or Malaysian highest court. It is a matter of choice whether the EU is seen as a national legislator. Of course we will refer to the legal institutions of the member states as national legislators. For the scenarios purposes also the EU legal institutions (European Commission, European Council, European Court of Justice) can be captured by the concept of national legislator.

National legislators face many different environments such as the economies, societies, and technologies they regulate. National legislators also face an international arena in which legal norms that transcend national boundaries are created and upheld and in which disputes that transcend national boundaries are settled. We refer to this environment as *the global legal environment*. Whereas *national legislator refers to either national legal institutions responsible for a national legal order* the *global legal environment refers to the whole of legal institutions outside the national legislator that authoritatively creates or upholds norms or standards perceived as law that transcend national boundaries or settles disputes that transcend national boundaries*. The Hiil scenarios are briefly sketched in Annex I.

Because of the lack of scenarios concerning the global legal environment as defined here, the trends and scenario studies for stocktaking have to be selected indirectly. This report therefore includes the scenario reports that have been carried out from a global perspective. Many national trend reports focus on specific regions or countries, such as census data bureaus (e.g. Eurostat). These reports will not be included in the stock as well as scholarly work on trends that does not include long term scenarios (e.g. Van Dijk, 2008). The stocktaking activities have thus been narrowed down to:

- scenario studies and reports from the past five years that follow the foresight methodology,
- in which long term trends and scenarios are presented,
- that depart from a global perspective,
- and are either qualitatively or quantitatively substantiated.

The stocktaking process is primarily focused on scenario reports published in the past five years (from 2008).

#### 4.1.2 Mega trends and drivers

This section presents the Megatrends included in the scenario reports. As argued above this report focuses on scenario studies and the Megatrends and critical uncertainties mentioned in these studies. Some scenario reports only mention and substantiate the critical uncertainties used for the scenarios whereas other scenario reports present a broad range of Megatrends in order to select the critical uncertainties on which the scenarios are built. The Megatrends mentioned in the scenario reports are presented in clusters that cover the following topics:

- global politics
- European neighbourhood politics
- global security
- the global economy
- global society
- regions and their connections with the globe.

After presenting the topic-related trends we will round up this section with an overview of the Megatrends.

##### ***4.1.2.1 Global Politics and Law: a balanced global distribution of power and the rise of Asia***

With regard to geopolitics many scholars observe a more balanced distribution of power in the world (e.g. Friedman, 2011; Kagan, 2008). The superpower position of the US that arose out of the collapse of the Soviet Union at the start of the 1990s is usually taken as a point of departure for this analysis. Increasingly the uni-polar geopolitical context with the US as the world's superpower is being contested, usually excluding its military power. For example, Zakaria argues that the military power of the US will guarantee its dominance. He substantiates his claim by referring to the military budget of the US. This budget comprises almost 50 per cent of the global military budget. Its budget is not only the biggest military budget in the world, its budget exceeds the second to fifteenth military budgets taken together (Zakaria, 2012). The military supremacy of the US is even bigger if technological advancement is included. The US spends more money on research and development connected with military technology than all other countries taken together. The superpower status of the US is not only connected with its military power. It is also caused by its position as no 1 economy of the world. Trend watchers observe a global shift with regard to the economy. The American economy may still be growing, the economic power of the US weakens because of the growth of some other economies. The rapidly growing economies of China, India, Brazil, Russia and South-Africa and the economic power of the European Union have created a more balanced economic map of the world even though the American economy is still almost 25 percent of the world's economy (Friedman, 2011: 238).

The European Commission has also observed a more balanced global distribution of power. It published its exploration of global trends to 2025 in 2009. In the report the European Commission focuses on trends 'that shape the international environment, the tensions which will structure its development in the coming decades and the transitions that Europe could contribute to promote it' (European Commission, 2009: 9). The European Commission used expert consultation for this forward looking exercise. The first trend

mentioned by the European Commission is the rise of the Asian continent. The European Commission even refers to this trend as 'the Asian century'. A number of indicators seem to point to the rise of Asia as a global power. First, a growing part of the world population will live in Asia in 2025. Together with the growing population the 'centre of gravity of world production will move towards Asia. The group made up of China-India-Korea will weigh as much as the European Union. With the addition of Japan, Thailand, Taiwan, Indonesia (...), the share of Asia would in 2025 reach more than 30% of the world GDP' (European Commission, 2009, 10). Asia will then become the world's biggest exporting region. It remains to be seen whether this economic development will foster a new middle class or reinforce existing inequalities. Asia will though catch up or even overtake the US and Europe in the area of research and R&D.

Economic growth is not the only driver of the expected geopolitical power shift from the US and Europe to Asia and the BRIC-countries. Resource scarcity and resource dependency is another major driver of geopolitical change. According to the European Commission (2009) the demand for energy is expected to further increase whereas the production of green energy will lag behind. Because of the resulting scarcity of energy the issue of energy security will arise as a global issue. Energy and resource security reshuffle global politics and as a result the strategic importance of the Middle East, Russia and the Caucasus will further grow. But energy is not the only scarce resource in 2025. According to the European Commission three billion people will be missing water in 2025 partly because of climate change. In order to reduce the impact of climate change CO<sub>2</sub> emissions have to be radically reduced in 2025.

On the whole the European Commission (2012) acknowledges a geopolitical shift to the east. Because of the absence of a simple global political system, globalization will probably be the single most influential driver shaping international politics. Multipolarity will therefore be the most probable geopolitical and security condition. The international system will not only be multipolar but probably also become more heterogeneous. Global governance will therefore 'be put under serious strain' (European Commission, 2012: 15). The European Commission also expects 'a world-wide political reframing of growth in terms of its quality rather than simply its quantity. This reframing will be necessary to support 'good global governance', creating the basis for a new social bargain world-wide' (European Commission, 2012: 15).

#### **4.1.2.2 Rising Economic Hubs in the European Neighbourhood**

The political and economical situation in Europe's neighbourhood is of importance for both economical performance of Europe, as well as the social stability. Recent demands for political changes and promising economic growth perspectives for neighbouring countries will change the interaction and power relations. Europe's position as the main economic player in the region might be challenged in the future.

Arab spring. The recent upheavals occurred within Arabic countries of the Mediterranean reconfigured economic relations between Europe and these countries seeking for a stable democracy. Despite the persistent governmental instability and religious rivalries, which are unlikely to be solved in the short term, new economic opportunities are offered for the EU with these neighbouring countries in terms of development potentials and cooperation (ESPON 2012e). On the other hand, political disorders provoked by the Arab spring raise challenges for future management of migration flows towards Southern Europe, thus forcing to rethink its policy approach towards the Southern Mediterranean (Carrera, Den Hertog, and Parkin 2012).

Eastern Neighbours. The *European Neighbourhood Policy* (ENP) contributes to institutionalise political and economical links with the Southern and Eastern neighbours. For these last, the multilateral framework agreement was improved by the creation of the Eastern Partnership in 2009, aiming at strengthening political and economic trade-relations

with the six Post-Soviet countries of strategic importance for the EU (Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine) (EU Observer 2009). Further economic integration coming from the Eastern Partnership will largely depend on the evolution of the internal territorial conflicts destabilising some of these countries (e.g. Transnistria in Moldova, Nagorno-Karabakh in Azerbaijan) (European Dialogue 2012). This initiative will also remain questioned until further democratic progress will be achieved to overcome the legacies of the Soviet period.

Turkey's rising economy. Southern and Eastern Europe's neighbourhood is diverse and significant regional disparities exist. The pre-existing strong links between global cities in the neighbourhood and major urban areas in Europe are expected to increase due to market opportunities and available human capital (ESPON 2012e). In this regard, Turkey is growing as a main regional actor, and is likely to enter into the group of BRICS emerging powers if its growth rate remains stable for coming years (The Atlantic 2012). Depending on the uncertain negotiation process for a possible EU integration towards a common market, this neighbour could offer an economic bridge for Europe towards Asia.

The Gulf States. Even though the Gulf States have long been participating in the global economic system, they have been increasingly visible in global politics and economy since the millennium. Starting out relying on oil trade, global economic activities have become broader. Furthermore, a closer corporation between the most important BRICS economies (China and Russia) and the Gulf States is seen (Coates Ulrichsen 2011). Also the city of Dubai is emerging as a world city, attracting investments, workers and tourist.

The importance of the Arctic region in geo-politics. The interests in the resources and possibilities in the Arctic region have grown: the presence of unexploited natural resources (in particular oil and gas), the control for eventual new shipping lanes in the Arctic resulting from climate change, the interest to the scientific community. Several disputes over claiming territories have already occurred, however not all resolve and new future claims are to be expected (Nuttall 2012; Nordic Council of Ministers 2011a).

#### ***4.1.2.3 Global Security: diffusing risks and threats as well as diffusing power to deal with these risks and threats***

Several scenario reports focus on global risks and security threats. A previous mapping exercise in the realm of security has been carried out in the framework of a FP-7 project (European Foresight Platform, 2012; see [www.mappingforesight.eu](http://www.mappingforesight.eu)). This report maps 16 forward looking exercises in the realm of EU security representing four types of forward looking activities (forecast, foresight, horizon scanning, and impact assessment). With regard to the methodologies used for forward looking activities in the realm of security the report observes a shift from forecasting to foresight methods. Apparently the trends are related to new concepts and institutions and these can better be captured by foresight methods than forecast methods built on statistical modelling. The scope and goal of these forward-looking activities differs substantially, but some trends or megatrends are mentioned in several studies. According to the European Foresight Forum global security is affected by a number of main drivers or megatrends:

1. Globalization and increasing mutual interdependencies, especially with regard to the vulnerability of global infrastructures.
2. Redistribution of global power, with power shifts to Asia and new economic powers (Brazil, Indonesia, Turkey, South Africa) that result in a multipolar and polycentric power constellation. The new distribution of power will affect the international system: 'The international system that is likely to emerge as a result of all these shifts will probably mix balance-of-power politics and multilateralism,



with states making issue-by-issue shifts and alliances. This will generate a higher level of unpredictability in international relations, and make it harder to attain a broad consensus even on matters requiring urgent global action.’ (European Foresight Forum, 2012: 20)

3. Climate change is expected to impact global security in at least three ways. First, because of increasing frequency and intensity of extreme weather the number of disasters may grow (floods, spreading diseases, drought). Second, climate change will affect the global distribution of natural resources such as water or land fit for agriculture. Third, because of the disasters and redistribution of natural resources new conflicts and migration flows may cause global security threats.
4. Increasing scarcity affects global security because of the social unrest and conflicts it may cause but also because of the humanitarian crises it may provoke. Resources scarcity also creates new interdependencies that in turn further globalization and vulnerable infrastructures. The report of the European Foresight Forum also mentions the possibility of inter-state conflicts as a result of resource scarcities. Water scarcity and the scarcity of raw materials may cause inter-state conflict in many parts of the world, including Europe. In its long term exploration of the future of Europe the European Commission also signals resource scarcity. According to the European Commission growing consumption will result in more constraints on key resources such as water, energy and food. Resource security increasingly includes water, land, food and raw materials.
5. Globalization both creates and increases some inequalities and because of global connectivity it also makes people more aware of unequal opportunities. The awareness and the wider gap may foster feelings of injustice and these feelings may in turn lead to conflict and social upheaval.
6. Demographic imbalances such as a growing population of young people in the Middle East, Central Asia, and sub-Saharan Africa on the one hand and ageing in the West may trigger social instability and waves of migration from less wealthy regions.
7. The main issue with regard to health has to do with the ‘expected inequalities, movement of people and rising migration’. Both within countries and regions and on a global scale unequal access to health may lead to migration and social conflict. But migration may also facilitate the diffusion of diseases and organisms that are resistant to antibiotics.
8. Global challenges like these require global responses, but the governance systems are not well suited yet for these responses. At least three different pressures are expected on the governance systems. First, the current governance systems only allow partial solutions for these global challenges. Second, this report expects ‘increasing pressure to reform multilateral institutions to reflect shifting power relations, including a drive towards greater inclusiveness’ (European Foresight Forum, 2012: 22). Third, global responses increasingly depend on non-state actors such as transnational corporations, NGOs or philanthropic institutions. This means that their power will also increase and in turn their geopolitical role will become more important.
9. The highly interconnected world of cyberspace may affect political identities and it also created new security threats such as cybersecurity. The global interconnectedness may stimulate an awareness of the global community of humans but it may also provoke political conflicts.

10. Women seem to play an increasingly important role in both labour markets and politics. The rising employment rate of women may therefore 'mitigate the economic impacts of global aging'. Political participation of women may also change the dominant political agendas because 'active women place greater importance on societal issues such as healthcare, the environment, and economic development. If this trend continues over the next 15-20 years, as is likely, an increasing number of countries could favour social programs over military ones. Better governance also could be a spinoff benefit, as a high number of women in parliament or senior government positions correlates with lower corruption' (European Foresight Forum, 2012: 23).
11. Proliferation of modern weapons. Modern weapons' technologies will further proliferate on the globe. This trend is expected to lead to instability and shifting military balances in several regions. Terrorist groups will gain access to modern and potentially destructive weapons through organized crime groups but 'a major conflagration involving CBRN weapons is not likely to happen over the next two decades' (European Foresight Forum, 2012: 23). Cyber-attacks are expected and may cause substantial damage.
12. Urbanisation. The report expects that by '2040, around 65%, or 6 billion, of the world's population will live in urban areas' (European Foresight Forum, 2012: 24). Megaslums may become the breeding grounds of social unrest and terrorism and megacities may become important global players. 'By 2030, the fifty greatest megacities in the world will concentrate more resources than most small and middle-income states, and they will demand more autonomy and exert greater power, even taking on a more prominent international role' (European Foresight Forum, 2012: 24). The rise of megacities will lead to new concentrations of resources but it may also cause social instability and unrest. The European Commission (2009) expects that because of migration poverty will be concentrated in megacities. These concentrations will become major sources of social instability. Without migration to the European Union Europe's population will decrease.
13. Technology and innovation. The main technological development and innovations are expected with regard to sensors, electro-optics and materials, for example as applications of nano-technologies. Technological innovations will not end the scarcity of resources. Neither will technological innovations diminish pollution and solve major environmental problems. The proliferation of technologies will enable terrorists to organize high impact attacks also because of the omnipresence of networked technologies.

Instead of trends the Global Risks report of the World Economic Forum focuses on risks. The trends mentioned by the European Foresight Forum show remarkable resemblance with the risks mentioned in the Global Risks report. This report maps global risks by explicitly clustering and addressing economic, environmental, geopolitical, societal, and technological risks. The empirical basis of the risks captured by the World Economic Forum is the Global Risks Perception Survey. The survey is distributed amongst experts such as 'high-level leaders from business, academia, NGOs, international organizations, the public sector and civil society' (World Economic Forum, 2013a: 61). For the 2013 survey 'over 6,000 invitations were sent out and 1,234 respondents returned the questionnaire with usable information; 1,006 of these were complete responses' according to the Global Risks report. The 2013 report uses an impact-uncertainty matrix to envision the likelihood and the impact of the global risks (World Economic Forum, 2013a: 10).

In general, the top five risks ranked by likelihood are:

- severe income disparity;
- chronic fiscal imbalances;
- rising greenhouse gas emissions;
- water supply crises;
- mismanagement of population ageing.

The top five risks ranked by impact are:

- major systemic financial failure;
- water supply crises;
- chronic fiscal imbalances;
- food shortage crises;
- diffusion of weapons of mass destruction.

The high-impact/high-likelihood risks therefore are water supply crises and chronic fiscal imbalances. The geopolitical risks mentioned in the report are:

- Diffusion of weapons of mass destruction;
- Global governance failure;
- Failure of diplomatic conflict resolution;
- Pervasive entrenched corruption;
- Unilateral resource nationalization;
- Entrenched organized crime;
- Widespread illicit trade;
- Militarization of space.

Three constellations of global risks are derived from this analysis (World Economic Forum, 2013a: 15):

1. A constellation on economic and environmental resilience, which includes major systemic financial failure, severe income disparity, chronic labour market imbalances, chronic fiscal imbalances, unmanageable inflation or deflation, global governance failure, failure of climate change adaptation, food shortage crises, water supply crises, persistent extreme weather, and rising greenhouse gas emissions. Whereas the economy and the environment are sometimes presented in a zero sum manner in which economic growth inherently created environmental pressure and vice versa, the report argues that seen from a long term perspective economic growth and a healthy environment go along.

2. A constellation of 'digital wildfires in a hyperconnected world'. This constellation includes critical systems failure, cyber attacks, massive digital misinformation, massive incident of data fraud/theft, terrorism, rising religious fanaticism, failure of diplomatic conflict resolution, major systemic financial failure, global governance failure, and backlash against globalization. Digital wildfires are considered especially dangerous 'in situations of high tension, when false information or inaccurately presented imagery can cause damage before it is possible to propagate accurate information. The real-world equivalent is shouting "fire!" in a crowded theatre – even if it takes only a minute or two for realization to spread that there is no fire, in that time people may already have been crushed to death in a scramble for the exit.' (World Economic Forum, 2013a: 25). Several examples of these digital fires and their consequences are mentioned such as a fake tweet that has moved markets.
3. The third constellation is called the 'Dangers of Hubris on Human Health'. It includes a failure of the intellectual property regime, rising rates of chronic disease, antibiotic-resistant bacteria, unforeseen consequences of new life science technologies, and vulnerability to pandemics. The use of antibiotics and the spread of antibiotic-resistant bacteria may trigger vulnerability to pandemics and a global spread of many old and new diseases. According to the Global Risks report the threat of antibiotic-resistant bacteria therefore should be urgently addressed by stakeholders.

The Global Risks 2013 report maps these global risks with a survey among experts and leaders. Neither the trends nor the risks and constellations have a solid basis in facts and figures. The report does not extensively elaborate on these risks. It does argue that the global risks mapped in the report are 'interdependent and correlated with the other' (World Economic Forum, 2013a: 15).

Even though the US National Intelligence Council report on global trends (National Intelligence Council, 2012) to 2030 does signal a similar set of risks it better substantiates and elucidates these by referring to trends. This report also distinguishes between megatrends and game-changers.<sup>51</sup> Megatrends 'will likely occur under any scenario' while game-changers are 'critical variables whose trajectories are far less certain'. A third category of variables are tectonic shifts which are defined as 'critical changes to key features of our global environment that will affect how the world "works".' (National Intelligence Council, 2012: iii). The US National Intelligence Council summarizes the megatrends as follows:

- Because of growing middle classes all over the world and communication and education opportunities individual empowerment will accelerate.
- Diffusion of power refers to two megatrends. First, the National Intelligence Council observes a diffusion of power among countries with regard to GDP, population size, military spending, and technological investment. Both the rising powers of China and India and the declining powers of the US, the EU, and Japan will result in a more diffused power balance on a global scale. Second, the National Intelligence Council observes a diffusion of power from countries to informal networks and coalitions. The National Intelligence Council argues that 'power almost certainly will shift toward multifaceted and amorphous networks composed of state and nonstate actors that will form to influence global policies on various issues. Leadership of such networks will be a function of position, enmeshment, diplomatic skill, and constructive demeanor. Networks will constrain policymakers because multiple players will be able to block policymakers' actions at numerous points' (National Intelligence Council, 2012: 19).

<sup>51</sup> The latter will be dealt with as wildcards in section 1.3.



- With regard to demography four trends are believed to persist to 2030. 'These trends are: aging both for the West and increasingly most developing states; a still significant but shrinking number of youthful societies and countries; migration, which will increasingly be a cross-border issue; and growing urbanization, which will spur economic growth but place new strains on food and water resources' (National Intelligence Council, 2012: 21). The ageing of western societies may also affect these societies' culture (more risk-averse), but the National Intelligence Council refers to these impacts as 'speculative'.
- The National Intelligence Council expects a growing demand for food, water, and energy caused by population growth and a growing middle class. The growing demand for food, water, and energy will not necessarily produce resource scarcity, but it certainly may cause a changing marketplace and new pressures.

#### ***4.1.2.4 Global economy: new K-wave after crises driven adaptation of the global economy***

Recently the Finland Futures Research Centre published a report on global change in the foresight tradition (Finland Futures Research Centre, 2012)<sup>52</sup>. The report presents a long cycle theory on socio-economic development based on the theory developed by Nikolai Kondratieff. These cycles are referred to as K-Waves and they provide a 'framework for anticipating the medium to long term future (2010-2050), with regard to current megatrends and drivers for change as well as potential game changers for the next wave of development' (Finland Futures Research Centre, 2012: 8).

In modelling terms the wave is envisaged by discerning key megatrends, key innovation platforms, and key trajectories for social change. The megatrends are:

- globalization, defined as the 'decentralization of power centers';
- 'demographic change implying aging and longevity'.

The key innovation platforms are:

- 'the expansion of resource efficient technologies';
- 'the rise of the bioeconomy';
- 'digitalization and the dominance of second economy'<sup>53</sup>;
- 'growth of health services'.

The key trajectories for social change are:

- maturing environmental concerns;
- web-based empowerment of the people;
- the rise of complex societies.

A new Kondratieff wave is also foreseen by the European Commission in its exploration concerning the future of Europe (European Commission, 2012). According to the European Commission technological breakthroughs may radically increase eco-efficiency and possibly provoke a new long-term economic Kondratieff wave.

<sup>52</sup> See "In the winter of a K-Waves" on chapter 1.1.1.2 of this report.

<sup>53</sup> [http://www.mckinsey.com/insights/strategy/the\\_second\\_economy](http://www.mckinsey.com/insights/strategy/the_second_economy)

Even though long-term enthusiasm may be justified by the technological innovations indicated by the Finland Futures Research Centre economic pessimism driven by the financial and economic crises is widespread in the scenario reports included in the stocktaking process. In 2009 right after the financial crisis broke out the World Economic Forum signaled a dramatic change and stagnation of financial services. Global interconnectedness had driven growth but it also appeared to reveal economic imbalances. These are considered as the root causes of the financial and economic crises that broke out in 2008. According to this World Economic Forum report this crisis provoked three dramatic changes in the global financial system:

1. Deleveraging and global economic slowdown, which will create a 'sustained stress on the global economy'. Financial services are therefore confronted with 'fewer attractive lending and investment opportunities'. With less lending possibilities for businesses their growth is seriously hampered. In turn this will affect the assets on the balance sheets of financial institutions
2. Government intervention: governments all over the world have intervened in financial markets either by tightening regulation (e.g. concerning buffers or credit opportunities) or by buying banks or nationalizing financial institutions. The money needed for these interventions has increased fiscal strain in many well developed economies all over the world. Besides regulators governments have also become financial market players. Because of their risk aversion the governments' presence will further slowdown markets.
3. A threat to the pace of globalization: financial globalization flourished from the start of the 1990s but further globalization of financial markets is not likely because of the shifting macroeconomic and financial landscape. In turn a slowdown of financial globalization is also expected to slowdown global economic growth and global trade.

Whether or not these trends will continue during the next decades is highly uncertain. The near-term outlook for the financial markets based on these trends entails regulatory reform by governments aimed at stricter regulation, more transparency, and an expanded scope of regulatory oversight. Both businesses and financial institutions will go 'back to basics' focusing on their clients and keeping their clients' trust and savings. The financial institutions landscape will be reorganized and high risk investors such as hedge funds will be restructured if they survive at all.

After focusing on long-term strategies in its report on the future of the global financial system in 2010 the World Economic Forum reassessed the future of the international monetary system in 2012. In this report the WEF observes a structural imbalance between growing international trade (world trade almost tripled in two decades) and an unchanged international monetary systems. Whereas global trade increasingly integrates markets the regulation of the currency and monetary systems are still fragmented. This imbalance may have fuelled the global financial crises that inflamed in 2008. Despite the coordination efforts of the G20 the imbalances and the instability they cause are still observed in 2012. The WEF signals a 'widespread view that the world is moving towards a multipolar currency system based on the euro, dollar and yuan, in which greater competition between reserve currencies would lead to greater discipline to maintain the respective economies in balance' (World Economic Forum, 2012: 7).

#### **4.1.2.5 Global society: smaller families and exploding civil society**

Several scenario reports focus on issues expected to indicate the future constitution of societies. For example, Stevens and Schieb (2012) focus on the future of families to 2030. They particularly focus on changes in family structures in OECD member countries.

As analysed in-depth in Chapter 2.- of this report "D1.b "Demographic and Social Change Trends and Challenges" number of trends are observed in relation to the composition of households and the shapes of families. Demographic changes are also observed in the scenarios developed by the European Commission concerning the future of Europe (European Commission, 2012).

Key elements worth remembering:

- Average household size falling. The number and share of one-person households is expected to grow in OECD countries
- Marriage rates fall and divorces increase. Almost 10% of all children now live in reconstituted households. The number of children born outside marriage tripled.
- An increasing number of couples without children in most OECD member countries. The number of solo-parent households on the rise. One in 15 children live with their grandparents.'
- Population ageing driven by low fertility rates and increasing life expectancy  
(Stevens & Schieb, 2012: 17)

And additionally, changes in society and technology will also impact on the labour market and the working habits of citizens:

- a generational shift will lead to a more flexible and hyperconnected labour force of 'digital natives'
- growth of highly educated women
- growing workforce in the US
- shrinking workforce in the EU
- increasing fiscal stress and increasing unemployment, with direct impact on family structures
- income inequality is also expected to increase.

From the perspective of the future constitution of societies also the World Economic Forum report on the future role of civil society seems relevant (World Economic Forum, 2013c: 6). The trends, uncertainties, and scenarios in this report are based upon approximately 80 expert interviews and five 'strategic foresight workshops'. The report defines the civil society as the 'area outside the family, market and state, encompassing a spectrum of civil society actors and entities with a wide range of purposes, structures, degrees of organization, membership and geographical coverage' (World Economic Forum, 2013c: 8). By observing the civil society from a global perspective the World Economic Forum witnesses some profound shifts in global civil society. First, civil society appears to become more dynamic. The report states:

'Technology, geopolitics and the markets have created opportunities and pressures, spurring the creation of millions of civil society organizations around the world, giving rise to exciting models for citizen expression both online and offline, and generating increasing involvement in global governance processes' (World Economic Forum, 2013c: 6).

The number of international non-governmental organizations reported in the Yearbook of International Organizations is used as a leading indicator. This Yearbook reports an increase from 6,000 non-governmental organizations in 1990 to 65,000 in 2012. Civil

society also appears to become increasingly vibrant. The online networks and the political use of these networks are mentioned as leading indicators. The report states:

'Since 2010, there has been a renewed energy of citizen expression and participation in different forms around the world, including the Arab Spring revolutions; the Occupy Movement as a response to growing inequality; citizen protests against austerity measures in Greece and Spain; and the "For Fair Elections" protests in the Russian Federation'.

Third, civil society has become increasingly influential:

'Whereas 20 years ago civil society might have been viewed as being in opposition to other sectors; now formally organized and more loosely networked civil society groups are increasingly involved in partnerships with governments and businesses, and are engaged in official consultation processes of multilateral for a such as the G20 and the United Nations.' (World Economic Forum, 2013c: 7)

Fourth, the World Economic Forum observes increasing restrictions on civil society organizations and activities both online and offline. The restrictions may be severe such as banning organizations but more common measures subtly restrict the activities and the networking capacities of these organizations.

A fifth trend observed by the World Economic Forum concerns the roles civil society plays. Among others the civil society's roles include watchdog, expert, and service provider. According to the World Economic Forum these roles are blurring. The roles are 'increasingly carried out through engagement in partnerships and collaborative frameworks across civil society, and with stakeholders from business, government and international organizations' (World Economic Forum, 2013c: 9). Businesses and business leaders also perform civil society roles and the networks of business, civil society and government have become more diverse.

In order to assess the future of the global civil society six 'critical driving forces' are defined in the report that may either be high or low in 2030:

- 'The level and sources of funding for civil society stakeholders
- The social and political influence of increasing access to technology
- The extent and type of citizen engagement with societal challenges
- The state of global and regional geopolitical stability and global integration of markets
- The effect of environmental degradation and climate change on populations
- The level of trust in governments, businesses and international organizations'.

#### ***4.1.2.6 Regions and their global connections: Europe and the east-west axis***

Several scenario studies transcend national borders but to not primarily take a global perspective. For example, in 2012 the European Commission published its scenarios concerning Europe's future. Among others the European Commission argues that electronic voting and social media change the very nature of democracy. Both pressures from within and the rise of illiberal democracy will put more strain on liberal democracies that currently prevail in Europe. The European Commission also foresees that sustainable transport will stay as a major challenge for Europe because of the growing mobility, the continuous need to reduce CO2 and the space occupied by cars, roads, parking places and other means of transportation. The EU innovation gap will continue to draw attention. This gap refers to



the under-performance and under-financing of research and innovation in Europe as a whole.

The Transatlantic Survey aims to map trends across both sides of the Atlantic by interviewing random sets of respondents. A longitudinal analysis reveals a number of stable trends:

- Both Americans and EU citizens expect strong leadership in world affairs from each others leaders;
- A large majority of Europeans has favourable views of the United States even though the European countries differ widely;
- Except for the U.K. a majority of Americans and Europeans think favourably of the EU;
- A majority of Europeans consider the US to be more important for their countries' national interests than Asia; in turn a majority of Americans feels that the EU is more important than Asia for the US national interests;

The views on Russia 'turned from favorable to unfavorable on both sides of the Atlantic'. This view does not represent a mutual feeling because 'half of the Russian respondents (50%) has favorable views of the United States, while two-in-three (53%) thought favorably of the European Union'. (Stelzenmüller c.s., 2012).

#### 4.1.2.7 Overview of the trends

The trends mapped by the scenario reports can be summarized and connected as follows:

- **Global Politics and Law: two power shifts**  
A common denominator in many scenario reports is the global redistribution of power in two ways. First, power will be more evenly distributed between Europe and the US on the one hand and the rest of the world on the other hand. The economic power of Asia will also be converted to political power, rising economies will gain more power and especially countries with scarce natural resources will become increasingly powerful (such as Russia). A second power shift observed in the scenario reports is the more even distribution of power between countries and national governments on the one hand and informal networks, NGO's, businesses, and social movements on the other hand. The more or less natural advantage of informal networks is the fact that these easier transcend national borders and interests.
- **Global Security: diffusing risks and threats but also diffusing power to deal with these risks and threats**  
Many familiar drivers of global risks are defined in the scenario reports. At least four drivers are explicitly mentioned. First, inequality of opportunities, income, wealth and access to resources fueled by individual empowerment and hyperconnectivity may become a prime source of social upheaval, unrest, and instability. Second, the increasing scarcity of natural resources because of climate change will provoke migration and conflict. Third, demographic imbalances due to ageing and urbanization may trigger both migration and concentrations of deprived citizens. The latter are the typical breeding grounds of terrorism and other security risks. Finally, because of technological and economic developments there will be easier access to modern weapons. Globalization both magnifies and multiplies these risks because of the open borders, the global communication possibilities and the increasing interdependencies of economies and infrastructures. The thus magnified

and multiplied risks are major systemic financial or infrastructural failure, resource supply crises, armed conflict and organized violence, governance failures, and many new opportunities for organized crime, terrorism, and illicit trade.

- **Global Economy: globalization slowdown and new K-wave**  
 The financial and economic crisis is expected to have at least three effects the next couple of years. First, global economic growth will be less than it has been for the past two decades. Second, the globalization process in its economic meaning (opening up markets and creating global markets) is expected to stagnate. Third, more government intervention is foreseen in the economy and in the financial system. From a long-term perspective a new K-wave is expected. Again new technologies will trigger such a wave. Intelligent technologies are the most probable candidates that will trigger the next K-wave.
- **Global Society: smaller families, more civil society**  
 The most important trends observed in the included scenario reports are related to demography, the family structure and civil society. With regard to demography ageing is regarded as a predominant trend that is not particularly connected with the West or the OECD countries. With the exception of some parts of the world (e.g. northern Africa) the global population appears to be ageing. Ageing puts stress on the welfare state and on labour markets. With regard to family structure smaller families are expected in the OECD countries. Whereas families may be eroding the global civil society is still exploding.

Taken together these Megatrends reveal a governance imbalance and lots of governance strain. Economies, societies, risks and technologies increasingly transcend national borders and their effect appears to be an integrating effect. The common denominator is globalization. Globalization refers to the dissolving and fading borders between countries and regions. Whereas the trends point towards global integration, the governance mechanisms are still fragmented. The governance gap caused by this imbalance provides opportunities which are usually seen as politically undesired. Businesses are able to avoid taxes, organized crime and illicit trade is facilitated by the the disorganization of law enforcement, and clever actors on financial markets use these imbalances to make lots of money. From a social perspective gap between social and economic integration and governance and legal fragmentation will increasingly cause disruptions and instability.

#### 4.1.3 Critical uncertainties

This chapter will describe seeds and wildcards, which represent critical uncertainties for the global governance. These seeding phenomena can give an indication of other possible directions. However, as they are only emerging, the full impacts are not yet to be predicted. Despite the uncertainty the seeds or wildcards are important to be taken into account when forecasting global law and governance. They are all chosen after an extensive literature review and with a particular focus on their relevance for global governance. Further information on each presented trend can be found in Annex 1.

##### 4.1.3.1 Global Politics

Recently Shell published an innovative scenario report (see [www.shell.com/global/future-energy/scenarios/new-lens-scenarios.html](http://www.shell.com/global/future-energy/scenarios/new-lens-scenarios.html)). Instead of defining key uncertainties and trends Shell focuses on three paradoxes as signs of the times. These paradoxes can be regarded as critical uncertainties because they may propel future developments. The paradoxes identified by Shell are:

1. The prosperity paradox  
 This paradox demonstrates that raising living standards and economic growth contribute to the world's prosperity but simultaneously negatively affect prosperity. It causes stress on the world's resources, politics, and financial systems. Income inequality between nations has been reduced because of economic growth but within nations income inequality has grown. In turn prosperity may thus also breed popular discontent.
2. The connectivity paradox  
 Growing global connectivity is a key driver to global economic growth and global cultural integration but at the same time increases interdependencies and feedback loops. In turn these enhance the instability and volatility of economic and political processes.
3. The leadership paradox  
 This paradox argues that global coordination is increasingly required but it is also becoming increasingly difficult because of the diversity of interests to be taken into account. According to Shell these paradoxes define the tensions that will drive future developments.

#### 4.1.3.2 Global Security

With regard to global security the National Intelligence Council (2012) observes a number of game-changers that may also be regarded as critical uncertainties:

- Crisis-Prone Global Economy. This uncertainty is defined as follows: 'Will global volatility and imbalances among players with different economic interests result in collapse? Or will greater multipolarity lead to increased resiliency in the global economic order?' The National Intelligence Council expects that regional economies in the world will develop with rather different speeds during the next decades. These differences may boost global imbalances. The key uncertainty primarily relates to the impact of global imbalance and regional differences with regard to economic growth and technological advancement. These imbalances may lead to a global breakdown and collapse or to a resilient global economy in which high growth regions and low growth regions alternate.
- Governance Gap. The key question here is whether governments and institutions will be able 'to adapt fast enough to harness change instead of being overwhelmed by it'? The adaptations that appear to be necessary are caused by the diffusion of power and the fragmented governance structures that will result from it. New public and private actors such as cities may become global players and undermine national and multilateral power. It is uncertain whether or not the new fragmented structures will be connected for concerted action and coordination or not.
- Potential for Increased Conflict. Will the 'rapid changes and shifts in power lead to more intrastate and interstate conflicts'? Interstate conflict seems to occur less but this does not mean that conflict is banned from a globalized world. Both intrastate conflict and terrorism may grow. The National Intelligence Council observes that 'three different baskets of risks could conspire to increase the chances of an outbreak of interstate conflict: changing calculations of key players – particularly China, India, and Russia; increasing contention over resource issues; and a wider spectrum of more accessible instruments of war' (National Intelligence Council, 2012: viii).
- Wider Scope of Regional Instability. This key uncertainty is defined as the question whether 'regional stability, especially in the Middle East and South Asia, (will) spill

over and create global insecurity’? According to the National Intelligence Council the potential for interstate conflict has not diminished in some regions. Asia may economically grow at rapid pace but it still lacks a ‘well-anchored regional security framework able to arbitrate and mitigate rising tensions’ (National Intelligence Council, 2012: ix).

- **Impact of New Technologies.** The game-changer here may be the technological breakthroughs ‘to boost economic productivity and solve the problems caused by a growing world population, rapid urbanization, and climate change’? Despite the still rapid development of information technology (the ‘big data’ era) and health technologies, the major uncertainty concerns the technologies related to vital resources such as water, food, and energy. In other words, will the key technologies be developed necessary ‘to meet the food, water, and energy needs of the world’s population’?
- **Role of the United States.** The role of the US is especially important from the perspective of its National Intelligence Council. The question the council poses is whether or not the US be able ‘to work with new partners to reinvent the international system’. If a more balanced geopolitical order emerges out of the imbalanced economic growth we now witness both the US and the EU will have less power in a couple of decades. But this does not necessarily mean that the international political role will become less important. Partly because of its military power and partly because of its leadership, diplomatic tradition, and its success in helping to manage international crises the dominant role of the US may continue even though this is not justified by its economic power.

The National Intelligence Council also defines some *black swans* such as a severe pandemic, rapid climate change, Euro/EU collapse, and a democratic or collapsed China. These black swans may also be regarded as wild cards.

The global shocks identified by the OECD are closely connected with critical uncertainties. The OECD deliberately chose to look at ‘global shocks’ instead of global risks. It argues that the concept of “global shocks” takes account of a different pattern of risk: cascading risks that become active threats as they spread across global systems, whether these arise in health, climate, social or financial systems.” (OECD, 2011: 3). A future global shock is: ‘a rapid onset event with severely disruptive consequences covering at least two continents’ (OECD, 2011: 12). This changing perspective on risk emphasizes the accumulation and propagation of the impact of events because of the interconnectedness of systems. The concept of global shocks also provides policy makers with some new tools to assess risks and to build resilience. According to the OECD report several risks may cause global shocks. These are summarized in the table below.

### Features of potential global shocks

Global shock	Hazard	Precursors	Uncertainties	Global vectors	Frequency
Pandemic	Human influenza	National epidemic threshold exceeded	Location and timing of onset, attack rate, morbidity and mortality	Travel in aeroplanes, wild aquatic birds	$\mu \sim 30$ years
Critical Infrastructure Disruption	Zero day exploit of virus or worm code	Terrorist threats made in advance	Cross-border interdependencies	Internet, USB keys, DVD, CD, floppy disk	?
Financial Crisis	Massive bank illiquidity/insolvencies, currency	Asset bubbles, sudden rise in	Amounts of bank debt exposures	Interconnections of bank debt holdings,	?



Global shock	Hazard	Precursors	Uncertainties	Global vectors	Frequency
	crisis, sovereign default	spread of bank rates		common currencies and pegged currencies	
Geomagnetic storm	Geomagnetically induced current	Coronal mass ejection	Ranges of latitude exposed to direct impacts	Critical infrastructure disruptions	Peaks during 11-year solar cycle
Social unrest	Political revolt or revolution	Riots, protest demonstrations	Duration, severity, credibility	Affiliation of political, religious or cultural identity	?

Table 26 – Features of potential global shocks  
 Source: HiiL 2013

#### 4.1.3.3 Critical uncertainties in the scenarios (see Annex I)

Taken together the scenarios in annex 1 and the underlying critical uncertainties sketch a remarkable coherent picture, at least on the level of critical uncertainties. The key uncertainties on which the scenarios pictured above are built are:

- Geopolitics, governance, law, and regions
  - Will there be a slow or rapid shift of economic power from the US and Europe to Asia and the rising economies? Connected with this power shift is the uncertainty whether liberal (Western) values will become dominant all over the world or whether liberal and illiberal values co-exist?
  - Will adequate and integrated governance mechanisms be developed to deal with new global risks such as scarcity of resources, global inequality, and demographic and economic imbalances or will governance be fragmented?
  - Will there be a stable set of governance mechanisms or will instability and volatility become the main characteristics of global governance mechanisms?
  - Will global governance mechanisms predominantly rest on state actors or non state actors?
- Global security and risks
  - Will global inequality persist or even be reinforced or not? (inequality is associated with social risks such as terrorism, unrest, and instability)
  - Will countries, regions and the globe become more cohesive or will divergent forces prevail and cause conflict?
- Economy
  - Will global economic growth characterize the next decades or will these be decades of economic slowdown? (in turn economic growth is sometimes associated with growing globalization and vice versa)
- Society
  - Will citizens predominantly put their trust in governments, business or civil society?
  - Will there be a culture of intrusive checks, rules, and control mechanisms (a legalistic or low trust culture) or a culture of trust and informal mechanisms (a high trust culture)?
  - Will there be a slow or rapid adoption of human-centric and other technological innovations?

## 4.2 Key challenges for Europe in the World context

### 4.2.1 Megatrends and challenges as defined by the European Commission

In its 2009 report the European Commission identifies three major trends (European Commission, 2009; see section 1.1). These trends are the dawn of an Asian century, increased mobility, and increased scarcity of natural resources. The European Commission concludes that if these trends pursue they may generate some major tensions:

1. A tension between the current methods of production and consumption on the one hand and the availability of non renewable resources. This tension is expected with regard to food consumption and production, access to water, raw materials and energy.
2. A tension between simultaneous global economic differentiation and increased levels of global interdependency. Because of the growing interdependencies the need for political and economic convergence also grows but at the same time the multipolar world fosters political and economic divergence. Human rights, democracy, the rule of law and capitalism will become focus points of debate.
3. Cultural tensions between cosmopolitanism and cultural complexity on the one hand and the integration of migrants and foreigners.

Because of the trends and tensions Europe needs to adapt to some transitions:

1. A transition towards a multi-polar world and global governance. New types of institutions for global governance will arise and the new geopolitical situation will be mirrored in these institutions.
2. The politico-cultural transition towards a new universalism. Global responses are required and demanded and cultural and political heterogeneity will have to be overcome.
3. The transition towards a 'large integrated Europe' and a 'global Europe'. The world's increasing multi-polarity could induce Europe to further enlarge and strengthen its relationships East- and Southward.
4. The transition towards a new 'socio-ecological' production model. In order to adapt to increased scarcity and to provide resource security radical innovations are needed in the current production and consumption systems.
5. The urban transition. The rise of megacities provides some new opportunities for sustainable systems of transport, energy, waste and telecommunication infrastructures. These opportunities require collaboration between Europeans and developing countries and megacities.

The demographic transition. Population growth, longer life expectancy, ageing populations and demographic imbalances induce the need to rethink social security systems (including pensions), migrations policies and Europe's economic vitality.

### 4.2.2 The EU legal strategies as a point of reference for the key challenges

The challenges that can be derived from the Megatrends and the scenarios should be related to strategic goals. The challenges only become relevant if the strategic goals of the EU are taken into account. With regard to law and governance the Megatrends and the critical uncertainties may challenge the EU legal strategies. In order to determine the challenges we therefore need to reconstruct the EU legal strategies first. With regard to the scenarios the relevant legal strategies of the EU are:

1. The EU policies with regard to the EU as a legal order and the EU institutions as legal institutions.
2. The strategies with regard to other legal orders outside the EU, especially with regard to international law in the realms of global politics, global security, the global economy, and global society.

The legal strategies of the EU are not coherently and explicitly laid down in a single policy document. Instead these should be derived from policy documents made up for other purposes, such as the Stockholm program. At least three sources can be used to derive the EU legal strategies:

1. Legal sources, such as the Treaty on European Union and the Treaty on the Functioning of the European Union.
2. Policy documents from the European Commission.
3. Policy documents and statements from the European Council, including the presidency and the High Representative of the Union for Foreign Affairs and Security Policy.

The legal strategies of the EU can be summarized as follows.

1. A 'thick' or broad rule of law approach with regard to the EU legal order

Article 2 TEU expresses the foundations of the legal strategies of the EU and its institutions. It stipulates:

*The Union is founded on the values of respect for human dignity, freedom, democracy, equality, the rule of law and respect for human rights, including the rights of persons belonging to minorities. These values are common to the Member States in a society in which pluralism, non-discrimination, tolerance, justice, solidarity and equality between women and men prevail.*

This article implies that the rule of law is the prime cornerstone of the legal strategy of the EU and its institutions. This article also implies a 'thick' definition of the rule of law that does not merely include legality but also human rights and fundamental freedoms. Many articles in TEU and TFEU emphasize the legality of the EU institutions, such as the articles 4 and 5 TEU and article 13(2) TEU. The EU dedication to human rights and fundamental freedoms is among others emphasized by the Charter of Fundamental Rights of the European Union. This Charter is positioned on the same level as the treaties that constitute the EU and its institutions (TEU and TFEU). Human rights and fundamental freedoms are thus regarded as part and parcel of the EU legal order (article 6(3) TEU). Third, article 2 implies legal equality of EU citizens. Legal equality is also implied by article 3(2) TEU. This paragraph stipulates:

*The Union shall offer its citizens an area of freedom, security and justice without internal frontiers, in which the free movement of persons is ensured in conjunction with appropriate measures with respect to external border controls, asylum, immigration and the prevention and combating of crime.*

And article 9 stipulates:

*In all its activities, the Union shall observe the principle of the equality of its citizens, who shall receive equal attention from its institutions, bodies, offices and agencies. Every national of a Member State shall be a citizen of the Union. Citizenship of the Union shall be additional to and not replace national citizenship.*

More recent policies confirm the EU commitment to fundamental rights and citizenship in the EU. For example, the Stockholm programme defines promoting citizenship and fundamental rights as a key political priority for the European Council. In this programme the European Council invites 'the Union institutions and the Member States to ensure that legal initiatives are and remain consistent with fundamental rights and freedoms throughout the legislative process by way of strengthening the application of the methodology for a systematic and rigorous monitoring of compliance with the European Convention and the rights and freedoms set out in the Charter of Fundamental Rights'.

## 2. Recognizing multi-layeredness and flexibility that allows both scaling-up and scaling-down

A broad or 'thick' rule of law interpretation is the first major policy choice with regard to the EU legal strategies as distilled from legal and policy documents. Second, the legal strategy with regard to the EU legal order is based on multi-layeredness. Ever since the European Court of Justice ruled in *Van Gend en Loos* that EU legal order is considered a 'new legal order of international law for the benefit of which the states have limited their sovereign rights' the EU legal order is regarded as being in some aspects autonomous from the national legal orders of its member states. In *Costa v ENEL* the European Court of Justice ruled that the European legal system has become an integral part of the legal systems of the member states. Article 288 TFEU and Declaration 17 nowadays codify the precedence and (conditionally) the primacy of community law. But except for the Estonian Supreme Court EU has never been recognized as a being supreme (Chalmers, 2010: 190). Next to the primacy and the autonomy of the EU legal order the treaties force EU institutions to respect national law. Article 4(2) TEU stipulates:

*The Union shall respect the equality of Member States before the Treaties as well as their national identities, inherent in their fundamental structures, political and constitutional, inclusive of regional and local self-government. It shall respect their essential State functions, including ensuring the territorial integrity of the State, maintaining law and order and safeguarding national security. In particular, national security remains the sole responsibility of each Member State.*

The EU legal order is thus strategically grounded in both primacy and autonomy of EU law and respect for national authority. Respect for national legal orders is also laid down in TEU in which the principles of subsidiarity and proportionality are expressed (article 5 TEU). Article 5(1) TEU stipulates:

*The use of Union competences is governed by the principles of subsidiarity and proportionality.*

And article 5(3 & 4) stipulates:

*Under the principle of subsidiarity, in areas which do not fall within its exclusive competence, the Union shall act only if and in so far as the objectives of the proposed action cannot be sufficiently achieved by the Member States, either at central level or at regional and local level, but can rather, by reason of the scale or effects of the proposed action, be better achieved at Union level.*

(...)

*Under the principle of proportionality, the content and form of Union action shall not exceed what is necessary to achieve the objectives of the Treaties.*

Article 67(1) stipulates:

*The Union shall constitute an area of freedom, security and justice with respect for*



*fundamental rights and the different legal systems and traditions of the Member States.*

At surface these principles may not seem compatible. The tension between the autonomy and the primacy of EU law on the one hand and respect for national authority and sovereignty (at least partially) may give rise to conflicts between EU law and national law. EU law nowadays provides some directions to resolve conflicts within the EU legal order.

Article 2 TFEU sketches some resolutions for different situations:

- 1. When the Treaties confer on the Union exclusive competence in a specific area, only the Union may legislate and adopt legally binding acts, the Member States being able to do so themselves only if so empowered by the Union or for the implementation of Union acts.*
  - 2. When the Treaties confer on the Union a competence shared with the Member States in a specific area, the Union and the Member States may legislate and adopt legally binding acts in that area. The Member States shall exercise their competence to the extent that the Union has not exercised its competence. The Member States shall again exercise their competence to the extent that the Union has decided to cease exercising its competence.*
  - 3. The Member States shall coordinate their economic and employment policies within arrangements as determined by this Treaty, which the Union shall have competence to provide.*
  - 4. The Union shall have competence, in accordance with the provisions of the Treaty on European Union, to define and implement a common foreign and security policy, including the progressive framing of a common defence policy.*
  - 5. In certain areas and under the conditions laid down in the Treaties, the Union shall have competence to carry out actions to support, coordinate or supplement the actions of the Member States, without thereby superseding their competence in these areas.*
- Legally binding acts of the Union adopted on the basis of the provisions of the Treaties relating to these areas shall not entail harmonisation of Member States' laws or regulations.*
- 6. The scope of and arrangements for exercising the Union's competences shall be determined by the provisions of the Treaties relating to each area.*

TFEU even provides for a legal instrument for scaling-up policies and law to the EU level without the necessary authority has been conferred to the EU institutions. It stipulates:

- 1. If action by the Union should prove necessary, within the framework of the policies defined in the Treaties, to attain one of the objectives set out in the Treaties, and the Treaties have not provided the necessary powers, the Council, acting unanimously on a proposal from the Commission and after obtaining the consent of the European Parliament, shall adopt the appropriate measures. Where the measures in question are adopted by the Council in accordance with a special legislative procedure, it shall also act unanimously on a proposal from the Commission and after obtaining the consent of the European Parliament.*
- 2. Using the procedure for monitoring the subsidiarity principle referred to in Article 5(3) of the Treaty on European Union, the Commission shall draw national Parliaments' attention to proposals based on this Article.*
- 3. Measures based on this Article shall not entail harmonisation of Member States' laws or regulations in cases where the Treaties exclude such harmonisation.*
- 4. This Article cannot serve as a basis for attaining objectives pertaining to the common foreign and security policy and any acts adopted pursuant to this Article*

*shall respect the limits set out in Article 40, second paragraph, of the Treaty on European Union.*

The legal order is thus intentionally designed as a multi-layered legal order that both allows scaling-up and scaling-down and tensions between different legal layers. More recent policy programs seem to point at further harmonization and integration of the legal order. For example, the Stockholm programme states as one of the political priorities:

*'The achievement of a European area of justice must be consolidated so as to move beyond the current fragmentation.'*

The Stockholm programme also emphasizes 'legal coherence'. It states:

*'Better regulation and better law-making principles should be strengthened throughout the decision-making procedure. ... The European Council invites the Council and the Commission to enhance the internal coordination in order to achieve greater coherence between external and internal elements of the work in the area of freedom, security and justice.'*

For many years the European Commission has adopted specific policies for regulatory quality, smart regulation and regulatory fitness. These policies will be combined in 2014 into a 'Regulatory Fitness and Performance Programme'. Even though this programme seems to be primarily meant to reduce administrative costs it also aims at strengthening the coherence of the EU legal order.

### 3. Global constitutionalism and a 'thick' rule of law approach

Regarding its external policies and global legal strategies article 2(5) TEU provides some strict guidelines. It stipulates:

*In its relations with the wider world, the Union shall uphold and promote its values and interests and contribute to the protection of its citizens. It shall contribute to peace, security, the sustainable development of the Earth, solidarity and mutual respect among peoples, free and fair trade, eradication of poverty and the protection of human rights, in particular the rights of the child, as well as to the strict observance and the development of international law, including respect for the principles of the United Nations Charter.*

Again the rule of law both in its meaning of legality and its meaning of human rights appears to be the basic core of the legal strategy (e.g. article 21 TEU, article 23 TEU). The same principles should be taken into account in the relations between the EU and its neighbors (article 8 TEU).

Second, with regard to the global legal environment TEU also explicitly addresses the ideals to be strived for. Article 21(1) TEU stipulates:

*The Union's action on the international scene shall be guided by the principles which have inspired its own creation, development and enlargement, and which it seeks to advance in the wider world: democracy, the rule of law, the universality and indivisibility of human rights and fundamental freedoms, respect for human dignity, the principles of equality and solidarity, and respect for the principles of the United Nations Charter and international law.*

*The Union shall seek to develop relations and build partnerships with third countries, and international, regional or global organisations which share the principles referred to in the first subparagraph. It shall promote multilateral solutions to common problems, in particular in the framework of the United Nations.*

The framework of the UN appears to be the EUs most desired framework for multilateral cooperation. Global economic integration and global harmonization of the rule of law and human rights are also explicitly stated as the goals of the external (including international) policies of the EU (article 21 TEU). For example, the external policies should be directed towards promoting an international system based on stronger multilateral cooperation and good global governance (article 21(2) sub h TEU).

In its Stockholm programme the European Council reaffirms the importance of promoting fundamental rights both within and outside the Union. The Council argues that the 'values of the Union should be promoted and strict compliance with and development of international law should be respected'. The programme also defines the key partners of the EU, in particular:

- *Candidate countries and countries with a European Union membership perspective for which the main objective would be to assist them in transposing the acquis,*
- *European neighbourhood countries, and other key partners with whom the Union should cooperate on all issues in the area of freedom, security and justice,*
- *EEA/Schengen states have a close relationship with the Union. (....)*
- *the United States of America, the Russian Federation and other strategic partners with which the Union should cooperate on all issues in the area of freedom, security and justice,*
- *other countries or regions of priority, in terms of their contribution to EU strategic or geographical priorities,*
- *International organisations such as the UN and the Council of Europe with whom the Union needs to continue to work and within which the Union should coordinate its position.*

With regard to international organisations the Council reaffirms the UN as the foundation for global governance in its Stockholm programme:

*'The UN remains the most important international organization for the Union. The Lisbon Treaty creates the basis for more coherent and efficient Union participation in the work of the UN and other international organisations. The Union should continue to promote European and international standards and the ratification of international conventions, in particular those developed under the auspices of the UN and the Council of Europe.'*

Strengthening the UN is also a cornerstone of the European Security and Defence Policy (ESDP). The EU appears to choose for a multilateral global order in which the UN are positioned at the top. In its policies the European Council also chooses to cooperate with regional organizations (African Union, ASEAN) and global players like the United States of America and China.

#### **4.2.3 Key challenges for the EU legal strategies as derived from the stock of scenarios**

The key challenges for Europe in the world context can be determined by confronting the Megatrends and critical uncertainties mentioned in the sections 1.1 and 1.2 with the legal strategies sketched above. Taken together the scenarios and the underlying key uncertainties sketch a remarkable coherent picture, at least on the level of key uncertainties.

The key uncertainties on which the scenarios have already been pictured before<sup>54</sup>, but can be synthesized once again as follows:

- Changing and more diverse geopolitics at global level
- Continued global economic growth in the future or economic slowdown
- States as main geopolitical actors or Others
- More cohesive world or more divergent conflictive forces
- More integrated governance mechanisms or more instability
- More liberal values in the world or more illiberal values
- Citizen trust in governments, business or civil society
- Security and control culture VS more trust and informality
- Increasing social risks derived from rising inequalities (terrorism, unrest, instability)
- Slow or rapid adoption of human-centric and other technological innovations

To a large extent the stocktaking exercise confirms the Hiil scenarios and the key uncertainties on which these scenarios have been built. The uncertainty with regard to the predominance of public or private governance mechanisms is strongly connected with the observed power shift from state actors to non-state actors and informal networks and coalitions. This uncertainty is thus confirmed by the stocktaking exercise. Second, the internationalization uncertainty is slightly connected with the question of fragmented or coordinated global governance mechanisms but these are not synonymous. The uncertainty whether global governance mechanisms are fragmented or coordinated seems to better capture the core question with regard to the global legal environment than the key uncertainty in the Hiil scenarios (nationalization or internationalization of law). The internationalization uncertainty is too much defined from the national law perspective whereas the fragmentation/coordination uncertainty primarily focuses on the global legal environment. Second, the issue of a possible governance gap is better captured by the fragmentation/coordination uncertainty than by the internationalization/reversed internationalization uncertainty. The third key uncertainty used in the Hiil scenarios (will there be further spread of the rule of law?) is also confirmed in our stocktaking. First, it is connected with the uncertainty regarding a global consensus on liberal (Western) values. But the rule of law in its 'thick' interpretation also appears to be the nucleus of the EU legal strategy. Whereas this uncertainty was eliminated from the Hiil scenarios before FLAGSHIP requires that the rule of law is included. Because of the importance of the 'thick' rule of law approach in the EU legal strategy (both with regard to the EU legal order and with regard to the global legal environment) the key uncertainty needs to be included in the FLAGSHIP scenarios.

There are thus sound reasons to amend the Hiil scenarios on at least two points. First, the internationalization/reversed internationalization uncertainty should be replaced by the fragmentedness/coordinatedness of the global legal environment. The latter much better captures what is at stake with regard to the global legal environment. Second, the rule of law in its 'thick' definition needs to be included in the FLAGSHIP scenarios. Including this definition may lessen the worldwide applicability of the scenarios but it dramatically increases their use for the EU legal strategy. The FLAGSHIP scenarios on law and governance should thus be built on three critical uncertainties

The critical uncertainties are:

- Will more fragmented or more coordinated legal and governance mechanisms evolve on the global level?
- Will legal and governance mechanisms become predominantly formal and connected with state actors or predominantly informal and connected with private actors?

<sup>54</sup> See chapter 4.1.3.3 "Critical uncertainties in the scenarios (see Annex I)" on this report



- Will these legal and governance mechanisms be characterized by a 'thick' or broad rule of law approach (legality + human rights) or by a 'thin' or small rule of law approach (legality)

These changes affect the key uncertainties but do they do not necessarily lead to new labels. The Hiil labels can still be used, but these have to be complemented because of the third key uncertainty. The narratives captured by these labels require thorough rethinking and rewriting because of the changes on the level of key uncertainties. The scenarios are therefore adjusted according to table ...

### Adjusted Hiil scenarios

	Formal/state	Informal/private
Fragmented law and governance	Legal borders (either with or without human rights)	Legal tribes (either with or without human rights)
Coordinated law and governance	Global constitution (either with or without human rights)	Legal internet (either with or without human rights)

Table 27 – Adjusted Hiil scenarios  
Source: Hiil 2013

The challenges posed by these scenarios are connected with the legal strategies of the EU. These have been summarized as follows:

1. A 'thick' or broad rule of law approach with regard to the EU legal order;
2. Recognizing multi-layeredness and flexibility that allows both scaling-up and scaling-down;
3. Global constitutionalism and a 'thick' rule of law approach.

If the legal strategies of the EU are confronted with the scenarios sketched above at least two mutually connected key challenges for Europe are revealed. These challenges are derived from both the Megatrends and critical uncertainties. The two major challenges caused by these trends and critical uncertainties are the global coordination challenge and the global rule of law challenge.

### 1. The global coordination challenge

Many Megatrends and critical uncertainties trigger growing interdependencies on a global scale. These interdependencies are connected with increasing scarcity of resources, hyperconnectedness of economies and societies and growing risks and global shocks. The interdependencies should be countered by global governance mechanisms that enable either public or private regulation. Lacking global coordination will result in a governance gap. The first challenge for Europe as well as for other global powers therefore is to avoid the global governance gap. Closely connected with the challenge to avoiding a global governance gap is the challenge to align the necessary global governance mechanisms with the multi-layeredness of the EU legal order.

### 2. The global ('thick') rule of Law challenge

The 'thick' rule of law approach is a major cornerstone in the EU legal strategy. Both with regard to the internal EU order and the desired global legal order the EU pursues 'thick' rule of law strategies. These strategies aim at embedding the principle of lawfulness as well as fundamental rights in global governance mechanisms. Several Megatrends and critical uncertainties affect these strategic goals. For example, the rise of the Asian century and the geopolitical shift of power may hamper the inclusion of fundamental rights in global governance mechanisms. Global risks and global shocks may also trigger policies that are

in opposition with the fundamental rights currently embedded in the EU legal order. Third, migration may affect both the legitimacy of fundamental rights within the EU legal order and on a global scale. Europe is thus confronted with a rule of law challenge.

#### 4.2.4 SWOT table

The EU cannot adequately address the dual challenges of global coordination and 'thick' rule of law by itself. It is not the grand designer of the global legal environment; it is part of it. At the same time, the EU cannot sit back in apathy and wait either. It has to act in order to achieve its goals. The strategies it adopts should take into account the strengths and weaknesses of the EU as an actor within the global legal environment and the opportunities and threats that occur in the global legal environment.

##### Strengths

- The legal strategies of the EU emphasize a 'thick' rule of law approach, both with regard to the EU legal order itself and vis à vis the external global legal environment. One of the major strengths of the EU is that its legal order is already built on a 'thick' rule of law approach, which is quite deeply entrenched within the national legal orders of its members. Whereas only recently fundamental rights have been incorporated in the EU legal order other foundations such as legality and lawfulness have been part and parcel of the EU legal order from the start. A 'thick' rule of law approach also characterizes the legal orders of the member states. Member states have also signed the European Convention for the Protection of Human Rights and Fundamental Freedoms. Accordingly, a fairly solid 'thick' rule of law tradition and stable institutions to guarantee compliance to such an approach can be regarded as a major strength of the EU.
- Second, the political commitment to the rule of law and to a 'thick' rule of law approach seems stable, well anchored, and widespread within the EU. This is also strength.
- Third, from a geopolitical perspective the EU represents a major market. By using the access to its markets the EU is able to exercise the power to promote and sometimes even force a 'thick' rule of law approach. For example, with regard to child labour or respecting workers rights the EU is able to use the access to its markets to force business to comply with EU standards.
- Fourth, the EU represents mayor investment power.
- Fifth, the EU has one of the world's largest development aid budgets.
- The EU is, by any standards, still seen as a very attractive place to live (consistent high levels of wellbeing and wealth) and the governance model that supports this is seen as a good one.

##### Weaknesses

- The main weakness comes from a possible breaking down of the political, social and cultural consensus on rule of law in the EU, for example as result of a major security crisis. This could come from political fragility.
- The EU is a complex entity. Decision-making can be slow and sluggish. Consensus is not always possible. It can take a while to get interests aligned. This does not

always make it possible for the EU to act as one, to act fast, and to be coherent over a longer period in all policy areas.

- States with governance systems that differ from that of the EU (a tendency to coordinate internationally and a foundation in a thick rule of law) are beginning to present alternative governance models which may be seen as credible. The EU's way is not longer automatically the beacon of light to navigate to.

## Opportunities

- From its strengths come its opportunities. The economic might that the EU presents both as a market place and as a source of investment can be leveraged to push for basic rule of law standards and international coordination in areas important for the EU.
- The EU is also one of the world's largest donors. This can also be leveraged to push for rule of law and democracy.
- The growing importance of non-state actors and trust in civil society also represents an opportunity. If non-state actors also adopt a 'thick' rule of law approach they can be regarded as partners in an EU led coalition to further embed this approach in the global legal environment. If the EU chooses to use this opportunity it should allow the 'soft law' of non-state actors in both the EU legal order and the global legal environment.

## Threats

- Rapid geopolitical shift of power from the US and the EU to Asia. Many countries in Asia do not have the 'thick' rule of law tradition so embedded within the EU and US legal orders. At its best, this means that the EU will have to deal with states that are not well equipped to deal with thick rule of law concepts. At its worst, these states will actively push their alternative governance model.
- An extended period of economic stagnation will undermine internal trust in the EU governance system and will decrease the leveraging power of the EU in economic terms.
- Inequality is defined as one of the major critical uncertainties. Growing inequality on a global scale may become a threat because it undermines public and political support for a 'thick' rule of law approach. Inequality commonly causes more crime, more migration, and more social and political unrest. In turn, the economic, social, cultural, and political conditions under which a 'thick' rule of law approach flourishes are affected. Any strategy that aims to preserve the conditions for a stable and 'thick' rule of law approach needs to address global inequality.

## Strengths

## Weaknesses

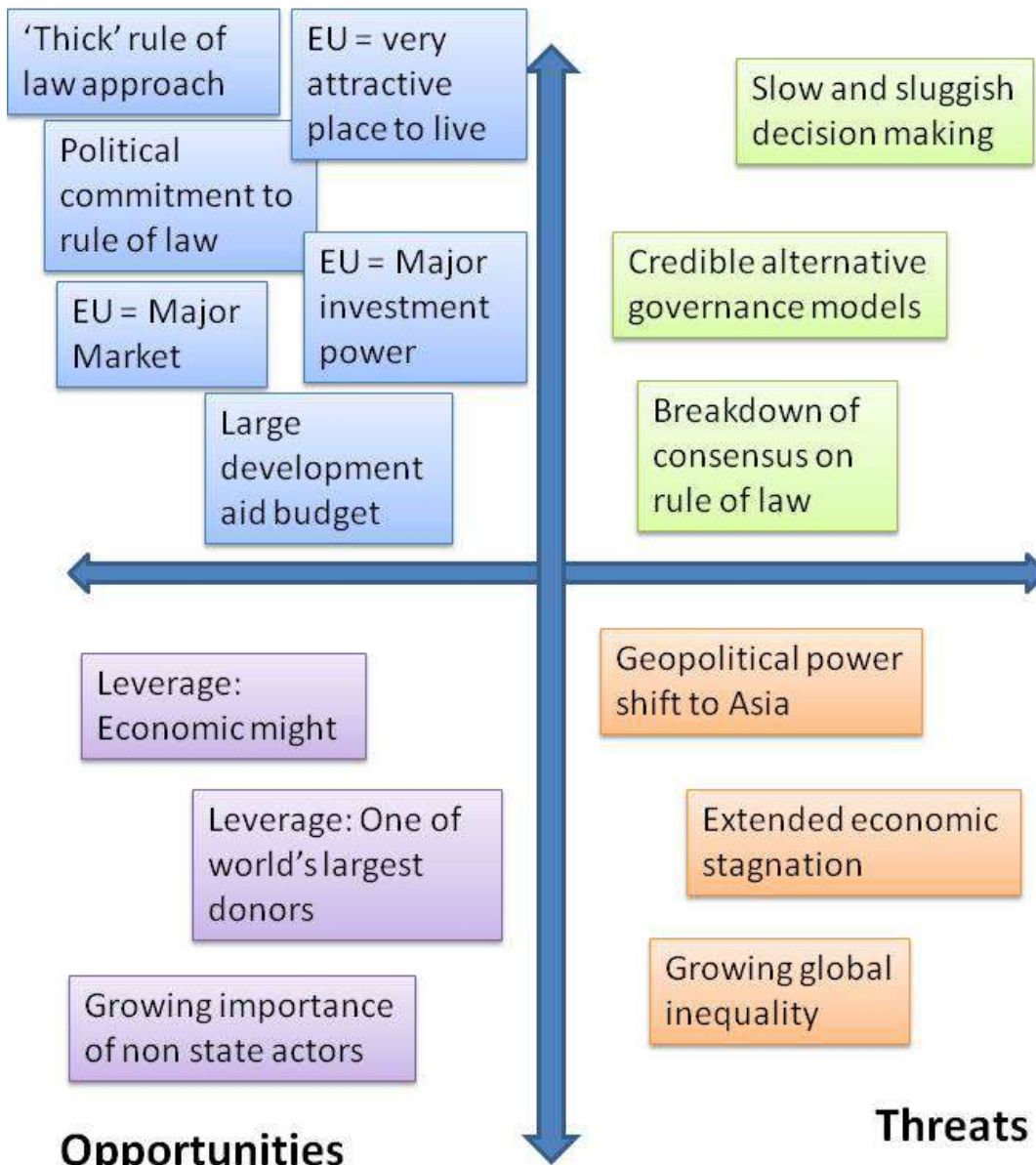


Table 28 –SWOT table of the Governance thematic area



## 5.- D1.e “Territorial dimension of Grand Societal Challenges”

### 5.1 Megatrends at Global and European level

#### 5.1.1 Introduction

Territorial development is highly dependent on current societal trends and changes. The evolution of the society can be understood in the framework of Kondratiev waves, which is assuming the economic growth is driven by a specific technological revolution. In that light today's society is characterised by the 5<sup>th</sup> k-wave of “Communication Technologies”. The Megatrends presented in this chapter therefore represent concretisations and outcomes of this wave. Yet signs of the beginning of a 6<sup>th</sup> wave are emerging. Gradually as the challenge of climate change and environmental degradation grow, a focus on sustainability and technologies focusing on solving these issue increases. The critical need for at the same time increasing productivity as well as decreasing the environmental impact paves the way for a 6<sup>th</sup> wave of “Eco-innovation and –technologies” (M. H. Smith 2005).

The following provides an outline of ongoing work at the current state of the project. All trends, seeds and wildcards are selected on the basis on an extensive literature review, in which we have paid particular attention to their relevance for territorial development. Furthermore most trends cover very broad phenomena, and the report thereby aims at giving an overview of the most important trends and challenges for Europe in the future. This report reflects the knowledge we gained so far in relation to drivers and challenges for territorial development. We envisage to dig deeper into a selection of trends of which we believe are of most importance in the on-going work.

The trends screened in this report overlap to a certain degree with trends discussed in other tasks running in parallel. This overlap illustrates possible connection points and synergies in the further work of the Flagship team. Furthermore, it underlines the need to consider some of the trends approached in other task at more general level with a higher level of territorial nuance and their links to governance processes. The very same trend can play out differently in different types of regions or cities and therefore pose different governance challenges in different locations. Furthermore, it meets different governance contexts in different locations, which need to be considered in addition to the wider overarching governance trends in Europe. This is also linked to the question of the importance of a place-based approach for territorial governance, emphasising the needs to better consider local and regional development conditions and the involvement of ‘local elites’ and their tacit knowledge in multi-level governance approaches (see Barca 2009).

The presentation of drivers and challenges is divided into two sections. The first is looking at megatrends, which are already a present factor and therefore very likely to strongly influence the territorial development in the future. The next section reflects on critical uncertainties, which are seeding trends whose impact are still not known, as well as potential wildcards, which might change the development in unexpected directions. To get a more detailed description of each trend, fact sheets for every trend are available in the annex.

Territorial development covers many areas, which is why the sections are sub-divided into five themes; (a) Resources & Environment, (b) Economy & Growth, (c) Knowledge & Technology, (d) Demography & Society and (e) Governance. The mind map seen on the next figure gives a first overview of the identified trends. As economy and particular growth are the main drivers behind territorial development, trends in this theme are not surprisingly dominant in numbers. As seen on the figure these trends are divided into four

group; which is later on referred to as (a) Regional Development, (b) Financial trends, (c) Europe in the World and (d) Metropolitan areas.

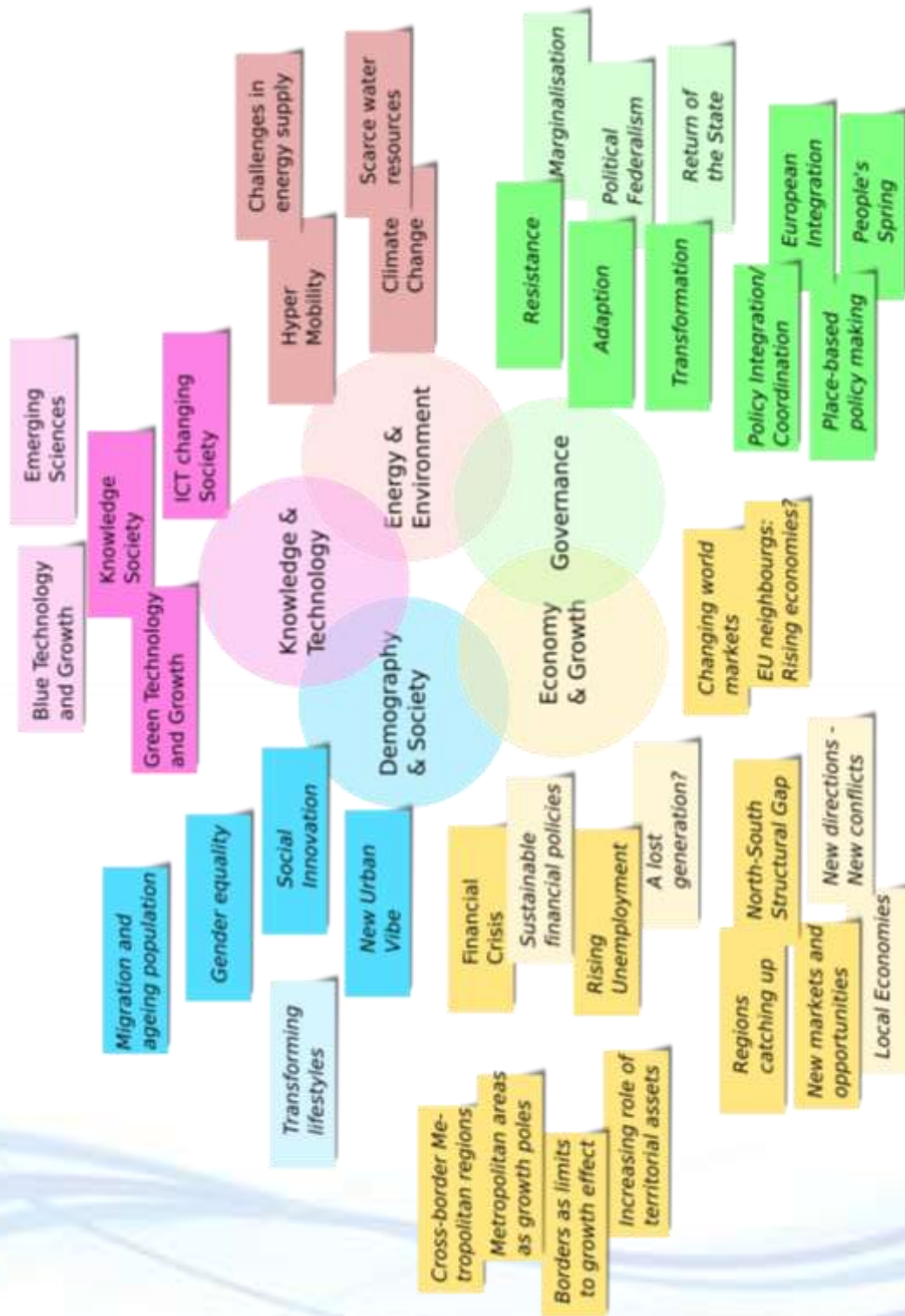


Figure 71 - Mindmap of Territorial development and governance trends. Dark colors = Megatrends, Bright colors = Seeds and Wildcards  
Source: Spatial Foresight 2013

### 5.1.2 Territorial Development Megatrends

The following megatrends are a selection of trends, which are believed to have a strong influence on territorial development in Europe at present, as well as in the future. They are all chosen after an extensive literature review and with a particular focus on their relevance for territorial development.

Further information on each presented trend can be found in the fact sheets annex.

#### **5.1.2.1 Resources & Environment**

The first selection of trends deals with the growing use of resources and energy as well as the pressure on the environment. Climate change is an obvious megatrend which challenges are already present, furthermore the increasing demand of natural resources (in particular energy and water) makes these trends inevitable to consider. At last, the growing mobility in today's society is an environmental challenge, as well as an important factor in understanding our changing world.

##### **Climate changes / Changing approach to climate change**

Although their extent is uncertain and will vary between different regions, the megatrend of climate Change contains five trends that are closely related to each other (Strategic Foresight Initiative 2011): (1) Global temperature is projected to increase, (2) The intensity of hurricanes is likely to increase, (3) Sea levels will rise, (4) Floods and droughts are likely to become more common and more intense, (5) The effects will pose a threat to human health and shift disease patterns.

The impacts of climate change vary considerably across regions with different types of impacts and different degrees of vulnerability (TA 2020 2011). In order to fully understand the territorial impact of climate change, five different dimensions of sensitivity should be considered; Physical, Social, Economic, Environmental and Cultural sensitivity (ESPON 2011).

In relation to economic sensitivity; "climate change is likely to significantly change sectoral conditions. Therefore, certain regions will face increasing pressure for sectoral adaptation and in the worst case restructuring of the regional economy. This applies especially to regions dominated by the most vulnerable climate change sectors: fishery, agriculture, tourism, forestry and energy" (p. 20, European Commission 2009).

Furthermore, some areas have a high social sensitivity towards climate change. The impacts might force people to abandon areas where life becomes unbearable. Rising sea levels will even threaten whole countries. The Maldivian government is already looking for places to relocate when the water will inundate the islands slowly but surely (CNN 2008). Low-lying (i.e. partly below sea level) countries like Bangladesh or the Netherlands will have to spend more efforts to protect their territories (Aerts 2009).

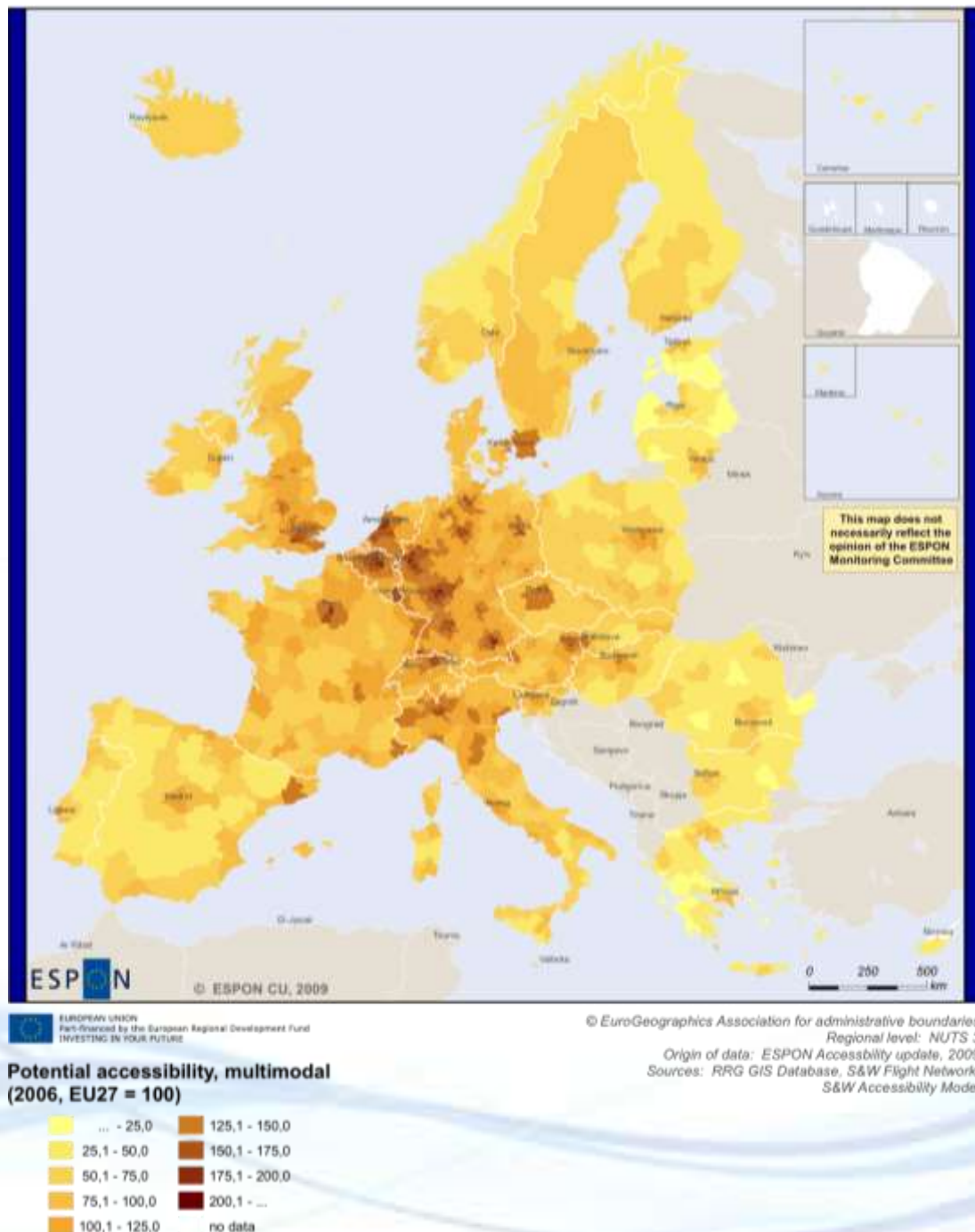
Climate change as opportunity. "Regions have different opportunities to embed adaptation and mitigation into their strategies, decreasing greenhouse gas emissions and adjusting their socioeconomic systems to a low carbon economy (...) developing environmental services of the ecologically active areas, such as Natura 2000 et. It also opens new possibilities for green growth and green technologies such as carbon capture and sequestration possibilities" (p. 6 and 17, TA 2020 2011).

##### **Hyper mobility**

Hypermobility refers to the vast growth in mobility by a small number of individuals (only 2-3% of global population participate in international air travel e.g.) and is defined as the maximisation of physical movement (Gössling et al. 2009). An average Briton travelled 5



miles per day in 1950, 30 miles in 2000 and is expected to travel 60 miles per day in 2025 (Adams 2001), yet hypermobile travellers even travel up to 250 km per person per day (2002/2003) (Gössling et al. 2006). The trend from frequent but shorter trips to more distant locations will continue in both leisure- and business-related transport (Gössling et al. 2009), and promote time and territorial delimitation of both professional and private life, and therefore lead to more complex and distinct social networks and family structures (Schier and Jurczyk 2008).

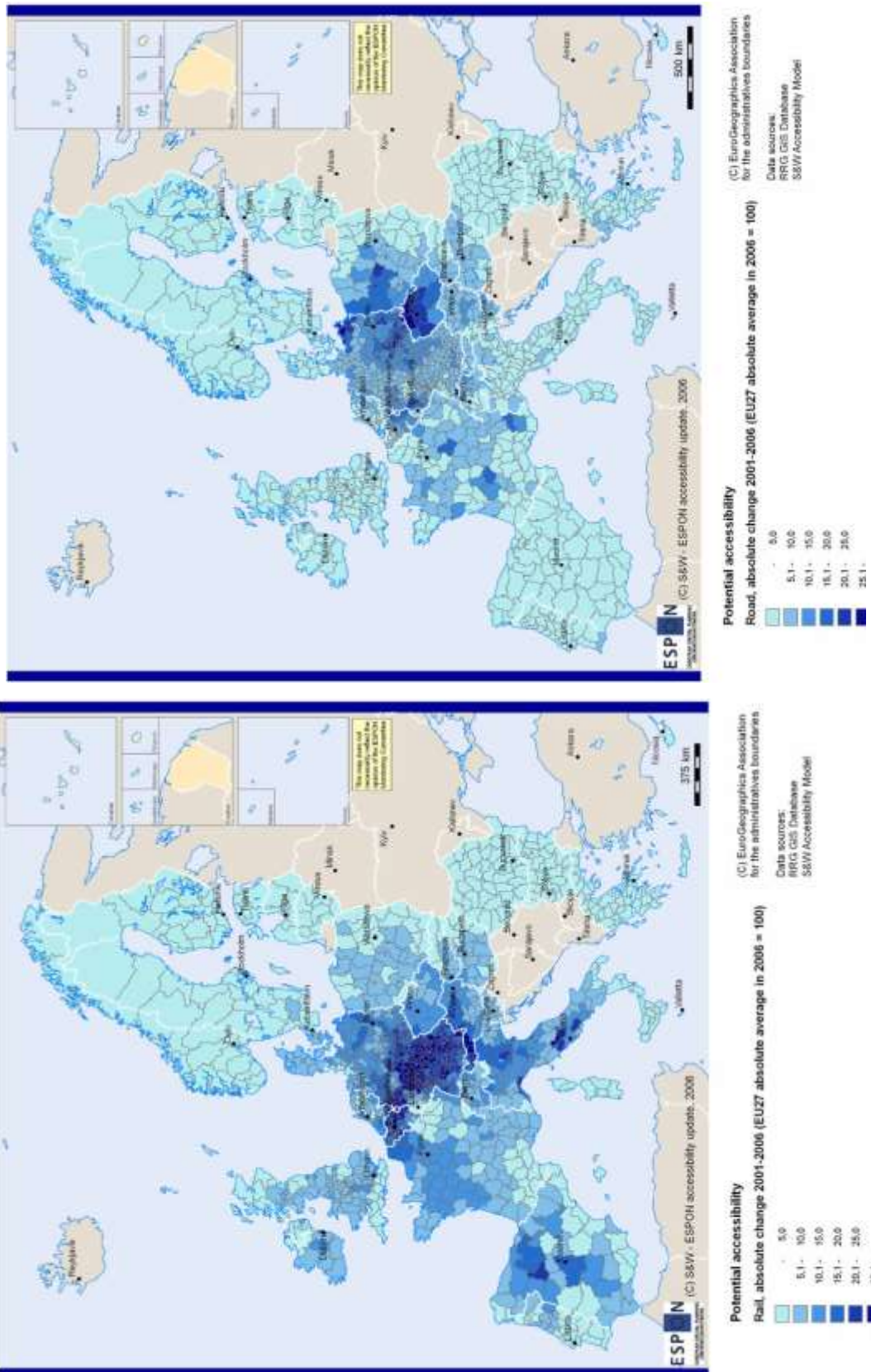


The change in mobility patterns fundamentally changes perceptions of distance, place, space, as well as routine and non-routine environments (Gössling et al. 2009). Long-distance rail traffic is directly affected by aviation's increasing competitiveness. This brings



forward a new dimension of long-distance rail traffic facilities like the Trans-rapid Beijing-Shanghai or AGV Torino/Venice-Salerno.

As seen on Map 16 the potential accessibility differs greatly across Europe. The pentagon of London, Paris, Milano, Munich and Hamburg are not surprisingly very well connected. While other parts of Europe shows high concentration around the main cities, and poor accessibility in the surrounding regions. Map 17 illustrates the total change in rail and road accessibility between 2001 and 2006. While there are significant differences between the changes in rail and road accessibility, what is most striking is the lack of development in peripheral regions. Both general accessibility but also national and regional disparities concerning availability and affordability of traffic will further increase, especially between hubs / spokes, and remote / peripheral areas. Increasing mobility of goods and people will deepen the global division of labour and therefore affect regional economies but probably hamper decoupling transport from GDP growth.



Map 17- Absolute change in potential accessibility by rail or road, 2001-2006  
Source: S&W, ESPON Accessibility Update 2006

### **Challenges in energy supply**

The question of energy supply is highly influenced by two main developments: On the one hand the era of cheap conventional energy sources seems to be coming to an end, due to both limited resources and increasing demand. On the other hand, climate change requires substantial reductions in greenhouse emission, i.e. using less or even carbon-neutral energy (Lechtenböhmer et al. 2008).

If conventional energy sources (coal, gas, oil) get more expensive, other energy sources become more competitive. New technologies (i.e. hydraulic fracturing) allows for exploiting natural resources for gas, which previously were not accessible. The technique releases gas and oil from shale rocks, by fracking them with injection of liquid at high pressures. However this new technology implies enormous pollution of the environment, as large amount of water and chemicals are used in the process. Alternative and renewable energies are often related to green or blue growth. Breeding and treatment of different algae types might provide opportunities to promote renewable energies, which would diminish the dilemma 'food vs. fuel'. This dilemma will however remain very relevant as long as both world population and energy demand increase.

Both global powers, the US and China, currently build nuclear power plants. Within the EU, Finland plans to start new constructions, while Sweden cancelled its decision to close nuclear plants. Other countries might come to the same decision in order to become less vulnerable to Russian or Arab energy supplies. The linkages of the energy net in Europe are further developing (e.g. smart grids), and the already emerging present interdependencies of the energy supply between countries will further deepen. Furthermore, the possibility of new sources of fossil fuels in regions that are not net energy producers at the moment (e.g. Cyprus, Greece and other Mediterranean countries) could change the worldwide economic power structure dramatically (CNN 2013; William Engdahl 2013)

### **Scarce water resources**

Because demand for food and water will increase substantially (35-40% until 2030, up to 70% until 2050) due to permanent global population growth, problems pertaining to one of these resources will always affect supply and demand for the other. Growing demands might lead to scarcities in the next 15-20 years (National Intelligence Council 2012). Dams and water reservoirs are already built in order to guarantee water supply. These infrastructures can have side effects on other countries as their water supply worsens as an outcome of a dam or reservoir close in a neighbouring country. One example of this is the likely conflict between Egypt and Ethiopia over the Ethiopian construction of a dam on the Nile in the Ethiopian territory that will affect the level of Nasser lake waters. If clean water runs shorter and shorter, this development might cause geopolitical and even military conflicts (Le Monde diplomatique 2009).

Climate change will further deepen regional disparities of water supply as the severity of existing patterns will intensify, with wet areas getting wetter and dry and arid areas becoming more so (National Intelligence Council 2012). Therefore, breakthroughs pertaining to the security of vital resources will be essential. Because of close linkages to agriculture and food production, key technologies also include genetically modified crops, precision agriculture and water irrigation techniques (National Intelligence Council 2012). One can generally expect both intensification on existing cultivated land and expansion of farmland (FAO 2011).

Hence, the key questions concern an effective management of critical resources, the extent to which technologies mitigate resource challenges, and better governance mechanisms to avoid bad outcomes of potential conflicting interest of water resources, are important factors in overcoming the challenges the increased demand for clean water brings (National Intelligence Council 2012).

### 5.1.2.2 Economy & Growth

The second section focuses on a selected range of different trends which all influence economic growth. This includes financial policies, changes on the world market, as well as regional development tendencies. The financial crisis has a strong influence in many parts of society. In the following some of the main impacts and challenges are outlined. Despite the financial crisis, trends in relation to emerging markets and new growth opportunities are seen as well. These are important to give an idea of Europe's way out of the crisis. Additionally, trends of a changing economic pattern of regional development in Europe are presented.

#### Financial crisis impacting territorial development differently

"The extent to which the financial crisis and the subsequent recession have been affecting the EU regions strongly depends on their initial structural conditions and associated vulnerabilities. The major impacts can be grouped into five key vulnerabilities of regions that basically all influence each other (...): (i) the crisis of the capital and durable goods industries; (ii) the crisis of the real estate market and the construction sector; (iii) the crisis of the financial sector; (iv) the crisis of household incomes and (v) the crisis of increasing government deficits boosted by the crisis and related countermeasures" (p. 14, Öir et al. 2011). Vulnerability analysis shows that:

- "In the **manufacturing focus**, the Nordic countries, the UK, and some industrial regions of the Eastern European New Member States are among the most vulnerable. Additionally, traditionally industrialized regions in other member states, such as Ireland, Northern Italy, central Austria or Southern Germany are concerned. The least vulnerable regions across the Union are more rural regions, where agriculture and tourism are important. When demand on the world market will have started to increase again, these regions will be amongst the first to recover. Only regions whose industrial mix is in more need of structural reforms will continue to struggle." (p. I, Öir et al. 2011)
- "The **construction sector** is not elastic to global demand, but to the local financial and real estate markets and to public and private investments. Therefore, economic 'boom' regions of the last decade and tourist regions are among the most vulnerable concerning building activities: the Baltic states, Ireland, the UK, Spain and many coastal regions in the Mediterranean. But also Norwegian, Danish, Austrian and Belgian regions show increased construction sector vulnerability. The construction sector is much less likely to recover quickly." (p. I, Öir et al. 2011).
- "The impact of the crisis of the **financial sector** is difficult to localise on regions, because of the systemic and volatile nature of the industry that only depends on territory to a minor extent. However, urban regions that house large financial centres, such as the United Kingdom, Ireland and Luxembourg, are more exposed to financial turbulence than others. Several European capital cities with less intensive bank support measures (the regions of Prague, Budapest, Madrid, Lisbon, Rome, Paris) are most vulnerable. Additionally, countries/regions which are the home base of cross-border banking activities in struggling emerging economies in Central and Eastern Europe are also likely to be more strongly affected (notably Austria, Belgium and Sweden, with Sweden being exposed to the Baltic economies). Furthermore, industrialised regions with an important financial sector are also observed to be most vulnerable (e.g. Milan, Turin and Genoa in Italy, Munich, Hamburg and Frankfurt in Germany, and Cyprus)." (p. 19, Öir et al. 2011).



### **New emerging markets and growth opportunities**

Europe's position on the global market is in decline, new emerging economies (in particular the BRICS countries: Brazil, Russia, India, China, South Africa) are expecting to get a bigger share in the future (Goldman Sachs 2013). However, it is not certain if the export will decline, or if Europe will manage to either keep the level of trade or increase it.

In Europe public budget reductions and a changing market characterise the economy. This creates a serious challenge for Europe, both in order to remain a competitive region but also to insure the population in terms of jobs and security.

Whereas some markets will disappear and de-localisation of industries in Europe will continue, new industries, in particular in the service sector, are likely to flourish.

With the increased focus in green growth and protection of the environment in Europe, a new emerging market could derive from the waste and environmental management expertise that is being built. Exporting the knowledge and expertise to markets outside EU could be a likely possibility in the future. Blue growth could furthermore be a new emerging market.

Furthermore the leisure and tourism economy are expected to grow in Europe. The growing Chinese middleclass already brings more tourists from China to Europe (Aramberri and Liang 2012). The growing number of tourists from outside Europe will likely mean an expansion of the traditional and cultural tourism. A Europe economically relying on Asian tourists could be a scenario for the future (Kunzmann 2010).

Rapid technology innovation creates a smart, mobile world. "Smart technology offers the promise of remote access to health care and education, while blurring boundaries between industries. The power of the individual will grow and new competitors will emerge, disrupting industries and creating new business models" (Ernst & Young 2011).

Smart Specialisation in Europe. In Europe a shift towards a more individualised growth policy is seen as well. Even though the common goals and strategy might be the same (e.g. Europe 2020), it is stressed that the regional implementation needs to focus on the uniqueness and existing strengths of each region. One example of this is the EU strategy of Smart Specialisation (European Commission 2012a).

### **Regions catching up, however slowly**

"The economic inequalities between the regions of the EU27 have decreased (...) But this is not due to a general process of convergence, rather it is the result of catching up of poor member states, whereas regional disparities within most of the EU countries are not changing or even increasing (...) While the regions of the new Member States are catching up in terms of income and productivity, the wide gap between the EU12 and the EU15 regarding technology, knowledge-intensity and innovation is hardly narrowing. Therefore, it might take very long for the EU12 countries to approach the development level of the old member states" (p. 33, Cullmann and Geppert 2012).

### **North-South Structural Gap**

Even though policies and Structural and Cohesion Funds have enabled considerable transfers from Northern to Southern European regions, a structural gap is still remaining. Shortly the Economy of the North is characterised by technology-oriented industries, while the South is experiencing a continuous de-industrialisation process. This is furthermore reflected in the salaries, which in the south are compensated by either a reduced consumption or an increase in the private debt. The economic gap is expected to remain and even become bigger (ESPON 2012a).

### **Rising unemployment**

The problem of unemployment has been made much more important by the economic crisis but the different European countries have labour markets with different capacities to produce jobs. At EU27 level the unemployment rate was in April 2013 at 11%. This however covers a difference from Greece and Spain having nearly 27% unemployed, while at the same time Germany and Austria have only rates around 5% unemployed. Furthermore the youth unemployment was for EU27 22,8 % in 2012, while the territorial patterns is similar to the overall unemployment (Eurostat 2013), However the future development and implication of this trend is questionable. The evolving lack of skilled professionals in certain fields, and a future projected shortage of labour force in Europe, could in the long run diminish the challenge of this trend. Nevertheless the challenge of a lost generation remains (see section 5.1.3.1, Skilled labour and a lost generation).

### **Borders as a limit for the diffusion effects of development poles**

"Economic activities do not tend to concentrate close to the national borders and public institutions normally have a limited interest in investing in these areas. However, the growing integration of European regions should lead to the development of many border regions that could exploit their formerly hindered potential" (p. 49, ESPON 2012b).

"Integration barriers at local and regional level can result in the underutilization of human, cultural, economic and ecological resources of the border regions and increase their peripheral position and social exclusion" (ESPON 2012c)

### **Cross-border polycentric metropolitan regions**

"Cross-border polycentric metropolitan regions (CBPMRs) are spatial configurations whose potential lies in combining the characteristics on either sides of the border in a complementary way. The success of these regions in exploiting the metropolitan potential depends to a large extent on the will and the strategies of the actors to cooperate within a complex multi-level context." (p. 8, ESPON 2010a).

"CBPMRs are localised in the shadow of the most prominent and internationally renowned metropolitan regions such as Randstad, Rhine-Ruhr, Frankfurt-Rhine-Main, Zurich, Milan or Paris ("Pentagon"). However, several other regions (e.g. Vienna, Copenhagen) have considerable potential to transform themselves into CBPMR. In Central and Eastern Europe CBPMRs do not yet play a role comparable to those in some old member states. The headquarters of economy as well as the most important political institutions are not evenly spread over CBPMRs; instead they are always concentrated in selected parts of the CBPMR settings. The different centres of the CBPMR systems are not equal partners in terms of metropolitan quality but they are complementary parts of a complex setting. The overall complementarities comprise economic specialisations on different sectors (knowledge intensive services or industrial innovation and production), the diversity in cultural offer, landscape diversity etc. Using these differentials is a complex challenge, but might be a rewarding strategy in the long term for all partners involved" (p, 9-10, ESPON 2010a).

### **Territorial assets and increasing role of attractiveness of places**

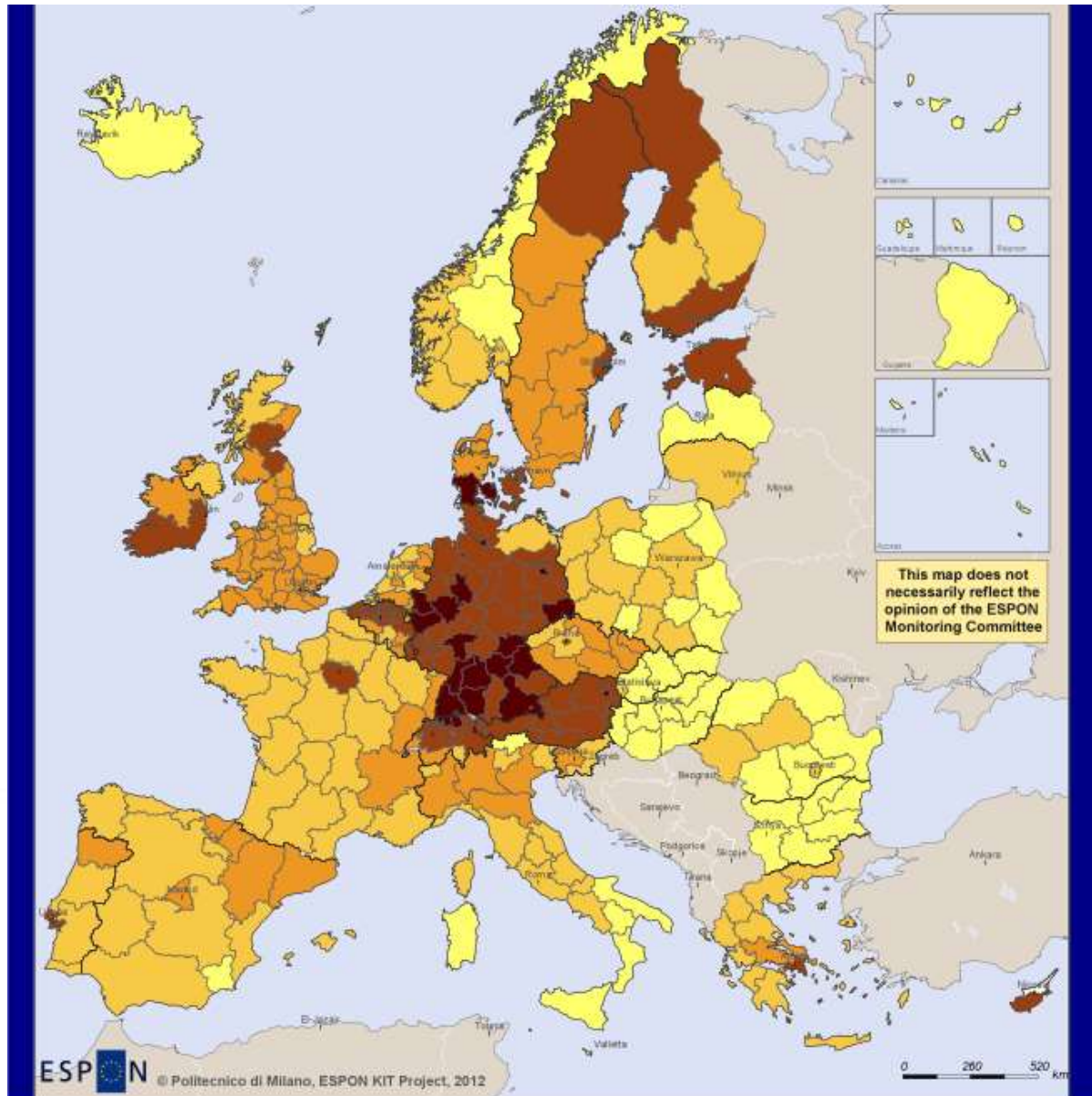
Territorial assets and resulting attractiveness of places:

- "are decisive for global competitiveness; global accessibility is no longer only a matter of distance or location. Accessibility has become a function of the quality of the infrastructure (transport and ICT), the frequency of existing connections, innovative thinking, policy making and networking. Access to key raw materials, drinking water, food and energy sources has become even more important. At the

same time, the relevance of local intrinsic (territorial) characteristics such as human and social capital or the existence of local milieus has increased. Being accessible, in global terms, has increasingly become about having good integration of local, regional and national development policy, supported and implemented through strong public-private partnerships and cooperation" (p 18, TSPEU 2011).

- "determine the pathways of regional and local development (...) Attractiveness is conceived a precondition or an essential dimension of competitiveness (...) By focusing and building on the diverse strengths of places more harmonious development can be achieved" (p. 3, ESPON 2012c):
- "the regional assets related with economic conditions and the structure of the job markets, which arguable remains the most important drivers of work-related migration, favour the core of Europe and especially large cities and national capitals, but also some of the most mature tourist destinations regions in the Western Mediterranean arc" (p. 8, ESPON 2012c).
- Furthermore as seen on Map 18 a differentiation among regions with regard to the type of innovation is apparent. Some regions are strong in traditional science and to produce knowledge, while others are better at applying this knowledge. Furthermore some regions excellence in entrepreneurship (ESPON forthcoming)

"Other forms of territorial capital [socio-cultural, environmental and antropic] are distributed more evenly: almost all regions of Europe have some kind of relative specialisation with one or more factors that have been attractive to specific audiences, or have the potential become attractive, being provided the right policy and governance conditions are activated" (p. 8, ESPON 2012c).



EUROPEAN UNION  
Part-financed by the European Regional Development Fund  
INVESTING IN YOUR FUTURE

Regional level: NUTS2  
Source: Own elaboration, 2012  
Origin of data: EUROSTAT, 2012  
© EuroGeographics Association for administrative boundaries

#### Legend

- No data
- Imitative innovation area
- Smart and creative diversification area
- Smart technological application area
- Applied science area
- European science-based area

*Map 18- Territorial Pattern of Innovation*  
Source: Politecnico di Milano, ESPON KIT Project 2012

### Metropolitan areas as growth poles

"EU metropolitan areas, while being of relatively modest size, host the most advanced worldwide services and most innovative high-tech manufacturing sectors. The risk of



diseconomies of agglomeration is much lower in the EU than in some other parts of the world and new activities can still be accommodated. However, the capability of European cities to compete worldwide is considered as an important challenge in relation to Europe's competitiveness in the world. Among reasons for this are the structural and social problems of EU cities" (p. 18, TSPEU 2011).

"[On the other side], only half the EU metropolitan areas have a higher level of development than their country, indicating that benefits from agglomeration are far from automatic. The capital cities tend to have the highest GDP per capita, while most of the smaller metros and some of the second tier metropolitan areas score low. In the less developed EU countries, the capital metro attracts a large share of economic growth and has a far higher level of development than the other metros and the rest of the country. A comparison with the more developed EU countries suggests that this trend might also reverse with higher growth outside the capital cities" (p. 3, Djikstra 2009).

Shifting balance between urbanisation and localisation economies. "Whilst it is difficult to test localisation and urbanisation economies – the two principal forms of agglomeration analysis of such case study areas as Barcelona, Dublin, Lyon and Manchester show that localisation economies were more important in the earliest period (...) and urbanisation economies, which are often argued to be more relevant to service sector activities, have become more important in the last two decades. (...) The shifting balance between urbanisation and localisation economies is broadly reflected in the changing geography of economic activity in each of the case study areas. The highest rates of economic growth, as measured by employment change, tend to be found in relatively high value service sector activities at the core of each of the conurbations whilst older manufacturing industries tend to survive in pockets in smaller urban centres at the metropolitan periphery. Higher value manufacturing activity and some of the more routine service sector activities – particularly those requiring extensive land – tend to cluster around key transportation infrastructures, often on the fringe of the core urban area" (p. 7-8, ESPON 2010b).

### **5.1.2.3 Knowledge & Technology**

The third section emphasises trends that are of importance to knowledge and technology. The development of new knowledge and technologies strongly influences economic growth, which is why green growth, has been selected. ICT have already revolutionised interaction in society, and furthermore shows potentials for innovation, therefore it constitutes as an important megatrend. Likewise the influence of the Knowledge Society is getting more attention, as the sharing and dissemination of knowledge as well as focus on fostering innovation grows.

#### **Green technologies and growth**

Green technologies and growth is indeed a hot issue. Often linked with goals of sustainability, it constitutes a concern for the future environment in relation to economic growth, and therefore emphasises a focus on developing new green technologies within the research communities. Green growth aims at ensuring economic growth without destroying the nature. The concept is partly a response to the current economic crisis, and can be understood as a new economic growth model.

For Europe green growth can constitute a new market, and perhaps a boom of exporting know-how about green technologies and environmental management will be seen. Under the Research and Innovation priorities of the European Commission lies four main categories, also concerning green growth. These are food, agriculture and forestry, fisheries and aquaculture, and biotechnology. Investments in these fields show the need for a society built on sufficient resources and environmentally friendly production and

consumption. The most recent example of it is the new EU Strategy on the adaptation to climate change.

Focus on green consumption is increasing as well. The consumers are getting more aware of the consequences of former consumption patterns (climate change, environmental challenges etc.), which is why the selling of products with a green profile is booming. More and more bio products are becoming available, alongside a preference to local products.

The number of strategies, partnerships, forums, studies etc. including green growth is strong evidence of the growing importance of the seeding trend.

To name a few, starting with Inclusive Green Growth (World Bank 2012), the green growth policy in Asia and the Pacific Region (United Nations ESCAP), Global Green Growth Forum<sup>55</sup>, as well as the EU strategy for the next decade, the Europe 2020 Strategy (COM(2010) 2020 2010).

### **ICT changing Society**

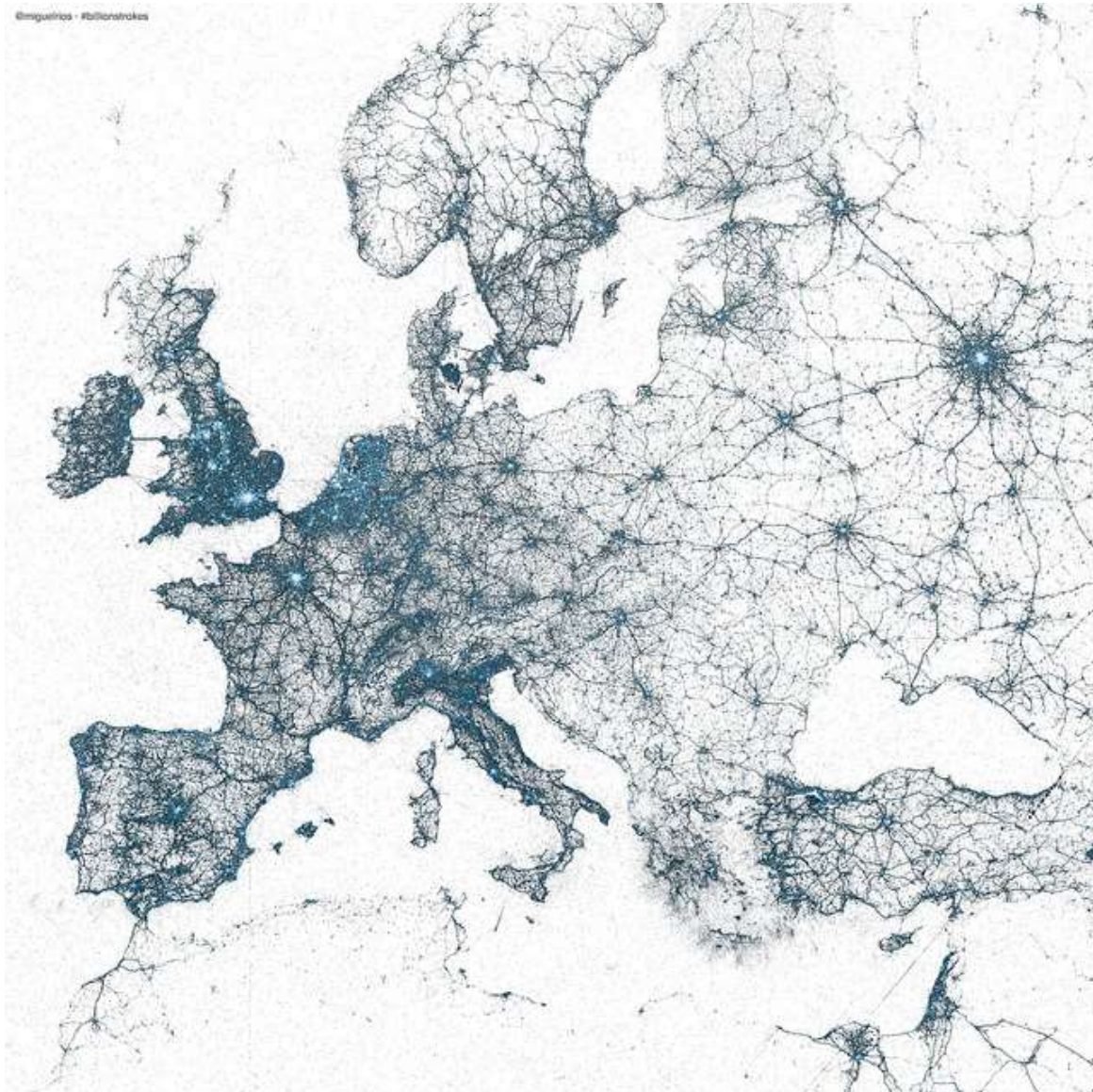
Information technology has already changed our society. However, the full potentials of ICT are still to be unfold: we are at the beginning of the Google Era where new technologies come to replace the former known forms of communication (*Greeks Gutenberg Google : Ivar Gjørup at TEDxAthens 2012 2013*).

The traditional understanding of ICT, as mainly a tool for facilitating smother and cheaper communication, should be replaced by a more dynamic and broader understanding. Rethinking the nature of ICT unfolds new potentials, some of these are already starting to show (Beyond the horizon 2006; "FuturICT FET Flagship" 2013).

Map 19 shows the accumulation of geo-tagged tweets since 2006. By illustrating the territorial pattern of tweets one gets an idea of the territorial pattern of ICT usage in Europe. London, Paris, Madrid, Moscow, Stockholm, Berlin and Rome are clearly visible on the map. However the dominance of the rural areas in different countries differs. While big parts of Britain, the Netherlands, Ireland and Belgium are covered fully by tweets, regions in other country seem to have a less dense coverage of tweets. Furthermore the clear indication of the transport network is interesting, as it gives an impression of the importance of transport links. These patterns give insight into important differences and challenges in regard to the usage of ICT. However the maps also gives an optimistic insight into the growing linkages between countries due to new technologies.

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<sup>55</sup> Denmark, China, Mexico, Kenya, Qatar, South-Korea (<http://3gf.dk>)



Map 19– Occurances of tweets in Europe. Accumulation of geo-tagged tweets since 2009  
Source: M. Rious, blog.twitter.com

The unfolding of ICT is manifold:

1. The age of Big Data. The network society and the growing information collected give rise to the age of Big Data. Big data represent the enormous pool of data accumulated by information technologies, and the “secrets” these data contain are of interest for both governments, NGOs, private companies as well as the scientific community. As it has been stated; “Data scientists are the magicians of the Big Data era.” (Lohr 2012; Miller 2013) (“Big Data, Big Impact: New Possibilities for International Development” 2013).
2. Robots becoming part of everyday life. Robots gradually take a stronger place in our everyday life and artificial intelligence is gaining more and more importance. It does not only aim at improving lifestyles through technological advances, e.g. in transport issues or health industry, but also easing the life of people with special needs.
3. Fabbing Economy. As a physical realisation of ICT, 3D printers enable a personalisation of objects, which was mass-produced so far (Z-Punkt 2008; Steinmüller and Steinmüller 2003). This could fundamentally change industrial production.



4. ICT changing the media landscapes. New technologies make it possible for everybody to publish. The distribution of news and information are no longer limited by cost of distribution, as the internet makes the entrance cost very low. Blogs, Twitter and Instagram are examples of this.

5. Smart Cities and Housing. "The new intelligence of cities resides in the increasingly effective combination of digital telecommunication networks, ubiquitously embedded intelligence, sensors and tags, and software" (Mitchell 2007). "The most dramatic general effect of digital telecommunications is to create new kinds of interdependencies among scattered regions and settlements" (Mitchell 2000). This would dramatically change the urban structure and function in the future.

6. E-services. A growing demand for e-Services (e-Commerce, e-Services and e-Governance), as well as the rising need for convergence among these systems is a clear manifestation of the growing importance of ICT.

### **Knowledge Society**

Knowledge society implies a growing human, social, political and economic intelligence. This will naturally increase the role of science and education in society. Network society is one outcome of this. The increase in possibilities for online interaction creates new ways of learning. One example is the newly emerging free online courses offered from well-established universities<sup>56</sup>. This phenomena represent a revolution in the traditional university world, and the future evolution of this could bring education to a greater number of people who previously did not have the means to study, or was constrained by geographical distance. This form of education brings more flexibility and individualised education, and thereby gives new perspectives for future education.

Critical role of innovation as a durable source of regional growth. Innovation is a key driver of economic growth in knowledge society, which is why policies supporting innovation as well as R&D are in focus in Europe.

Progressive convergence for public R&D expenditures in EU Member States is seen (Hollanders, Léon, and Roman 2012), "but knowledge absorption, creation and diffusion capacities across regional innovation systems tend to persist over time, both between and within countries" (p. 32, OECD 2011a). "Furthermore, industry-based R&D is increasingly concentrating in few selected locations, especially densely populated metropolitan areas in Western Europe" (ESPON 2012a). However, in the overall picture of investment in R&D Europe is lacking behind. Furthermore, a decreasing supply of qualified human capital (Scientist and engineers) will be a challenge for Europe in the future (Kunzmann 2010).

Innovation policies are generally shifting towards a more mission-oriented approach (demand side innovation/research policy), as well as greater collaboration between business and academia are encouraged.

Globalisation is reshaping the innovation process worldwide, with a dual effect on regions. "On the one hand, globalisation increases the need to identify possible sources of growth from within the region, as well as retaining firms and skilled talent. On the other hand, globalisation creates opportunities for organising research and production across borders, favouring the mobility of talent and increasing the opportunities for international collaboration" (p. 22, OECD 2011b). There are already several European programmes concerning education and exchange of researchers and students. As for the Erasmus and Erasmus Mundus programmes, the circulation of information and the interaction with

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<sup>56</sup> <https://www.coursera.org>



different groups of people from several backgrounds sets the scene for the creation of a knowledge society.

Government's role in innovation grows. "Regions face strategic choices when deciding how to boost their innovation-driven growth: They can build innovation capabilities around current advantages, support socio-economic transformation, and/or create a regional knowledge-base. All require a smart mix of policy instruments, along with a corresponding mix of tools for effective public action and bringing private actors into the policy process" (p. 23, OECD 2011b).

#### 5.1.2.4 Demography & society

Following section describes the selected megatrends for demographic & societal. The changing demographic dynamics expose a challenge for Europe. The trend of an overall ageing population, together with migration patterns in favour of urban areas, leaves some regions with severe demographic problems, which is why the trends are gaining attention. Additionally these challenges trigger a need for social innovation. Furthermore, gender equality and the growing female participation on the labour market and in society in general is an important trend, in order to understand territorial development, in particular in regard to the changing migration dynamics. All these trends have the underlined assumption of an on-going urbanisation, which is increasing the importance of cities on the expense of regions and nations. Furthermore the notion of life in a city is changing. The changing lifestyles of city-dwellers, reflects the overall tendency of emergence of new lifestyles and the growing acceptance of the plurality of life choices.

##### **Migration and ageing population**

On a global scale the population will grow with 2 billion in the next 38 years, whereas the total population will be expected to shrink by 2100 (*State of the Future 2012* 2012). Though an ageing population at the moment is not a global problem, it could become in the long run. Globalisation is one of the main motors of migration. Migration is a major factor for the demographic composition, and an increase in the mobility of people is seen.

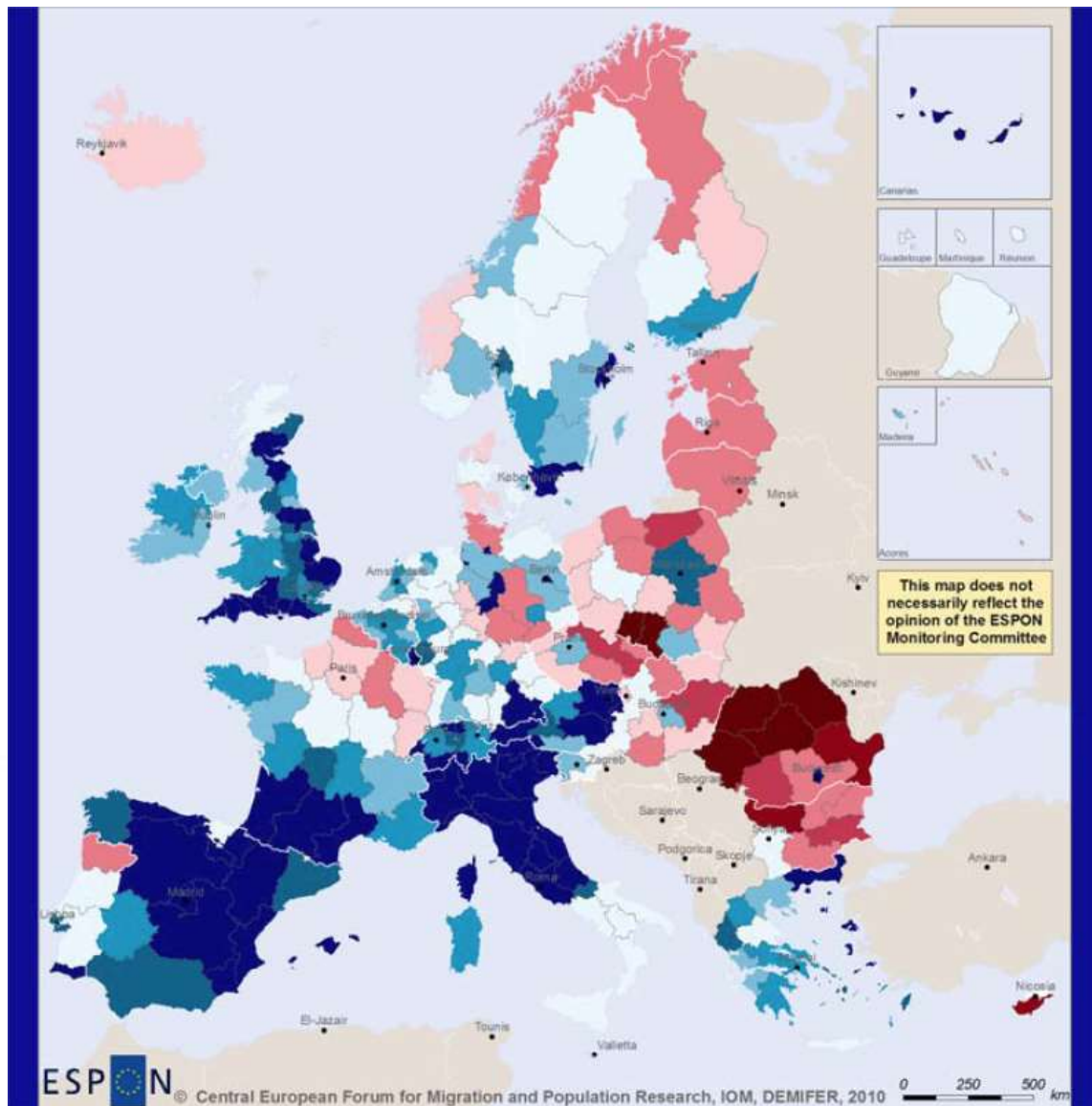
The ageing population is a societal challenge in Europe, which is already high on the political agenda. The peak of the ageing population has not yet been seen, but the pressure of an ageing population is already increasing (Nordic Council of Ministers 2011a; EFMN and European Commission 2009). It is not only caused by a negative natural population balance, but also migration patterns of young people which are seen around Europe. Young people tend to migrate either for studying or seeking for a job, which both create brain-drain and reinforce the effect of an ageing population in some regions.

The differentiated territorial impact of this is clear, as some territories are less impacted than others, due to both different natural population dynamics and migration patterns.

"[Whereas, Metropolitan areas, especially] capital cities, remain attractive in terms of having the average net effect of pulling in large numbers of younger and middle-aged adults but having a net outflow of older aged adults" (p. 4, ESPON 2012c). Many smaller European cities experience shrinking cities and demographic uncertainty. Dealing with a shrinking or ageing population, declining economic growth and perhaps a decaying building stock, is or can become the reality of many regions not in the hot spot of growth.

Scenarios on the impacts that migration may have on regional labour forces in 2050, seen on Map 20, indicates that metropolitan and capital city regions, as well as large parts of Spain and Italy are expected to have high levels of in migration in 2050. Regions severely

effected by out migration are large parts of Romania, Cyprus and Bulgaria (ESPON forthcoming).



EUROPEAN UNION  
Part-financed by the European Regional Development Fund  
INVESTING IN YOUR FUTURE

Regional level: NUTS 2  
Source: ESPON 2013 Database 2010  
Origin of data: Eurostat, NSIs, Estimations, 2009-2010  
© EuroGeographics Association for administrative boundaries

### Impact of Migration on Labour Force in 2050, Difference in Population in %

-60.0 – -40.0	(7)
-40.0 – -30.0	(3)
-30.0 – -20.0	(7)
-20.0 – -10.0	(25)
-10.0 – 0.0	(28)
0.0 – 10.0	(55)
10.0 – 20.0	(35)
20.0 – 30.0	(43)
30.0 – 40.0	(24)
40.0 – 138.0	(62)
no data	

Impact of migration on labour force in 2050  
calculated as the difference between the  
*Status Quo* and *No Migration*  
scenarios in % of the labour force in the  
*No Migration* scenario

Map 20– Impact of Migration on Labour Force, 2050

### **Growing importance of social innovation**

"Societal trends [ageing of Europe, migration waves, social exclusion etc.] are increasingly perceived as opportunities for innovation. What's more, trends in demography, community and social media, poverty, the environment, health and wellbeing, or ethical goods and services are more and more understood as growth markets. In addition, there is a real excitement around new entrepreneurial answers and solutions to the rapidly changing challenges that these trends raise. Moreover, we already see a lot of business model experimentation – the emergence of hybrid organisational models, horizontal business models designed to create economic and social value at once" (p. 10, European Commission 2013). Furthermore social innovation implies new types of corporation between private and public sector. CSR-partnerships<sup>57</sup> and partnership between NGOs and public administrations are becoming increasingly used in dealing with societal problems. However the territorial pattern of social innovation are a reflection of past choices, administrative structures, as well as which societal problems are evident at a given territory. Therefore social innovation is expected to take many different forms across the territory. Nevertheless social innovation are expected to be a key driver for territorial development, in particular as part of solutions to challenges which has a high impact on territorial development e.g. the ageing society, gender imbalances and migration.

### **Gender imbalances**

Empowerment of women and equality between the sexes is an on-going trend in society and politics. (PASHMINA 2010; *State of the Future 2012*. 2012). Also in Europe a growing interest in gender politics is seen. Europe 2020 specifies an increase of female participation on the labour market as a goal, furthermore national discussions on broader inclusion of females, e.g. in boards, are seen. This is mainly due to the fact that there are still examples of gender inequality to be seen in Europe, especially as a gender pay gap, i.e. that women generally earn less than men (EUROSTAT 2009).

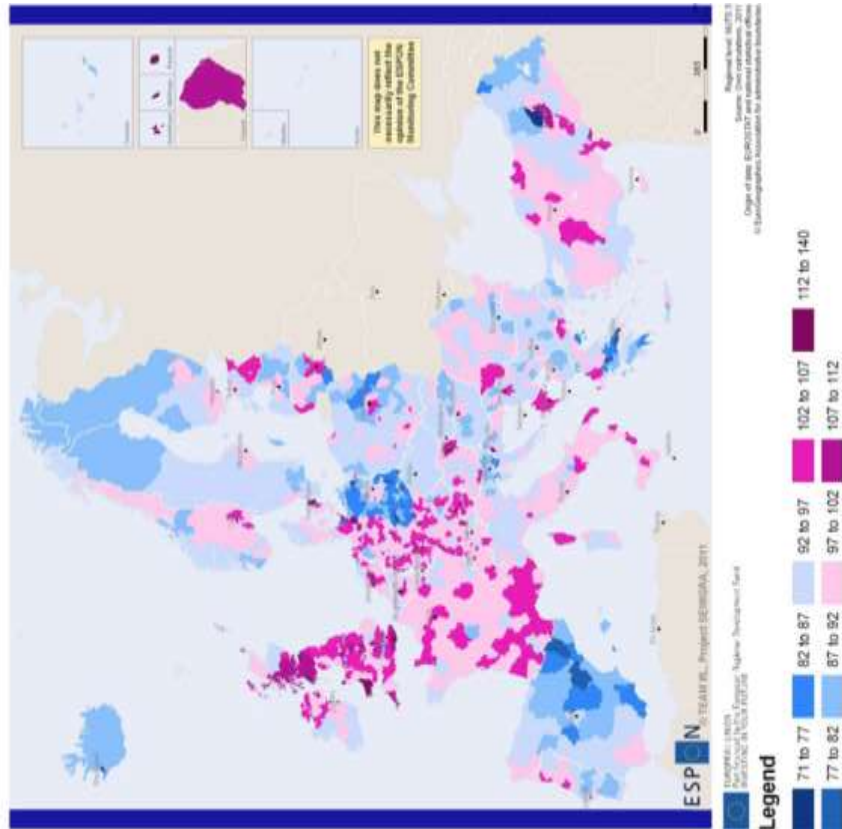
On the other hand, signs on increased female empowerment in the educational system are already seen, as women are surpassing men in educational attainment (van der Lippe et al. 2009). Besides the positive effects of more education of women, the changing sex-ratio in educational achievements, can have big impact on the demographic development, which is not a positive story for all territories. A generally higher mobility of women is seen, which the generally higher educational level of women partly explains. The migration happens from peripheral and less wealthy regions to urbanised regions characterised by economic growth. This trend may change the territorial sex ratio pattern, and does leave a large number of men behind in the peripheral regions. In a long-term perspective this female-drain of regions can enhance the already existing trend of population ageing seen in these regions due to lower natural population growth. Map 21 show the sex ratio for the age groups 20-24 years and 30-34 years. The timeframe from 20-30 years is the period where most finish their education and find the first job. The significant change in the distribution that can be observed is interesting, as it gives an indication of the dynamics of female migration and furthermore gives perspective to future demographic development. As can be seen the capital and metropolitan regions as well as western Europe in general experience a female surplus, while other regions see the opposite trend.

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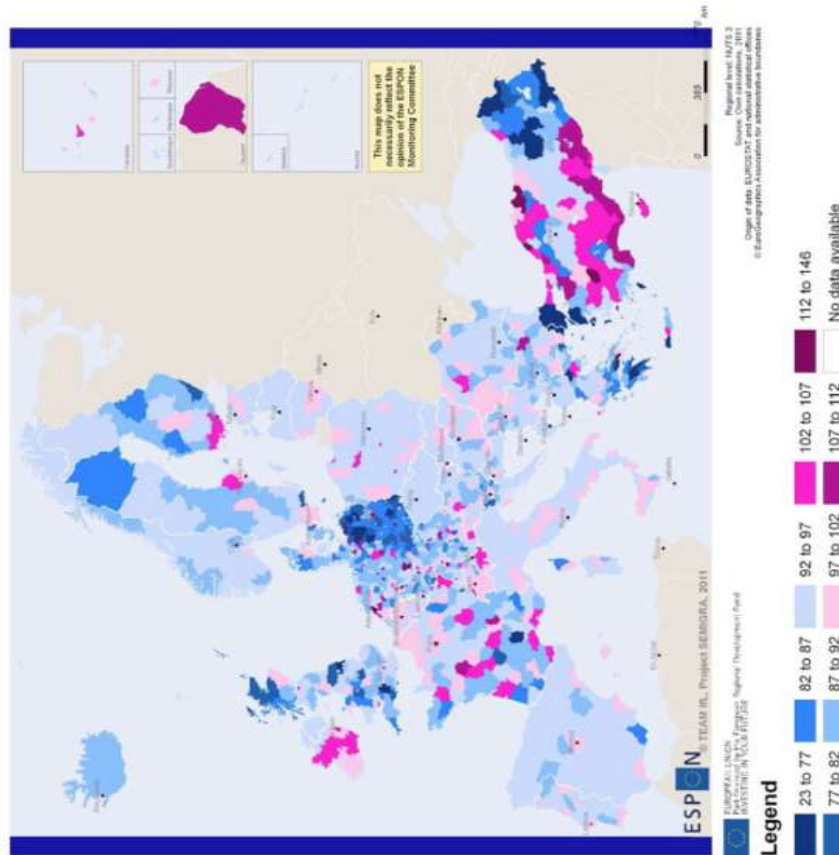
<sup>57</sup> Corporate Social Responsibility Partnership



## Number of women in the age group 30 to 34 per 100 coeval men 2008



## Number of women in the age group 20 to 24 per 100 coeval men 2008



Map 21– Changing sex ratio of the European territory, Number of Women per 100 coeval men, 2008  
Source: ifl, ESPON SEMIGRA Project 2011



### **New urban vibe**

Urbanisation is an on-going trend, and as for the present time the majority of the world's population are living in urban areas. The development of megacities<sup>58</sup> has gone rapidly, from only existing 2 in 1950, 3 in 1975, the number had increased to 19 in 2007 and is expected to reach 27 in 2025 (L. C. Smith 2011; Z-Punkt 2008, -).

The consequences of the urbanisation are manifold, as it implies firstly a large number of people migrating to urban areas, and secondly these people being from various socio-economic and cultural background. Among those consequences are urban sprawl, changing lifestyles and changing territorial patterns of the continent. Even though the trend has a worldwide coverage, the challenges differ as very different regions and people yield different impacts from the trend. One example are sparsely populated regions, like the Arctic (Nordic Council of Ministers 2011b), in comparison to a much denser central Europe. In general a polycentric urban landscape is emerging and the development of Europe into being a city of cities, instead of a Union of Member States, could be a likely scenario (PASHMINA 2010). One concrete example is the emerging city network. Additionally, a tendency of cities branding themselves as part of the "new urban vibe" is seen. This aims at making the city more attractive for potential new inhabitants.

The new reality of the urban brings changing lifestyles and new sub-cultures/trends; a new urban vibe is seen. A major trend within this is sustainable cities which includes: Slow movements, Slow cities<sup>59</sup>, unplugged communities and Urban farming (Leivestad; PASHMINA 2010; "Hållbar Stad" 2013).

However, with the diversity of people moving to the city, it is apparent that not all urban dwellers are part of the mentioned new urban vibe and its seeding trends. Even though new lifestyles are emerging, and structures in society are changing, an increase in social disparities becomes apparent.

### **Transforming lifestyles**

As lifestyles are transforming, the territorial dynamics are as a logic consequence changing as well (e.g. rural/urban dynamics, transportation systems, living conditions and working life). In the future the majority of people will most likely live in a city, however the way the cities are organised will have changed and thereby our daily lives and routines will look different as well. The following two trends represent important phenomena within the branches of emerging new lifestyles.

New technologies as drivers of changing lifestyles. New communication technologies, in particular the internet, have revolutionised the possibilities to interact on a long distance. Web 2.0 has brought both new virtual communities, e.g. Anonymous, Occupy, and Social media, e.g. Facebook, Twitter (Z-Punkt 2008). Yet another consequence of ICT is the growing E-commerce (The Times 2012), which enables both a detachment from the territory and a bigger selection of goods for the consumer. The new platforms furthermore give new possibility to reach out to people; Crowdsourcing and reality tagging are fast growing phenomena.

Family life in transformation. From a understanding of the nuclear family, this picture is now slowly multiplying into a variety of family forms (van der Lippe et al. 2009). In Europe this does not only change our way of life, but also impacts a number of structures in society (e.g. changing need of housing, more flexible or more constrained migration pattern, legal recognition of new family forms across borders).

<sup>58</sup> Cities with more than 10 mio inhabitants (source: United Nations)

<sup>59</sup> Cittaslow.org

#### 5.1.2.5 Governance

Firstly the section presents five dynamics of territorial governance that constitutes important megatrends in the current policy debate. The dynamics reflect four key characteristics and important players in governance: Policy, Politics, Democracy and Markets. However in order to understand how these are used and implemented in practice, the first part is followed by a presentation of three basic types of territorial governance. These are all megatrends, in the sense that they describe a situation of 'continuity' compared to status quo. However as the trends each describe an archetype of governance structure in Europe, a more thorough territorial analysis will most likely reveal a more mixed picture.

#### Selected dynamics of governance:

##### **Policy integration / coordination [Policy]**

In a world that is perceived as increasingly complex, policy-making and governance processes focus progressively more on integrated approaches to be able to respond to complex challenges and trends. To a certain degree this can be seen in economic and financial governance processes at European and national level. The ambition for better policy integration or at least coordination is most explicitly spelled out e.g. in European Integrated Maritime Policies, and in European territorial development policies. This concerns horizontal coordination or integration between different sectors, as well as vertical integration between different policy levels. In the case of territorial or regional policies it covers even approaches towards territorial policy integration or territorial impact assessments (Barca 2009; Böhme et al. 2011; TA 2020 2011).

To a certain extent the trend of policy integration, goes together with a shift to more strategic approaches. The word „strategy“ is broadly used, as for instance in the coming Europe 2020 Strategy. The emerging EU macro- regional strategies or the most recent EU strategy on adaptation to climate change (Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 2013). In addition, the flagship idea of projects is getting more and more support, which is why the projects tend to be more tailor-made and guidelineed.

##### **Place-based policy making [Policy]**

In addition to the overarching governance trends, there is also an increasing trend stressing the role of local elites and the consideration of the territorial context in governance processes. This covers various types of participatory planning, community mobilisation and decision making trends. When it comes to territorial policies it is most pronounced in the 'place-based approach'. The focus is usually on the development of long-term strategies with the aim to reduce the underutilisation of resources, making use of people's tacit knowledge and capacities (Barca 2009; Böhme et al. 2011; TA 2020 2011). Most recently this trend is also reflected in the proposed regulations for European Structural and Investments Funds (ESIF) for the period 2014 to 2020: LEADER experience on community development and empowerment has been transferred into an approach allowed for all ESIF funds.

##### **People's spring / mobilisation of masses to stand up for values [Democracy]**

Whereas Europe tends to talk about the Arab spring and most recently also follows other countries where citizens raise their voices against decisions made and priorities set at government level, seeds for this can also be observed in Europe. There are e.g. the demonstrations against financial policies in countries experience severe budget cuts (e.g. Greece or Portugal), but also the mobilisation of people in other countries to raise their

voice for defending or fighting for their ideas and values (e.g. gay marriage in France). In that respect, this trend has three dimensions. (a) There is an increasing readiness of people to express their opinions not only in elections and debating circles but to demonstrate for them. (b) There is a decreasing consensus in society on how to cope with societal challenges and trends which also may point at increasing differences when it comes to basic societal values and ideas on which a society is based (which links up to a trend on growing focus on tribes or civil society). (c) There seems to be an increasing disaffection/disenchantment with established democratic political channels. This goes hand in hand with a decreasing participation of citizens in public elections.

### **European Integration and Brusselisation [Politics]**

A stronger role of the EU is to be seen as well. This raises awareness on „Brusselisation“, under which it is meant that “while the relevant competencies do remain ultimately at the disposal of the Member States, the formulation and implementation of policy will be increasingly Europeanized and Brusselized by functionaries and services housed permanently at Brussels” (Barbé, Esther 2004). The European Integration is a process that dates back several years. Throughout several policies, with regional policy being the most common, the European Union has been trying to achieve integration in its territory. Europeanisation processes will never cease being a goal of the European Integration, regarding the expected EU enlargement as well. Especially nowadays, when the trust in the EU is being questioned, creating a common European identity for EU citizens and building stronger bonds between them and the European Union will constitute a future trend. Examples of this may be seen in the currently introduced “European Citizen Initiative”, a future harmonisation of healthcare in Europe, in further cooperation for issues of common interest and common challenges.

### **European Integration and the Single Market [Markets]**

The European Integration is largely linked to economic ideas and developments not at least expressed in the European Single Market. Increasingly market forces, the power and influences of “the market” and major investors shape processes of European integration. In these processes, the key ideas are efficiency and productivity and a strong emphasis on innovation, science and technology. This strives towards an increasing harmonisation and integration of the European Single Market, but also the development of a European Research Area.

### **Types of governance:**

#### **Resistance: Territorial governance practices by conformity**

The first trend implies incremental rise in multi-level government, in cooperation within government, and in the involvement of socio-economic stakeholders in TG.

It is characterised by a growing involvement in policy-making of both socioeconomic stakeholders and citizens at a regional and local level. However:

- Governmental entities are still predominantly sectoral and keep their prominence as primary actors in the formulation and evaluation of policies;
- Socioeconomic stakeholders are queried only when policies are being formulated; in some cases, they may get to play a relevant part in the implementation stage of a restrict number of policies and, especially, of programmes;
- Citizens are queried solely during the formulation stage, basically to fulfil formal or legal requirements; overall they are granted no deliberative abilities.

This basic type reveals a strong persistence of systems of sector-based government. These are accompanied by a selective, and often fundamentally formal openness to territorial processes of coordination and cooperation, generally designed to provide answers to regulatory dispositions, either EU or national-related (Bauman 2012; ESPON 2012f; Faludi A 2012; Flockhart T 2010; Huber 2011; Leonardi and Nanetti).

#### **Adaption: Political-administrative based territorial governance practices**

This second trend is characterised by a stronger involvement of both socioeconomic stakeholders and citizens in processes still managed by local or regional governmental bodies, in which:

- The spaces for intervention correspond to political-administrative jurisdictions;
- Governmental bodies develop processes through which they build shared visions for those spaces through the mobilisation of the most relevant stakeholders and citizens, granting them the possibility to influence policies and programmes, to play an active role in their implementation, and also to be involved in their monitoring and assessment;
- Processes of territorial governance are based on political-administrative jurisdictions, which can be single (one region or municipality) or involve various jurisdictions, either in the same country or comprising different countries, through policies and programmes promoting transnational territorial cooperation.

This basic type reveals a wider openness on the part of governments and administrations towards territorial governance mechanisms; nevertheless, the state, at different administrative levels, does not waive its role as the most important policy agent (Bauman 2012; ESPON 2012f; Faludi A 2012; Flockhart T 2010; Huber 2011; Leonardi and Nanetti).

#### **Transformation: Functional based territorial governance practices**

This third trend is based upon the establishment of coalitions between governmental and non-governmental entities in which:

- The spaces of intervention have a predominantly functional nature (functional urban areas, economic regions, water basins, protected areas, among others), they have fuzzy boundaries not coinciding with political or administrative limits, and aim at responding to thematic issues;
- The partnerships established between governmental and non-governmental entities have a crucial role in the implementation stage and they may also be relevant for the design and evaluation of policies and programmes;

Where bottom-up processes are more effective and granted a chiefly role, citizen participation may take a deliberative form (Bauman 2012; ESPON 2012f; Faludi A 2012; Flockhart T 2010; Huber 2011; Leonardi and Nanetti).

### **5.1.3 Critical uncertainties**

This chapter will describe seeds and wildcards, which represent critical uncertainties for the future territorial development. These seeding phenomena can give an indication of



other possible directions. However, as they are only emerging, the full impacts are not yet to be predicted. Despite the uncertainty the seeds or wildcards are important to be taken into account when forecasting territorial development. They are all chosen after an extensive literature review and with a particular focus on their relevance for territorial development. Further information on each presented trend can be found in the fact sheets annex.

The structure of the chapter follow the same logic as the previous with the sub-themes (a) Economy & Growth, (b) Knowledge & Technology, (c) Demography & Society and (d) Governance. There are no selected seeds or wildcards for Resources & Environment, as all identified trends in the final sorting was selected to be of already substantial influence. However the trends of "Challenges in Energy supply" and "Scarce water resources" both holds a number of uncertainties, which is already covered in section 5.1.2.1.

### **5.1.3.1 Economy & Growth**

The selected seeds and wildcards for critical uncertainties in Economy & Growth are presented below. Some signs of a refocus on local economic systems are showing, this however also paves the road for conflicts in regard to decisions on growth strategies. Furthermore the future might bring shortage skilled labor, which impact might be enhanced by the threat of a lost generation. Lastly the future economic development depends strongly on the current financial policies, the last seed discuss the possible future impact of current financial policies.

#### **Local Economies**

As a response to globalisation and more intertwined economies, a seeding focus on more local based economy is seen. Several examples of local economic systems and/or currencies emerge. However, at the same time the trend has a global outreach, for which especially the Internet and social media plays an important role in the process of sharing ideas (i.e. Glocalisation).

The growing number of local economy movements focuses on small-scale enterprises that serve smaller geographic areas. They try to create an alternative to a neo-liberal economy, by focusing on the local products in close relation to a goal of greater sustainability. At the moment the agro-localism is the strongest manifestation of this movement, but spreading to others spheres of the economy as well (Posey 2011). Furthermore, as stated previously, local currencies are seen as well, aiming at supporting the local economy and growth.

#### **New directions and new conflicts**

The greater focus on the different strengths and thereby no one-size-fits-all-strategies for territories, along side with a seeding emphasis on local economy and local purchase paves a new way of growth strategies and economic development. However, potential conflicts between different groups on how to achieve sustainable growth could become a potential challenge in the future.

#### **Skilled labour and a lost generation?**

The emerging of new markets brings the challenge of securing skilled labour to perform these tasks. On the one hand the current level of unemployment in Europe suggests that an available labour force is existing in Europe. However, it is a critical issue to insure that the current pool of unemployed labour force are not becoming marginalised and loose acquired skills by a long-term absent from the labour market during the crisis. On the other

hand a lack of qualified professionals in certain industries is foreseen in the future (e.g. engineers), which is why it might become a challenge to actually attract such labour, and even more so if Europe has to compete with the emerging economies of the BRICS countries (Kunzmann 2010).

### **Sustainable financial policies**

The financial crisis has increased the focus of the sustainability of the financial policies in the EU Member States, with an especially great focus on increasing public debts. However, only looking at the current debt does not show the whole picture, a likely future scenario of great debt problems in Europe lies ahead. Especially the future expenditure on pensions is forgotten in the current debate.

The projection of future public debt is closely linked to the expected population development, as well as countries' financial policies (especially in relation to pensions). Looking across Europe, for what seems to be a healthy financial policy today can become a problem in the future.

According to Stiftung Marktwirtschaft (2012), when taking into account future spending, the picture of the economic situation in Europe changes. In particular it is interesting that Italy, Germany and Portugal have more sustainable financial policies than e.g. Luxembourg, Slovenia and United Kingdom.

### **5.1.3.2 Knowledge & Technology**

Uncertainties in Knowledge & Technologies are manifold; however the following seeds and wildcards are carefully selected on basis of their relevance. Seeds in the area Knowledge & Technology include a growing focus on blue technologies and thereof derived growth potentials. Likewise a number of sciences are starting to show potentials for new innovations and thereby also to become the basis for future growth.

### **Blue technologies and growth**

Water has in many ways played a big role in the economy and economic development through time. However, recently a focus on the un-exploited potentials in the maritime industry is seen. In the introduction of the Maritime Innovative Territories International Network, the concept of blue growth is presented as following: "The concept of "blue growth" reflects the path chosen by a number of maritime territories to carry on or boost their development through the sustainable exploitation of the Ocean" (Maritime Innovative Territories International Network 2013).

Facing similar problems, the European Union's long term strategy to support the maritime sector "Blue growth – Blue economy"<sup>60</sup> is aiming at boosting the maritime economy presenting opportunities for marine and maritime sustainable growth, however, with a focus on identifying environmental and social challenges. The main areas of interest are short-sea shipping, coastal tourism, offshore wind energy, desalination and use of marine resources in pharmaceutical and cosmetics industries, for example (European Commission 2012b).

By combining several existing initiatives on maritime issues, such as the Marine Knowledge 2020, the Marine Strategy Framework Directive, the Common Information Sharing Environment or the Horizon 2020 with its 5 main aims, a local impact is to be seen (European Commission 2012b). Job creation, growth and information exchange could have

<sup>60</sup> Not to be confused with "Blue Economy" as presented by Gunter Pauli ([www.theblueeconomy.org](http://www.theblueeconomy.org)).

a positive effect for remote regions, as for example on islands, where a better use of the natural resources and marine protection will improve the well-being of the locals. Blue growth shows the importance of the maritime regions and deduces the maritime issues as important, not only as means for environmental sustainability, but as means of economic growth as well.

Concerns on impact on marine life. However not all share the same enthusiasm as the Commission: "The declaration seems to be very much inspired by the aim of growth, but we need sustainable economic activity that meets the needs of current and future generations. We are afraid that a large amount of EU funding will be used to boost not only the traditional, polluting marine industries (transport and oil operations) but also 'young' industries, such as aquaculture and the exploitation of underwater mining resources, whose impact is still unknown" (Argophilia 2012).

### **Emerging Sciences**

High levels of education and research are traditionally understood as the basis of growth. That is why the expenditure on R&D is in focus in EU policies (e.g. Europe 2020). However, the most optimistic aim should be to invest in new emerging and promising sciences from which the new wave of growth should be expected. This may be a challenge for the future, i.e. to identify the most visible, promising and "value for money" science. Creations of clusters (e.g. techno-poles) are a way of fostering a surrounding which offers the best pre-conditions for new sciences to unfold.

What is the new big science? A number of sciences are already showing prosperous potentials and are in the focus of many innovation strategies as well as cluster creations.

Possible candidates to become the new big science are: Data Science (i.e. Big Data), Sciences related to renewable energy and sustainable technology, Material Science (eg. Nano chips), Synthetic Biology (genetic engineering), Personalised Medicine, Cognitive Sciences (human enhancement), Neuro Science (Markoff 2013; Miller 2013). On another field, sciences related to social aspects and well-being, as well as human care are about to play an important role due to increasing shares of old people and increasing social disparities.

However, this focus on innovation and creating a supporting environment as part of a growth policy raises the question of what the most important trend is about. Is it the identification of new sciences or the fact of pursuing a vibe of new sciences as such?

#### **5.1.3.3 Demography & Society**

As already outlined in the megatrend section several new lifestyles are emerging. However some of these can still be considered seeds. The two selected seeds are respectively changing consumption patterns and a tendency of people turning towards religion or other more traditional lifestyles in the search for some stability in a changing world.

### **Transforming lifestyles**

Changing consumption patterns. Economic growth and improved standard of living does naturally imply changing consumption patterns and lifestyle. On a global scale this is in particular true for bigger developing economies like China and India, which are affected by rapidly growing middle classes (Hubacek, Guan, and Barua 2007). However, the increased and/or changing consumption is also a seeding trend in Europe.

Going back to the basis. A turn towards a sense of belonging and going back to the roots is one of these emerging trends. This can be manifesting in many ways; turning towards religion, going back to old traditions or focus on sustainable and local food production (*State of the Future 2012*. 2012).

Even though these lifestyles have a very local focus, they are indeed at the same time part of a global movement ("Glocal"). One concrete example is Foodism (The Guardian 2012), which has many branches: functional food, organic and local food, vegetarians and the general turn towards sustainable food systems (AG2020 2009). For some places and people this lifestyle is not chosen out of need, whereas this phenomenon is partly a response to the crisis in other places (e.g. Athens) (Skordili 2013).

#### 5.1.3.4 Governance

Following is the presentation of three governance types, which are all possible future governance scenarios. These are supplementing the three governance types presented in the Megatrend chapter. However opposite the previously presented types, these three governance types all imply a 'disruptive' situation compared to status quo.

##### **Marginalisation of the EU-Cohesion Policy: De-mainstreaming territorial governance in a context of "perfect storm"**

This is a 'disruptive' situation compared to status quo. Implies radical change in terms of undervaluing the principle of social cohesion and generally of territorial governance, and of subordination to market dynamics and/or to international institutions.

The convergence between different features such as the current context of economic crisis, the priority given to macroeconomic aspects, the change of the conditions for funding public policies, and a growing disbelief in overwhelmingly complex policy instruments, may create the condition for a 'perfect storm', one which justifies deep shifts in the current cohesion policy towards an undervaluing of the principle of social cohesion, of the strategies of place-based development and generally of the different modes of territorial governance. Under this new context, territorial governance would no longer be part of EU's mainstream discourse and its enforcement would probably be limited to those state-members or regions with successful policies and experiences grounded on territorial governance practices (Bauman 2012; ESPON 2012f; Faludi A 2012; Flockhart T 2010; Huber 2011; Leonardi and Nanetti).

##### **Political federalism: territorial governance in a context of EU-Led centralised decentralization**

Implies radical change in EU geopolitical terms, EU integration under strong global geopolitical pressure.

The definition of objectives and priorities and the design of policy tools will, to a large extent, be the responsibility of European institutions, although benefitting from the e-participation of citizens. The modes of territorial governance will be outlined in European policies. Conversely, the design and especially the implementation of programmes may become increasingly decentralised, founded in the involvement of regional and local socioeconomic stakeholders and resorting, in a progressively enlarged number of policy fields, to deliberative processes that proactively involve citizens in the EU's diverse territories (Bauman 2012; ESPON 2012f; Faludi A 2012; Flockhart T 2010; Huber 2011; Leonardi and Nanetti).



**Return of the state: Territorial governance in a context of state-led centralised decentralisation**

This is a 'disruptive' situation compared to status quo. Implies state centralism under pressure from strong global powers.

In this case, EU multilevel governance will lose its current configuration in favour of a centralised decentralisation occurring at the national level. National governments would regain the chief position they once held in the context of the modern paradigm of 'government' and 'administration' in what concerns the design and evaluation of policies and programmes. On the contrary, the EU and the regional (sub-national) levels will lose prominence in all the stages of the policy cycle. National, institutional and cultural traditions will strongly influence the approaches to territorial governance to be adopted at the sub-regional level: While in some cases these will grant supremacy to public actors and administrative jurisdictions, in other situations a stronger openness towards the establishment of partnerships between different actors and fuzzy bounded functional areas of intervention will be the case. (Bauman 2012; ESPON 2012f; Faludi A 2012; Flockhart T 2010; Huber 2011; Leonardi and Nanetti).

## 5.2 Key challenges for Europe in the World context: SWOT tables

The following describe five Strengths, Weaknesses, Opportunities and Challenges analyses (SWOT), covering each sub-theme outlined in the previous chapter, i.e. Knowledge & Technology, Demography & Society, Resources & Energy, Economy & Growth and Governance. For each theme the SWOT analysis distinguished between the trends identified using different colours. Due to larger number of trends in Economy & Growth an additional grouping of trends has been made (the mind map in Figure 71 indicates this sub-division).

The analysis gives an indication and a short overview of perspectives and challenges for Europe in the future. The SWOT analyses are a result of a preliminary brainstorm, which is why future changes and further nuancing of these analyses are foreseen. Additionally the values, on which we currently base our analysis, are at the moment implicit assumptions, which we would need to address more explicitly when progressing with the analyses.

As mentioned previously the trends are all chosen for their relevance to territorial development, which is why the SWOT analyses all implicitly focus on territorial challenges. However a differentiation of territories in the sense of exposure, sensitivity and impact will be the next step in the continuous work.

## 5.2.1 Resources & Environment

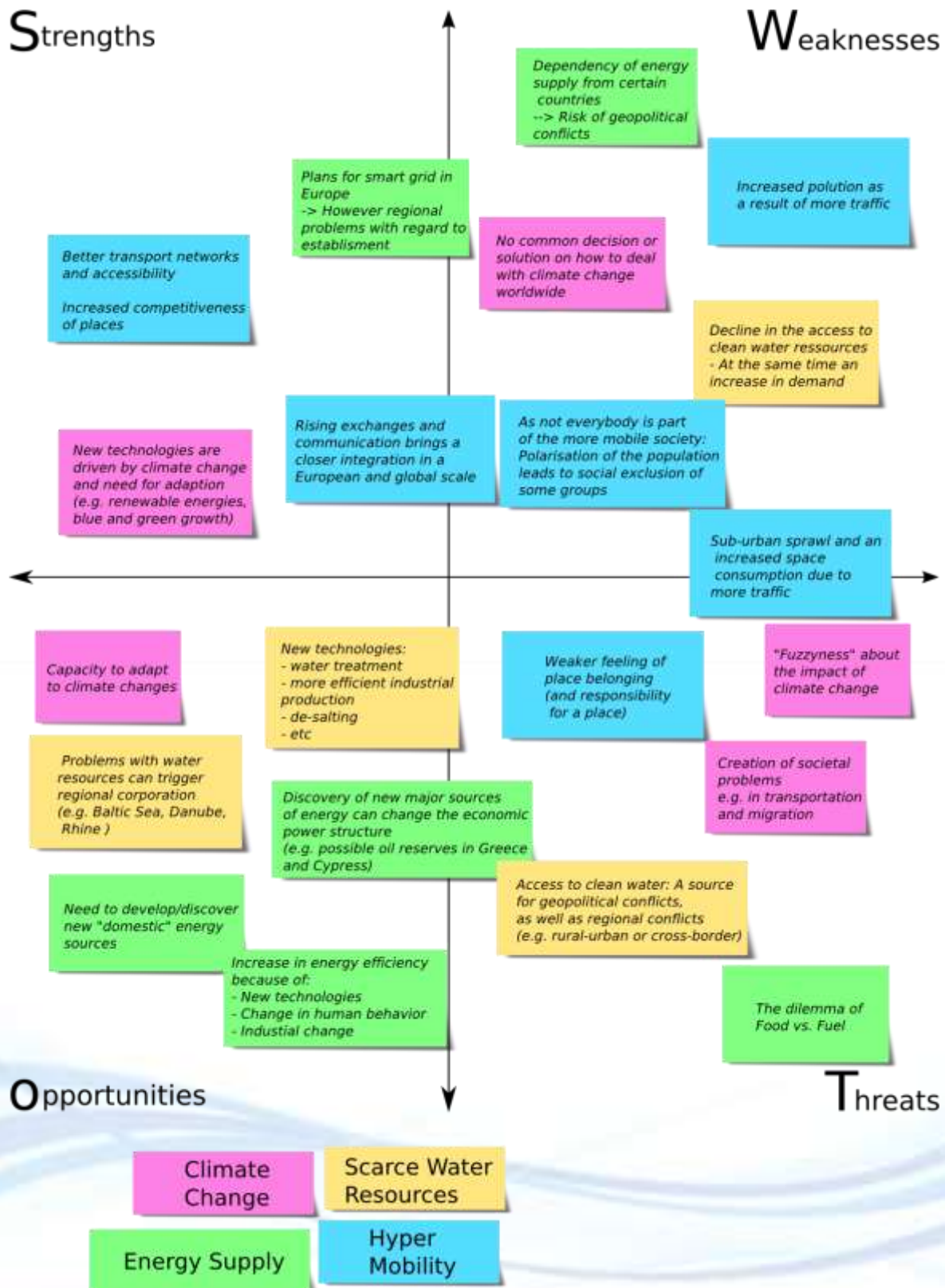


Table 29 –SWOT table of the Resources and Energy thematic area in relation to Territorial Development

### **Strengths**

The increasing number of possibilities of mobility offer the opportunity for the population to develop contacts and experiences in other countries (studies, jobs, meetings, etc...), thus encouraging further integration with global actors. Furthermore the efforts deployed in favour of an increasing accessibility foster the competitiveness of the transport networks within the European territory.

The growing concerns triggered by the environmental challenges have proven to have beneficial effects on several issues. Hence, the need to improve energy efficiency and sustainability led to plans of streamlining the electricity network by conceiving a smart grid in Europe. The crucial need for ingoing ways of adaptation to climate change is furthermore favourable to the development of new technologies such as renewable energy and innovative growth models.

### **Weaknesses**

Despite the growing level of connectivity among European centres, a significant part of the population do not benefit from these progress, highlighting the persistence of social exclusion.

Another main weakness is represented by the intensification of pollution originating from the development of transports networks and the thereby increased traffic. The environment is also affected in regard to a deterioration of water quality, and accompanied at the same time by an increased demand.

The lack of common decisions to bring global solutions to challenges of sustainable and stable water and energy supply, raises the risk of potential geopolitical conflicts, in particular in a context of dependency on supply from external sources.

### **Opportunities**

The challenges of climate change and sustainable energy/water supply, can be translate into unique opportunities, since the necessity of adaptation stimulates new innovative solutions. Consequently, the emergence of new technologies in the framework of water treatment or industrial production is not only bringing innovative solutions, but also promoting incentive to further researches and discoveries. Alternative solutions are likely to emerge for countries facing energy dependence.

As environmental problems do not follow national border a strengthening of cross-border cooperation could be a likely outcome and opportunity arising from these challenges.

The exploration of new energy sources could change the economic power structure of regions most affected by the financial crisis, and thereby become an opportunity for an economic boost.

### **Threats**

The increasing concentration of population in urban areas could become a threat in term of space-consumption, and the thereby derived bigger pressure on natural resources and biodiversity in sub-urban areas. This furthermore makes efficient management of water and energy resources an essential task. Land-use conflicts can become a problem, as land offers limited capacities, and new responses to the increasing demand of energy emerges (e.g. production of bio-fuel replacing the production of food).

Resulting from the likely increase of natural disasters, the intensity of migrations is likely to rise due to damages caused on lands or infrastructures (floods, rise of the sea level, desertification, etc...). The uncertainty, which characterized future scenarios of environmental impacts, makes strategic choices and agreement on policies to tackle the challenges hard to make on a global, regional or even national scale.



## 5.2.2 Economy & Growth

**S**trengths

**W**eaknesses

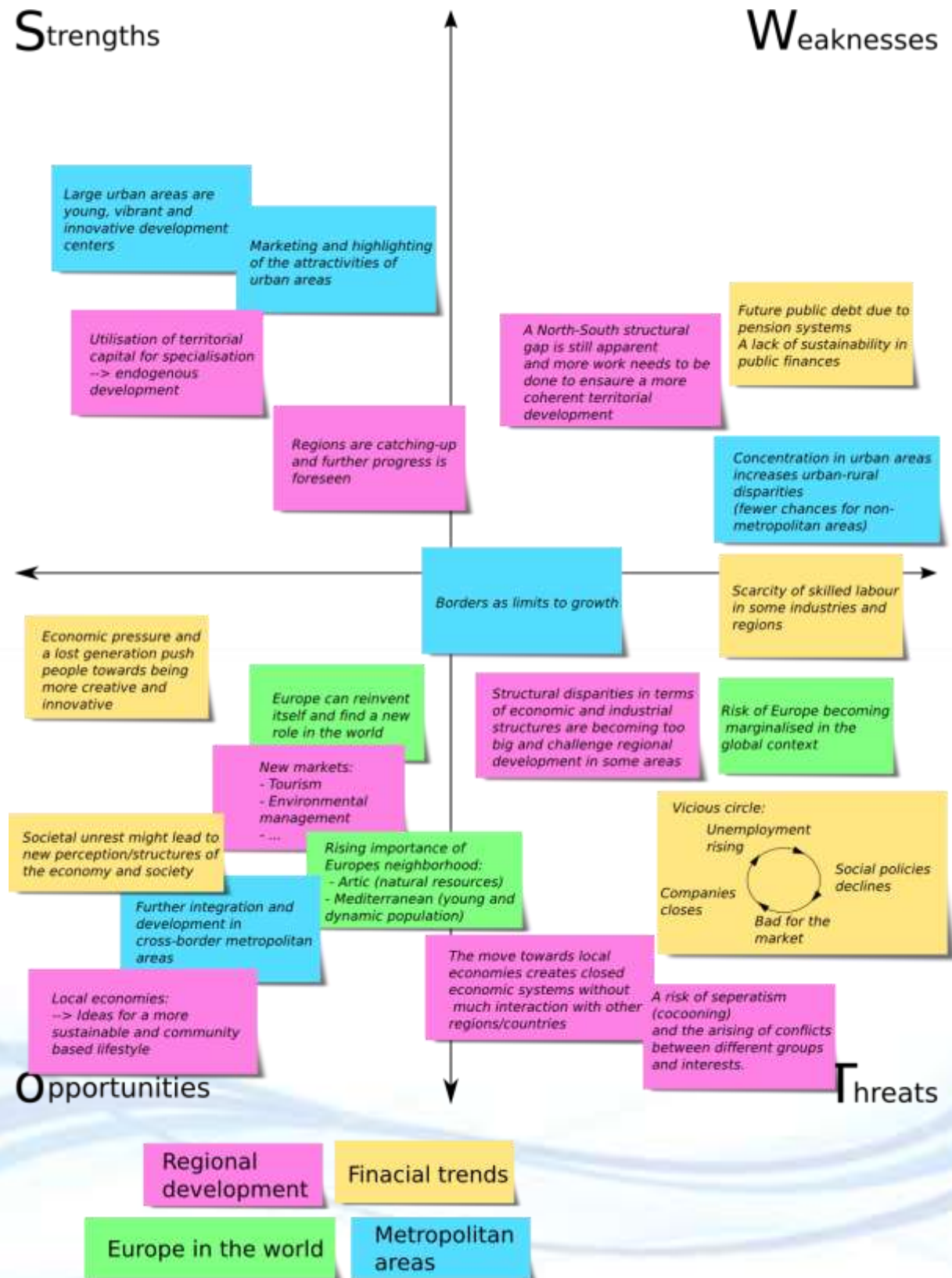


Table 30 –SWOT table of the Economy and Growth thematic area in relation to Territorial Development

### **Strengths**

Regions have very different qualities, which gives potential for specialisation in a wide range of industries across the continent. The no-size fits all approach provide a framework for utilisation of endogenous territorial capital. Likewise a process of catching-up between regions in Europe has been seen.

Furthermore the multiple young, vibrant and innovative urban areas in Europe create a fertile ground for development and innovation.

### **Weaknesses**

However despite the increased cohesion between European regions, a structural gap between south and north is still seen in Europe. Furthermore despite recent focus on financial policies in the light of the financial crisis, several European economies haven't done sufficient to ensure sustainable financial policies for the future. This is especially true with regard to the pensions systems, which due to the ageing population will become a big burden in the coming years.

The concentration of population in the metropolitan areas, results in rural areas losing competitiveness, and thereby increases the urban-rural disparities. Likewise the borders acting as limit for growth is a weakness, which for some regions enhanced the rural-urban disparity. At the same time there is in other regions and industries seen a scarcity of skilled workers, which is why an insufficient supply of skilled labour is a weakness.

### **Opportunities**

The challenges that the economic crisis brings can become a push factor that could lead to new creative solutions to societal problems, and increased social innovation. Furthermore social unrest, might lead to a systemic changes, for enabling a better handling of the challenges in society (e.g. ageing population and unsustainable financial policies). Likewise in the light of the changes in the European neighbourhood and in general the changing world order, Europe has the chance to reinvent its role in the world and on the international market.

Additional a number of opportunities for new markets arise, e.g. growing tourism from especially the BRICS economies, exporting the know-how of environmental management etc. At the same time to increasing local focus, could bring perspectives of a more sustainable and community based economy. Furthermore growth potentials of cross-border metropolitan regions are still to be utilized.

### **Threats**

As outlined above the structural disparities of economic and industrial development in Europe, constitutes a challenge and potential threat for some areas. Likewise the impact of the economic crisis can become a vicious circle with rising unemployment, decline in social policies as well as company closures.

Furthermore the changes in the world markets constitutes a threat for marginalisation of Europe in a global context. Additionally the movement of local economies can become a threat if these local economies become too closed. In the extreme perspective the risk of separatism and new conflicts even within Europe could be the outcome.

### 5.2.3 Knowledge & Technology

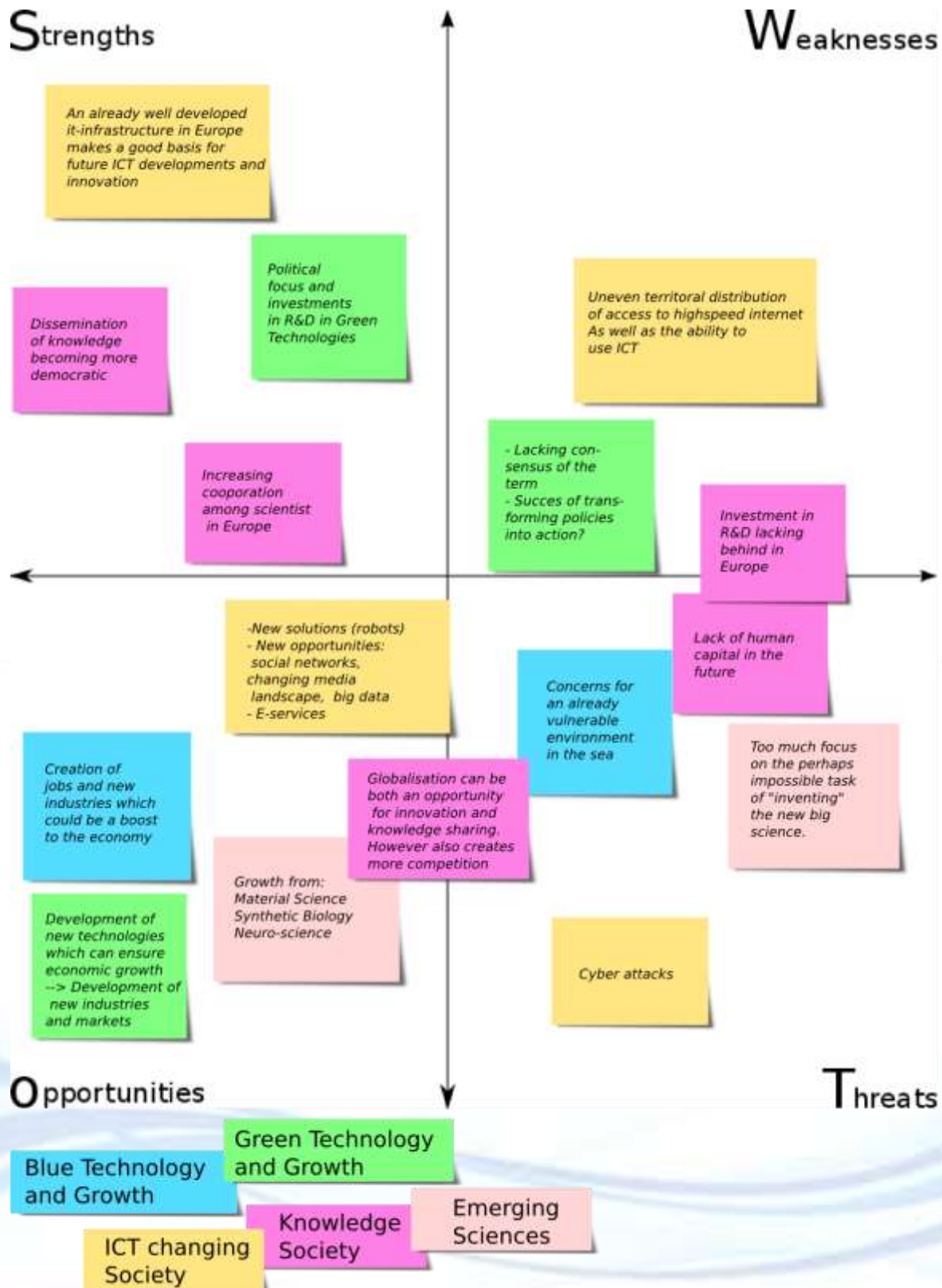


Table 31 –SWOT table of the Knowledge and Technology thematic area in relation to Territorial Development

### **Strengths**

Europe already has a good basis for a strong position in the field of knowledge and technology. The growing knowledge sharing, more cooperation among scientist across borders, as well as political focus on enhancing the innovation processes, in particular with support for R&D in new green technologies, together constitute a solid basis for a future territorial development Europe.

Furthermore the ICT infrastructure in Europe, which for most areas is already well developed, gives a solid basis for future innovation and benefits derived from these technologies.

### **Weaknesses**

Despite all the strengths outlined, the territorial development is influenced by the uneven distribution of investment in R&D and access to a good IT infrastructure across Europe. Furthermore the total expenditure of R&D in Europe is below the target set by the EU Commission, as well in comparisons with competing countries and regions. Relating to policies and investment in green growth, a weakness is seen in the lack of consensus with regard to the definition of the term. Furthermore there is a lack of knowledge about the outcome of green growth strategies, both in relation to the impact on the environment and the economic growth.

### **Opportunities**

As already outlined, the strength in Europe in this fields, gives the basis for opportunities for the future. The creation of growth, new jobs as well as industries, are all possible outcomes of the new growth policies. Green growth has already gained substantial attention, whereas blue growth is still in an initial phase of development.

Furthermore the support of innovation within science, gives yet unknown opportunities in the future in relation to technologies derived from emerging sciences.

Globalisation and ICT brings new possibilities of interaction among regions, people and scientist, which creates opportunities of more innovative solutions, both in technologies, but also in others spheres. Likewise ICT technologies in it self, already shows great potentials for new solutions and new ways of information and knowledge sharing.

### **Threats**

Already emerging concerns about a lack of human capital in certain industries, should be considered a threat for European growth and economy, and therefore be high on the political agenda. Furthermore the threat exist that the focus becomes more on growth, whereas the green and environmental part of the strategies are drawn to the background.

The urge for investing in the right science, or new industry, can also become a threat, as the single focus on particular new sciences, could be contradicting the more unstructured nature of innovation and scientific discoveries.



## 5.2.4 Demography & Society

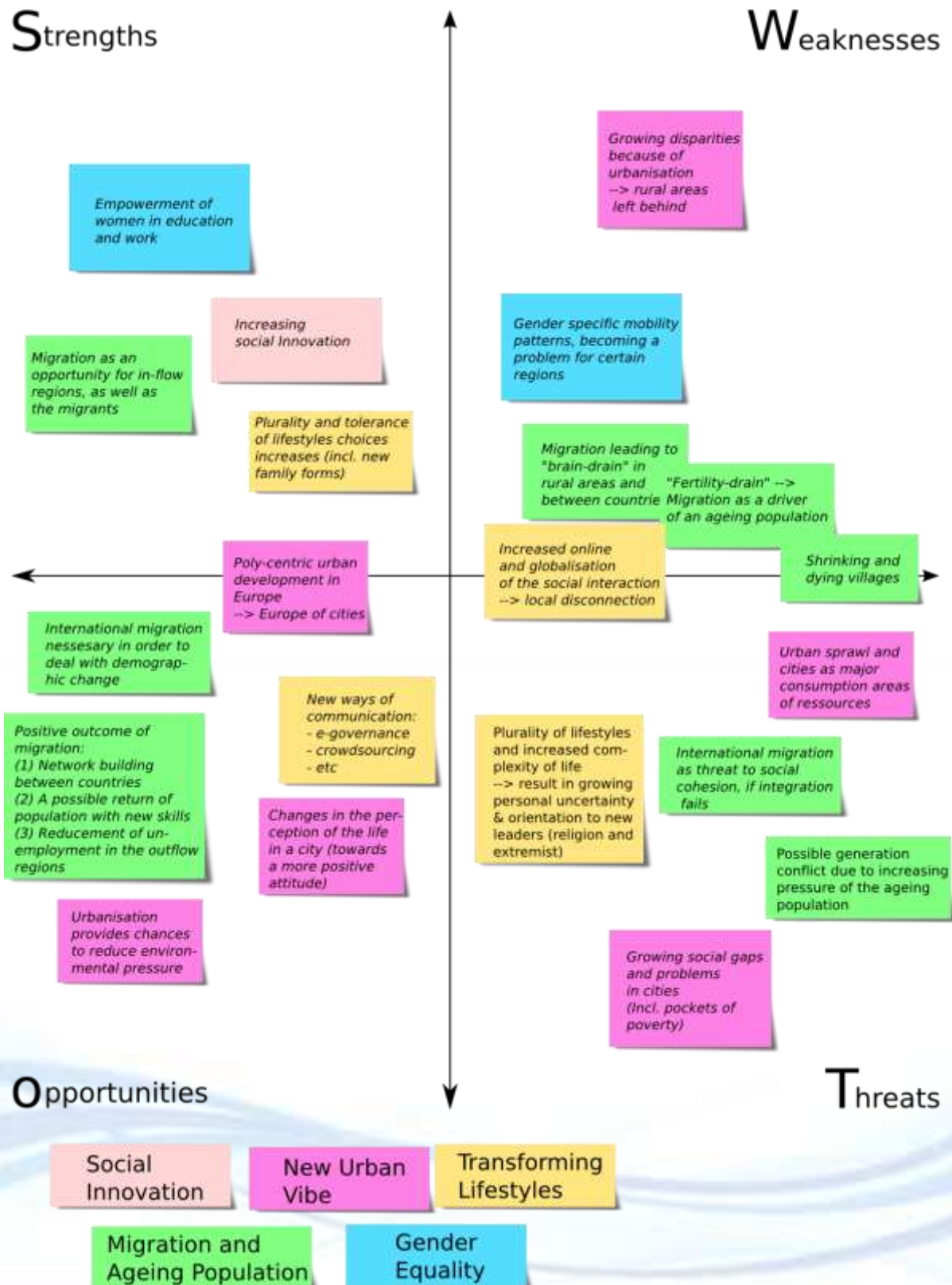


Table 32 –SWOT table of the Demography and Society thematic area in relation to Territorial Development

### **Strengths**

The plurality of new lifestyles constitutes a growing acceptance of different groups and ways of living. Likewise the empowerment of women in education and work, is a positive contribution to society and the economy.

EU facilitating a more smooth movement of labour has resulted in an increasing borderless labour market, which constitutes an asset for both workers and regions. Migration is an advantage for many regions, if the local labour supply is not sufficient, and furthermore a chance for the migrants mainly because of the possibility for employment.

Furthermore the growing tendency of social innovation (solving social problems in new innovative ways) shows a strength from which further solutions on social problems can be derived from.

### **Weaknesses**

The urbanization process brings further disparities among regions. The gender specific migration enhances the impact of out-migration from rural and peripheral region due to perspectives of better life quality in urban areas. Together this constitutes a fertility-drain in rural area, which consequently results in shrinking and dying villages.

In line with the increase in online communication, the social interaction has become global. It can constitute a weakness, if the social life becomes increasingly disconnected to the local.

### **Opportunities**

International migration can bring an opportunity to solve challenges of demographic changes (e.g. ageing population). Furthermore migration can bring more interaction across borders, and act as a facilitator of international network building. Moreover, not only an immediate reduction in unemployment can be beneficial for the out-flow regions, but also a long-term perspective of the return of migrants, which can bring back new knowledge and skills to help boost the economy.

Furthermore the perception of city-life has changed, which brings new opportunities for development of cities. Urbanisation can also be part of the solution to environmental challenges, as the density of inhabitants allows for more environmental friendly behaviour (e.g. using public transport).

Furthermore changing use of ICT (e-governance, crowdsourcing etc.) brings opportunities of new and more efficient ways of interaction.

### **Threats**

The urbanization also brings the threat of sprawling urban areas, that consume land, which thereby becomes more vulnerable (e.g. deteriorating bio-diversity, more vulnerable towards climate change). The growing cities also brings a growing social gap within the cities, these pockets of poverty, in otherwise wealthy and prosperous cities, can become a threat to social stability. Furthermore the ageing population could lead to a conflict between generations.

The downside of the growing plurality of lifestyles is a growing uncertainty among people, this can lead to sub-cultures which distance themselves from the society and turn towards religion or traditions instead.

Alongside the urbanization, an increase in migration can result in further problems of social cohesion, if the integration of migrants fails.

## 5.2.5 Governance

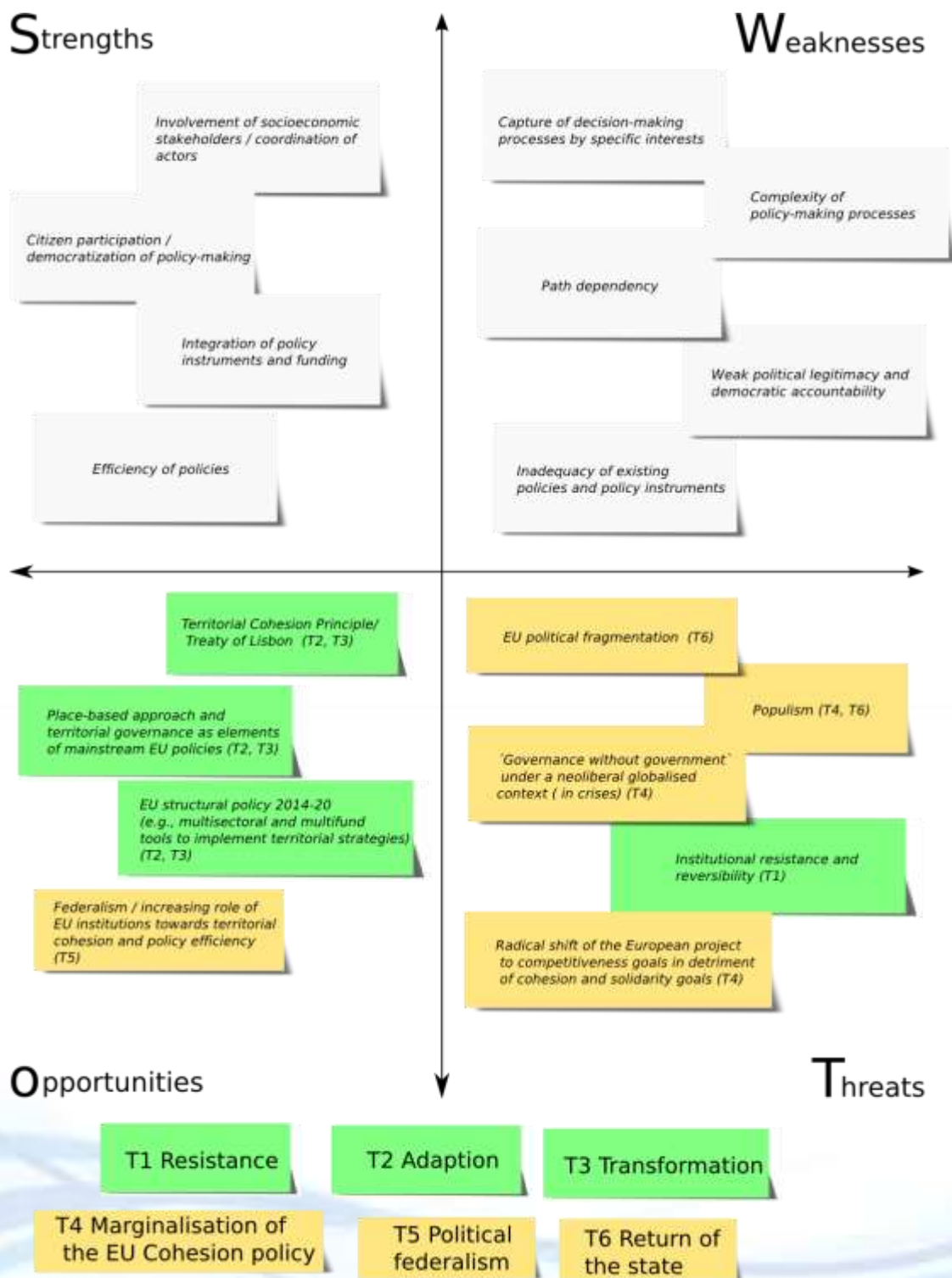


Table 33 –SWOT table of the Governance thematic area in relation to Territorial Development

The character and analysis of governance trends differs somewhat from the analysis of other territorial development trends. Accordingly, also the discussion of the SWOT has a slightly different character. The governance trends discussed in the previous section have been further depicted in terms of opportunities and threats linked to them. At the same time, existing governance strengths and weaknesses have been identified at a more general level.

### **Strengths**

For the development of future scenarios in particular four strengths of governance in Europe have to be considered, although their existence and meaning varies across Europe. They are (a) the involvement of socioeconomic stakeholder and the coordination of different actors involved in policy making and territorial development, (b) the processes of democratisation of policy-making and citizen participation, (c) the approaches to integrating different policy instruments and funding sources into more coherent development strategies, and (d) the efficiency of policies focussing on collaborative and result-oriented decision-making process adjusted to territorial contexts. Certainly all these points can be further strengthened in the future, but the degree to which they are practiced already across Europe is seen as a good basis for governance processes related to territorial development.

### **Weaknesses**

Governance traditions in Europe have also a number of inherent weaknesses. Although they differ between territories, five overarching areas have been identified as important weaknesses to be considered for future oriented scenarios. They are (a) the past dependency of decision making and development processes which often act as strong inertia to change, (b) the tendency or risk of decision-making processes being captured by specific interests, (c) the complexity of policy making processes including non-binding decisions about the commons and issues of public interest, (d) partially weak political legitimacy and democratic accountability, especially when it comes to European level decision making, and (e) the partial inadequacy of policies and policy instruments, which may imply that needed actions cannot be taken.

### **Opportunities**

Opportunities depend on the trend in question. In the main opportunities are linked to trends in the fields of (a) adaptation, (b) transformation and (c) political federalism. With regard to the trends on adaption and transformation discussed above, three distinct opportunities have been identified. These are mainly (a) the territorial cohesion objective introduced in the Treaty of Lisbon, (b) the place-based approach (cf. Barca 2009) and territorial governance dimension of mainstream EU policies, and (c) the integrated approach of EU Cohesion Policy (ESIF – European Structural and Investment Funds 2014-2020). When it comes to the trend of increasing political federalism, the increasing role of EU institutions and their striving towards territorial cohesion and policy efficiency is an important opportunity.

### **Threats**

Also possibly threats depend rather on the individual trends. Threats are linked mainly to trends in the fields of (a) resistance, (b) marginalisation of EU Cohesion policy, and (c) the return of the state. With regard to the trend on marginalisation of EU Cohesion policy, threats are increasing populism, governance without government in a neoliberal globalised context, and a radical shift of European project to competitiveness goals in detriment of cohesion and solidarity goals. Linked to the trend of a state return, threats are a political fragmentation of the EU and increasing populism. Institutional resistance and reversibility are threats linked to the trend on resistance.



## 6.- ANNEX I - Literature review of Scenarios and Visions, and Policies

### 6.1 Economic Scenarios

#### 6.1.1 Future Scenarios for the Eurozone (2020)

**By Björn Hacker, at Friedrich Ebert Stiftung 2013**

The Eurozone is standing at a crossroads, facing the biggest challenges in its history: the systemic crisis and the political attempts to overcome it have far-reaching consequences for the future of the Economic and Monetary Union, European integration and Europe in the world. By identifying the main driving forces that influence the future development of the Economic and Monetary Union, a number of different scenarios were developed to show what the Eurozone will look like in the year 2020.

Four major scenarios are imaginable:

- Muddling through the Crisis. The Eurozone remains a house without a protecting roof.** In the year 2020, the Eurozone and, with it, the EU is stuck in the ongoing crisis, which started to unfold in 2010. Most of the Southern European countries still need rescue packages and the European Central Bank keeps on buying their public bonds, as the borrowing costs for them are too high. The resources of the European Stability Mechanism are still inadequate and thus there is always the possibility of sovereign default. The Economic and Monetary Union remains incomplete, unable to ensure growth and employment and, even less, a transition to a new growth model that is greener, smarter and more inclusive. Globally, Europe remains a weak player, whereas the United States and other big powers, such as China, have managed to overcome the crisis. As a result, the EU's dependence on financial support from external partners increases.
- Break-up of the Eurozone. The Euro house falls apart.** In the year 2020, the European Economic and Monetary Union is split up into different blocs and some countries have reintroduced their former currencies. The European Union still exists, but is reduced to a loose alliance in which even free trade is seriously hampered by protectionist measures in many Member States. In some of these countries, anti-European and nationalist-populist movements have come to power and pursue a beggarthy-neighbour policy. In the weakened economies, many strategic assets are bought up by non-European countries, reducing Europe's control over its own production chains.
- Core Europe. Construction of a smaller and stable, but exclusionary Euro house.** In the year 2020, the Economic and Monetary Union is completed by a smaller core group of Member States within the framework of a new full-fledged Treaty outside the EU treaties and excludes the non-Eurozone Members and even some Eurozone Members (a »two-level Europe«). The European Union still exists, but is mainly reduced to a huge free-trade zone which even can accept new members hostile to closer political integration (for example, Turkey). The core group has implemented fiscal union and is moving towards a real political union, while some EU members on the periphery fall far behind these developments.
- Completion of the Monetary Union by a fiscal and political union. The roof is repaired and construction completed.** In the year 2020, Fiscal Union is

completed in the European Monetary Union, albeit with saving clauses for those Member States particularly hit by the crisis. The Eurozone, building on a more consistent Economic and Monetary Union, is coordinating its external position and there is a single Eurozone representation in the Bretton Woods institutions. The Euro has become a reference currency attracting financial resources from all over the world. On the way to political union, a »two-speed Europe« emerged, in which the Eurozone as a vanguard of states explores closer integration. Non-members of the Eurozone are encouraged and assisted by the vanguard to meet the preconditions for integration, which encompass more than the Maastricht Criteria.

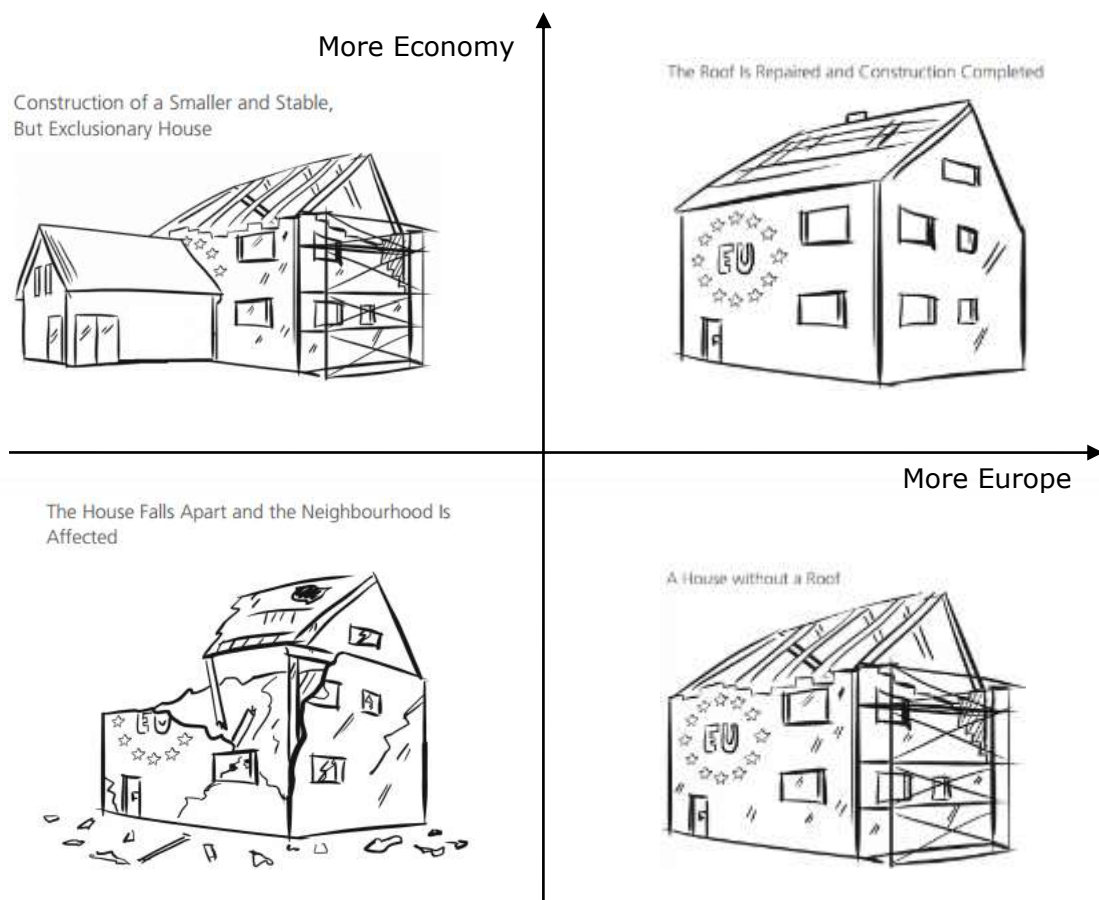


Figure 72 - Future Scenarios for the Eurozone to 2020  
Source: Friedrich Ebert Stiftung 2013

### 6.1.2 Time bomb? The future of Financial Services

**By Gill Ringland, Long Finance, 21st October 2011**

In summary, our scenarios take into account the effect of the financial crisis which started in 2006, and assume that by 2050:

- The global population will grow to nine billion and get older, with most of the additional people in Africa and Asia. This will cause major shifts of economic power, causing turbulence as political shifts follow.
- The new centres of power may not share the value systems of the west, or the Washington consensus.

- Technology (info, cogno, bio, nano) will continue to introduce changes in personal capacity and lifestyles, while ICT will underpin much of society as well as commerce.
- Ecological, energy and environmental limits will be tested or breached as the percentage of the population living in cities approaches 70% and the new middle class eats meat, uses cars, refrigerators and electronic goods, and travels for pleasure

For thousands of years, people lived in the countryside. Slowly people started to aggregate into villages, then towns and cities. Then, in 2008, the number of people living in cities was over half of the world's population (UN, 2008). By 2050, when the global population is expected to be nine billion, urban dwellers will exceed six billion. Most of these will be in smaller cities, but projections based on UN forecasts for 2025 suggest there could be 500 million people living in 20 mega-agglomerations with populations over 20 million by 2050, (UN, 2007) and <http://www.skyscrapercity.com>.

Currently, vast cities in the poor nations are seen as centres for the epidemic diseases arising from poverty, where crime and ideologically-inspired violence are fuelled by poor governance. Furthermore, many cities are near the sea or in river valleys subject to flooding, with the consequent exposure to extreme weather events - and despite this, suffering water shortages, (WWF, 2011). But there is also evidence that concentrating people in one place increases economic activity, return on infrastructure investment and social vitality: if the population of a city is doubled, there is an average 15% increase in the wages and the patents produced compared with two cities of the original size. There is also an inverted effect in terms of infrastructure - if the population of a city doubles, it needs 15% less physical infrastructure than two cities (Bettencourt, 2011). The importance of clusters - requiring cities to support them - was discussed above. Cities however have another side effect, which is changing society. When people move to cities, women tend to be educated. And this leads to smaller families. This is one of the factors leading us to think that the global population may not rise above nine billion.

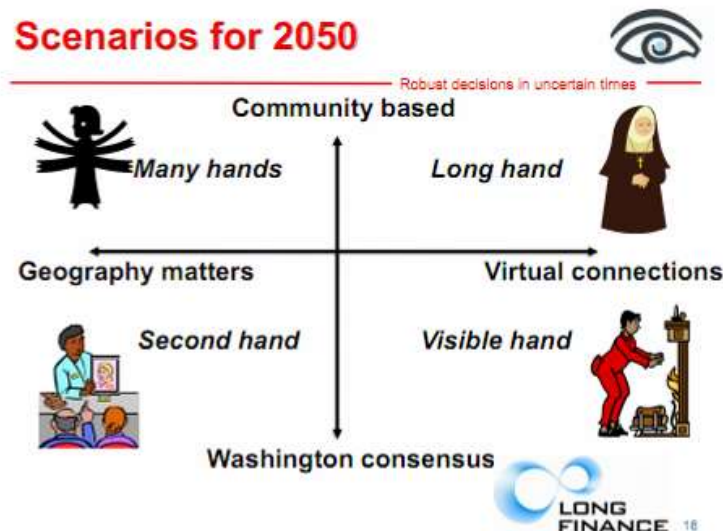


Figure 73 - Financial and economic policy scenarios to 2050  
Source: Gill Ringland, 2011

**Second Hand** is a world in which democracy is still valued, western values and institutions are still part of the global business environment, capitalism is still the dominant paradigm, as part of the Washington consensus. It is a world in which geography - in the form of the

nation state – still matters, though with weaker powers than today. It is a muddle through scenario, in which international structures decay as they do not reflect the relative wealth of the BRIC countries and other industrialising nations such as Turkey.

**Visible Hand** is a world in which the current political, social and economic regimes are still recognisable as the Washington consensus. It will have evolved after the financial and fiscal crises, responding to population and resource pressures, and taking advantage of new technological capability. The world is more educated and well fed but at the expense of rugged individualism, with a pervasive homogeneous global culture. This homogeneous culture leads to extreme volatility and break down into a Long Hand or Many Hands world by 2050.

In the **Long Hand** scenario, the financial crisis in the early years of the century was followed by a fiscal crisis in many western countries. This overloaded states' budgets, and caused a retrenchment in consumer spending power and overall consumption. As a result, virtual connections based on affinity groups – ethnic, religious – and spanning geographies become the main global organising structures

The **Many Hands** scenario sees a world which has declared globalisation to have failed, democracy to be too unwieldy, and western value systems inadequate. The concept of the nation state as provider has disappeared. In its place, a multitude of city states have emerged, in some cases replacing completely a failed state, in others co existing (occasionally awkwardly) with a state whose role and authority are often substantially reduced. Mobility across states and between cities is the norm. The city state communities have very different strengths and weaknesses, wealth and brand

### 6.1.3 A future for small business? Prospective scenarios for the development of the economy based on current policy thinking and counterfactual reasoning

**By Andrew Atherton, Lincoln Business School, 2007**

This paper generates a series of possible futures based on an identified policy priority, namely the encouragement of increased levels of small business activity. Counterfactual thinking is used to challenge this policy objective and to formulate alternative possibilities. Specific consideration is made of the nature of the future economy in terms of business linkages and market integration, as are the likely strategic responses of businesses and government. Eight scenarios are developed based on these drivers of change in economic structure and business activity. Data on the world economy are then applied to 19 developed and developing economies to test the scenarios. How these 'externally generated' scenarios can be applied to and made relevant to businesses, and in particular smaller enterprises, is examined, as are the broader implications for the future nature and structure of economic activity.



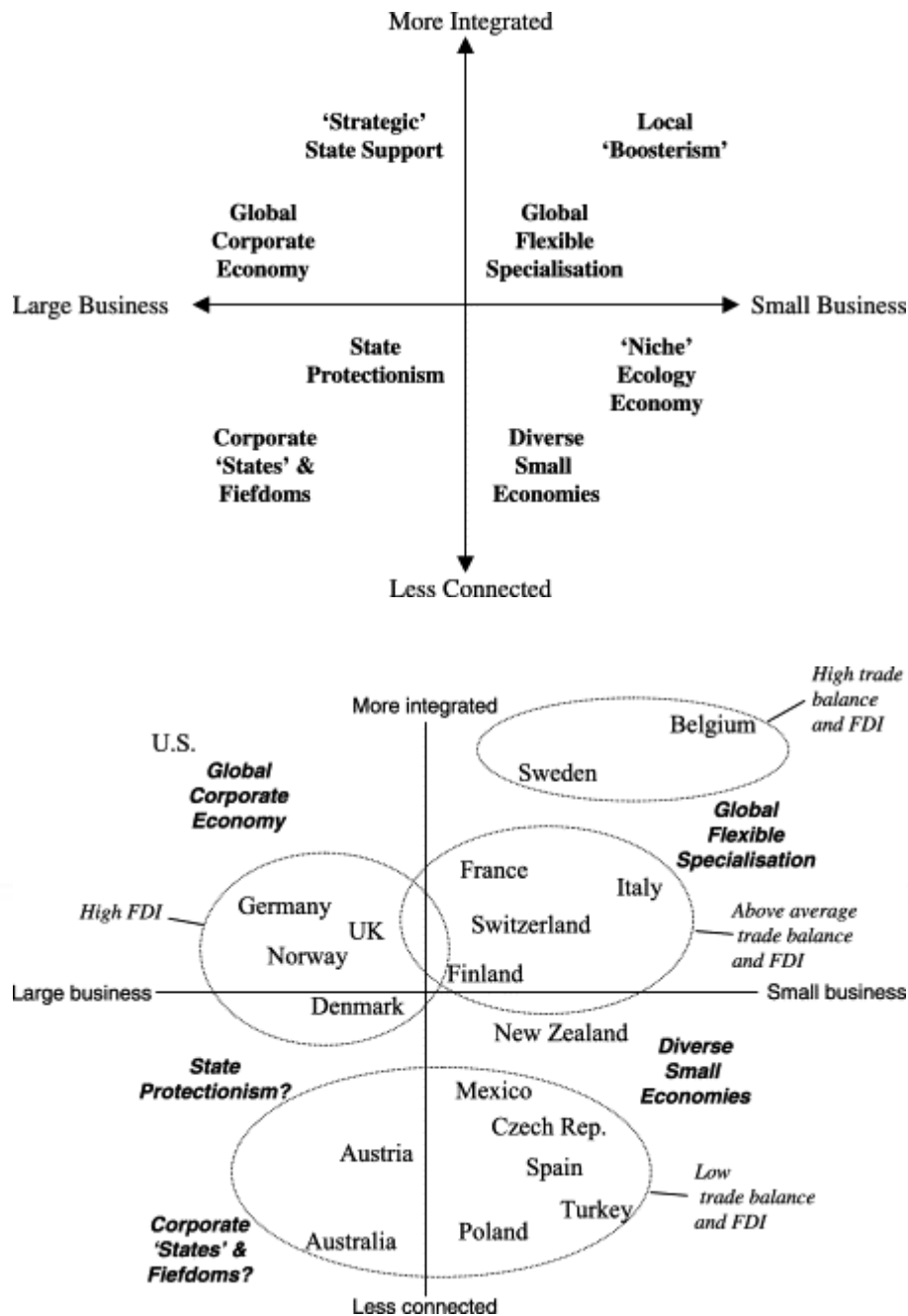


Figure 74 Business Scenarios from SME  
Source: Lincoln Business School, 2007

#### 6.1.4 After the global economic crisis: policy implications for the future of the European territory

**By Klaus R. Kunzmann 2010**

There is not one future of European spatial development. Too many economic and social development trends and strategic policy decisions will influence the direction of possible paths of development. The following five scenarios will sketch holistic policy actions in a few limited policy fields. They reflect ongoing trends and related local and regional policy arenas. The narratives presented thereafter, draw on personal observations, selected empirical evidence and creative imagination. They do not represent alternative strategies and options, which the European Commission together with national and regional

governments could select. They are just story lines of possible spatial development strategies.

Five major scenarios are imaginable:

- **Scenario 1- Europe: learning theme park of the world – the old Europe scenario.** In the aftermath of the crisis of the capital market the new role soon became visible. “Old” Europe realized that it was about to gradually lose its global competitiveness in many fields of science and technology. The chances to catch up with the rivals or even lead innovation in areas such as biotechnology, environmental technologies, computer sciences, medicine or advanced engineering decreased. This alarmed the European Union and caused a considerable shift in regional development strategies.
- **Scenario 2- The creative economy slump – a warning!** In the beginning of the 21st century, all cities want to be creative. Not unexpectedly, however, the creative economy bubble burst in the second decade of the 21st century. The hopes were exaggerated, once the public support and the absorptive capacity of the market came to an end and export expectations did not materialise. Many other countries were exploring and developing their own creative potentials with much success, particularly China, Korea and Brazil. Large groups of the creative class had to search for other jobs, in low paid service industries, agriculture and traditional crafts and trades, as the expected demand of creative products reached saturation point. The export potential of the European creative economy turned out to be limited.
- **Scenario 3- Post-Bologna renaissance of knowledge industries – a normative scenario!** Immediately after the European Union had survived the worst economic crisis of its existence, European governments, faced with falling behind the US and China, started to considerably increase investments in higher education and research. There was unanimous agreement that Europe has to invest more in science and technological innovation, if it wants to maintain its competitive position and attract more and better qualified students and researchers to European institutions.
- **Scenario 4- Europe: China’s special economic zone – not an unlikely scenario!** Within two decades China has become an economic power with much interest in European technology and expertise, quality standards and process competence. Changing immigration laws in Europe enabled Chinese engineers to gradually take over jobs from early retiring European engineers, due to the lack of a next generation of qualified European engineers. Many of these engineers found their first job in Europe in technology parks supported by large European or Asian corporations. With such experience and new visions in mind, regional governments in Europe had started to develop special (free) zones for Chinese investors in Europe, mainly as a transitional means to promote and enhance European-Chinese Cooperation in technology related industrial development. The Chinese input caused a renaissance of traditional European industries in metropolitan city regions.
- **Scenario 5- Slow Europe: a pastoral continent.** Intensified by the recent financial crisis, there is less and less trust in global financial institutions and growing resistance to accept market driven economic development. In the decade after the crisis ecological objectives, low carbon development and resource conservation principles received more and more sympathy among the people in Europe. A return to a pastoral continent, a continent where agriculture and rural life in all forms regains economic importance, became a realistic option. The idea of opting out from the global competition for economic growth became something more and more citizens in Europe could sympathize with.

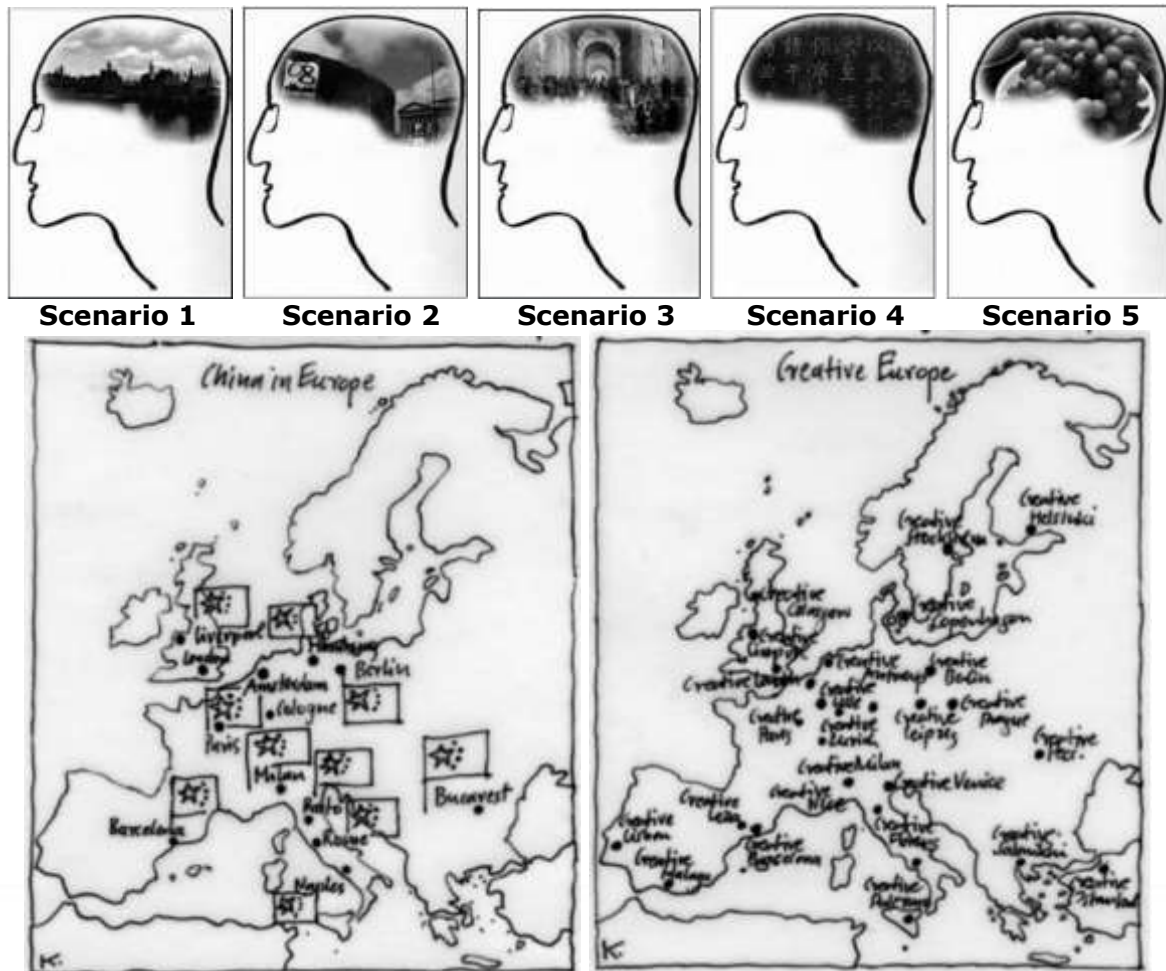


Figure 75 Klaus R. Kunzmann Scenarios for Europe  
Source: Klaus R. Kunzmann 2010

### 6.1.5 PASHMINA Global Scenarios. Paradigm Shifts Modelling

*By ISIS and MCRIT, within PASHMINA project EC 7FP, 2010*

PASHMINA project's objective is to model global scenarios based on changes of paradigm in long term time perspective (2030–2050) derived from new behavioural trends in Earth societies, especially considering the challenges of energy provision, climate change and land-use equilibrium. The project involves a large number of parties and several different models and sub-models studying different dimensions of the problem, like the evolution of cities, of rural and natural environments, or the evolution of transport.

**Growing beyond limits scenario** features the strengthening of corporate capitalism and market mechanisms, pursued globalization of goods and financial markets, a new technological wave in the form of ICT, nano-technologies and biotechnologies.

**Growing within limits scenario** assumes that a low-carbon economy and adequate biodiversity protection can be achieved with currently identifiable technologies and at moderate economic costs without damaging opportunities for human development, provided that a number of barriers to achieving the right policy conditions and institutional settings are overcome.

**New welfare scenario.** The present measurement of growth is abandoned in the New welfare scenario. A new frame is set up to account features of wellbeing "beyond GDP", including self-production and services rendered by nature, taking into account the realities

that do not pass through the market or get irrelevant evaluation by a market. A new techno-economic and social paradigm emerges

**Turbulent decline scenario.** The key question with respect to turbulent decline is whether the growth in material flows could remain within the limits for climate change, natural resources' availability, global ecosystems' health and biodiversity loss, as well as help to alleviate global poverty. The answer would be negative, and the world is set to collapse.

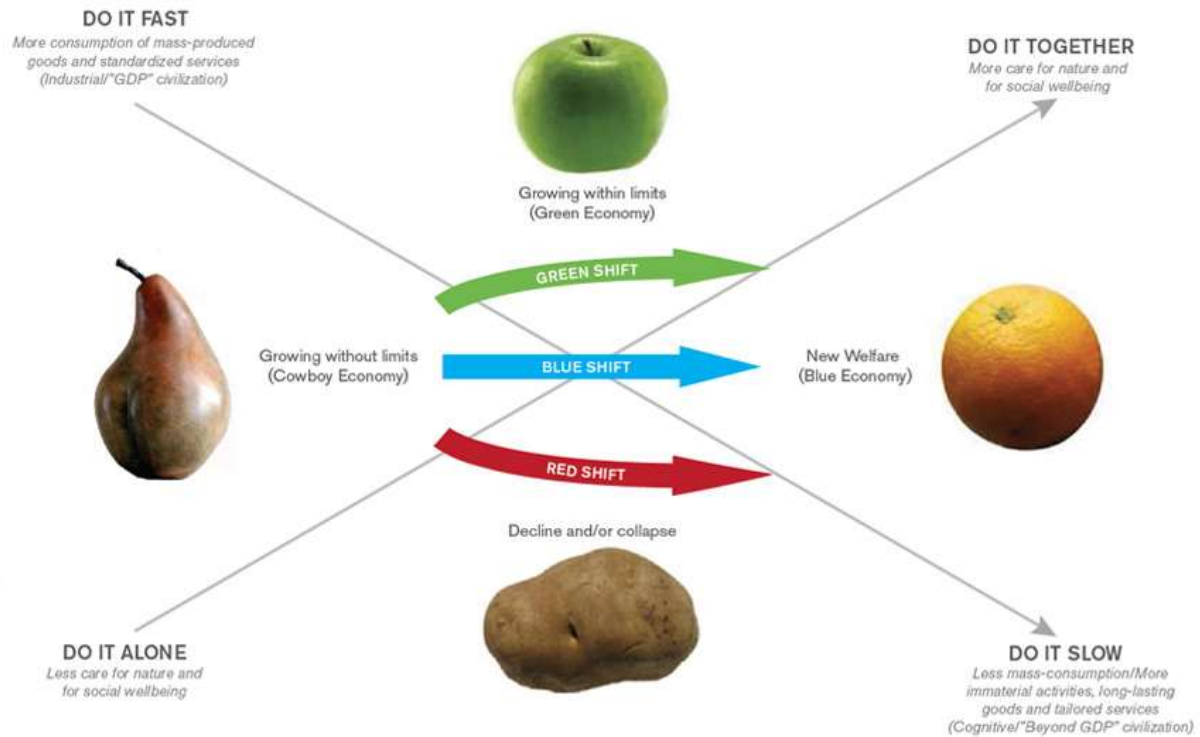


Figure 76 Paradigm shifts as transitions between four scenarios  
Source: PASHMINA FP7, 2010



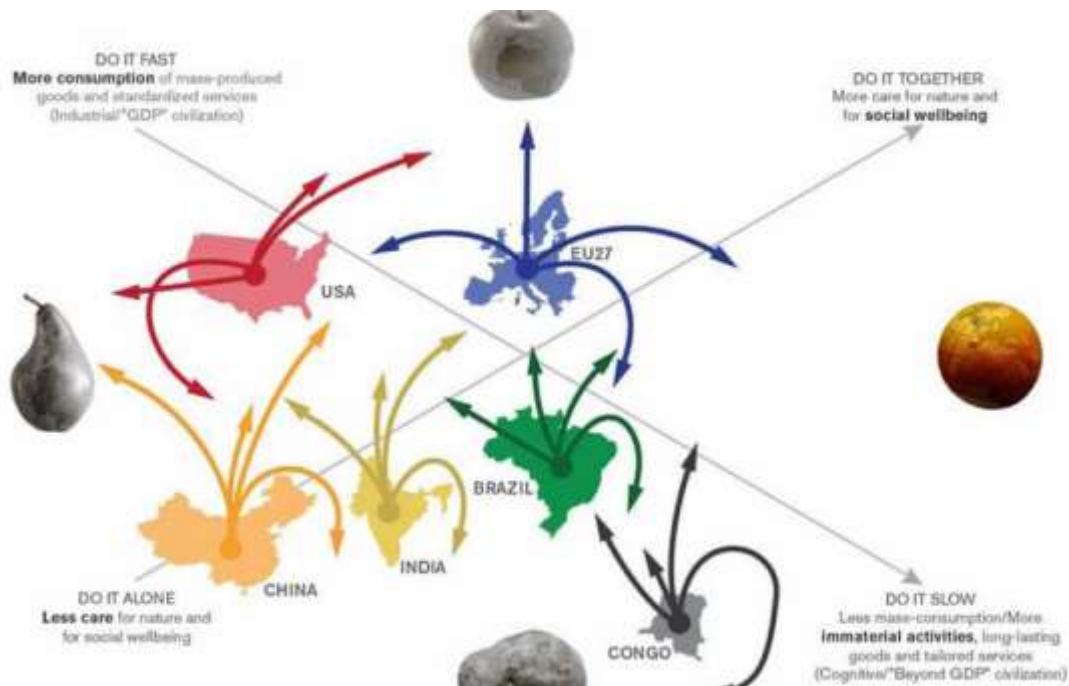


Figure 77 Localisation of world's representative regions in a GDP-wellbeing space  
Source: PASHMINA FP7, 2010

### Growing beyond limits: the Peer Scenario

<b>The driving forces</b>	<b>The world shape</b>	<b>The human landscape</b>
<b>The technological revolution</b>	<b>Irregular shape, evoking north-south disequilibria</b>	<b>Soft and smooth pear peel evoking cultural uniformity</b>
<p>The technological revolution allows for clean energy production, health innovations, environmental and green techs... globally relieving pressure on environment. While energy consumption will still grow at a high pace (even if energy intensity will continue to progressively decline), released emissions per unit of energy production will fall down increasingly faster due to technological innovation. Transport will still grow along with economy, invalidating the decoupling paradigm, but this does not matter anymore as vehicles have become clean and emissionless.</p>	<p>The pear is irregular in its shape evoking disequilibria in different parts of the world, both economically and socially. Some countries, regions, even neighborhoods will keep progressing economically while others will have substantial difficulties to develop. Countries growing beyond limits have GDP annual growth rates ranging between 3% and 6% depending on the level of maturity of their economies, while lagging countries show very fluctuant instable patterns of growth, with poor average rates over time.</p>	<p>A close look onto the surface of a pear shows a uniform smooth pear landscape, evoking progressively uniform values and habits all over the world. Globalization and increased mobility of people (migrations, global business, leisure travel) increase the trend towards social homogenization of world societies. Minorities helplessly see their identities diluted, while global homogeneous values spread around.</p>

Figure 78 Pashmina Growing beyond limits scenario (PEAR)  
Source: PASHMINA FP7, 2010

## Growing within limits: the Apple Scenario



### The driving forces

#### The social democratic revolution

The Global Green New Deal is a set of new institutional conditions that are created to spur off the shift towards fundamental transitions that will help bring a "green" economy. Regulations as well as citizen behavioral changes contribute to decrease progressively energy intensity, as societies turn from being mostly consume driven to being mostly service and knowledge oriented. GDP growth therefore becomes increasingly independent from energy demand. Innovation contributes to reducing GHG emissions from power generation as well. Climate change threat progressively banishes. Dietary changes and increased efficiency of agriculture relieve land claim pressure.

### The world shape

#### Regular shape, evoking a more equilibrated world

The apple is spherically shaped, evoking a more equilibrated world, both economically and socially. Poor nations increase their wealth in a steady consistent way, and steered development cycles generate low social disparities. Rich nations devote significant aid to developing countries, especially through skills, knowledge and technology transfers. Countries growing within limits have average GDP annual growth rates ranging between 1.5% and 3%, decreasing as they become more mature economies.

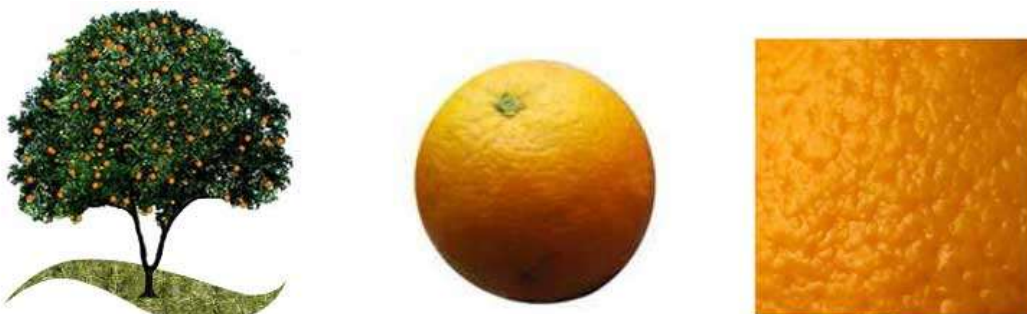
### The human landscape

#### Soft and smooth apple peel evoking cultural uniformity

A close look onto the surface of an apple shows a uniform smooth peel landscape, evoking progressively uniform values and habits all over. Multilateral governance and interregional cooperation promote good understanding among different cultures, increasing the trend towards progressively shared social and cultural values, diluting minority identities in favor of common progressive ideals.

Figure 79 Pashmina Growing within limits scenario (APPLE)  
Source: PASHMINA FP7, 2010

## New welfare: the Orange Scenario



### The driving forces

#### Welfare beyond economic growth

The New Welfare scenario is the result of a deep behavioral social mutation, with people becoming more concerned about wellbeing and quality of life than economic wealth. Hedonism mixes up with new "social innovative" mechanisms to satisfy new social community needs. Material consume is reduced; barter becomes common. Info, digi, cyber, holo and other immaterial high-tech technologies are extremely successful, while mechanical elements progressively substitute energy driven mechanisms: it is the age of the crank, the spring, the pedal and the ladder. New eco-cultural paradigms emerge, changing the human-nature interaction, from "exploitation" to "gardening". Education and research are at the center of social values.

### The world shape

#### Regular shape, evoking an equilibrated world

An orange is spherically shaped, evoking a world that tends to progressively harmonize different regions, becoming more equilibrated in the mid and long term. As there will be mostly small scale local economies, highly self-sufficient but well connected to networks, societies will more easily steer stable economic frameworks with little perturbations. The economy will be operating with the minimal levels of production and consumption necessary for a high quality of life, using new GDP measures where indicators such as quality of life and ecosystems' health will gain predominantly weight.

### The human landscape

#### The wrinkled orange peel evoking cultural diversity

A close look onto the surface of an orange shows a soft but wrinkled peel, non homogeneous but still harmonious. This is the social spirit of the New welfare scenario: a world recognizing and promoting differences on communities as an enriching element to society, a rich mixed salad with an "earthy" dressing. People's attachment to institutions and nations, which was one of the bases of industrial organization, is not essential anymore. There will be mostly small scale local communities, connected to the rest of the world through social networks. Multi-level governance with bottom-up participatory approaches will largely diminish national and global powers.

Figure 80 Pashmina New welfare Scenario (ORANGE)  
Source: PASHMINA FP7, 2010



## Turbulent decline: the Potato Scenario



**The driving forces**

**Failure to sustain global economic growth**

Market forces are dominant. Most services are privatized or franchised. Energy shortages, lack of innovation, and low emotional social conditions make service providing inefficient at all scales: services to people, to enterprises, mobility services and goods production. R&D budgets are almost residual. Energy intensity breaks its decreasing trend and starts increasing after 2030, implying that more energy is needed to produce single units of GDP. Technologies become old, but investigation is mostly deployed to new "evading from reality" techs such as emotion controllers or virtual reality devices. Both inefficient transport vehicles and inefficient power generation increase emission factors, aggravating the problem of climate change. Polluted environment and toxic atmosphere accelerate biodiversity destruction.



**The world shape**

**The world shape: very irregular shape evoking highly fragmented world**

The potato world is irregularly shaped, evoking a much disequibrated world, both economically and socially. It is a world in crisis. Protectionism in different regional economies induces disparate economic evolutions for different nations and continents. Disparities become more evident. There is a global draw back in the global economy, with fluctuations and unstable regimes. Wealthier people get in control of governments in some parts, military in some others, even religious leaders, with many democracies tending to evolve towards lobbycracies and autocracies. Average annual GDP growth rates are negative in most regions, but in some, economic growth is extremely high (over yearly 5%).



**The human landscape**

**The human landscape: rough potato skin evoking the importance of differences**

A close look onto the surface of a potato shows a rough skin with wrinkles, with different local topographies from one point to another. These differences in local topologies evoke a world where the social setting stays mostly heterogeneous. Everyone goes back to his own corner of civilization. Protectionism becomes the common rule, flows of people and information become more difficult, and as a consequence, societies tend to enforce their identities and sometimes they are confronted to their neighbor's, generating conflicts. It is a world of nations, micronations and city-states. The spiritual dimension gains importance at the center of people's life, even if believes are in own personal "inspirations" rather than in "God".

Figure 81 Pashmina Turbulent Decline Scenario (POTATO)  
Source: PASHMINA FP7, 2010

### 6.1.6 Scenarios on the Future of Europe (2030)

**ESPON 3.2 project, integrated by IGEAT, AETS, BBR, CRS-HAS, CUDEM, DIG, Mcrit, NISR, Nordregio, UMS 2414 Riate**

The main objective of the ESPON 3.2 project was to develop spatial scenarios. The time horizon for the spatial scenarios was set to 2015 (mid term) and 2030 (long term). An integrated baseline scenario showed the probable evolution of the European territory in a situation of no major changes (political or external). Two prospective policy scenarios explored the effects of EU policy in a cohesion-oriented scenario (policies formulated with the goal of social, economic and territorial cohesion as top priority) and in a competitiveness-oriented scenario (overall global competitiveness of EU economy being the major objective). A proactive scenario provided an attempt at translating policy goals into an image of how Europe should look like territorially in 2030.

The project discussed issues in the social, economic, territorial and environmental dimensions, including considerations on transport and mobility. Find below the most relevant characteristics of ESPON 3.2 scenarios in the mobility domain.

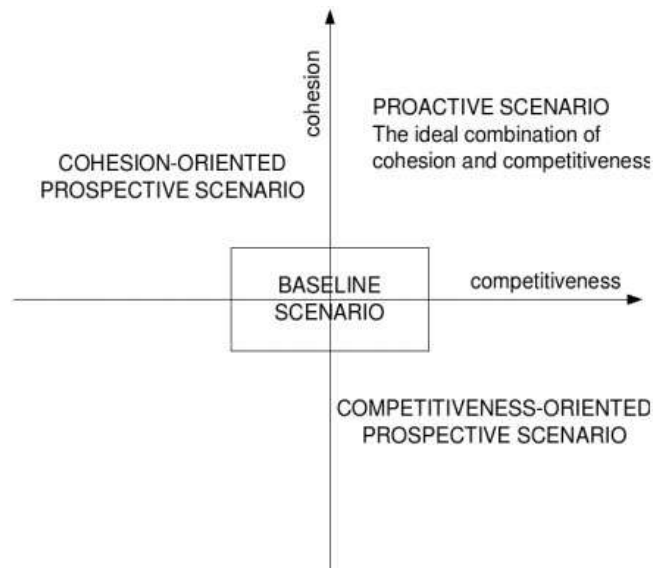


Figure 82 Espo scenarios in a cohesion // competitiveness 2D space  
Source: ESPON 3.2 Project, 2006

The **Baseline Scenario** for 2030 refers mainly to the impact of policy continuity in a context where new challenges emerge, adding to those already existing. Areas with good pan-European accessibility will spread from the central Pentagon area in almost all directions. However, disparities in accessibility between central and more peripheral areas will remain significant, especially regarding freight transport, and even more in terms of regional or local accessibility. For some regions, improving accessibility will remain top priority. Higher oil prices are likely to influence travel behaviour to a certain extent, with residential locations well-served by public transportation likely to gain in popularity. The increasing number of retirees may generate forms of mobility very different from the classical home-work commute. These are more linked to recreation and leisure, cultural activities, family visits and health care. A remarkable concentration of activity has occurred in the metropolitan areas of the central economic area, the Pentagon, but also in less central regions (mainly capital cities and other European engines). As a result, the Pentagon has extended outwards along main transport corridors in the direction of major metropolitan areas like Barcelona and Madrid, Rome, Glasgow, Copenhagen, Stockholm and Oslo, Berlin and Warsaw, Prague, Vienna and Budapest. At the same time, various areas are at risk of economic decline. The marginalisation of some rural areas has continued unabated.



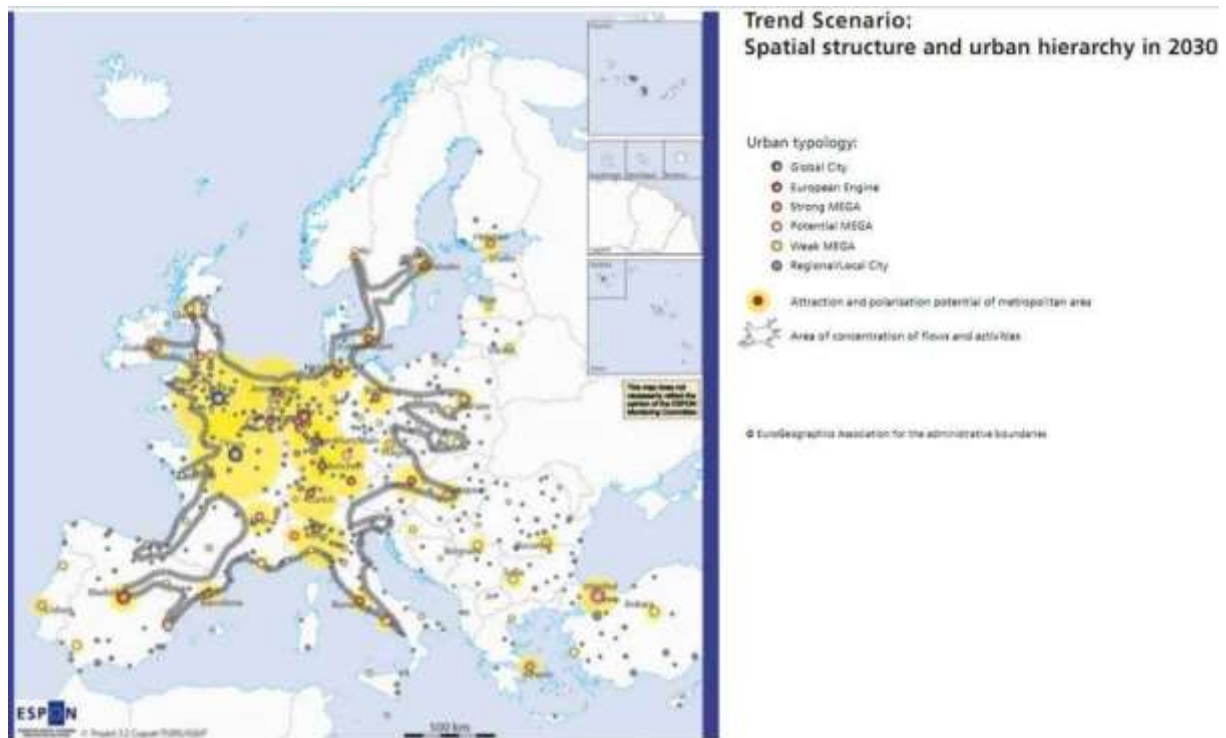


Figure 83 Spatial structure of Espo trend scenario in 2030  
Source: ESPON 3.2 Project, 2006

In **the competitiveness-oriented scenario (Rhine-Rhone Scenario)**, most of the autonomous developments (i.e. globalization, climate change) identified in the trend scenario were held constant. The difference lies in the policy response. In this scenario a 'policy mix' is created which is aimed at boosting Europe's competitiveness. The attraction and polarisation potential of metropolitan areas is particularly strong and activities are concentrated in the traditional Pentagon. Only very few metropolitan areas beyond it are able to generate significant attraction and polarisation effects. The area of concentration of flows and activities is much more limited than it would be following current trends. It covers only parts of the traditional Pentagon, although it also extends out along a few major corridors, to reach Vienna and Copenhagen. The risk of rural marginalisation is much more intense than with current trends. The areas at risk of industrial decline are more numerous and the intensity of risk is also higher. External immigration flows are particularly intense. The areas with high potential for tourism and retirement are similar to current trends, but the areas with severe population ageing, generally in remote rural regions, are more extended. Impacts of natural hazards (drought, fires, and floods) are more intense than expected by current trends.

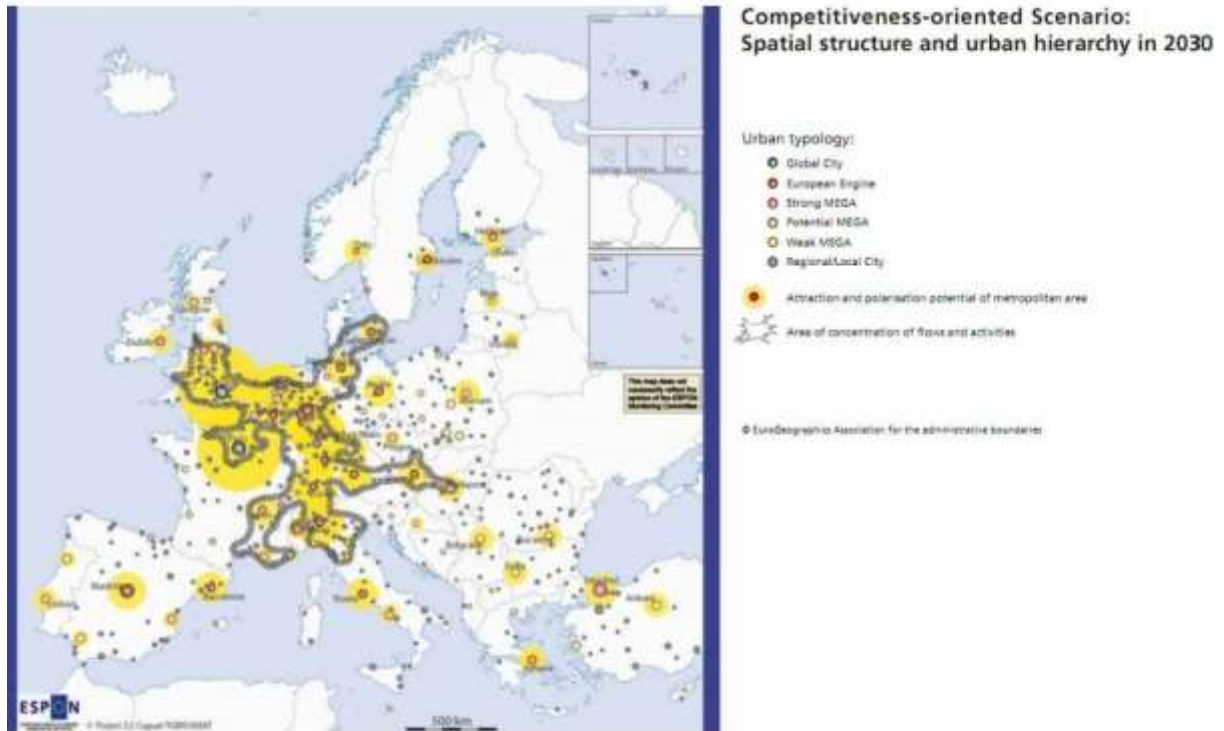


Figure 84 Spatial structure of Espon Rhine-Rhone (competitiveness-oriented) scenario 2030  
Source: ESPON 3.2 Project, 2006

In **the competitiveness-oriented scenario (Danube Scenario)**, most of the autonomous developments (i.e. globalization, climate change) identified in the trend scenario were held constant. The difference lies in the policy response. In the cohesion-oriented scenario, a 'policy mix' is created which is aimed at improving cohesion in Europe. This 'policy mix' comprises the following measures. The image of the European main territorial structure reveals a more diffused pattern as far as the attraction and polarisation potentials of metropolitan areas are concerned. Urban settlements are characterized by greater polycentricity, stretching over larger swathes of the European territory than in the trend scenario. In contrast to the trend scenario, several well-performing integrated zones have emerged outside the Pentagon, also in more peripheral areas. The Pentagon has grown and includes a larger number of cities outside this area. The number of areas at risk of marginalization and of declining activities is comparable to the trend scenario, but their size is reduced and intensity lower. The areas with high potential for tourism and retirement as well as those with severe population ageing remain similar.

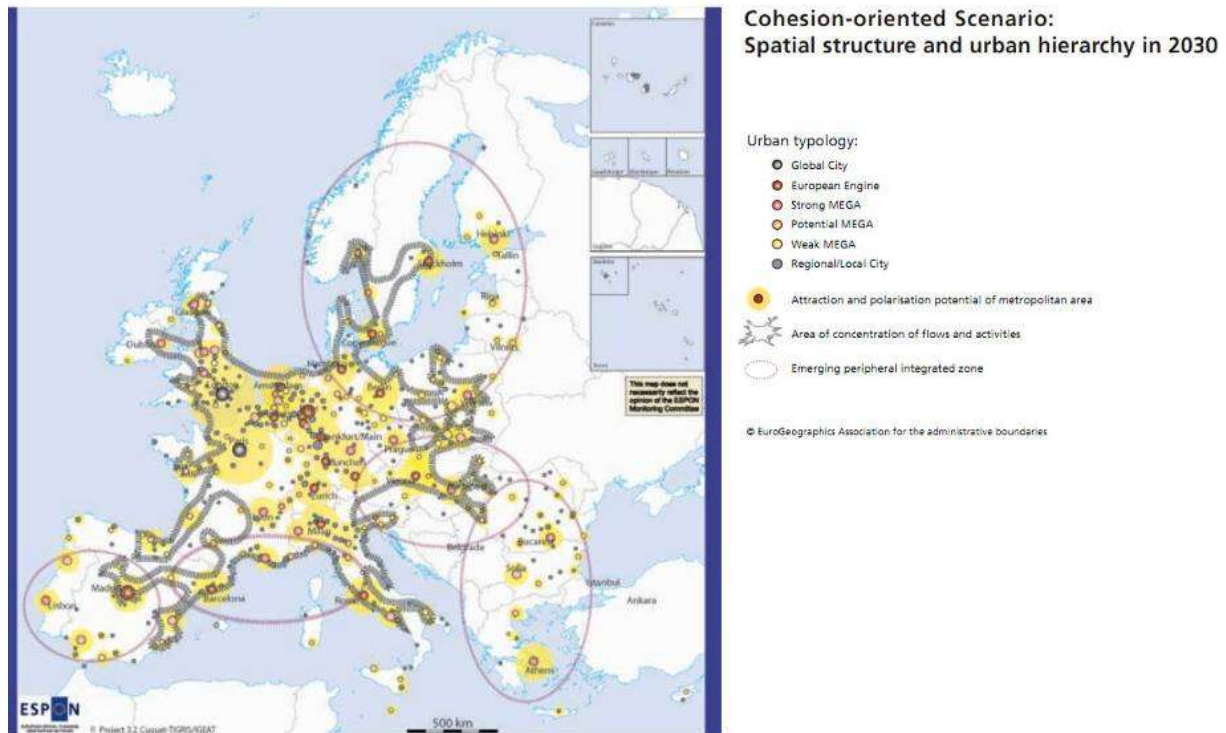


Figure 85 Spatial structure of ESPON Danube (cohesion-oriented) scenario in 2030  
Source: ESPON 3.2 Project, 2006

### 6.1.7 Intelligent Infrastructure Futures. The Scenarios – Towards 2055

**By Andrew Curry, Tony Hodgson, Rachel Kelnar and Alister Wilson for the Foresight Programme of the Office of Science & Technology of United Kingdom, 2006**

The Foresight Project on Intelligent Infrastructure Systems (IIS) set out to examine the challenges and opportunities for the UK in bringing 'intelligence' to its infrastructure – the physical networks that deliver such services as transport, telecommunications, water and energy. In particular, the project explored how, over the next 50 years, we can apply science and technology to the design and implementation of intelligent infrastructure for robust, sustainable and safe transport, and its alternatives. The technological opportunities and social factors are such that IIS can develop in many different ways. The direction will depend on the direction that society takes. The Foresight project investigated many alternative futures and identified 60 different 'drivers for change' (see Appendix). It is difficult to say how these drivers will change the future. However, to illustrate the possibilities, and guide its thinking and analysis, the project created four scenarios of how the future might look.





Figure 86 Intelligent Infrastructure Futures. The Scenarios – Towards 2055  
Source: Office of Science & Technology of United Kingdom, 2006

**Perpetual Motion Scenario.** This scenario describes a society driven by constant information, consumption and competition. In this world, instant communication and continuing globalisation have fuelled growth: demand for travel remains strong. New, cleaner, fuel technologies are increasingly popular. Road use is causing less environmental damage, although the volume and speed of traffic remains high. Aviation still relies on carbon fuels and remains expensive. It is increasingly replaced by 'telepresencing' technology (for business) and rapid train systems (for travel).

In **Urban Colonies Scenario**, investment in technology primarily focuses on minimising environmental impacts. In this world, good environmental practice is at the heart of the UK's economic and social policies; sustainable buildings, distributed power generation and new urban planning policies have created compact, sustainable cities. Transport is permitted only if green and clean – car use is still energy expensive and is restricted. Public transport – electric and low-energy – is efficient and widely used. Competitive cities have the IT infrastructure needed to link high-value knowledge businesses, but there is poor integration of IT supporting transport systems. Rural areas have become more isolated, effectively acting as food and bio-fuel sources for cities. Consumption has fallen. Resource use is now a fundamental part of the tax system and disposable items are less popular.

**Tribal Trading Scenario** describes a world that has been through a sharp and savage energy shock. The world has stabilised, but only after a global recession has left millions unemployed. The global economic system is severely damaged and infrastructure is falling into disrepair. Long-distance travel is a luxury that few can afford and, for most people, the world has shrunk to their own community. Cities have declined and local food production and services have increased. Canals and sea-going vessels carry freight: the rail network is worthwhile only for high-value long-distance cargoes and trips. There are still some cars, but local transport is typically by bike and by horse. There are local conflicts over resources: lawlessness and mistrust are high. The state does what it can – but its power has been eroded.

**The Good Intentions** scenario describes a world in which the need to reduce carbon emissions constrains personal mobility. A tough national surveillance system ensures that people travel only if they have sufficient carbon 'points'. Intelligent cars monitor and report on the environmental cost of journeys. In-car systems adjust speed to minimise emissions. Traffic volumes have fallen and mass transportation is used more widely. Businesses have adopted energy-efficient practices: they use sophisticated wireless identification and tracking systems to optimise logistics and distribution. Some rural areas pool community carbon credits for local transport provision but many are struggling. There are concerns



that the world has not yet done enough to respond to the human activity which has caused the environmental damage. Airlines continue to exploit loopholes in the carbon enforcement framework. The market has failed to provide a realistic alternative energy source.

## 6.2 Innovation Scenarios

### 6.3 Four Scenarios for Digital Europe in 10 years time

**By Pim Bilderbeek (METISfiles, Bilderbeek Consulting) 2011**

There are four likely scenarios that government officials will need to consider in planning public service accessibility and government digitalization for the next 10 years. The two axes to consider in these four likely futures are 1) the availability of public cloud infrastructure and the trust that citizens have in using this and 2) the digitalization state of the government itself. Will government embrace public cloud for both internal and external services, or will government limit the uptake of both? Will citizens trust government with their data and will everyone have equal access or will there be a dual Internet infrastructure and wide distrust? The graph below lays it all out in four resulting scenarios:



Figure 87 Digital Europe Scenarios to 2020  
Source: Bilderbeek Consulting) 2011

**Digital Europe** is the preferred scenario of Neelie Kroes and the European Commission. This is the Europe where governments have embraced cloud services. Not only to become

more efficient themselves, but also to deliver on-demand services to the business community and citizens. In this scenario there is also a neutral cloud environment available, accessible for every citizen and company, poor or rich, large or small.

**Digital Divide** is a scenario where governments have embraced cloud services and are delivering on-demand services. However, in this scenario the Internet is no longer neutral. There are in fact several Internets and clouds and there is a division in the level of government service between those who have access to exclusive clouds and those who have not. In addition, there is no catering for those who are not ready to trust the government to safeguard their private data.

**Disconnected Government** is a scenario where governments fail to implement cloud services, perhaps for budgetary reasons, perhaps for political reasons. As a result government is inefficient and digital services for citizens are scarce. This is all the more problematic because there is a neutral Internet and citizens and business have embraced digital commerce and social networking. As a result the government is out of touch with society and disconnected from the general public.

**Twentieth Century** is a scenario where governments fail to implement cloud services and the Internet is no longer neutral. This takes Europe back to the 20th century. Digital infrastructure that is content and service neutral is scarce, citizens do not want to bring their private data to the cloud, the government has limited on-demand service availability and has an inefficient IT infrastructure.

## 6.4 "Monitoring e-Skills Demand and Supply in Europe – Current Situation, Scenarios and Future Development Forecasts until 2015"

**By IDC Government Insides, empirica GmbH 2009 (prepared for DG ENTR)**

Empirica and IDC EMEA Government Insights have developed five foresight scenarios for Europe including a "back to normal" scenario, which describes how the labour market for ICT practitioners will evolve if we get back onto the previous, pre-crisis trajectories in terms of growth rates, the number of computer science students and graduates and the role of ICT-based innovation as a driving factor of European economic development. Contrasting with this scenario, they analysed four alternative paths varying the main factors that influence the demand and supply for e-skills.

**Back to normal** – a return to "before the crisis" moderate growth development model, with ICT-based innovation developing unevenly across Europe. This results in a limited e-skills gap (estimated at 384,000 excess demand in 2015, about 8% of the ICT workforce);

**Investing in the future** – a scenario of moderate growth similar to the previous one until 2011, when, thanks to decisions to step up investments in ICT innovation and the future Internet, there is an acceleration of economic and ICT growth, expected to increase after 2015. This leads to higher demand for R&D and ICT skills in the period 2012-2015, with an estimated e-skills gap of 580,000 jobs in 2015, about 11% of the ICT workforce.

**Turbo knowledge economy** – the knowledge economy takes off in Europe, thanks to a virtuous circle of productivity and economic growth driven by widespread diffusion of ICT-based innovation. ICT careers become more attractive and demand of e-skills grows, leading to an e-skills gap of approximately 669,000 jobs in 2015, about 13% of the ICT workforce, even if the attractiveness of ICT jobs increases, leading to a slight increase of e-skills supply.

**Tradition wins** – after the crisis, an export-driven recovery advantages traditional industries, rather than high-tech and innovative industries, resulting in a combination of moderate economic growth with low ICT growth. The relocation of the ICT industry outside of Europe accelerates and the demand of e-skills from 2010 to 2015 grows very slowly while the attractiveness of ICT careers declines. A small level of excess demand of e-skills remains, but at the same time there are mismatches between demand and supply across the EU, particularly in the countries where the advanced high intensity IT users remain an important presence.

**Stagnation** – a very slow recovery, accompanied by domestic protectionism in the most important countries, discourages innovation investments. The European socioeconomic system struggles to keep up with the emerging economies and tends to close itself ("fortress Europe"), with low ICT investments counterbalanced by IT off-shoring growth. Both demand and supply of e-skills are flat, without growth, and the result is a very small e-skills gap accompanied by mismatches in the e-skills labour market across Europe.

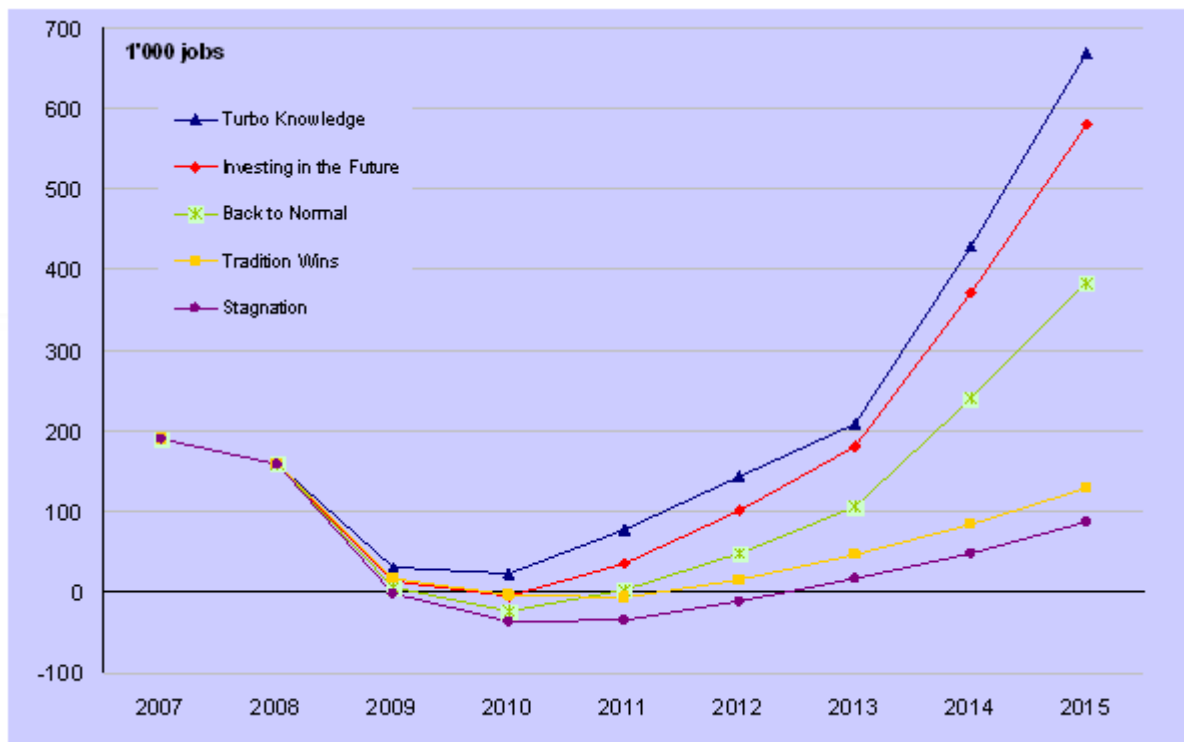


Figure 88 e-skills Demand and Supply Gaps (excess demand) in the EU27 until 2015 in five scenarios  
 Source: IDC Government Insides, empirica GmbH 2009

## 6.5 Global Governance Scenarios

### 6.5.1 The Hiil scenarios as a point of reference

The stocktaking exercise aims at mapping trends and scenarios in order to amend the Hiil scenarios and to provide some building blocks for the leading indicators. The Hiil scenarios are therefore the point of reference for the lessons to be learned by the stocktaking process. The Hiil scenarios are briefly sketched to illustrate the underlying trends and triggers that should be amended if the trends and scenarios are taken into account observed and developed in other scenario reports. Based on the underlying key

uncertainties (further internationalization and privatization of law or reversed internationalization and privatization of law) four scenarios have been presented.

## **Global Constitution**

In this scenario a global constitutional order has emerged in 2030, slowly but surely covering all major legal areas on a global scale – trade, environment, security, crime, finance, markets and competition, intellectual property, labour, taxation, and health – leaving only a few areas untouched by international rules and procedures. Global law has not been driven by a specific set of values or leading legal systems. Instead, the process of blending has to a large extent been eclectic. Whereas global competition law and contract law has primarily been driven by free market ideals, global criminal law has been led by retaliation principles. It therefore became more punitive and strict than European countries were used to.

In the Global Constitution scenario consumers are protected by a global system of consumer law that builds on the old European consumer law. Global consumer law is enforced – mainly via the internet – by a global regulatory agency with offices all over the world. Tort law is largely regulated through a global civil code that has been adopted in 2028. This global civil code provides general parameters from which regional and national systems may not deviate. Constitutional and (global) administrative law have become hugely important fields. There are constant questions on areas of competence and jurisdiction. The principle of legality – all governments are bound by law – is the broadly accepted principle that underlies the global legal environment. The global constitutional order is not based on one document or charter, but rather on a series of charters and constitution-like documents, in which international regulators, adjudicators, and courts are defined and connected with each other. This multi-layered system is complex, and at times Byzantine.

The rules and institutions that make up this global legal environment are difficult to change once formalised. The enforcement of rules is public in nature, or a clear derivative thereof. The International Criminal Court (ICC) may have taken ten years to finally conclude its first case (Lubanga in 2012), but subsequent trials have been concluded much more efficiently. The ICC's 'positive complementarity' approach has proved successful in enhancing national capacity thus leading to limited ICC involvement. Technological developments have made it easier for enforcement bodies to share information. Criminal records, tax filings, debtor records, and in some instances, even things like employment records can be shared when needed.

How did the global legal environment evolve between 2012 and 2030? First, many challenges became apparent which revealed the global interdependencies. The financial crisis of 2008 is a prime example. Directed by the G-20, which slowly transformed into an effective economic and social global governing board, an impressive body of international regulation, aimed at building a more stable economic system was put in place. This body not only coordinated regulation in the financial area, but it was also able to build a more holistic definition of the notion of economy, which now includes the environment, social cohesion, and sustainability.

In 2016, the drug wars in Central America and Western Africa intensified and spread. This caused intolerable violence, social deprivation, migration, and problems for international shipping and aviation. These problems quickly jumped over to more stable and well-organised parts of the world. The Organisation of American States (OAS) and the African Union (AU) with Economic Community of West African States (ECOWAS) pushed the issue on the global agenda and a global approach was developed in 2018. The scarcity of water and food was also an important driver of change. It required global policies on water redistribution and agriculture. Here too the G-20 proved very effective; food security was



placed on the agenda in 2016; water security followed in 2019. The Food and Agriculture Organisation was given a new life; it became a food security watchdog with direct lines to both the United Nations (UN) and regional Security Councils (in cases which involved war), and the Economic Council and its regional bodies.

## Legal Borders

In this scenario national and regional legislation have become the primary source of rule making in 2030. Regional and sub-regional organisations have become the ultimate defence against what were widely perceived to be out-of-control international institutions and an international environment in which common values are scarce. The international level is for politics, not law. New global powers such as China, India, Indonesia, Brazil, Mexico, South Africa, Egypt, and the Gulf States fundamentally changed the nature of the debate in the global environment. There is lot less talk about universality than there once was. In fact, most would agree that there is no universality.

With regional legal pluralism, the rule of law has also been regionally pluralised. As a consequence context-specific regional and national interpretations of concepts such as fundamental human rights, separation of church and state, balance of powers, and the principle of legality have become predominant. The international institutions that had developed at the end of the 20<sup>th</sup> century have slowly eroded and lost their significance. In some instances states have withdrawn ratifications, in others they are being minimally interpreted at best, and otherwise completely ignored. International courts – insofar as they are given adequate funding – face strong pressure to reduce their footprint and the scope of their decisions.

New legal notions, which determine whether something should be regionalized, have been developed, requiring compatibility with 'inalienable national values' and 'core national legal principles'. They provide a key reference point for all constitutional lawyers, judges, and national lawmakers. The informal, flexible approach pioneered by the G-20 during the Great Crisis of 2008 – 2015 has become the norm and the UN has adapted to it. On global economic issues, the G-20 still runs the show. It is now linked to the R-5, a loose overarching framework built around the five regional groups that developed within the old UN. The previous decade, starting in 2020, witnessed a gradual and deliberate process of de-treatying; international negotiations replacing international regimes with political arrangements, if needed, or even terminating them. These processes sometimes worked out peacefully, but some of this legal disentanglement has ended with violence.

Yet many successful corporations have made their fortunes through legal tourism, taking advantage of the legal differences between states and regions. They are supported by international law firms, which have made huge investments in comparative legal knowledge and have specialized in legal tourism. Sometimes this race to the bottom yields dramatic results. In the environmental realm, it has led to poor states and regions that have become garbage dumps for strong transnational corporations using the legal regime. Enforcement is also a national affair. In some areas enforcement is loosely coordinated on a regional level to prevent natural disasters (e.g. environmental law).

Several trends and events between 2012 and 2030 triggered this scenario. It actually started with the 9/11 attacks. Initially led by the US, but soon followed by others, a common response was to toughen immigration restrictions, make more extensive use of criminal and administrative law to curb freedoms, and introduce restrictions on the movement of goods and capital. The financial crisis that started in 2008 also contributed significantly. It proved very difficult to resolve it internationally. The G-20 and its network seemed successful at first, but when after 2013 worldwide unemployment (especially for those under 30 years old) was still very high – up to 45% – states slowly abandoned the international law route. It also proved difficult to agree to effective international action

regarding transnational crime, illicit trade, cross border fraud, and global terrorism. Legal and other borders gradually emerged. Immigration and the international flow of capital were curbed. Economic growth ended for many years, but security and stability were preferred above wealth.

## **Legal Internet**

In this scenario, rules – in the sense of ‘law’ – in 2030 have become a lot less important than they were in 2010. In the course of the first decade of the millennium the true potential of information technology and relationships supported by social media has become apparent. Through cheap laptops, tablets and smartphones, connected by cloud technology and clever search engines, interaction across borders and access to useful and relevant information became accessible for most people around the world. By 2018, this had already radically changed the way people interact on a global scale. By 2030, it is engrained into the global legal environment. New generations have become acquainted with new ways of rule making, law enforcement, and resolving disputes. Reputation, trust, transparency, mobilization of voice, and demonstrated effectiveness have become the new mechanisms to secure a social and political order. In 2030 formal rules and procedures are considered old-fashioned, too formal, ineffective, too uniform, and too inflexible.

Public rules have gradually been replaced or marginalised by standards developed by private actors. Monitoring and even enforcement are dealt with by private regimes and mechanisms created by the parties involved. Democracy or accountability is less a matter of working through parliaments and more a matter of working through interest groups and loosely organised structures that operate between interest groups. Self-regulation has become the prime source of legitimacy. The 2025 world summit that gathered in New York to celebrate the eightieth birthday of the United Nations was attended by the heads of 228 different states, the leaders of the 100 wealthiest companies, and 100 civil society leaders. Thanks to smart information technology it was possible to have a meaningful debate in the six months leading up to the final event. The leaders adopted the 2045 Good Governance Pact (GGP), which laid down 15 governance standards that the leaders consider fundamental for good governance, wherever it occurs.

Five years afterwards, a dozen measuring tools to assess implementation and compliance with the GGP were fully operational, keeping the leaders focused on the agreements that were made. Leaders, be they from government, business, or civil society, meet at regular intervals to discuss strategic directions on issues, and people and organisations at the operational level work things out and implement. If you have demonstrable added value, you can join the process. If not, you are no longer involved. The UN has largely been reduced to a web-based Internet forum, run by a relatively small secretariat, on which rule making initiatives are collected, published, and on which expert advice can be sought: the UN Rule and Process Forum (UNRPF). But even for this function it faces tough competition from private initiatives claiming to be faster and better facilitators.

Private rule making, enforcement, and dispute resolution mechanisms are usually flexible and efficient, whereas public regimes are more bureaucratic and rigid. The absence of clear, all-encompassing organising principles (like the principle of legality, the UN definition of the rule of law, or state sovereignty) makes the global legal environment complex, often confusing and most of the time unstable. The verb ‘to regulate’ is rarely used. The art is now known as R&O – Regulate & Organise. The pattern is usually the same: close to a problem or a challenge – be it local or international – a need for regulation emerges.

Actors confronted with a problem build a coalition to resolve it. Most enforcement takes place outside the scope of the state, or at the very least with the involvement of powerful private actors concerned. For example, global pharmaceutical corporations have not only adopted rules of conduct with regard to intellectual property, but they have also built an

organisation that monitors counterfeit medicines and acts against the networks that make and distribute these medicines.

What chain of events triggered this scenario? The failure of formal inter-governmental organisations to prevent the financial crisis of 2008- 2015 and to quickly recover from it caused a tectonic shift in international governance. The networked G-20 system proved more effective in handling the crisis, but in general the loss of trust in state and state-based institutions had pushed corporations, NGOs and communities away from the state. The standards that were developed during the difficult years between 2008 and 2015 gained traction through civil society organisations and public private partnerships, and were helped by information technology. Most governments were caught by surprise. National courts could not handle the number or the complexity of transnational cases, national court decisions could not be enforced, and states or international legal institutions could not agree on norms. As a consequence private actors created their own regimes.

The substantial growth of powerful global private players after 2015 also played a role. Transnational corporations and civil society organisations continued to grow and became more powerful, both with regard to creating norms and with regard to enforcement. The legitimacy crisis in which many states found themselves after 2015 was also an important factor. Self-regulatory regimes were widely seen as more legitimate.

## **Legal Tribes**

In this scenario the global legal environment in 2030 has witnessed a severe loss of relevance of the state combined with a loss of interest in internationalisation. In 2030 the global legal environment consists of a largely unconnected group of communities that govern themselves. In many ways states have become failed states. Global security is a serious issue and law has been completely abandoned as a way to achieve it. Local security, which is mainly self-organised, is the main basis for ordering. Besides, order is local and mainly privatised. It comes from small-scale networks of security corporations, communities and civil society organisations, and is supported, where possible and useful, by small public structures. The state and the international global legal environment have withered away, mainly as a result of the security and economic crises of the first two decades of the millennium. International organisations have lost their relevance and have closed due to lack of interest, funds, effectiveness, and legitimacy.

The scenario of Legal Tribes has not been too good to multinational companies either. Seen as remnants of failed internationalization, they had to change to survive. Many of them have broken into local or national entities. Very few have real global coverage; it is simply too risky economically, in terms of manageability, and even security. Wealth, effort, labour, profit are all generated at the local level and flow back to the local level. Security can really only be organised locally; at least then you know who you can trust. The dream of globalisation has been destroyed. Next to state borders, the global legal environment also witnesses religious borders, borders organised around economic activities, ethnic borders, and political borders. The old regional organisations have lost much of their economic *raison d'être*. The successful ones have transformed into security alliances: public-private regional fences within which smaller communities can conduct economic activity on a larger than local scale.

The main role of the public realm is to deal with the link between the huge variety of private self-regulatory regimes. But with a greatly reduced tax base, resources are limited. As a leading principle the rule of law has become an anachronistic concept. Enforcement is also a local and mostly private affair. In the most developed communities the public arena only plays an enforcement role in the area of crime, IT infrastructure, health, and linkages between private regulatory regimes. Again, local is good. In other communities, the public enforcement circle is even smaller. Social control, groups taking justice into their

own hands, and militias maintaining order are predominant in many parts of the world, whereas religious or public authorities take up these tasks in other regions.

How did this all come about? First, states and international organisations did not prove to be effective in restoring stability and economic recovery after the 2008 crises. The severe budget cuts that were made from 2013 onwards by many governments around the world proved to be the beginning of the end of the state. It was a last 'win or lose' effort by states to deal with massive unemployment, debt levels, and inequalities, but it failed. As a result, trust in government and the international system diminished. Conflict was widespread. Health systems broke down. Food and water became scarce. In many parts of the world life expectancy decreased. States and businesses failed to deal with the global crisis and were also seen to be responsible for a number of other issues such as major failure to protect data and massive fraud on a global scale. This has given rise to great suspicion about all things global and international. The anti-globalisation movement attracted more supporters than ever before.

### 6.5.2 The stock of related scenarios

In section 1.1 we derived the Megatrends we derive from the scenario and trend reports by identifying a number of topics and perspectives:

- global politics and law;
- global security;
- the global economy;
- global society;
- regions and their global connectedness.

The scenarios we have mapped are presented in the same order as the trends mentioned in section 1.1.

#### **Global politics and law: rigid power structures or liquid geopolitics?**

Shell has a longstanding history on scenario analysis and it uses innovative scenario methodologies that mirror the state of the art. For example, the Shell Global Scenarios 2025 started with three key uncertainties (the legal environment, the market culture, the global forces of integration and fragmentation) and it also took into account the interplay between these uncertainties.<sup>61</sup> Shell constructed three scenarios to explore the impact of these forces:

1. **Low Trust Globalisation:** this scenario is characterized as a legalistic world in which all-encompassing and intrusive checks and rules are predominant. Because market solutions do not adequately tackle the observed crisis of security and trust governments are forced to develop the necessary regulation. In this scenario trust is rules-based and regulatory integration takes place by regulatory competition.
2. **Open Doors:** in this scenario private solutions are capable of dealing with global regulatory problems. Regulatory harmonization follows the development of well-functioning systems of certification and mutual recognition. Whereas the Low Trust Globalisation scenario widens the gap between public and private regulation and governance, the Open Doors scenario links both regulatory regimes. Network governance and a networked legal environment appear to be key characteristics of this scenario and voluntary codes provide trust. Community mechanisms and market mechanisms are the regulatory drivers of this scenario.
3. **Flags:** the Flags scenario pictures a possible future in which global fragmentation prevails. Gated communities, nationalism, and global value conflicts are the cornerstones of this scenario. Community-based loyalty provides trust and gates

<sup>61</sup> <http://www-static.shell.com/content/dam/shell/static/aboutshell/downloads/our-strategy/shell-global-scenarios/exsum-23052005.pdf>



around communities should provide security. Regulation is primarily being developed and upheld at the national level. Because of the predominance of national regulation the global regulatory framework is highly fragmented. Whereas private attorneys general will evolve in the Low Trust Globalisation scenario and voluntary best practices are the typical instruments of the Open Doors scenario the Flags scenario is characterized by command and control instruments used by national governments.

Recently Shell again published some innovative scenarios.<sup>62</sup> These scenarios are built on the three paradoxes mentioned in section 1.2 (the prosperity paradox, the connectivity paradox, and the leadership paradox). With regard to possible futures two contrasting scenarios are explored as two panoramas. Shell justifies these contrasting 'New Lens Scenarios' as follows:

'high Mountains where the benefits of an elevated position are exercised and protected, and those who are currently influential hold on to power; and wide Oceans with rising tides, strong currents, and a volatile churn of actors and events with an irregular accommodation of competing interests.'

Shell has chosen a long term horizon for these scenarios (the 21<sup>st</sup> century). The scenarios can both be seen as perspectives that reveal certain flows and forces as well as possible futures. Both scenarios are summarized with some key characteristics. Shell does not explore these scenarios with evocative narratives. The Mountains scenario pictures a rather stable political world even though a geopolitical shift from the west to the east is expected. The key characteristics of the Mountains scenario are:

- 'Advantage creates advantage – influence remains concentrated in the hands of the powerful.
- Rigid power structures and institutions hamper economic development.
- With fewer power-brokers, positive advances in secondary policy areas are feasible – e.g. compact urban development, energy and environmental stress.
- Positive resource expectations are realized and, with supportive policy frameworks in place, natural gas becomes a backbone of the global energy system.
- Increasing CO<sub>2</sub> and environmental stresses are moderated by slower overall growth; the substitution of coal for natural gas, and the success of carbon capture and storage technologies.'

The Oceans scenario captures volatility and instability. This scenario is also pictured by a number of characteristics:

- 'New or competing economic and political interests are accommodated intermittently.
- Reform unleashes new economic productivity and increases aspirations for further reform.
- Empowered constituencies with new vested interests hinder secondary policy progress until resource stresses become acute e.g. urban growth sprawls, carbon capture and storage is delayed.
- Rising prices unlock more expensive energy resources and drive end-user efficiency.
- Liquid fuels and coal continue to play a leading role in the energy mix until solar overtakes in the latter part of the century. Natural gas grows but undershoots high expectations due to inadequate policy frameworks and resource disappointments.
- Greenhouse gas emissions peak and remain high for a prolonged period until reduced by the combination of biomass, CCS, and solar.'

<sup>62</sup> [www.shell.com/global/future-energy/scenarios/new-lens-scenarios.html](http://www.shell.com/global/future-energy/scenarios/new-lens-scenarios.html)

In the section on global trends (section 1.1) we observed a consensus in the scenario reports on the geopolitical balance of power and its redistribution. Uni-polarity and America's military, economic, and political power will increasingly be balanced by other countries and other parts of the world. Trend watchers disagree about the future. In general two futures are plausible. In one scenario America as a country may perhaps not dominate the world anymore, but the American values will. In this global free market and democracy scenario other economic and political systems will eventually evolve towards the American model. Economic growth and growing international trade are the triggers for political change (e.g. Friedman, 2007; Barnett, 2004). Because of the converging national markets it is believed that political and legal systems will also converge. A radically different scenario has also been proposed. In this scenario the growing economic power of countries will not lead to converging political systems but to more self-consciousness with regard to their own political systems (e.g. Kagan, 2008). For example, China and Russia may increasingly embrace free markets but this does not necessarily mean that these countries also embrace the political or legal system of the USA or the EU. In both scenarios national markets will converge but political systems may or may not converge.

### **Global security: concerted and inclusive response or fragmented and exclusive response?**

The National Intelligence Council (2012) uses the megatrends and game-changers mentioned above (see sections 1.1 and 1.2) to build scenarios. It also takes into account the tectonic shifts such as growth of the global middle class, wider access to lethal and disruptive technologies, urbanization, and a definitive shift of economic power to the East and South. Taking everything into account four scenarios are presented:

- **Stalled Engines:** basically this scenario departs from the assumption that the US and Europe turn inward and globalization stalls. In this scenario the Eurozone falls apart and the US lose their global leadership because of its focus on domestic issues. New leadership may be expected but it will probably not transcend the regional scale. The fragmented international system goes along with shrinking economies and increasing conflict all over the world.
- **Fusion:** in this world 'the US and China cooperate, leading to worldwide cooperation on global challenges'. The leadership of the US, EU, and China enables a governance system capable of dealing with global problems. Political reform in China makes it easier to collaborate because of more shared values and interests.
- **Gini Out-of-the-Bottle:** this scenario assumes that economic inequalities dominate. The National Intelligence Council pictures this scenario as a world of extremes. Inequalities dominate on the global scale but also on a regional and even national scale. The EU falls apart and in a way so does China. Social cohesion within and between countries diminishes and this opens the way for international crime, terrorism and insecurity.
- **Nonstate World:** whereas the other scenarios are dominated by state actors in this scenario 'nonstate actors take the lead in solving global challenges'. NGOs, international corporations, megacities, and social movements are the key players in this scenario. The nation-state may not disappear but it will become a part of a variety of governance networks. These networks are led by 'increasing global public opinion consensus among elites and many of the growing middle classes on major global challenges – poverty, the environment, anti-corruption, rule-of-law, and peace'.

Closely connected with security issues are scenarios concerning migration. In a 2011 report the UK Government office for science has presented its scenarios on global migration. In this report the authors followed a 'deductive' method to develop future scenarios on migration. They identify two major 'dimensions of uncertainty' regarding the future of

migration and these key uncertainties are used to build four scenarios. The time frame taken into account is 50 years. The first key uncertainty refers to global economic growth. Global economic growth can either be high or low. Global economic growth affects the jobs for migrants and wage levels. A second key uncertainty used in this report deals with political, social and economic governance. The relevant governance dimension is found in the opposition of exclusive and fragmented governance versus inclusive and connected governance. This dimension specifically refers to the 'potential 'sending' area of migration' and it affects the 'local opportunities and constraints' which may be more or less inclusive (Government office for science, 2011: 5). These two key uncertainties are used to build four scenarios:

1. High global growth and exclusive local social, political and economic governance (scenario A). In this scenario migration to richer economies and regional 'economic growth poles' is to a large extent 'gradual' or 'routine'. The governments' policy focus will be largely domestic due to a high demand for control and security.
2. High global growth and inclusive local social, political and economic governance (scenario B). Because of the global economic growth and the inclusive local governance there is less need for migration to richer economies. The policy challenges with regard to migration will probably be largely operational and less political.
3. Low global growth and exclusive local social, political and economic governance (scenario C). In this scenario migration is expected to grow. Skilled workers will migrate from poor economies to richer countries and internal migration opportunities are limited. There will be great stress on governments' ability to manage migration and the governments' focus on security and control will provoke irregular and unplanned migration.
4. Low global growth and inclusive local social, political and economic governance (scenario D). The low global economic growth in this scenario will stimulate migration but its effects are mitigated through inclusive governance. Whereas poorer countries will be more inclusive and cohesive migration will provoke political stress in richer countries. The combined transmission of aid from richer to poorer countries and the latter's participatory politics will further impede on migration.

### **Economy: regionalism or globalism and rapid economic growth or economic slowdown?**

Concerning the future of the global financial system the World Economic Forum already published its scenarios in 2009. The main question addressed in this scenario report has been framed as follows:

'How might the governance and structure of the global financial system evolve over both the near-term and the long-term?' (World Economic Forum, 2009: 8)

This question is dealt with in two ways. First, the trends observed in the global financial system are explored and mapped. Second, scenarios concerning the global financial system have been developed based on interviews, workshops and meetings with 'senior industry practitioners, leading international scholars, regulators, policy-makers and other distinguished experts and stakeholders' (World Economic Forum, 2009: 5). The report emphasizes the 'shifting macroeconomic landscape' during the 1990s and the start of the new millennium because of the 'dramatic expansion of debt relative to GDP' that 'coincided with sharp declines in nominal interest rates'. Because of the declining interest rates 'access to inexpensive credit magnified returns on actively managed investment portfolios'. The future is further explored by using scenarios.

The scenarios with regard to the distant future of the global financial system are built upon two critical uncertainties:

1. The degree of international coordination of financial policies, including tax policy, monetary and fiscal policy, and banking regulation. The degree of international coordination may either be high or low.
2. The pace by which geopolitical power shifts will take place. These power shifts are caused by differing real GDP growth paths between the US, Western Europe and Japan on the one hand and the BRIC countries and other developing economies on the other hand.

These two critical uncertainties allow four scenarios:

1. Harmonized international financial policy and slow shift of geopolitical and economic power. This scenario is called Re-engineered Western-centrism. The key indicators mentioned for this scenario are:
  - a. 'Global growth is 3,6% overall for the decade, with growth in the advanced economies surging to 3,1% and the emerging nations averaging just over 6%.
  - b. With slower growth in emerging economies and rising exports of highly innovative products and services from the US and Europe, global imbalances unwind slightly.' (World Economic Forum, 2009: 44)
2. Harmonized international financial policy and rapid shift of geopolitical and economic power. This scenario is labeled as Rebalanced multilateralism. The key indicators and events pointing at this scenario are:
  - a. Global growth is initially depressed to approximately 2,5%, but recovers to average 3,6% for the decade as emerging economies post particularly strong results. The US and EU continue to struggle with restructuring and deflationary pressures, with average growth around 1,8%.
  - b. Severe weather events in 2017 induce a second major financial crisis in the US, creating renewed incentives for international financial cooperation and risk management.' (World Economic Forum, 2009: 44).
3. Fragmented international financial policy or discordant coordination and slowly shifting geopolitical and economic power makes up the scenario of Fragmented protectionism. The key indicators for this scenario are:
  - a. 'Global growth averages just 2,3% as debt unwinds in developed markets and almost all markets are negatively affected by economic stagnation and a series of natural disasters.
  - b. Capital controls and severe restrictions on the movement of goods and people exacerbate the economic malaise.
  - c. The Eurozone disintegrates in 2014 under the pressure of public debate defaults and fundamental disagreements among members.' (World Economic Forum, 2009: 44)
4. The scenario that combines discordant coordination of financial policy and rapid geopolitical and economic change is called Financial regionalism. The key indicators and events mentioned by the World Economic Forum are:
  - a. 'Global growth is moderate but highly skewed, with emerging economies posting results of 9% while the US and EU remain at only 1,2%. Average global growth is 3,2%.
  - b. The US dollar and the euro are no longer the sole reserve currencies, thanks to the advent of a trade and currency regime within the newly created Eastern International Economic Community.
  - c. Global economic power and geopolitical primacy have shifted firmly East, with China acting as the leader in Asia.' (World Economic Forum, 2009: 44)

In 2012 the World Economic Forum again focused on the future of the global financial system. The 2012 scenario report particularly addresses the international monetary system. The report observed a monetary imbalance that also appears to be a root cause



of the global financial and economic crises. With regard to the adjustment process from the current situation of imbalance to a new global balance the World Economic Forum distinguishes several scenarios. These scenarios are based upon a 'series of strategic conversations with leaders from the public, private and academic sectors, exploring their most pressing concerns and uncertainties' (World Economic Forum, 2012: 7). The horizon for these scenarios is 2030. The report observes a major shift from a unipolar to a multipolar currency system. Whereas the global economy has primarily relied on the dollar the report observes that the global importance of the euro has been rising since its introduction. It also observes that the international use of the yuan is increasingly promoted by the Chinese authorities. On the other hand the euro has met serious problems during the financial crisis since 2008. Neither of these three currencies seems to be a natural successor of the dollar monopoly during the second half of the twentieth century. The US is confronted with a huge challenges concerning its fiscal position and the Eurozone still faces internal economic imbalances and instability. One of China's challenges concerns the need for a stable and robust financial sector. So each currency has to effectively cope with an adjustment process during the next decades. Three scenarios are based upon different 'combinations of more or less successful adjustments within each currency area' (World Economic Forum, 2012: 16):

1. A reversion to regionalism scenario. The report summarizes this scenario as follows:

- 'Policy-makers in Europe and the United States struggle with their respective fiscal challenges as they turn inwards and resort to increasing protectionism.
- Slowing global growth and decreased demand for exports make adjustments to China's growth model more challenging, leading to stalling economic reforms.
- Trade and financial flows decrease at the global level, leading to a regionalization of economic interactions.' (World Economic Forum, 2012: 17)

The scenario is based upon the assumption that neither the euro nor the dollar or the yuan will successfully adjust to the new multipolar system. In this scenario global coordination of the international monetary system will not further evolve. There will be limited or less mobility of capital between regions and this will increase barriers to trade. Global economic growth will be replaced by global recession and protectionism will grow in this scenario.

2. The G2 rebalancing scenario. In this scenario the euro will not successfully adjust to the requirements of becoming a global currency but the dollar and the yuan will successfully adjust. A new US-China economic and monetary axis will then evolve that will foster global economic growth. The Eurozone will gradually disintegrate and Europe will lose both its economic and political position on the global stage. The World Economic Forum (2012: 17) summarizes this scenario as follows:
  - 'Political deadlock and stagnating growth in Europe lead to a gradual disintegration of the monetary union.
  - Structural reforms lead to a gradual unwinding of imbalances between the G2 – the United States and China.
  - Continued high consumption in the United States and the growth of China's domestic consumer economy place pressures on natural resource sustainability.'
3. The third scenario is called Reconciling a Two-speed World. In this scenario both the euro and the yuan will successfully adjust but the dollar will fail. The yuan will evolve as the 'de facto BRICS currency'. A failure of the US government to decide on and implement fiscal reforms will diminish the global role of the dollar. There

will be a two-speed growth. China and the EU will flourish and the US will fall into a long term crisis. A number of characteristics is used to picture this scenario:

- 'While Europe successfully reforms its economic governance and emerges as a fiscal union, markets focus on the unsustainable fiscal situation of the United States.
- Emboldened by strong growth, China actively pursues the use of the RMB for trade among emerging markets.
- As an alternative, a BRICS monetary order emerges with the RMB at its core; questions arise about how to reconcile this two-speed world.' (World Economic Forum, 2012: 17)

### **Society: will citizens trust business, civil society or the institutions of the state?**

As mentioned in section 1.1 on global trends one of the scenario studies included in the stocktaking exercise focuses on the future of families in the countries of the OECD. The trends mapped by Stevens and Schieb (2012: 39) have been used to explore some contrasting scenarios on the future of families. The key uncertainties they use are:

1. Will there be a stable low or high economic growth in the OECD member countries?
2. Will there be a slow or rapid adoption of human-centric scientific and technological innovation?

Four different scenarios have been built upon these key uncertainties. Only two contrasting scenarios are explored from an economic, technological, and family structure perspective:

1. Golden age. In this scenario economic growth is high and stable and there is a rapid adoption of innovation and new technologies. Because of the economic growth families are put under serious stress. Parents are working full-time and informal care structures erode. Society depends on the welfare state for care and education and financial resources allow families to depend on the state. There is a serious possibility of growing inequality between high-income families and low-income families, both with different family structures.
2. Back to basics. In this scenario economic growth is low and there is a slow adoption of innovation and new technologies. Structural unemployment and income inequality are the key characteristics of this scenario. The gap between rich and poor families is huge. According to Stevens and Schieb (2012: 43) two 'broad types of family unit have emerged: those with high and those with low skills. (...) In both broad types there is a marked segregation between men and women. With a greater proportion of women unemployed and the elderly playing a bigger role in social care, informal care networks have been boosted.'

The other two scenarios are explicitly mentioned but these are not extensively explored.

3. Innovative but fragmented society. This scenario demonstrates low economic growth but rapid adoption of new technologies and innovation.
4. Sustainable growth, a scenario that combines high economic growth and slow adoption of innovation.

In its report on the future of the civil society the World Economic Forum (2013c) also uses the trends and driving forces mapped in the report to explore some future scenarios (to 2030). The World Economic Forum discerns four scenarios that comprise the driving forces. The report summarizes these scenarios as outlined in the table below which is an exact copy of the summary in the report (see World Economic Forum, 2013c: 22).

	<b>Mad Max</b>	<b>Transparently Blurred</b>	<b>Turbulence and Trust Deficits</b>	<b>Privatized World</b>
<b>Critical driving forces</b>	Conflict, control and a restricted space for CSOs	A transparent world with many engaged sectors	A turbulent, networked world where trust is scarce	The private sector grows in influence as governments fail
<b>What is the level and what are the sources of funding for civil society stakeholders in 2030?</b>	Low levels of funding outside of security areas due to shift in economic output to sectors designed to manage conflict and resource scarcity	High levels of financing for development, particularly from foundations, but very dependent on measurable, verified outcomes	Fluctuating levels of financing for development – fairly steady bilateral/foundation funding, but volatile private funding	Low levels of funding due to a second major economic crisis caused by the collapse of the Eurozone and debt fears worldwide
<b>What is the social and political influence of increasing access to technology?</b>	Technology is tightly controlled by governments	Technology has ushered in a new era of complete transparency	Technology has ushered in a new era of online action and activity	The internet is governed by a series of global companies and has fragmented regionally
<b>What is the extent and type of citizen engagement with societal challenges?</b>	Citizens disengaged with global and regional challenges, but highly engaged with local issues	High levels of individual engagement with societal and environmental challenges, increasingly in East and South	High levels of citizen engagement due to a resurgence in social solidarity and volunteer activity, but mostly on a local level	Very diverse engagement globally by citizens. Employees are encouraged and incentivized to do social work, volunteerism declines
<b>What is the state of global and regional geopolitical stability and global integration of markets?</b>	High levels of global insecurity and instability means that governments are paranoid and nationalistic	Following a turbulent period, a rather benign and positive global economic outlook	A turbulent global environment with significant tensions but no major physical conflicts	A turbulent global environment where online conflict, cyber attacks and intellectual property are major concerns
<b>What is the effect of environmental degradation and climate change on populations?</b>	Climate change-related disasters are the norm, but overshadowed by national security threats and fossil fuel resource concerns	Climate change-related disasters have begun to emerge, but with high levels of awareness, adaptation is underway	Climate change-related disasters are the norm, and floods and hurricanes have resulted in significant migrations	Climate change-related disasters are the norm, and floods and hurricanes have resulted in significant migrations
<b>What is the level of trust in governments, businesses and international organizations?</b>	Trust fragmented nationally due to conflict, foreign organizations distrusted. Trust in governments relatively high	Relatively high levels of trust in an increasingly engaged global private sector, particularly in the East and South	Private sector trying to be engaged with societal challenges, but relatively distrusted by populations	High levels of trust in the private sector, low levels of trust in government; businesses take on many roles

Table 34 – World Economic Forum Scenarios

The signposts for these scenarios mentioned in the report are some newspaper articles that may be regarded as weak signals for a possible evolvement of the scenarios.

*Regions and their global connectedness: a fragmented or integrated world system and clashing or converging values and institutions?*

Several scenario reports focus on specific regions in the world from a global perspective. The main question addressed in these reports deals with the way these regions are connected with the rest of the world. In other words, the future of specific countries or regions is explored from a global perspective.

The European Commission report on the future of Europe provides a first example of such use of future scenarios (European Commission, 2012). Previously in this stocktaking report several trends observed by the European Commission have been mentioned. The scenarios presented by the European Commission do not directly build on these trends. Instead these

scenarios have been developed as contrasting ways of imagining the future of European integration. The scenarios are thus deliberately EU-centric. The report sketches three contrasting scenarios:

1. Nobody cares: standstill in European integration. In this scenario the European economies do not substantially grow and the gap between the EU and the other leading world economies widens. The fact that the challenges of ageing are not adequately addressed causes social and economic instability.
2. EU Under threat: a fragmented Europe. In this scenario global economic decline provokes protectionism and low-intensity conflicts in advanced economies. The withdrawal of leading member states heralds the fragmentation of the EU as a whole. Innovation slows down and so do productivity rates.
3. EU Renaissance: further European integration. In many respects the world follows the same path the EU has followed the past decades. Global security is better achieved and human rights and the rule of law are enforced throughout the world. The EU enlarges east- and southwards and ecological and scarcity challenges are adequately addressed by national governments and international organizations.

These scenarios are pictured as narratives. The European Commission has also attempted to convert these models into quantitative parameters such as economic growth. A number of macro-variables are used to bridge between the qualitative and the quantitative analysis; these are the drivers that are assumed to provoke different scenarios. The model built upon these variables includes:

- the convergence and divergence of EU-institutions
- financial globalization
- energy efficiency
- education
- total factor productivity for the EU
- energy price
- obsolescence of the EU economy
- migration into EU
- migration out of southern Mediterranean countries
- migration out of sub Saharan Africa
- Emissions
- Trade cost
- Agricultural total factor productivity
- Current acceleration rate
- Tariff rates.

These macro-variables are used to picture and calculate the effects of the scenarios.

Within the context of the World Economic Forum several scenario studies have been carried with regard to specific countries or regions such as China, India, the Russian Federation, the GCC countries, and the Mediterranean Region.<sup>63</sup> Already in 2005 the World Economic Forum presented its scenarios on India and the world. By consulting Indian experts two critical questions have been identified:

- 'Can India engage the whole nation in its quest for sustained security and prosperity?
- How will India's relationship with the rest of the world impact the Indian agenda?'

The key uncertainties are thus defined as domestic inclusive or exclusive growth and development and integration in the world or isolation from the world. Three scenarios have

<sup>63</sup> The World Economic Forum also published scenario reports on some smaller countries such as the Kingdom of Bahrain, the Kingdom of Saudi Arabia, and the United Arab Emirates (see [www.weforum.org/scenarios](http://www.weforum.org/scenarios)).



been built on these uncertainties. If India will be integrated in the world and simultaneously is not able to achieve domestic inclusive growth and development the Bolly World scenario will evolve. India will then become an interesting place for foreign investments because of the cheap labour and low operation costs. The economy will especially flourish in India's cities while the rural areas are largely excluded from economic growth. Poverty will grow and social cohesion will be undermined. In effect, India will become more unstable and this will cause a withdrawal of foreign investments and major international corporations. If India manages to become more integrated in the world and achieve inclusive economic growth and development the Pahale India (India First) scenario will evolve. Pahale or first does not only mirror the essence of this scenario, it is also the acronym for Poverty alleviation – 'basic needs for all', Agriculture and rural development, Healthcare, Access to education, Leapfrogging infrastructure constraints, and Effective governance. Because of the unity, equity, and cosmopolitanism of the Indian people in this scenario India will emerge as a global economic and cultural leader. The Atakta Bharat (India getting stuck) scenario is the exact opposite of the Pahale India scenario. It combines exclusive growth and development in India with the country's increasing isolation from the rest of the world. A stagnating global economy and uneven development within India are the root causes of this scenario. Failing institutional reforms within India, protectionist policies all over the world, and failing consensus among the Indian elites also contribute to this scenario.

The report on these scenarios also comprises a forecast of some leading indicators in these various scenarios. Especially economic indicators are used, such as global GDP growth, India's share of developing countries' FDI inflows, India's share of world trade, India's GDP growth, and change in poverty levels in India.

The World Economic Forum scenario analysis on China and the world resembles the scenario analysis on India. Concerning China's future two core questions have been selected:

- 'Can China implement internal reforms to further its development?
- How will China's relationship with the rest of the world affect its development and shape the global context?'

The key uncertainties somewhat reframe these questions. They are defined as effective versus ineffective institutional reforms and an inclusive global environment vis-à-vis a discriminative global environment. Three scenarios have been built on these key uncertainties. With effective institutional reforms and a discriminative global environment the Regional Ties scenario is expected to evolve. Because of the protectionist reaction on China's rising economy, Chinese corporations are not included in the world economy. The Chinese government will then focus on the domestic market and its Asian neighbours. They will establish an Asian Economic Region with a free flow of goods, capital, and technology. Regional economic cooperation will enable Chinese government to combat popular discontent and maintain social cohesion within the Chinese society. The Unfulfilled Promise scenario departs from an inclusive global environment and ineffective institutional reforms in China. In this scenario reform attempts are initiated but these cannot be implemented and enforced. Because of the lacking enforcement corruption will prevail and China becomes somewhat isolated from the global economy. The innovation and diffusion of technologies will in turn be seriously hampered and this will affect economic growth. As a result of ineffective institutional reforms on the nation's level it is expected in this scenario that Chinese regions will initiate and implement reforms. A third scenario starts from the assumptions that institutional reforms are effective and the global environment will become more inclusive. This scenario has been labeled as the New Silk Road. In this scenario China will rise economically, culturally, and politically. China will be peacefully integrated in the world economy and the global political system. The reforms successfully implemented relate to the rule of law, the environment, the banking sector, and state-owned enterprises. Most of all Chinese national government succeeds in organizing legitimacy among local and regional leaders and its population in general. Because of the success of

these reforms and the inclusiveness of the global environment China becomes one of the world leaders. It plays an important role in peacekeeping, climate change, and sustainable energy use. According to this scenario analysis the answer to the question which of these scenarios will evolve depends on a number of factors:

- 'The intent of China's leadership and its ability to sustain the implementation of decisions made;
- The economic policy choices made, including the degree of liberalization and openness;
- The extent to which social stability can be maintained and popular expectations managed;
- The reaction of other global factors to China's rise, and the broader geopolitical situation.' (World Economic Forum, 2006: 6)

The scenario group of the World Economic Forum organization (2007) has also developed three scenarios for the future of the Gulf Cooperation Council (GCC) countries (Saudi Arabia and a number of small Arab countries in the Persian Gulf) to 2025.<sup>64</sup> These scenarios have been built on two key uncertainties:

- 'Will leaders in the GCC countries be willing and able to implement the necessary economic and political reforms and enforce the rule of law, both in public and in private governance?'
- 'Can the GCC countries maintain internal order and stability, in particular vis-à-vis a complex and uncertain regional situation?'

These key uncertainties have been used to build three scenarios. In Oasis regional instability is combined with effective governance and reforms. Several factors appear to trigger this scenario. For example, stable oil prices and the level of coordination of both diplomatic and economic policies are mentioned by Davis & Hayashi. In the Sandstorm scenario regional instability goes along with ineffective institutional reforms and a lack of leadership to implement these reforms. Volatile oil prices are seen as a key factor that triggers this scenario. Volatile oil prices trigger instability and hamper reforms because reforms then 'deflate or collapse from a lack of attention to the root cause of internal issues and the tendency for governments to focus on short-term stability at the expense of long-term solutions' (World Economic Forum, 2007: 8). This scenario may also be triggered by chaos in the gulf region, for example because of military interventions by the US. The Fertile Gulf is a third scenario presented by Davis & Hayashi). Both regional stability and effective institutional reforms are the cornerstones of this scenario. Again, oil prices seem to be the key factor. High and stable oil prices are expected to both guarantee regional stability and enable the necessary institutional economic and political reforms. According to this scenario analysis reforms are necessary to create efficient and competitive markets and economies. The rule of law refers to guaranteeing property rights in legislation and the enforcement of legislation in this realm but also to reducing corruption and nepotism.

In 2011 the World Economic Forum published its scenarios on the Mediterranean region. Based on in-depth interviews and scenario workshops with experts and stakeholders three key uncertainties have been defined which are expected to affect the long-term development of this region:

- 'Will regional politics in the Mediterranean be cooperative or fragmented?' Currently politics in the Mediterranean region is described as predominantly fragmented.
- 'Will regional resource management be sustainable and complementary or unsustainable and competing?' Resources include water and food, agricultural

<sup>64</sup> Scenarios have been separately developed for Saudi Arabia, Bahrain, and the United Arab Emirates.

land, and energy. The experts and stakeholders currently observe unexploited possibilities for complementarity and much competition.

- 'Will the regional labour market be efficiently or inefficiently managed?' This key uncertainty refers to the demography and unemployment rates in the region. Whereas the population in the Southern Mediterranean countries grows fast with high numbers of young people the Northern Mediterranean countries will shrink and age the next decades. The mirroring demography and the high unemployment rates highly affects labour markets in this region.

These key uncertainties are used to envisage three scenarios for the Mediterranean region:

- **MediterrAfrica Rising.** In this scenario political cooperation is limited to the northern and southern shores of the Mediterranean. The southern countries profit from Africa's economic growth that fosters cooperation between these countries. There are few possibilities for regional management of resources and despite the economic growth of the Southern Mediterranean countries youth unemployment is still high. In this scenario a divided Europe will result in introspect Northern European countries and a lost set of Southern European countries.
- **Resource Famine.** In this scenario there is no coherent Mediterranean region except for the geographical fact that all countries have a Mediterranean shore. There is no regional politics. Instead there is increasing antagonism, partly triggered by the scarcity of resources in the region. Northern Mediterranean countries are supported by the EU but Southern Mediterranean countries have to cope with resource scarcity themselves. The countries' labour markets are not connected and there are no coherent regional labour policies.
- **Green Mobility.** This scenario is the exact opposite of the previous scenario. Because of the regional policies to approach labour and resource scarcity, regional complementarities are fully exploited. Resource scarcity is not the source of competition or antagonism, but a source of innovation and complementarity. The renewed regional north-south partnership enables the countries' governments to seek complementarity and to produce a coherent sustainable and efficient regional economy.

Recently, the World Economic Forum (2013b) produced a scenario analysis of the future of the Russian Federation. Again experts and stakeholders were consulted to map the key uncertainties for the Russian Federation and its future. And again three key uncertainties were defined:

- **The global energy landscape.** Because of Russia's dependency on oil and gas revenues especially the oil and gas prices appear to be a key uncertainty. Both their level and their stability determine to a large extent Russia's economic position and GDP.
- **The institutional environment.** This key uncertainty refers to 'the quality of domestic institutions' such as the 'levels of corruption, deficiencies in the rule of law and lack of market competition, to name a few' (World Economic Forum, 2013b: 9).
- **Social cohesion.** This uncertainty is not clearly defined but it appears to refer to measures of inequality, social polarization, political stability and protest, and generalized trust in the government.

The scenarios are then built on these key uncertainties. First, in the future the energy prices may be high or low. Second, the (social, political, legal, and so on) domestic institutions may or may not be supportive to the full development of the economy. A supportive institutional environment is characterized by an efficient delivery of public services, transparency, protection of property rights, and consistent application and enforcement of regulations. High levels of corruption, growth of state companies, and inconsistent application of regulations are the prime characteristics of an unsupportive

institutional environment. If Russian society shows a high level of discontent, social cohesion is low and vice versa. Three scenarios appear to arise out of this combination of uncertainties:

- Beyond complacency. In this scenario the institutions are supportive, the prices of oil and gas are high and popular discontent is increasing. Substantial economic growth and institutional reform seem to point at a rather bright scenario, but according to this scenario analysis they will produce complacency. In turn complacency will produce popular discontent because of the pace of institutional reform. With many Russians who enjoy higher incomes the demand for further institutional reform will be stronger. It is expected that this will set the stage 'for loud clamour from the country's elites, which begin to split between proponents of vested interest in the energy sector and frustrated advocates of a more diversified economic base' (World Economic Forum, 2013b: 38). Because of the split of elites a radical wave of reforms is being expected in this scenario.
- Regional Rebalancing. This scenario combines low energy prices with supportive institutions and moderate popular discontent. It is assumed that these factors will lead to stronger regions in Russia and to problematic central institutions. Well-governed regions will witness economic growth because of global resource scarcity and a flourishing agricultural sector, but those regions that do not reform will stagnate.
- Precarious Stability. Long-term low oil and gas prices, no institutional reforms and growing popular discontent constitute this scenario. In this scenario the country's social stability is seriously threatened. The low oil and gas prices trigger a spiral of economic crises and the government desperately tries to content its citizens by keeping a firm grip on the economy. The problems produced by this dynamics open 'a range of uncertainties about the country's long-term economic future' which is a euphemism for a far-reaching social, economic, and political fragmentation of the Russian Federation (World Economic Forum, 2013b: 34)

In the scenario analysis of the future of the Russian Federation the World Economic Forum also mentions some signposts which are defined as early indicators of this future. Signposts for the Regional Rebalancing scenario are:

1. Increased attention for a mayoral election somewhere in Russia's regions;
2. The regionalization of Russian politics;
3. The enormous potential of agriculture currently unexploited.

Signposts for the Precarious Stability scenario are:

1. the growing tension between the demand for social spending and the country's fiscal deficit;
2. the declining demand for oil and gas because of the economic crises;
3. the pulling out of foreign investments and the Russian government's stronger grip on the economy and energy production.

There are also signposts for the Beyond Complacency scenario such as:

1. some economic measures are prepared to increase investments in oil and gas exploration projects;
2. climate change dramatically affects Russian weather which will become more unpredictable;
3. a growing Russian economic middle class seems to increasingly demand political opposition.

### 6.5.3 The implications of the stocktaking exercise for the Hiil scenarios and the monitoring mechanism

To a large extent the stocktaking exercise confirms the Hiil scenarios and the key uncertainties on which these scenarios have been built. The uncertainty with regard to the



predominance of public or private governance mechanisms is strongly connected with the observed power shift from state actors to non-state actors and informal networks and coalitions. This uncertainty is thus confirmed by the stocktaking exercise. Second, the internationalization uncertainty is slightly connected with the question of fragmented or coordinated global governance mechanisms but these are not synonymous. The uncertainty whether global governance mechanisms are fragmented or coordinated seems to better capture the core question with regard to the global legal environment than the key uncertainty in the Hiil scenarios (nationalization or internationalization of law). The internationalization uncertainty is too much defined from the national law perspective whereas the fragmentation/coordination uncertainty primarily focuses on the global legal environment. Second, the issue of a possible governance gap is better captured by the fragmentation/coordination uncertainty than by the internationalization/reversed internationalization uncertainty. The third key uncertainty used in the Hiil scenarios (will there be further spread of the rule of law?) is also confirmed in our stocktaking. First, it is connected with the uncertainty regarding a global consensus on liberal (Western) values. But the rule of law in its 'thick' interpretation also appears to be the nucleus of the EU legal strategy. Whereas this uncertainty was eliminated from the Hiil scenarios before FLAGSHIP requires that the rule of law is included. Because of the importance of the 'thick' rule of law approach in the EU legal strategy (both with regard to the EU legal order and with regard to the global legal environment) the key uncertainty needs to be included in the FLAGSHIP scenarios. Next to the uncertainties confirmed by the stocktaking exercise new uncertainties have been discovered such as:

- Will there be growing global inequality that fosters unrest or not? Inequality also affects migration, terrorism, and other security issues and risks)
- Will there be a culture of intrusive checks, rules, and control mechanisms (low trust culture/legalistic culture) or a culture of trust and informal mechanisms (a high trust culture)
- Will there be a stable set of governance mechanisms or will instability and volatility become the main characteristics of global governance mechanisms?

These key uncertainties can be included in the narratives as far as these are relevant for the global legal environment. Inequality will probably affect the fragmented/coordinated uncertainty and it will also affect the stability of the global legal environment. The uncertainty with regard to legalism will be considered autonomous. Both state and non-state legal and governance mechanisms can be either legalistic or high trust.

There are thus sound reasons to amend the Hiil scenarios on at least two points. First, the internationalization/reversed internationalization uncertainty should be replaced by the fragmentedness/coordinatedness of the global legal environment. The latter much better captures what is at stake with regard to the global legal environment. Second, the rule of law in its 'thick' definition needs to be included in the FLAGSHIP scenarios. Including this definition may lessen the worldwide applicability of the scenarios but it dramatically increases their use for the EU legal strategy. The FLAGSHIP scenarios on law and governance should thus be built on three critical uncertainties

The critical uncertainties are:

- Will more fragmented or more coordinated legal and governance mechanisms evolve on the global level?
- Will legal and governance mechanisms become predominantly formal and connected with state actors or predominantly informal and connected with private actors?

- Will these legal and governance mechanisms be characterized by a 'thick' or broad rule of law approach (legality + human rights) or by a 'thin' or small rule of law approach (legality)

These changes affect the key uncertainties but do they do not necessarily lead to new labels. The Hiil labels can still be used, but these have to be complemented because of the third key uncertainty. The narratives captured by these labels do need thorough rethinking and rewriting because of the changes on the level of key uncertainties. The scenarios are therefore adjusted according to table ...

	<b>Formal/state</b>	<b>Informal/private</b>
Fragmented law and governance	Legal borders (either with or without human rights)	Legal tribes (either with or without human rights)
Coordinated law and governance	Global constitution (either with or without human rights)	Legal internet (either with or without human rights)

Table 35 – Adjusted Hiil scenarios

## 6.6 National immigration policies

This Annex contains for a selected number of EU countries a short outline of actual immigration policies, by means of the available country factsheets provided by the European Migration Network (EMN)<sup>65</sup>.

### Austria

An underlying principle of the Austrian migration regime is the strict differentiation between short-term stays (up to six months) and long-term stays (over six months). Visas are issued for short-term stays of up to three months, and in the case of national "D visas", up to six months. For stays of over six months, residence titles are available, depending on the purpose of stay (studies, research, employment, family reunification, etc.). First residence permits are applied for via the competent Austrian representation authority in the country of origin. Criteria include (amongst others) German language skills at A1 level of the Common European Framework of Reference; and at A2 level within two years after immigration. Level B1, German language knowledge for independent use is necessary for a long-term residence permit as well as citizenship.

Work permits are usually restricted to certain occupations and applications must be filed by the future employer; a working allowance gives labour market access in a particular Federal State and an exemption card provides access to the wider labour market. Asylum seekers are allowed to obtain work permits for specific sectors only; international protection status allows unrestricted access to the labour market.

An application for international protection can only be filed within Austria. The procedure is divided into two phases: 1) an admission procedure, clarifying the competence of Austria with regard to the Dublin Regulation and the principle of international protection in a safe third-country and 2) if Austria is found to be competent for the case, an assessment of the application for international protection with regard to the Geneva Convention and Art. 3 and 8 ECHR is carried out. Free legal aid is provided in both phases.

### Belgium

Third-country nationals must meet the following conditions prior to entry for short stays (not exceeding three months per six-month period): possession of valid travel documents; possession of a valid visa if required, justification of the purpose and the conditions of stay;

<sup>65</sup> <http://emn.intrasoft-intl.com/html/index.html>, accessed on 16 April 2013.

adequate means of subsistence (for the duration of the stay and the return trip); not flagged for non-admission in the SIS; not considered a threat to the public order or national security. An application for asylum will be examined initially by the border police where after the applicant, if not rejected, will be transferred to a detention or reception centre.

Embassies and consulates can issue visas. Short stay (type C) visa encompass e.g. the following categories: tourists, business, family visit and medical treatment. Long stay (longer than three months) includes those of a limited duration (such as employees, self-employed, au pairs, students and internships) and those of possibly unlimited duration (family reunification in different cases, victims of trafficking, refugees and some regularised persons). All persons legally residing need a valid residence permit. Asylum applicants are issued a Certificate of Immatriculation, and when recognised as a refugee, a permit for unlimited duration is granted. Subsidiary protection provides entitlement to temporary residence (for one year) with the possibility of extension.

There are no integration requirements in relation to residence permits, only material conditions. However, Flanders has a mandatory integration programme for certain types of migrants. Several Regions and Communities have taken up policy measures with regard to integration. The Walloon Region is also working on a mandatory integration programme.

For access to the labour market, in principle both a residence permit and a work permit are required. A prior authorisation is needed to gain access, both regarding paid employment and self-employed. The most common permit (category B) is valid for up to 12 months. There are certain exceptions to the general conditions for e.g. highly skilled workers, persons undertaking a management position and researchers and professors meeting certain criteria. For self-employment, third-country nationals must in principle apply for a professional card.

## **Bulgaria**

Third-country nationals may enter the territory with the required valid travel document and visa. Visa types include: air transit visa, transit visa, short-term residence visa, and long-term residence visa. A visa is not required if the foreigner holds a prolonged, long-term or permanent residence card. Admission requires the fulfilment of specific criteria and the possession of documentation. EU citizens and their family members wishing to stay for more than three months must register to receive a residence permit. Applications for international protection may be lodged with the State Agency for refugees or any other State Authority. During the asylum procedure, accommodation, health care and social assistance are provided to applicants. All applicants, except unaccompanied minors are determined under an accelerated procedure and receive a decision (whether rejected as unfounded or admitted to general procedure) within three days. Legal aid is available at all stages.

Short-term residence may not exceed ninety days. Prolonged residence is given for the period up to one year mainly for reasons connected with education, family reunification and labour. Long-term residence is given for a period of 5 years, with a possibility of renewal, for the purpose of e.g.: employment, (freelance) self-employment, commercial activities, study, non-profit activities, medical treatment, and family reunification. Requirements must be met regarding housing, subsistence, compulsory insurance and social insurance. Permanent residence may be granted after five years of uninterrupted residence or in case of e.g. certain family ties, investments or Bulgarian nationality.

Regarding access to the labour market, certain types of short term employment and study are exempted from work permit requirement. Registration must however be done before entry and employment. Work permits may be issued to a third-country national having specialised knowledge, skills and professional experiences, where certain conditions are met. A work permit can be extended for up to 12 months if valid grounds exist and

employment is not interrupted. Asylum applicants have access to the labour market if the asylum procedure has not been finalised after one year. Refugees and persons granted humanitarian status have the right to work.

### **Estonia**

The competence for control of persons entering Estonia lies with the Police and Border Guard Board (PBGB). Border surveillance and checks are carried out to prevent, detect and tackle illegal immigration. Legal entry requires air transport visa (type A), short-stay visa (C) or long-stay visa (D). Asylum applications must be submitted in person to the PBGB. Entry is refused at the border if the asylum application is clearly unfounded.

A temporary residence permit may be issued: for the purpose of employment, enterprise, study, family reunification, and where sufficient legal income can be demonstrated. Only aliens staying on a legal basis have the right to apply for a long-term residence permit or citizenship.

An alien is allowed to undertake employment if there are no employees in Estonia or from within the EU who would have the same skills and qualification for the respective position. Settling for employment or enterprise is restricted within an annual quota of 0.1% of the Estonian permanent population. An alien with a residence permit is allowed to work, if the Aliens Act does not foresee otherwise. Aliens with temporary stay may work, if the employment is registered. Following an application for a work permit, an asylum applicant is allowed to work if the PBGB has not made a decision in the asylum case within a year. When granted International Protection a work permit is not then needed.

### **France**

For entry, all foreign nationals must, as required, provide documents and visas, accommodation certificates (for private visits), documents related to purpose and conditions of stay and return, and documents required to carry out work. Short-stay visas are issued within the framework of the common regulations. Circulation visas are valid for several years, but with a limit of 90 days in a six month period. Long-stay visas are issued mainly for study, family reunification and employment. A long-stay visa equivalent to a residence permit (VLS-TS) was introduced in June 2009.

Applications for international protection are made with State representatives (Prefects), and the applicant receives temporary stay. If an applicant does not have documents to enter, the division of asylum at the border of the French Office for the Protection of Refugees and Stateless Persons (OFPRA) may carry out interviews at the border to decide whether a case can be made.

To settle, a residence permit is required. Generally, temporary residence permits are valid for a maximum of one year, and are renewable. They may be issued for: persons living on their own resources and not taking up work; employment; private and family reasons (issued to persons granted subsidiary protection); study; scientific research; and artistic and cultural activities. In addition, "skills and talents", "employees on assignment" and "European Blue Card" permits, valid for three years; full residence permits, valid for ten years (issued to recognised refugees); residence permits for Algerian nationals; retired person's permits, valid for ten years; and EU and EEA permits are also available.

In principle, foreigners who wish to have paid employment must hold a work authorisation, issued by Regional Directorates for Companies, Competition, Consumption, Work and Employment (DIRECCTE) and a medical certificate issued by the OFII. The various categories of work authorisations include residence documents with permission to work (permanent residence card or temporary residence permit) or provisional work authorisations (APT), which are valid for a maximum period of 12 months. In order to



respond to the recruitment needs of certain economic sectors, a list of fourteen shortage occupations, open to third-country nationals, was established in August 2011.

Asylum applicants are not permitted to work. However, if a decision has not been reached within a year, they may apply for a work authorisation.

### **Germany**

Upon entry, the municipal Foreigners Authorities are generally the competent administrative bodies for all residence and passport-related measures and rulings. However, an asylum applicant reporting to the Border Agency, and being entitled to enter, is transferred to the nearest initial Reception Centre, where the Federal Office for Migration and Refugees (BAMF) takes over processing the asylum claim. Applications for asylum must usually be made in person at the BAMF.

Prerequisites for a residence title include: holding a secure means of subsistence; known identity and nationality; no grounds for expulsion; no objections and no jeopardy of the interest of the state, possession of a valid passport or travel document. A residence permit is granted for a specific purpose and a limited period of time. Residence permits are issued for the following purposes: employment, family reunification, study and self-employment. A settlement is permanent. Each foreigner appealing to the basic right of asylum must undergo the recognition procedure outlined and fixed in the Asylum Procedure Act with personal interviews as the core of the asylum procedure. Persons recognised as entitled to asylum obtain a residence permit (refugee status pursuant to the Geneva Conventions entitles a residence permit). Negative decisions may be appealed to the administrative court.

Obligatory integration courses are linked to some residence titles, for others it may be optional.

While access to the labour market usually requires a residence permit, it is also possible that a national visa by law or by special permission may authorise employment. The local Foreigners Office is responsible for issuing residence titles, including for employment (involving the Federal Employment Office). For authorisation of employment, it must be proven that this does not negatively impact on the job market, that there are no German or co-equal workers, and that the working conditions are not below those of comparable German labourers. There are certain regulations for e.g. seasonal workers and highly qualified foreigners. Asylum applicants may work with a "subordinate" work permit after one year. Persons granted subsidiary protection may also only be granted "subordinate" permits during the first three years of residence. Recognised refugees obtain unrestricted and unlimited work permits.

### **Greece**

Entry is only permitted through controlled entry points. Third-country nationals, who enter / exit illegally, are sentenced with imprisonment. A valid passport or travel document is required, as well as a short stay ('Schengen') or long stay ('National') visa, in line with international conventions, EU and national law. Visas are issued by Consular Offices, but may exceptionally be issued by the passport control agencies.

Asylum applicants may submit their application to police authorities at the border, after which an accelerated procedure is followed. If no decision is reached after four weeks, entry is allowed.

Regarding admission conditions, visas are issued for specific reasons (i.e. seasonal work, independent financial activity, studies, family reunification), while an application for the respective residence permit must be submitted before expiration (except for seasonal

workers, who reside with a national visa for the specific period) to the Decentralized Authorities of Greece (former Regions) or at the relevant offices of the Municipality where the "one-stop shop" services are not yet established. Once the required documentation is submitted, a certificate of lodgement is issued and the residence is legal until a decision is reached. Interviews may be undertaken during the examination. The categories of permits include: employment, independent financial activity, special reasons (e.g. studies or training), exceptional reasons (e.g. humanitarian), family reunification, long term (10 years duration) and EU long-term resident status. Asylum applicants also undergo an interview procedure and are entitled to legal assistance at their own expense (this is free in cases of appeals). Asylum applicants may choose their place of residence.

The duration of most types of initial residence permits is one year - renewals mostly last for two years. The purpose of stay can be changed after three years from the granting of the initial permit. Five years of residence results in entitlement to a long-term residence status, provided certain pre-conditions are fulfilled. Recognised refugees receive a residence permit for five years, which can be renewed.

Regarding access to the labour market, regional committees report each year on the labour market needs: a precondition for access for third-country nationals is a formal labour contract with an adequate salary. New contracts in the same specialty are accepted, and after one year, work in different prefectures is allowed. Different procedures exist for third-country nationals entering for investment purposes. Work permits and residence permits are unified, with certain employment restrictions for students and adult children of diplomatic employees. Asylum applicants have the right to temporary employment under certain conditions. Recognised refugees can acquire a work permit with duration similar to their residence permit.

### **Hungary**

For residence of less than three months within a six-month period, either an airport transit visa or short-stay visa is required for entry: The issue of specific transit visas (the former type "B" visa) and long stay visas concurrently valid as a short stay visa for the first three months (the former type "D+C" visa) has been abolished with the application of the Visa Code, from 5 April 2010. Visas in these categories, issued prior to this date, remain valid until their date of expiry. Visa validity is for a maximum of five years, and applications are typically submitted to the Consul, an authorised representative of a Schengen State.

The Police headquarters carrying out border control may refuse entry if documents are not in place. Asylum applications are lodged with the Office of Immigration and Nationality (OIN). If an applicant intends to lodge an application with a different authority, this authority has a duty to record the applicant's wish and to notify the OIN.

For admission for less than three months, the following is required (see 562/2006/EC establishing a Community Code on the rules governing the movement of persons across borders (Schengen Borders Code): a) possession of a valid travel document; b) possession of a valid visa, c) justification of the purpose of entry and stay; d) having sufficient means of subsistence and financial resources for intended stay and return; e) not being subject to an entry ban, and not considered a threat to public policy, public security or public health, or to the national security.

The asylum procedure consists of a preliminary assessment procedure not exceeding 30 days (where applicants are accommodated in Reception Centres).

According to the general rules, a residence permit is an authorization to reside for a limited duration of at least three months and not more than two years. It may be extended for two additional years. Specific purposes of stay include for example family reunification, gainful employment, studies, scientific research, official duties, medical treatment, visit

and voluntary service activities. Applications may be submitted to consular offices; however, the competent Regional Directorate of the OIN makes the final decision. In the case of some permits, other institutions or bodies are also involved. Various types of permanent residence permits for foreigners with legal stay are available. Third-country nationals applying for asylum, subsidiary or temporary protection at the OIN, persons recognized as stateless persons as well as unaccompanied minors are granted a residence permit on humanitarian grounds. The following categories of work permits are issued: a) employment with a work permit obligation and b) employment with notification the fact of the employment.

There is a set maximum number of work permits to be issued (18 784 on 31th March 2012). Work permits can be issued by the competent employment centre on the basis of a valid workforce request submitted by an employer, and if neither a Hungarian worker nor an EEA national (or relative) registered as a job-seeker is available for the position.

### **Ireland**

Third-country nationals need a valid entry visa before arrival. On application for a visa, individuals must indicate: whether travel will be for a short stay (90 days or less) or a long stay (over 90 days); whether their application is for a single journey or multiple journeys; and the purpose of their travel. All third-country nationals are required to seek leave to land in the State by reporting to an immigration officer at an Irish port of entry. The immigration officer may grant leave to enter for a period of three months or if the person wishes to remain longer they must register with the Garda National Immigration Bureau (GNIB).

Visas types include: visit, study, tourism, employment/business, joining family, conference/performance, medical treatment or research. Admission will be refused if the third-country national: has insufficient funds to support themselves; intends to take up employment without a permit; suffers from certain specified conditions; has been convicted of an offence which carries a penalty of one year imprisonment or more; does not have a requisite visa; is the subject of a deportation order or similar; does not have a valid passport; intends to abuse the Common Travel Area; poses a threat to national security.

Section 9 (1) of the Refugee Act 1996 provides that a person who arrives at the frontiers of the State seeking asylum or otherwise indicating an unwillingness to leave the State for fear of persecution, shall be given leave to enter the State. Asylum applicants have permission to remain in the State in accordance with section 9 of the Refugee Act until their asylum application is withdrawn, transferred under the Dublin II regulation, or refused. If a person receives a declaration of refugee status their rights are similar to those of an Irish citizen. Refugees are entitled to work without any further documentation and may access social welfare, medical and housing support.

Permission to remain: various forms of residence rights allow third-country immigrants to live in Ireland. If permission to remain is granted, a Certificate of Registration is endorsed on the immigrants' passport by the Garda National Immigration Bureau. Several types of permit allow access to the Irish labour market: Green Cards; Work Permits; Spousal/Dependant permits; Intra-Company Transfer Permits; Graduate Scheme - issued by the Department of Jobs, Enterprise and Innovation. The Immigrant Investor Programme and Start-Up Entrepreneur Programme also provide for leave to remain. Asylum applicants may not legally access the labour market while a decision on their status is pending.

### **Italy**

The entry procedures of Italy generally follow the regulations of the Schengen System. A Decree of the Ministry of Foreign Affairs of May 2011 implemented the new EU regulations but still contains 21 different types of visa, some of which have been redefined.

With regards to admissions conditions, only third-country-nationals planning a stay longer than three months are obliged to apply for a residence permit – in a number of cases (e.g. study, family reasons or work) are required to apply to the so called “Sportello Amico” of Poste Italiane (a specific Help Desk of the Italian post offices), where they can obtain and fill in the necessary forms. All the documentation is then transferred to the Single Desk operating in the “Prefettura” (the Territorial Governmental Office). Applications for asylum can be submitted at the Border Police offices upon entry or at the Immigration Offices. The evaluation of the application is made by the relevant Territorial Commission for Refugee Status Recognition.

Italy has recently taken steps aimed at transferring the administrative jurisdiction for the renewal of residence permits to Municipalities. In this regard a new “online network for assistance with residence permit renewal” has been created and was in November 2011 joined by more than 450 Municipalities. As an alternative to paper forms, the foreign citizen may submit his/her application to any Municipality (or to specific offices specialized on free assistance, called “Patronati”) enabled to process the online submission. Furthermore, the Ministry of Interior has developed an automated system for the presentation of foreign citizens to the Police Headquarters for the validation or delivery of their residence permits.

An employer hiring a non-EU worker must go to the Single Desk for Immigration at the Prefecture of the province where the work will take place. The Single Desk issues an authorization certificate; the worker then has a 6 month window to apply for an entry visa.

## **Latvia**

Applications for granting the status of a refugee or an alternative status are submitted to the State Border Guard - both at the border control posts and inside the country. The Asylum Affairs Division of the Office of Citizenship and Migration Affairs (OCMA) then evaluates the application of the individual and decides on the application within five business days. The decision of the Asylum Affairs Division of the OCMA may be appealed at the Administrative District Court, but the Court decision is final. If an applicant is denied asylum, he/she is expelled by the State Border Guard. A refused person is entitled to submit a repeated application in the event that conditions have changed in their favour. Visas are issued by the Latvian diplomatic and consular missions abroad, the OCMA, the State Border Guard or the Consular Department of the Ministry of Foreign Affairs. The visa is extended by the OCMA or the Consular Department of the Ministry of Foreign Affairs.

A wide range of state and municipal institutions is involved in the area of admission of aliens. The OCMA coordinates cooperation in this area.

The total duration of the examination of the asylum application according to the regular procedure by both the OCMA and the Administrative District Court is approximately 8 to 9 months. The decision on issuing of a residence permit is taken after examination of all submitted information within 30 days.

Two types of residence permits are issued in Latvia – temporary residence permits and permanent residence permits. The temporary residence permit with the validity term of more than one year shall be registered every year, meanwhile, the permanent residence permit is registered once every five years. An alien is entitled to receive a permanent residence permit or a status of a long-term resident of the European Union if he/she has acquired the Latvian language at least at grade 2 of the basic (the lowest) level. If an alien fails to acquire the Latvian language at the requested level, such person shall be entitled to continue residing in Latvia with a temporary residence permit.



## **Lithuania**

**Admission conditions:** In general, admission conditions depend on the category of a third-country national (TCN).

**Family reunification:** as a general rule a family member may join a legally residing TCN (sponsor) only after the sponsor has lived in Lithuania for the last 2 years, holds a temporary residence permit (TRP) valid for at least one year and has reasonable prospects of remaining in Lithuania permanently. The Law foresees exceptions (e.g. highly qualified workers may bring their family members immediately). A decision on the issuance of a TRP is made by the Migration Department (MD) not later than within 6 months. Having resided uninterruptedly for the last five years, a family member may obtain a permanent residence permit (PRP).

**Work:** as a general rule, a TCN wishing to work in Lithuania needs two documents – a work permit (some categories are exempt from this requirement, e.g. heads of companies) and a TRP or a multiple-entry national visa. Employment process of TCNs in Lithuania is employer-led and a market test is used in order to evaluate the existing shortage, i.e. an employer wishing to recruit a TCN registers a vacancy in a territorial labour exchange one month before the submission of the application to issue a work permit. A work permit is issued for a maximum of 2 years period. At the same time a TCN may apply to a consular post abroad for the issuance of a TRP or alternatively a TCN can apply for a multiple-entry national visa after s(he) received a work permit.

**Study:** firstly, a TCN student must be enrolled into a higher education institution in Lithuania and only then apply to a consular post abroad for the issuance of the multiple-entry national visa or TRP. National visa allows a student to stay for up to one year. To prolong stay, a student needs to apply for the TRP while legally residing in the country.

**Asylum seekers:** an application for asylum can be lodged at a border crossing point, the Foreigners' Registration Centre (FRC), at a territorial migration service. These institutions interview the alien, take his/her documents and travel tickets, biometric data and forward all documents to the MD to take a decision. During examination of an application for asylum, an alien usually is provided with accommodation at the FRC. The application for asylum is examined within 3 months or extended up to 6 months.

**Legal residence:** If a TCN wishes to reside in Lithuania (s)he needs to apply for a TRP. The grounds and conditions for the issuance of a TRP are specified by the Law on the Legal Status of Aliens (LLSA). A TRP must be replaced yearly (exemptions apply for refugees, persons of Lithuania descent or persons who retained the right to the Lithuanian citizenship – they receive a PRP for 5 years). After uninterrupted residence for the last five years, a TCN may be issued a PRP for a period of 5 years. A TCN applying for the PRP needs to pass an examination in the state language and in the basic principles of the Constitution (some groups are exempt from this requirement).

**Access to Labour market:** Access to labour market for TCNs is regulated and restricted. Only certain categories of TCNs can access the labour market. Workers can work for the period indicated in the work permit but cannot change employer. Students can work from the second year of studies for no more than 20 hours per week, but need to obtain a work permit. Family members of a TCN with a TRP can access the labour market with no restrictions. Refugees can also access the labour market with no restrictions. Asylum seekers have no right to access the labour market.

## **Malta**

Third-country nationals must upon entry have a valid passport, a valid visa, provide documents showing the purpose and conditions of their visit prior to entry in Malta, show that they have sufficient means to support themselves during their stay, have not been prohibited to enter through an alert on the Schengen Information System (SIS), and are not a threat to public policy, international security, public health or the international relation of any Member State. The Principal Immigration Officer has the power to grant leave and entry and remain in Malta to any person arriving for a period of up to three months.

Admission is only permitted to third-country nationals who are in possession of a valid travel document (passport) or recognized equivalent travel document; in possession of documents substantiating the purpose and the conditions of the planned visit, and have sufficient means of support; in possession of valid entry or transit visa if required; not prohibited to enter through an alert on SIS; not considered to be a threat to public policy, national security or international relations. If any one of the aforementioned conditions are not met, the third-country national may be denied entry by the border authorities.

Third-country nationals who enter and apply for asylum are not removed, but are allowed to remain pending a final decision on their asylum application. Residence permits are issued to third-country nationals who have been authorized to reside for a specific purpose. Residence permits are issued for a validity of maximum one year unless the individual is an exempt person or a long-term resident.

Third-country nationals wishing to seek employment are required to submit an application form requesting the issue of an employment license to the relevant authorities before he/she is due to undertake employment in Malta. Third-country nationals will only be granted an employment license in circumstances where no suitable EU citizen is available to fill the vacancy. Refugees and persons enjoying subsidiary status have a full right to work and are issued with a permit automatically.

## **Netherlands**

To be able to enter the Netherlands, immigrants are required to hold a valid border-crossing document, with a visa where required. Visas are to be acquired at diplomatic representations and in certain cases at the border. Asylum applicants have to submit their application in person at the Dutch external border (sea port or airport) or at one of the three application centres of the Immigration and Naturalisation Service (IND).

Admission on the grounds of both migration and asylum is assessed by the IND. All residing foreign nationals need to have a residence document. For immigrants both temporary and permanent residence permits are generally issued according to the following main categories: family reunification and family; adoption and foster children; re-entry; work; study; Council Directive 2004/114/EC; exchange programmes; working holidays; au pairs; medical treatment; medical emergency situations; family members; victims or witnesses of human trafficking. Asylum applicants may be eligible for a temporary residence permit. If the IND decides positively on an application for asylum, the applicant will be given a temporary residence permit (for five years max.) in the first instance. If the individual still needs protection after five years, he or she may be eligible for a permanent residence permit. Holders of residence permits are entitled to accommodation in a municipality of their choice as well as training, social security benefits and study grants. They will also be entitled to family reunification subject to certain conditions.

Holders of residence permits are allowed to have paid employment. To be able to work in the Netherlands, employment migrants will be expected to have a residence permit and a work permit. A work permit is valid for up to three years. Highly skilled migrants, under the High Skilled Migrants Scheme, with a residence permit do not need a work permit.

Asylum applicants will be able to gain access to the labour market six months after the date on which the asylum procedure starts.

### **Poland**

A foreigner may be granted international protection in Poland through refugee status, subsidiary protection, tolerated stay, asylum and temporary protection. Applications are assessed by the Office for Foreigners.

A foreigner may cross the border and stay on the territory of Poland if he/she is a holder of a valid travel document and a valid visa. A foreigner may be issued a uniform (residence, up to three months, or transit) or national visa (three months to one year). A residence permit for a fixed period longer than three months may be granted, if justified. Permits are issued by local authorities but an application may be made to, and issued by, the competent voivode, via the Polish consul in the country of origin. Other types of residence permits include the permit to settle, issued to children of a foreigner holding a permit, spouses of Polish citizens, or persons having resided for at least 10 years on the territory. Long-term EC residence permits may be granted to foreigners residing legally / continuously for 5 years provided that they have sufficient means to support themselves and their family members

Holders of refugee, subsidiary protection and tolerated stay statuses are entitled to legal residence.

Migrants may carry out work in Poland if s/he has been issued a work permit (holders of a permit to settle, a long-term EC resident's residence permit and the Card of the Pole, and their family members, are exempted from this requirement). Citizens of neighbouring states (Ukraine, Belarus and Russia) as well as Georgia and Moldova may work in Poland without a permit for six months within a period of 12 months. Holders of refugee, subsidiary protection and tolerated stay statuses (and their family members) benefit from free access to the labour market. Asylum applicants may work if a decision has not been reached after six months.

### **Portugal**

Apart from the role played by consular posts in the process of granting visas, the Immigration and Border Service (SEF) is directly responsible for the procedures of entry. Consular visas include stopover visas, short-term visas, temporary stay visas and residence visas. Foreign citizens must hold a recognised travel document which is valid for longer than the intended duration of their stay, except in the case of re-entry. It is a condition for entry that the foreign citizen possesses sufficient means of subsistence for the period of stay and for return. Asylum applicants must submit their application to the SEF or any other police authority. In such cases, the police authority sends the asylum request to the SEF within a period of forty-eight hours, and the application for asylum must be processed within a period of 60 days, extendable for up to 180 days. Experts can be consulted, and the Portuguese Council for Refugees (CPR) can add reports or information to the case file, and obtain information about the case during this time.

For admission, a temporary stay visa allows the holder to enter for various purposes: a) medical treatment; b) the transfer of citizens of states party to the World Trade Organisation (WTO), for the purpose of providing services or professional training; c) to engage in a temporary professional activity; d) scientific activities, e.g. to teach higher education or engage in a highly skilled activity; e) to engage in a sporting activity; f) to remain for periods exceeding three months in order to fulfil international commitments made within the scope of the WTO; and g) accompanying family members undergoing medical treatment.

A residence visa allows the holder to enter in order to apply for a residence permit. This visa is valid for two entries and allows the holder to remain for four months. There are six different residence visas, according to the intended purpose: a) engaging in a subordinate professional activity; b) engaging in freelance professional activities or for entrepreneur immigrants; c) research or highly qualified activities; d) studies, student exchanges, professional internships or voluntary activities; e) for mobility of students enrolled in higher education; f) family reunions. A residence visa does not in itself confer the status of resident. A temporary residence permit is valid for a period of one year, renewable for successive periods of two years and must be renewed when there is a change in conditions. A permanent residence permit has an unlimited validity. Recognised refugees are granted a residence permit which is valid for five years and renewable.

Access to the labour market is permitted by a single document which simultaneously legitimises stay. This document can comprise a residence permit or a temporary stay visa, the latter intended for stays of limited duration. A foreign national must have a work contract and be enrolled in the social security system. Asylum applicants who have been issued a provisional residence permit can access the labour market after the period between the submission of the application and a decision as to whether the application is admissible.

### **Slovak Republic**

Granting visas and accepting applications for residence permits is the competence of the Ministry of Foreign Affairs. Granting residence permits, registering residence as well as detecting and preventing illegal migration is overseen by the Ministry of the Interior. As for entry procedures, the legislation distinguishes between temporary residence permit and permanent residence permit. The missions abroad review tourist visa applications and receive applications for residence permits. Applications can be filed also directly in the country. There are no specific entry requirements for asylum applicants - applicants remain under the care of the Migration Office who also reviews the applications. A decision must be given within three months.

A temporary residence permit is principally granted for a period exceeding 90 days. The reasons for a permit include: employment, business, study, family reunification, duties as a member of civilian units of the armed forces, special activity including e.g. lecturing, art, and sports, research and development, status of a Slovak living abroad and a status of a person with a long term residence in another member state. Temporary residence is also a residence on the basis of a Blue Card. A permanent residence permit is first issued for five years, where after it can be renewed for an unlimited period. Additionally, an alien may apply for tolerated stay for specific purposes defined by law. There are no fixed conditions regarding integration, but it can be included as a factor in decisions to extend residence permits.

Access to the labour market consists of two steps: granting a work permit and subsequently a temporary residence permit for the purpose of employment. A work permit is not required if the foreigner holds a permanent residence permit, a temporary residence permit for the purpose of a family reunification for more than 12 months or for study. A work permit and a temporary residence permit for the purpose of employment may only be applied for the specific activity for which it was granted. Asylum applicants who have not received a decision within one year do not require a work permit. Persons granted asylum or subsidiary protection have access to employment without a permit.

### **Spain**

The entry of third-country nationals takes place via border crossing points established for that purpose. It is a requirement to hold a valid passport or travel document, a valid visa where required, and other documentation justifying purpose and conditions for stay. There



are two basic situations by which aliens can be present in Spain: short-term stay or residence, according to article 29 of the Organic Law 4/2000. Short-term stay shall be construed as remaining in Spanish territory for a period of time not exceeding 90 days, and those admitted for study purposes, student exchange, non-working practices or voluntary service. In the residence situations are, amongst others, those who are legally present in Spain for working reasons, family reunification or non-work residence, and all of the foregoing is without prejudice to the situations established on the aforementioned Law 12/2009 of 30 October 2009, regarding those granted international protection.

Admission criteria for migration are primarily related to the labour market. Work permits for employees require that employment is obtained via a general scheme, a Collective Management of Recruitment in the Country of Origin (annual prevision of a hard-to-fill jobs list) or job search visa. Work permits for self-employed workers require certification that the third-country national holds the relevant professional qualifications or has the resources necessary for job creation. Refugees are entitled to a long-term residence and work permit. A provisional residence or stay permit - valid for up to six months, but renewable - is granted to asylum seekers during the application process. A work permit may be granted after that. Asylum applicants and refugees are entitled to access social programmes.

Legal residence includes the following phases: a) temporary residence, whose duration in general is one year for the initial permit and 2 years in case of renewal, with different validity periods for other situations of temporary residence (specially concerning family reunification residence), and b) long-term residence, after 5 years residence in Spain or fulfilling certain legal conditions, whose holders shall have an aliens' identity card with a validity period of 5 years, renewable.

## **Sweden**

If a person seeks asylum at the border, the Police transfers the case to the Migration Board. Most, however, seek asylum after entering the country at a Migration Board office. Here, the investigation of the case begins with an interview of the applicant in order to investigate the applicant's identity and determine whether any other country is responsible for examining the application for asylum. If it proves that a complete asylum investigation must be performed, public counsel is arranged for the asylum seeker. As a main principle entry permits must be arranged before entry to Sweden. Once the mission abroad has performed the investigation, the case is transferred to the Migration Board for decision. Upon special authorisation, the missions abroad may take the decisions in certain cases, such as residence permits for certain students and employees.

The decision on a granting a residence permit in an asylum case must specify the reasons on which the decision was based. Thereafter, the applicant is informed of the decision at a Migration Board Reception Unit. People who have been granted residence permits on the grounds of family connections or comparable have the same right to introduction in their home municipality as those who have been granted legal residence for protective reasons, but on a different legal basis (the Education Act and Social Services Act, since they cover everyone staying in the municipality).

Persons who wish to work in Sweden must have an offer of employment from an employer in Sweden. Other requirements include inter alia that terms of employment must be in parity with a Swedish collective agreement or customary terms in the occupation or sector, and that the job must have been advertised in Sweden and the EU. In general, a work permit is required for asylum seekers to work in Sweden. The work permit is normally valid until a residence permit has been granted or the asylum seeker leaves the country. Since 2008, asylum seekers whose applications have been rejected may also apply for a work permit.

## United Kingdom

For migration, prior entry clearance is required for visa nationals and visitors for more than six months, granted by an Entry Clearance Officer. Non-visa nationals, staying for six months or less also require entry clearance. At the border, all arrivals are seen by a UK Border Agency officer. Visitor categories include: general visitor (e.g. tourist), family visitor, business visitor, sports, entertainer and special visitor (e.g. children, private medical patients). Requirements must be met and stay is generally for up to six months. The UK Points-Based System (PBS) consolidates approximately 80 existing work and study application routes into five tiers: highly skilled migrants (Tier 1); skilled migrants with a job offer (Tier 2); low-skilled workers (Tier 3, currently suspended); students (Tier 4); and youth mobility and temporary workers (Tier 5). Points are scored against a range of attributes (e.g. age, qualifications and previous earnings), English language ability and available maintenance. Applicants in Tiers 2, 4 and 5 must provide a Certificate of Sponsorship. Asylum applications can be made at point of entry or in-country to the UK Border Agency. The asylum process begins with a screening interview, which determines the processing route. A single case owner deals with every aspect of the claim after the screening to conclusion. The outcome may be a Grant of Asylum, Humanitarian Protection, Discretionary Leave or Refusal. Refused applicants have a right of appeal. An asylum applicant can apply for a Judicial Review of his/her case at any point in the process.

In relation to legal residence, the main routes for settlement include family, most worker routes under Tier 1 and Tier 2 of the PBS, third-country nationals who have formed a relationship with an EU national and individuals granted settlement before entering. There is generally no right to settlement for Tier 5 visa holders. A person either recognised as a refugee or given Humanitarian Protection receives a residence permit for five years, and following a period of five years' continuous residence it is possible to apply for Residency or Indefinite Leave to Remain. All applicants are required to have passed courses in English and life in the UK. British citizenship is one of six different forms of British nationality. Only British citizens have an automatic right to live in the UK and to apply for a passport.

The PBS ensures that entry into the UK (for purposes other than visiting) and labour market participation are highly interlinked, and under Tiers 1, 2 and 5, entry is dependent on employability or being employed. The PBS is the only route via which third-country nationals can extend their stay beyond the length of time attached to their current immigration status. Asylum applicants do not have permission to work while awaiting a decision on their claim; however, there is an exception for those who have been awaiting a first instance decision for more than 12 months.

## 6.7 Selected Environmental Policies

Till to date, European Union has played a crucial role in controlling the environmental degradation at national and global level, EU commission proposed/ implemented various policies in the past at various levels, these policies are related to controlling the GHGs, protect various biodiversity losses, conserving ecosystem, control the extreme events, and also helped the policy makers and general public to understand the seriousness of the climate changes.

**Climate change:** EU is the first major group which started Kyoto Protocol for climate control. Current EU policy is committed to reduce 20% below the 1990 level target set at Kyoto Conference. Within EU several mitigation policies were undertaken, The revised EU Emissions Trading System (EU ETS) is more transparent than earlier and annual binding national targets are set for the emissions those were not covered by the EU ETS; Increasing the share of renewable energy sources in the energy mix; such as wind, solar and biomass, to 20% by 2020; Creating a legal framework for the safe and environmentally-sound use of carbon capture and storage (CCS) technologies; Imposing the restriction fuel suppliers

to reduce greenhouse gas emissions from the fuel production chain by 6% by 2020. European Climate Change Programme (ECCP) is started, which is dealing with several policies and measures in relation to climate change. New road transportation policies are imposing binding targets and trying to control the emissions from new vehicles.

**Biodiversity:** European Commission have identified and have taken initial steps to restore/protect the biodiversity and ecosystem services. EU countries committed to halt the loss of biodiversity and the degradation of ecosystem services and restore them by year 2020 or less (DG Environment, 2012). The main of these new policies are<sup>66</sup>

- Conserving and restoring nature;
- Maintaining and enhancing ecosystems and their services;
- Ensuring the sustainability of agriculture, forestry and fisheries;
- Combating invasive alien species; and,
- Addressing the global biodiversity crisis.

**Land Use: Common Agricultural Policy** is the EU's policy for agriculture and rural development, incl. water issues.

- EEA Land use demand for land in Europe is high. Food and biomass production, housing, infrastructure and recreation all compete for space, with impacts on our climate, biodiversity and ecosystem services. In a recent assessment, the European Environment Agency (EEA) analyses land use change in Europe, concluding that we need an integrated policy approach based on reliable data to balance sectoral demands and manage land sustainably.
- The land use assessment published as a part of the EEA's flagship report The European environment – state and outlook 2010 (EEA 2010) covers 36 European countries and a total area of 5.42 million km<sup>2</sup>.
- It shows that the spread of urban areas and transport infrastructure has been accelerating. Artificial land cover increased by 3.4 % in Europe in the period 2000–2006, by far the largest proportional increase in all land use categories.
- Contrastingly, farmland is decreasing in terms of area but is often managed more intensively, partly due to growing demand for bio-energy crops. Wetlands and biodiversity-rich natural and semi-natural areas also continue to decline, although at a slower rate than observed in the period 1990–2000.
- Land use changes in Europe have significant environmental implications, including polluting soil and water, and releasing carbon dioxide and other greenhouse gases. Landscape fragmentation and habitat destruction exert strong pressures on biodiversity.
- Decisions about land use involve trade-offs between diverse sectoral interests, including industry, transport, mining, agriculture and forestry. Managing these trade-offs in a way that maximises society's wellbeing — both today and in the years ahead — requires an integrated policy approach incorporating environmental considerations.
- Of course, designing and implementing an integrated policy approach is impossible without accurate information, including accessible data on land cover and analysis of land use changes. The EEA provides a range of tools for this purpose.

Water management:

<sup>66</sup> [http://ec.europa.eu/environment/pubs/pdf/biodiversity/Biodiversity%20and%20Jobs\\_final%20report.pdf](http://ec.europa.eu/environment/pubs/pdf/biodiversity/Biodiversity%20and%20Jobs_final%20report.pdf)

- Common Agricultural Policy is the EU's policy for agriculture and rural development, incl. water issues.
- Common Fisheries Policy regulates fisheries.
- Sewage Sludge Directive (1986) regulates the use of sewage sludge in agriculture.
- Nitrates Directive (1991) regulates pollution through agricultural sources.
- Urban Waste Water Directive (1991) regulates pollution through private and certain industrial originators.
- Drinking Water Directive (1998) concerns the quality of water intended for human consumption.
- Water Framework Directive (2000) expands the scope to all waters (including ground and surface water), demands achievement of "good status" of all waters by set deadlines, requires water management based on river-basins, sets out a combined approach of emission limit values and quality standards and asks for new price incentives and public participation.
- Groundwater Directive (2006) complements the Water Framework Directive by setting up environmental objectives of good groundwater quantitative and chemical status, as well as ensuring continuity to the Directive 80/68/EEC on the protection of groundwater against pollution caused by dangerous substances.
- Bathing Water Directive (2006) lays down provisions for bathing water quality.
- Floods Directive (2007) aims to reduce and manage the risks of floods.
- Integrated Maritime Policy (2007) covers cross-cutting human activities centred on the sea.
- Marine Strategy Framework Directive (2008) is the environmental pillar of the Integrated Maritime Policy. It aims at the protection of the marine environment and natural resources and creates a framework for the sustainable use of our marine waters.
- A Blueprint to Safeguard Europe's Water Resources (COM(2012)673) is the water milestone of the 2011 Resource Efficiency Roadmap and guidance to better integrate water objectives into other EU policies.
- Currently, several international organisations are working on the Ocean Acidification (European Science Foundation, 2009).

**Ocean Acidification Network:** A group of international organisation formed as a network/community to provide various data/information and research activities related to ocean acidification, International Geosphere Biosphere Programme (IGBP), the Scientific Committee on Oceanic Research (SCOR), the UNESCO's Intergovernmental Oceanographic Commission (IOC) and the IAEA's Marine Environment Laboratories (MEL).

- The EU FP7 Integrated Project **European Project on Ocean Acidification** (EPOCA) started a blog<sup>67</sup>, which provides the information of the ongoing projects and activities at various levels.
- United Nations Environment Programme (UNEP)s **World Conservation Monitoring Centre** (WCMC), is working at global level<sup>68</sup>.
- To protect oceans, seas and coastal areas, the **International Coral Reef Initiative** (ICRI) has started, this organisation works on the coral reef ecosystems;

<sup>67</sup> [www.oceanacidification.wordpress.com](http://www.oceanacidification.wordpress.com)

<sup>68</sup> [www.unep-wcmc.org/resources/ocean\\_acid\\_promo.aspx](http://www.unep-wcmc.org/resources/ocean_acid_promo.aspx)



estuaries; tropical wetlands, including mangroves; sea-grass beds; and other spawning and nursery areas<sup>69</sup>.

- **Position Analysis:** the **Australian Antarctic Climate and Ecosystems** Cooperative Research Centre is working on the ocean impacts and adaptation issues in relation to CO<sub>2</sub> emissions and climate change<sup>70</sup>.

- **Honolulu Declaration on Ocean Acidification and Reef Management:** Develop a coordinated international network of monitoring stations to map the vulnerability of coastal areas to ocean acidification at scales relevant to managers<sup>71</sup>.

- **Monaco Declaration (2008):** In their Second Symposium on "The Ocean in a High-CO<sub>2</sub> World", October 2008, Monaco, urged for an immediate by policy makers to control CO<sub>2</sub> concentrations to avoid possible widespread and severe damage to marine ecosystems from ocean acidification<sup>72</sup>.

- **Ocean Acidification – US Ocean Carbon and Biogeochemistry Program,** working on several marine ecosystem projects such as ocean acidification; terrestrial/coastal carbon fluxes and exchanges; climate sensitivities of and change in ecosystem structure and associated impacts on biogeochemical cycles; mesopelagic ecological and biogeochemical interactions; benthic-pelagic feedbacks on biogeochemical cycles; ocean carbon uptake and storage; expanding low-oxygen conditions in the coastal and open oceans<sup>73</sup>.

<sup>69</sup> <http://www.icriforum.org/about-icri>

<sup>70</sup> [www.acecrc.org.au/](http://www.acecrc.org.au/)

<sup>71</sup> [cmsdata.iucn.org/downloads/honolulu\\_declaration\\_with\\_appendices.pdf](http://cmsdata.iucn.org/downloads/honolulu_declaration_with_appendices.pdf)

<sup>72</sup> [ioc3.unesco.org/oanet/Symposium2008/MonacoDeclaration.pdf](http://ioc3.unesco.org/oanet/Symposium2008/MonacoDeclaration.pdf)

<sup>73</sup> <http://www.us-ocb.org/>

## 7.- ANNEX II - References

### 7.1 Economic, Research and Innovation Trends and Challenges

Robert Wile (2012); **MEGATRENDS: The 6 'Gamechangers' that will impact the Planet for Decades**, Business Insider, December 2012.  
document (<http://www.businessinsider.com/megatrends-the-6-gamechangers-that-will-change-the-world-in-the-next-decades-2012-12?op=1>)

Stefan Hajkowicz (2012); **Our Future World: Global megatrends that will change the way we live**, CSIRO Global Foresight Project 2010 and updated in 2012.  
Document: <http://www.csiro.au/en/Portals/Partner/Futures/Our-Future-World.aspx>

Jeff Harding (2009); **Economic Megatrends That Will Drive Our Future**, The Daily Capitalist: the unconventional economics wisdom, September 15<sup>th</sup> 2009  
Document: <http://dailycapitalist.com/2009/09/15/economic-megatrends-that-will-drive-our-future/>

Wilhelm Hankel, Robert Isaak (2011); **Megatrends of the Global Economy of Tomorrow**, The World Financial Review.  
document (<http://www.worldfinancialreview.com/?p=499> )

David Gregosz (2012); **Economic Megatrends up to 2020. What can we expect in the forthcoming years**, Analysen & Argumente, Konrad-Adenauer-Stiftung KAS, No.106 August 2012.  
document preview ([http://www.kas.de/wf/doc/kas\\_31798-544-2-30.pdf?120927161750](http://www.kas.de/wf/doc/kas_31798-544-2-30.pdf?120927161750) )

Maxim Pinkovskiy, Xavier Sala-i-Martin (2009); **Parametric Estimations of the World Distribution of Income**. NBER Working Paper No. 15433  
document preview (<http://www.voxeu.org/article/parametric-estimations-world-distribution-income> )

EEA (2010); **SOER 2010. Assessment of Global Megatrends**  
document (<http://www.eea.europa.eu/soer/europe-and-the-world/megatrends> )

Adjiedj Bakas (2008); **MEGATRENDS Europe**, Marshall Cavendish Business/Cyan, 2006 - 271 pages.  
document  
[http://books.google.es/books/about/Megatrends\\_Europe.html?id=SiYVOQAACAAJ&redir\\_esc=y](http://books.google.es/books/about/Megatrends_Europe.html?id=SiYVOQAACAAJ&redir_esc=y)

Wayne Stevens (2007); **The Risks and Opportunities from Globalisation**, New Zealand Treasury Working Paper 07/05.  
document <http://www.treasury.govt.nz/publications/research-policy/wp/2007/07-05/>

Loren Goldner (2005); **Fictitious Capital and the Transition Out of Capitalism**.  
document <http://home.earthlink.net/~lrgoldner/program.html>

Lawson,S., Purushothaman,R. (2003); **Dreaming With BRICs: The Path to 2050**, CEO Confidential Issue 2003/12, Goldman Sachs.  
document: <http://www.goldmansachs.com/ceoconfidential/CEO-2003-12.pdf>

Steve Randy Waldman (2012); **Competitiveness is about capital much more than labor**, interfluidity.com blog entry, 26-Feb-2012  
document: <http://www.interfluidity.com/v2/2968.html>

Jesus Felipe, Utsav Kumar (2012); **Unit Labor Costs in the Eurozone: The Competitiveness Debate Again**, Working Paper 651, Levy Economics Institute, Asian Development Bank

document: [http://www.levyinstitute.org/pubs/wp\\_651.pdf](http://www.levyinstitute.org/pubs/wp_651.pdf)

Heiner Flassbeck (2012); **German Mercantilism and the Failure of the Eurozone**, INET's Berlin Conference

document:

[http://www.youtube.com/watch?list=PLD122A0085E58EA94&feature=player\\_embedded&v=iPFH-yXm9VY](http://www.youtube.com/watch?list=PLD122A0085E58EA94&feature=player_embedded&v=iPFH-yXm9VY)  
<http://yanisvaroufakis.eu/2012/04/21/german-mercantilism-and-the-failure-of-the-eurozone-quest-post-by-heiner-flassbeck/>

Bert Colijn, Bart van Ark (2012); **Despite the Chaos, Europe's Economies are Regaining Competitiveness through Improvements in Unit Labor Cost Performance**, Human Capital Exchange - The Conference Board. July 2012.

document <https://hcexchange.conference-board.org/blog/post.cfm?post=875&blogid=1>

Jonathan Portes (2012); **Recessions and recoveries: a historical perspective**, National Institute of Economic and Social Research. UK. Blog entry. 26 January 2012

document <http://niesr.ac.uk/blog/recessions-and-recoveries-historical-perspective#.UbWsUudgcne>

C.Lapavitsas et al. (2010); **Eurozone Crisis: Beggar Thyself and thy Neighbour**, Research on Money and Finance. RMF occasional report March 2010

document <http://www.researchonmoneyandfinance.org/media/reports/eurocrisis/fullreport.pdf>

Paul Mason. (2011); **Trichet: welcome to my great big fat Euro fiasco**, BBC News. Idle Scrawl Blog entry 7 April 2011

document

[http://www.bbc.co.uk/blogs/newsnight/paulmason/2011/04/trichet\\_welcome\\_to\\_my\\_great\\_bi.html](http://www.bbc.co.uk/blogs/newsnight/paulmason/2011/04/trichet_welcome_to_my_great_bi.html)

ESPON (2012); **ESPON Territorial Scenarios and Visions for Europe 2050 (ET2050)**, Interim Report 1 and Interim Report 2. Mcrit, Politecnico di Milano, S&W, IOM, ULB, HAS, RIKS, WSE, Nordregio, UTH, ISIS, Ersilia. October 2012

document

[http://www.espon.eu/export/sites/default/Documents/Projects/AppliedResearch/ET2050/ET2050\\_Interim\\_Report\\_Final.pdf](http://www.espon.eu/export/sites/default/Documents/Projects/AppliedResearch/ET2050/ET2050_Interim_Report_Final.pdf)

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Z-punkt GmbH (2012); **Megatrends Update**, Z-punkt The Foresight Company, Cologne Germany

US National Intelligence Council (2012), *Global Megatrends 2030: Alternative Worlds*, Office of the Director of National Intelligence, Washington DC, USA

<http://globaltrends2030.files.wordpress.com/2012/11/global-trends-2030-november2012.pdf>

Kubiszewski, I., Costanza, R., Franco, C., Lawn, Ph., Talberth, J., Jackson, T., Aylmer, C. (2013); *Beyond GDP: Measuring and achieving global genuine progress*, Elsevier Ecological Economies 93 (2013) 57-68

Gunter Pauli (2010); *The Blue Economy: a new Report to the Club of Rome*, Paradigm Publications, Taos NM, USA

M.Menon (2011) *Megatrends: Asia Pacific Market Insides*, Frost & Sullivan

<http://frost-apac.com/download/megatrends.pdf>

Berger, H., Nitsch, V. (2010); *The Euro's Effect on Trade Imbalances*, IMF Working Paper, European Department, WP/10/226

Document: <http://www.imf.org/external/pubs/ft/wp/2010/wp10226.pdf>

ECB (2012); *Analysing Government Debt Sustainability in the Euro Area*, ECB monthly bulletin, April 2012

[http://www.ecb.int/pub/pdf/other/art1\\_mb201204en\\_pp55-69en.pdf](http://www.ecb.int/pub/pdf/other/art1_mb201204en_pp55-69en.pdf)

Nassad, N. (2013); *A History of Europe's Debt Crisis and Current Issues*, FXTimes Education blog

<http://www.fxtimes.com/education/history-of-europes-debt-crisis-and-current-issues/>

Brynjolfsson, E., McAfee, A. (2012) *Jobs, Productivity and the Great Decoupling*, The New York Times, The Opinion Pages, December 11th 2012

[http://www.nytimes.com/2012/12/12/opinion/global/jobs-productivity-and-the-great-decoupling.html?\\_r=0](http://www.nytimes.com/2012/12/12/opinion/global/jobs-productivity-and-the-great-decoupling.html?_r=0)

Barslund, M. & Busse, M., 2013. *Time to move North?*, s.l.: CEPS.

Benhabib, J. & Spiegel, M., 2005. *Human capital and technological diffusion*. s.l.: s.n.

Boitier, B., Lancesseur, N. & Zagamé, P., 2013. *Global scenarios for European Socio-Ecological Transition*, s.l.: s.n.

BP, 2012. *Statistical Review of World Energy*, s.l.: s.n.

Chen, V. et al., 2012. *Projecting Global Growth*, s.l.: s.n.

Duval, R. & de la Maissonneuve, C., 2009. *Long-run GDP Growth Framework and Scenarios for the World Economy*, s.l.: s.n.

ECFIN, E. C. - D., 2013. *European Economic Forecast - Spring*, s.l.: s.n.

Fisher-Kowalski, M. et al., 2012. *Socio-Ecological Transitions: Definition, Dynamics and related Global Scenarios*, s.l.: s.n.

Fouré, J., Bénassy-Quéré, A. & Fontagné, L., 2010. *The World economy in 2050: a tentative picture*, s.l.: s.n.

Fouré, J., Bénassy-Quéré, A. & Fontagné, L., 2012. *The Great Shift: Macroeconomic projection for the world economy at 2050 horizon*, s.l.: s.n.

Friedrich Ebert Stiftung, 2013. *Future scenarios for the Eurozone - 15 Perspectives on the Euro crisis*, s.l.: s.n.

IMF, 2013. *World Economic Outlook, April 2013*, s.l.: s.n.

Monan, Z., 2013. *Breaking China's investment addiction*, s.l.: Project Syndicate.

OECD, 2013. *OECD Economic Outlook n°93*, s.l.: s.n.

Roubini, N., 2013. *China's Bad Growth Bet*, s.l.: s.n.

The Conference Board, 2013. *Global Economy Outlook, Update May 2013*, s.l.: s.n.

World Bank, 2013. *World Bank Development Indicators*, s.l.: s.n.



Adalid, R. and Detken, C. (2007) "Liquidity shocks and asset price boom/bust cycles". ECB Working Paper No. 732, February.

Alessandrini, P. and Fratianni, M. (2009) "International monies, special drawing rights, and supranational money", mimeo, June 29.

Alessi, L. and Detken, C. (2009) "Real time" early warning indicators for costly asset price boom/bust cycles: a role for global liquidity". ECB Working Paper No. 1039, March.

Borio C. and Philip Lowe (2002) "Asset prices, financial and monetary stability: exploring the nexus", BIS Working Paper 114.

Carmassi, Jacobo, Daniel Gros and Stefano Micossi (forthcoming) "Causes of financial instability and the remedy: Keep it simple" Journal of Common Market Studies, forthcoming in special issue on the financial crisis.

Chmelar, Ales and Elina Pyykkö (2013) "Household Debt and the Recession The household leverage cycle in the context of the European crisis" ECRI Report, Brussels, May 2013.

Costello, Declan with Alexandr Hobza, Gert Jan Koopman, Kieran Mc Morrow , Gilles Mourre, István P. Székely, "EU reforms to increase potential output", Voxeu.org, 15 July 2009, <http://www.voxeu.org/index.php?q=node/3771>.

De Grauwe Paul (2009) "Keynes' savings paradox, Fisher's Debt Deflation and the Banking Crisis", .Centre for European Policy Studies (CEPS)

Gros, Daniel (2009) "Why Europe will suffer more". CEPS Policy Brief No. 194, 16 July 2009, <http://www.ceps.eu/book/why-europe-will-suffer-more>

Gros, Daniel (2010) "The social cost of capital and the impact of Basel III" presentation to the Group of Experts in Banking Issues (GEBI), Brussels, October 22, 2010 [http://ec.europa.eu/internal\\_market/bank/docs/gebi/gros\\_en.pdf](http://ec.europa.eu/internal_market/bank/docs/gebi/gros_en.pdf)

Minsky, Hyman (2008) "Stabilizing an unstable economy", McGraw Hill.

J. Pisani-Ferry, S. Jean, H. Hauschild, M. Kawai, H. Fan, Y. C. Park (2013) "Deleveraging and global growth", paper based on the Asia Europe Economic Forum conference of 21-22 January 2013 available at <http://www.bruegel.org/publications/publication-detail/publication/778-deleveraging-and-global-growth/>

Sinn, Hans-Werner (2010) "Casino Capitalism: How the Financial Crisis Came About and What Needs to be Done Now" Oxford University Press".

### Scenario Studies

Björn Hacker (2013), *Future Scenarios for the Eurozone 2020*, International Policy Analysis Unit of the Friedrich-Ebert-Stiftung, Berlin <http://www.social-europe.eu/2013/03/future-scenarios-for-the-eurozone/>

Gill Ringland (2011); *Time bomb? The future of Financial Services*, Long Finance, 21st October 2011 [http://www.et2050.eu/et2050\\_library/docs/economy/scenarios/2011\\_finance\\_scenarios.pdf](http://www.et2050.eu/et2050_library/docs/economy/scenarios/2011_finance_scenarios.pdf)

Andrew Atherton (2007); *A future for small business? Prospective scenarios for the development of the economy based on current policy thinking and counterfactual*

reasoning, Lincoln Business School  
<http://eprints.lincoln.ac.uk/528/>

Klaus R. Kunzman (2010); *After the global economic crisis: policy implications for the future of the European territory*, Informationen zur Raumentwicklung. Heft 8.2010.  
[http://www.bbsr.bund.de/cln\\_032/nn\\_1191242/BBSR/EN/Publications/IzR/2010/Abstracts/8\\_Kunzmann.html](http://www.bbsr.bund.de/cln_032/nn_1191242/BBSR/EN/Publications/IzR/2010/Abstracts/8_Kunzmann.html)

ISIS and MCRIT (2010); *Paradigm Shifts Modelling and Innovative Approaches* – PASHMINA, Deliverables D1.1 and D1.2 of PASHMINA project EC 7FP

IGEAT et al (2006); *Spatial scenarios in relation to the ESDP and EU Cohesion Policy*, ESPON 3.2 Project, Luxemburg.  
[http://www.espon.eu/main/Menu\\_Projects/Menu\\_ESPON2006Projects/Menu\\_CoordinatingCrossThematicProjects/scenarios.html](http://www.espon.eu/main/Menu_Projects/Menu_ESPON2006Projects/Menu_CoordinatingCrossThematicProjects/scenarios.html)

Andrew Curry, Tony Hodgson, Rachel Kelnar and Alister Wilson (2006); *Intelligent Infrastructure Futures. The Scenarios – Towards 2055*, Foresight Programme of the Office of Science & Technology of United Kingdom  
[http://www.bis.gov.uk/assets/foresight/docs/intelligent-infrastructure-systems/2055\\_perspective\\_process.pdf](http://www.bis.gov.uk/assets/foresight/docs/intelligent-infrastructure-systems/2055_perspective_process.pdf)

Pim Bilderbeek (2011) *Four Scenarios for Digital Europe in 10 years time*, METISfiles, Bilderbeek Consulting  
<http://www.themetisfiles.com/2011/05/four-scenarios-for-digital-europe-are-we-ready/>

IDC Government Insides and empirica GmbH (2009); *Monitoring e-Skills Demand and Supply in Europe – Current Situation, Scenarios and Future Development Forecasts until 2015*, document prepared for DG ENTR.  
[http://www.eskills-monitor.eu/documents/Meskills%20Scenario%20and%20Foresight%20report\\_final.pdf](http://www.eskills-monitor.eu/documents/Meskills%20Scenario%20and%20Foresight%20report_final.pdf)

UNCTAD (2011); *Review of Maritime Transport 2011, report by the UNCTAD Secretariat* Chapter 1, UN, New York and Geneva 2011.  
[http://unctad.org/en/Docs/rmt2011ch1\\_en.pdf](http://unctad.org/en/Docs/rmt2011ch1_en.pdf)

AIRBUS (2012); *Navigating the Future: Global Market Forecast 2012-2031*, France September 2012  
<http://www.airbus.com/company/market/forecast/>

BOEING (2012); *Current Market Forecast 2013-2032*, Seattle WA, USA  
<http://www.boeing.com/boeing/commercial/cmo/>

## 7.2 Demographic and Societal Trends and Challenges

Abel, G.J., Riosmena, F., Sander, N. (2013). The Future of International Migration. Chapter 7 in: W. Lutz, W. Butz and S. K.C. World Population and Human Capital in the 21st Century. Oxford, Oxford University Press.

Abadan-Unat, N. (1995). Turkish migration to Europe. The Cambridge survey of world migration 279–284.

Adserà, A. (2011). The interplay of employment uncertainty and education in explaining second births in Europe. Demographic Research 25, 513–544.

Alley, D. E., et al. (2010). Can Obesity Account for Cross-National Differences in Life Expectancy Trends? International Differences in Mortality at Older Ages. E. M. Crimmins, S. H. Preston and B. Cohen. Washington, DC, The National Academies Press.

Angelucci, M. (2012). US Border Enforcement and the Net Flow of Mexican Illegal Migration. *Economic Development and Cultural Change* 60, 311 – 357.

Barakat, F. B., Durham, R.E. (2013). Projecting Global Educational Attainment. Chapter 8 in: W. Lutz, W. Butz and S. K.C. World Population and Human Capital in the 21st Century. Oxford, Oxford University Press.

Barro, R.J. and J.W. Lee (2001). "International data on educational attainment: updates and implications". In: *Oxford Economic Papers* 53.3, pp. 541–563. url: <http://oep.oxfordjournals.org/cgi/content/abstract/53/3/541>.

Basten, S., Sobotka, T., Zeman, K. (2013 forthcoming). Future Fertility in Low Fertility Countries. Chapter 3 in: W. Lutz, W. Butz and S. K.C. World Population and Human Capital in the 21st Century. Oxford, Oxford University Press.

Bengs, C. and Schmidt-Thomé, K. (2006). Urban-rural relations in Europe. ESPON 1.1.2 Final report. Brussels: ESPON Monitoring Committee.

Besharov, D.J., Lopez, M. H., Siegel, M. (2013). International Conference News: Trends in Migration and Migration Policy. *Journal of Policy Analysis and Management* 32(3), 655–660.

Billari, F. C., Kohler, H.-P. (2004). Patterns of low and lowest-low fertility in Europe. *Population Studies* 58(2), 161-176.

Bilsborrow, R.E. (1997). International Migration Statistics: Guidelines for Improving Data Collection Systems. International Labour Organization.

Björklund, A., 2006. Does family policy affect fertility? *Journal of Population Economics* 19, 3–24.

Bloom, D. E., Canning, D. (2008). Global demographic change: dimensions and economic significance. *Population and Development Review* 34, 17–51.

Bloom, D.E., D. Canning, and J. Sevilla (2001). Economic Growth and the Demographic Transition, Cambridge: National Bureau Of Economic Research, NBER Working Paper No. 8685.

Bloom, D. E., Canning, D. and Sevilla, J. (2003). The demographic dividend : a new perspective on the economic consequences of population change. Santa Monica: The Rand Corporation.

Boivin, J., Bunting, L., Collins, J.A., Nygren, K.G. (2007). International estimates of infertility prevalence and treatment-seeking: potential need and demand for infertility medical care. *Human Reproduction* 22, 1506–1512.

Bongaarts, J. (2006). "How long will we live?" *Population and Development Review* 32(4): 605-628.

Brezzi, M., Dijkstra, L. and Ruiz, V. (2011). OECD extended regional typology: The economic performance of remote rural regions. OECD Regional Development Working Papers 2011/06, OECD Publishing.

Butler, M. and Beale, C. (1994). Rural-urban continuum codes for Metro and non-Metro counties 1993. ERS Staff Paper 9425. Washington DC: US Department of Agriculture.

Carey, J. R., et al. (1992). "Slowing of mortality rates at older ages in large medfly cohorts." *Science* 258(5081): 457.

Carnes, B. A. and S. J. Olshansky (2007). "A Realist View of Aging, Mortality, and Future Longevity." *Population and Development Review* 33(2): 367-381.

Caselli, G., S. Drefahl, M. Luy, and C. Wegner (2013 forthcoming). Future Mortality in Low Mortality Countries. Chapter 5 in: W. Lutz, W. Butz and S. K.C. World Population and Human Capital in the 21st Century. Oxford, Oxford University Press.

CDC (2011). Assisted reproductive technology success rates 2009. National summary and fertility clinic reports. Center for Disease Control and Prevention, American Society for Reproductive Medicine, Society for Assisted Reproductive Technology, Atlanta.

Champion, T. (2007). Defining "urban": the disappearing urban-rural divide. In: H.S. Geyer (ed.), *International Handbook of Urban Policy*, vol. 1: Continuous global issues. Cheltenham: Edward Elgar, pp. 22-37.

Christensen, K., et al. (2009). "Ageing Populations: The Challenges Ahead." *Lancet* 374(9696): 1196-1208.

Christian Aid (2007). Human tide: the real migration crisis. London: Christian Aid 14.

Clark, X., Hatton, T.J., Williamson, J.G. (2004). What Explains Emigration Out of Latin America? *World Development* 32, 1871-1890.

Clemens, M. (2004). "The Long Walk to School: International education goals in historical perspective". In: Center for Global Development Working Paper 37.

Cohen, J.E., Kravdal, Ø., Keilman, N. (2011). Childbearing impeded education more than education impeded childbearing among Norwegian women. *Proceedings of the National Academy of Sciences of the United States of America* 108, 11830-11835.

Coleman, D. (1993). Contrasting Age Structures of Western Europe and of Eastern Europe and the Former Soviet Union: Demographic Curiosity or Labor Resource? *Population and Development Review* 19, 523-555.

Coleman, D. (2006). Immigration and ethnic change in low-fertility countries: A third demographic transition, *Population and Development Review*, 32(3):401-446.

Coleman, D. (2010). Migration and its consequences in 21st century Europe. *Vienna Yearbook of Population Research* 2009, 1-18.

Cornelius, W.A., Salehyan, I. (2007). Does border enforcement deter unauthorized immigration? The case of Mexican migration to the United States of America. *Regulation & Governance* 1, 139-153.



Coombes, M. (2004). Multiple dimensions of settlement systems: coping with complexity. In: T. Champions and G. Hugo (eds.), *New forms of urbanization: beyond the urban-rural dichotomy*. Aldershot: Ashgate, pp. 307-324.

Coombes, M. and Raybould, S. (2001). Public policy and population distribution: Developing appropriate indicators of settlement patterns. *Environment and Planning C: Government and Policy* 19: 223-248.

Cromartle, J. and Swanson, L. (1996). Defining Metropolitan areas and the rural-urban continuum: a comparison of statistical areas based on county and sub-county geography. ERS Staff Paper no. 9603. Washington, DC: Us Department of Agriculture.

Curtsinger, J. W., et al. (1992). "Demography of genotypes: failure of the limited life-span paradigm in *Drosophila melanogaster*." *Science* 258(5081): 461-463.

Czaika, M., De Haas, Hein (2011). The Effectiveness of Immigration Policies: A Conceptual Review of Empirical Evidence. IMI/DEMIG working paper, International Migration Institute, University of Oxford.

De Beer, J., van der Erf, R., and Huisman, C. (2012). The growth of the working age population: differences between rural and urban regions across Europe. NEUJOBS Working Paper D 8.1.

De Beer, J., Van der Gaag, N., Van der Erf, R., Bauer, R., Fassmann, H., Kupiszewska, D., Kupiszewski, M., Rees, P., Boden, P., Dennett, A., Jasińska, M., Stillwell, J., Wohland, P., De Jong, A., Ter Veer, A. Roto, J., Van Well, L., Heins, F., Bonifazi, C. and Gesano, G (2010). Final Report. The ESPON 2013 Programme, DEMIFER Demographic and migratory flows affecting European regions and cities, Applied Research Project 2013/1/3. [http://www.espon.eu/main/Menu\\_Projects/Menu\\_AppliedResearch/demifer.html](http://www.espon.eu/main/Menu_Projects/Menu_AppliedResearch/demifer.html)

De Giorgi, G., Pellizzari, M. (2009). Welfare migration in Europe. *Labour Economics* 16(4), 353-363.

De Haas, H., Vezzoli, S. (2011). Leaving Matters: The Nature, Evolution and Effects of Emigration Policies. IMI Working Paper 34 (DEMIG Project Paper 4), University of Oxford: International Migration Institute.

De Haas, Hein (2011). The determinants of international migration: Conceptualizing policy, origin and destination effects. Oxford: International Migration Institute, IMI Working Paper.

Deschênes, O. and M. Greenstone (2011). "Climate Change, Mortality, and Adaptation: Evidence from Annual Fluctuations in Weather in the US." *American Economic Journal-Applied Economics* 3(4): 152-185.

Dorbritz, J. (2008). Germany: family diversity with low actual and desired fertility. *Demographic Research* 19, 557-598.

Dijkstra, L. and Poelman, H. (2008). Remote rural regions: how proximity to a city influences the performances of rural regions. *Regional Focus* no. 1.

Easterlin, R.A. (1976). The Conflict between Aspirations and Resources. *Population and Development Review* 2, 417-425.

Ekert-Jaffé, O., Joshi, H., Lynch, K., Mougin, R., Rendall, M.S., Shapiro, D. (2002). Fertility, timing of births and socio-economic status in France and Britain: social policies and occupational polarisation. *Population (English Edition)* 57, 475–507.

ESHRE (2010). ESHRE Capri Workshop Group, Europe the continent with the lowest fertility. *Human Reproduction Update* 16, 590–602.

Esping-Andersen, G. (2009). *The Incomplete Revolution: Adapting Welfare States to Women's New Roles*, 1st ed. Polity Press, Cambridge.

Eurostat (2010). A revised urban-rural typology. In: *Eurostat regional yearbook 2010*. Luxembourg: Publication Office of the European Union, pp.240-253.

Fries, J. F. (1980). "Aging, Natural Death, and the Compression of Morbidity." *The New England Journal of Medicine* 303(3): 130-135.

Gauthier, A.H. (2007). The impact of family policies on fertility in industrialized countries: a review of the literature. *Population Research and Policy Review* 26, 323–346.

Goldstein, J.R., Sobotka, T., Jasilioniene, A. (2009). The End of "Lowest-Low" Fertility? *Population and Development Review* 35, 663–699.

Green, A.G., Green, D.A. (1995). Canadian Immigration Policy: The Effectiveness of the Point System and Other Instruments. *The Canadian Journal of Economics / Revue canadienne d'Economie* 28, 1006–1041.

Grossman, L.C., Kort, D.H., Sauer, M.V. (2012). Managing assisted reproduction in women over the age of 50 years: a clinical update. *Expert Review of Obstetrics & Gynecology* 7, 525–533.

Hackett, C. (2008). *Religion and Fertility in the United States: The Influence of Affiliation, Region and Congregation* (Unpublished PhD-thesis).

Hanushek, E. and D. Kimko (2000). "Schooling, Labor Force Quality, and the Growth of Nations", *The American Economic Review* 90: 1184-1208.

Hatton, T.J. (2004). Seeking asylum in Europe. *Economic Policy* 19, 5–62.

Headey, D.D. and A. Hodge (2009). The Effect of Population Growth on Economic Growth: A Meta-Regression Analysis of the Macroeconomic Literature. *Population and development review* 35 (2), 221-248

Holzer, T., Schneider, G., Widmer, T. (2000). The Impact of Legislative Deterrence Measures on the Number of Asylum Applications in Switzerland (1986-1995). *International Migration Review* 34, 1182–1216.

Hugo, G. (1996). Environmental Concerns and International Migration. *International Migration Review* 30, 105–131.

Hugo, G., Champion, T. and Lattes, A. (2003). Toward a new conceptualization of settlements for demography. *Population and Development Review* 29: 277-297.

Huisman, C., De Beer, J., Van der Erf, R., Van der Gaag, N. and Kupiszewska, D. (2013). Demographic scenarios, 2010-2030. *NEUJOBS Working Paper D10.1*.

Iacovou, M. and A.J. Skew (2011). Household composition across the new Europe: Where do the new Member States fit in? *Demographic Research* 25, 465-490.

Kannisto, V. (1994). Development of oldest-old mortality, 1950-1990: Evidence from 28 developed countries. Odense, Odense University Press.

Kannisto, V., et al. (1994). "Reductions in Mortality at Advanced Ages - Several Decades of Evidence from 27 Countries." *Population and Development Review* 20(4): 793-810.

King, R., Skeldon, R. (2010). "Mind the Gap!" Integrating Approaches to Internal and International Migration. *Journal of Ethnic and Migration Studies* 36, 1619-1646.

King, G. and S. Soneji (2011). "The Future of Death in America." *Demographic Research* 25(1):1-28.

Kohler, H.-P., Billari, F.C., Ortega, J.A. (2002). The Emergence of Lowest-Low Fertility in Europe During the 1990s. *Population and Development Review* 28, 641-680.

Kohler, H.-P., Ortega, J.A. (2002). Tempo-Adjusted Period Parity Progression Measures, Fertility Postponement and Completed Cohort Fertility. *Demographic Research* 6, 91-144.

Kupiszewska, D., Nowok, B. (2008). Comparability of Statistics On International Migration flows In The European Union, in: Willekens, F., Raymer, J. (Eds.), *International Migration in Europe: Data, Models and Estimates*. Wiley, London, England, pp. 41-73.

Kureková, L. (2011). From job search to skill search: political economy of labour migration in Central and Eastern Europe (PhD thesis). Department of International Relations and European Studies, Central European University, Budapest.

Lanzieri, G. (2011). The greying of the baby boomers, a century-long view of ageing in European populations *Statistics in Focus*, 23/2011. Luxembourg: Publications Office of the European Union.

Leridon, H., Slama, R. (2008). The impact of a decline in fecundity and of pregnancy postponement on final number of children and demand for assisted reproduction technology. *Human reproduction* 23, 1312-1319.

Lesthaeghe R. and L. Neidert (2006). "The Second Demographic Transition in the United States: Exception or Textbook Example?" *Population and Development Review* 32 (December): 669-698.

Lindstrom, D.P., Ramírez, A.L. (2010). Pioneers and Followers: Migrant Selectivity and the Development of U.S. Migration Streams in Latin America. *The ANNALS of the American Academy of Political and Social Science* 630, 53-77.

Lopez, A. D., et al. (1995). Moving from description to explanation of adult mortality: issues and approaches. *Adult mortality in developed countries: From description to explanation*. A. D. Lopez, G. Caselli and T. Valkonen. Oxford, Clarendon Press: 3-20.

Lopez, A. D., et al. (1994). "A Descriptive Model of the Cigarette Epidemic in Developed Countries." *Tobacco Control* 3: 242-247.

Lutz, W. (2006). Fertility rates and future population trends: will Europe's birth rate recover or continue to decline? *International Journal of Andrology* 29, 25-33.

Maheshwari, A., Scotland, G., Bell, J., McTavish, A., Hamilton, M., Bhattacharya, S. (2010). Direct health services costs of providing assisted reproduction services in older women. *Fertility and Sterility* 93, 527–536.

Massey, Douglas S., Arango, Joaquin, Hugo, Graeme, Kouaouci, Ali, Pellegrino, Adela, Taylor, J. Edward (1998). *Worlds in motion: Understanding international migration at the end of the millennium*. Oxford University Press, USA.

Matysiak, A., Vignoli, D. (2008). Fertility and women's employment: A meta-analysis. *European Journal of Population* 24, 363–384.

McDonald, P., Moyle, H. (2010). Why do English-speaking countries have relatively high fertility? *Journal of Population Research* 27, 247–273.

Mehta, N. K. and V. Chang (2011). "Secular Declines in the Association Between Obesity and Mortality in the United States." *Population and Development Review* 37(3): 435-451.

Meslé, F. (2004). "Mortality in Central and Eastern Europe: long-term trends and recent upturns." *Demographic Research Special Collection 2. Determinants of Diverging Trends in Mortality*(3): 46-70.

Mills, M., Rindfuss, R.R., McDonald, P., te Velde, E.R., Force, E.R.S.T., 2011. Why do people postpone parenthood? Reasons and social policy incentives. *Human Reproduction Update* 17, 848–860.

Myrskylä, M., Margolis, R., 2012. Happiness: before and after the kids (Working Paper No. 013), MPIDR working paper. Max Planck Institute for Demographic Research, Rostock, Germany.

Mayda, A.M., 2010. International migration: a panel data analysis of the determinants of bilateral flows. *Journal of population economics* 23, 1249–1274.

Neels, K., De Wachter, D. (2010). Postponement and recuperation of Belgian fertility: how are they related to rising female educational attainment? *Vienna Yearbook of Population Research* 8, 77–106.

Neels, K., Theunynck, Z., Wood, J. (2013). Economic recession and first births in Europe: recession-induced postponement and recuperation of fertility in 14 European countries between 1970 and 2005. *Int J Public Health* 58, 43–55.

OECD (2010). *OECD regional typology*. OECD Directorate for Public Governance and Territorial Development.

OECD (2011a). *Doing Better for Families*. OECD Publishing.

OECD (2011b). *How's Life? Measuring Well-being*. Paris: OECD Publishing.

OECD (2013). *Education at a Glance 2013*. Paris: OECD Publishing.

Oeppen, J. and J. W. Vaupel (2002). "Broken limits to life expectancy." *Science* 296(5570): 1029-1031.

Olshansky, S. J. (2005). "Projecting the Future of US Health and Longevity." *Health Affairs* 24(6): W5R86-W85R89.



Olshansky, S. J., et al. (1990). "In Search of Methuselah - Estimating the Upper Limits to Human Longevity." *Science* 250(4981): 634-640.

Olshansky, S. J., et al. (2001). "Prospects for human longevity." *Science* 291(5508): 1491-1492.

Ortega, F., Peri, G. (2009). The Causes and Effects of International Migrations: Evidence from OECD Countries 1980-2005 (Working Paper No. 14833). National Bureau of Economic Research.

Özden, C., Parsons, C.R., Schiff, M., Walmsley, T.L. (2011). Where on Earth is Everybody? The Evolution of Global Bilateral Migration 1960–2000. *The World Bank Economic Review* 25, 12–56.

Paldam, M. (2003). Economic freedom and the success of the Asian tigers: an essay on controversy. *European Journal of Political Economy* 19, 453–477.

Pampel, F. C. (2002). "Cigarette Use and the Narrowing Sex Differential in Mortality." *Population and Development Review* 28(1): 77-104.

Pampel, F. C. (2005). "Forecasting Sex Differences in Mortality in High Income Nations: The Contribution of Smoking." *Demographic Research* 13: 455-484.

Piore, M.J. (1980). *Birds of Passage: Migrant Labor and Industrial Societies*, New Ed. ed. Cambridge University Press, Cambridge, United Kingdom.

Pla, A., Beaumel, C. (2012). Bilan démographique 2011: la fécondité reste élevé. Insee première.

Preston, S. H. and A. Stokes (2011). "Contribution of Obesity to International Differences in Life Expectancy." *American Journal of Public Health* 101(11): 2137-2143.

Preston, S. H. and H. Wang (2006). "Sex Mortality Differences in the United States: The Role of Cohort Smoking Patterns." *Demography* 43(4): 631-646.

Prskawetz, A., Bloom, D.E., Lutz, W. (2008). Population aging, human capital accumulation, and productivity growth. Population Council.

Rau, R., et al. (2008). "Continued Reductions in Mortality at Advanced Ages." *Population and Development Review* 34(4): 747-768.

Rees, P. (2011). The dynamics of populations large and small: processes, models and futures. Chapter 1, pp.1-28 in Stillwell, J. and Clarke, M. (ed.) *Population Dynamics and Projection Methods. Understanding Population Trends and Processes*, Vol.4. Dordrecht: Springer.

Rendall, M.S., Ekert-Jaffé, O., Joshi, H., Lynch, K., Mougin, R. (2009). Universal versus economically polarized change in age at first birth: a French-British comparison. *Population and Development Review* 35, 89–115.

Rindfuss, R.R., Morgan, S.P., Swicegood, G. (1988). *First Births in America*. University of California Press, London.

Robine, J. M. and Y. Saito (2003). "Survival Beyond Age 100: The Case of Japan." *Population and Development Review* 29: 208-228.

Schmidt, L., Sobotka, T., Bentzen, J.G., Nyboe Andersen, A. (2012). Demographic and medical consequences of the postponement of parenthood. *Hum. Reprod. Update* 18, 29-43.

Sewell, William H. and Robert M. Hauser (1980). "The Wisconsin Longitudinal Study of Social and Psychological Factors in Aspirations and Achievements." Pp. 59-99 in *Research in Sociology and Education*, vol.1, edited by A. C. Kerckhoff. Greenwich, CN: JAI Press.

Shkolnikov, V.M., Andreev, E.M., Houle, R., Vaupel, J.W., 2007. The Concentration of Reproduction in Cohorts of Women in Europe and the United States. *Population and Development Review* 33, 67-100.

Shkolnikov, V. M., et al. (2011). "Steep increase in best-practice cohort life expectancy." *Population and Development Review* 37(3): 419-434.

Sierra, F., et al. (2009). "Prospects for Life Span Extension." *Annual Review of Medicine* 60: 457-469.

Sobotka, T. (2008). The rising importance of migrants for childbearing in Europe. *Demographic Research* 19, 225-248.

Sobotka, T. (2012). Fertility in Austria, Germany and Switzerland: Is there a Common Pattern? *Comparative Population Studies-Zeitschrift für Bevölkerungswissenschaft* 36.

Sobotka, T., Kohler, H.-P., Billari, F.C. (2007). The increase in late childbearing in Europe, Japan and the United States. Presented at the Annual Meeting of the Population Association of America, New York.

Sobotka, T., Skirbekk, V., Philipov, D. (2011). Economic Recession and Fertility in the Developed World. *Population and Development Review* 37, 267-306.

Spilimbergo, A., Hanson, G.H. (1999). Illegal Immigration, Border Enforcement, and Relative Wages: Evidence from Apprehensions at the U.S.-Mexico Border. *American Economic Review* 89, 1337-1357.

Tesching, K. (2012). Education and Fertility: Dynamic Interrelations Between Women's Educational Level, Educational Field and Fertility in Sweden. Stockholm: Acta Universitatis Stockholmiensis.

Testa, M.R. (2012). Family Sizes in Europe: Evidence from the 2011 Eurobarometer Survey (European Demographic Research Papers No. 2). Vienna Institute of Demography, Vienna.

Testa, M.R., Cavalli, L., Rosina, A. (2011). Couples' childbearing behaviour in Italy: which of the partners is leading it? *Vienna Yearbook of Population Research* 9, 157-178.

Thielemann, E. (2005). Does Policy Matter? On Governments' Attempts to Control Unwanted Migration (SSRN Scholarly Paper No. ID 495631). Social Science Research Network, Rochester, NY.

Thonneau, P., Marchand, S., Tallec, A., Ferial, M.-L., Ducot, B., Lansac, J., Lopes, P., Tabaste, J.-M., Spira, A. (1991). Incidence and main causes of infertility in a resident

population (1 850 000) of three French regions (1988–1989). *Human Reproduction* 6, 811–816.

Toner, J.P., Grainger, D.A., Frazier, L.M. (2002). Clinical outcomes among recipients of donated eggs: an analysis of the U.S. national experience, 1996–1998. *Fertility and Sterility* 78, 1038–1045.

Tromans, N., Natamba, E., Jefferies, J. (2009). Have women born outside the UK driven the rise in UK births since 2001? *Population Trends* Summer 2009, 28–42.

Tsimbos, C. (2008). Immigrant and native fertility in Greece: New estimates and population prospects (2005–2025). *Population Review* 47, 67–84.

UNHCR (2012). *Statistical Yearbook 2011: Ten Years of Statistics*. New York.

United Nations (2000). Millennium Development Goals Indicators [WWW Document]. URL <http://mdgs.un.org/unsd/mdg/Host.aspx?Content=Indicators/OfficialList.htm>

United Nations (2009). *World Population Monitoring. Focusing on Population Distribution, Urbanization, Internal Migration and Development. A Concise Report*. New York: United Nations.

United Nations (2011). *World population prospects, the 2010 revision*. New York, United Nations Department of International Economic and Social Affairs.

United Nations (2012). Department of Economic and Social Affairs, *World Urbanization Prospects: The 2011 Revision*, New York: United Nations.

Vallin, J. and F. Meslé (2004). "Convergences and divergences in mortality. A new approach to health transition." *Demographic Research Special Collection 2. Determinants of Diverging Trends in Mortality*(2): 11–44.

Vallin, J. and F. Meslé (2009). "The Segmented Trend Line of Highest Life Expectancies." *Population and Development Review* 35(1): 159–187.

Van de Kaa, D. (1987). Europe's second demographic transition. *Population Bulletin*, 42(1), 64p.

Van der Erf, R., de Beer, J. and van der Gaag, N. (2010). Report on effects of demographic and migratory flows on European regions. Final Report. Annex 1, The ESPON 2013 Programme, DEMIFER Demographic and migratory flows affecting European regions and cities, Applied Research Project 2013/1/3. Online: see de Beer et al. 2010.

Van der Gaag, N., J. de Beer, R. van der Erf and C. Huisman (2012), Migration, urbanization and competitiveness: What regions are most vulnerable to the consequences of a declining working age population? NEUJOBS Working Paper 8.2

Van der Gaag, N., L. van Wissen, E. van Imhoff, and C. Huisman (1999). National and Regional Population Trends in the European Union, 1975–2025. Eurostat Working Paper nr. 3/1999/E/n°8.

Van Imhoff, E., A. Kuijsten, P. Hooimeijer and L. van Wissen (1995). *Household Demography and Household Modeling*. New York: Plenum Press.

Van Nimwegen, N., Van der Erf, R. (2010). Europe at the Crossroads: Demographic Challenges and International Migration. *Journal of Ethnic and Migration Studies* 36 (9): 1359-1379.

Van Poppel, F.W.A., Derosas, R. (2006). Religion and the Decline of Fertility in the Western World. Springer.

Vaupel, J. W. (2010). "Biodemography of Human Ageing." *Nature* 464(7288): 536-542.

Zlotnik, H. (2004). Population growth and international migration. *International migration: Prospects and policies in a global market* 13-34.

## 7.3 Environmental Trends and Challenges

Amann, M (2012), TSAP-2012 Baseline: Health and Environmental Impacts. International Institute for Applied Systems Analysis IIASA

Arto, I., Genty, A., Rueda-Cantuche, J.M., Villanueva, A., Andreoni, A. (2012). *Global Resources Use and Pollution, Volume 1 / Production, Consumption and Trade (1995-2008)*, European Commission, Joint Research Centre, Institute for Prospective Technological Studies.

Barbier, E. B. and Markandya, A. (2013). *A New Blueprint for a Green Economy*, Routledge.

Battarbee, R. W., Kernan, M., Livingstone, D. M., Nickus, U., Verdonschot, P., Hering, D., Moss, B., Wright, R. F., Evans, C. D., Grimalt, J. O., Johnson, R. K., Maltby, E., Linstead, C. and Skeffington, R. A. (2008) Freshwater ecosystem responses to climate change: the Euro-limaps project. In: *The Water Framework Directive Ecological and Chemical Status Monitoring*, 313-354. John Wiley & Sons Ltd, Chichester, United Kingdom.

Cardinale, B. J., Duffy, J. E., Gonzalez, A., Hooper, D. U., Perrings, C., Venail, P., and others (2012). Biodiversity loss and its impact on humanity. *Nature*, 486(7401), 59-67.

Dai, A. (2011). Drought under global warming: a review. *Wiley Interdisciplinary Reviews: Climate Change*, 2(1), 45-65.

Dale, M. (2012). Meta-analysis of non-renewable energy estimates. *Energy policy*, 43, 102-122.

den Biggelaar, C., Lal, R., Wiebe, K., & Breneman, V. (2003a). The global impact of soil erosion on productivity: I: Absolute and relative erosion-induced yield losses. *Advances in agronomy*, 81, 1-48.

den Biggelaar, C., Lal, R., Wiebe, K., Eswaran, H., Breneman, V., & Reich, P. (2003b). The Global Impact Of Soil Erosion On Productivity II: Effects On Crop Yields And Production Over Time. *Advances in Agronomy*, 81, 49-95.

Doney, S. C., Fabry, V. J., Feely, R. A., and Kleypas, J. A. (2009). Ocean acidification: the other CO<sub>2</sub> problem. *Marine Science*, 1.

EC (European Commission) (9). Regions 2020. The climate change challenge for European regions



EC (European Commission) (2011). Global Europe by 2050. Directorate-General for Research and Innovation, [http://ec.europa.eu/research/social-sciences/pdf/global-europe-2050-report\\_en.pdf](http://ec.europa.eu/research/social-sciences/pdf/global-europe-2050-report_en.pdf)

EC (European Commission) (2011). Roadmap to a Resource Efficient Europe, Brussels.

EC (European Commission) (2011). A Roadmap for moving to a competitive low carbon economy in 2050

EC (European Commission) (2011). Our life insurance, our natural capital: an EU biodiversity strategy to 2020

EC (European Commission) (2012). Energy roadmap 2050, Belgium.

EC (European Commission) (2012). Report on the Review of the European Water Scarcity and Droughts Policy, Brussels.

EC (European Commission) (2012). Eurostat year book, Brussels.

EC (2012). Euromines, DG Environment Stakeholder consultation on the Resource Efficiency Roadmap Euromines positions the extractive industries with respect to Resource Efficiency.

European Environment Agency (2010). The European environment – state and outlook 2010, <http://www.eea.europa.eu/soer>

European Environment Agency (2010). EU 2010 biodiversity baseline, EEA Technical Reprot, Denmark.

European Environment Agency (2010). Assessing Biodiversity in Europe. Office for the Official Publications of the European Communities, Europe.

European Environment Agency (2011). Analysing and managing urban growth. <http://www.eea.europa.eu/articles/analysing-and-managing-urban-growth>

European Environment Agency (2012). Climate change, impacts and vulnerability in Europe 2012, An indicator-based report, EEA Report, Denmark.

European Environment Agency (2012) Towards efficient use of water resources in Europe (EEA Report No 1/2012). European Environment Agency, Copenhagen. <http://www.eea.europa.eu/publications/towards-efficient-use-ofwater>.

Feuchtmayr, H., Moran, R., Hatton, K., Connor, L., Heyes, T., Moss, B., Harvey, I. and Atkinson, D. (2009). Global warming and eutrophication: effects on water chemistry and autotrophic communities in experimental hypertrophic shallow lake mesocosms. *Journal of Applied Ecology* 46, 713–723.

Food and Agriculture Organization of the United Nations. (2010). Global Forest Resources Assessment 2010: Main Report. Food and Agriculture Organization of the United Nations. <http://www.fao.org/docrep/013/i1757e/i1757e.pdf>

Fraser, A. I., Harrod, T. R. and Haygarth, P. M. (1999). The effect of rainfall intensity on soil erosion and particulate phosphorus transfer from arable soils. *Water Science and Technology* 39, 41–45.

Futter, M. N., Helliwell, R. C., Hutchins, M. and Aherne, J. (2009). Modelling the effects of changing climate and nitrogen deposition on nitrate dynamics in a Scottish mountain catchment. *Hydrology Research* 40, 153–166.

GEA (2012). Global Energy Assessment - Toward a Sustainable Future, Cambridge University Press, Cambridge, UK and New York, NY, USA and the International Institute for Applied Systems Analysis, Laxenburg, Austria.

International Energy Agency (2010). Energy technology perspectives - scenarios & strategies to 2050, OECD/IEA, Paris.

IPCC (2007). The Regional Impacts of Climate Change: An Assessment of Vulnerability. Cambridge University Press, UK.

IUCN (2007). Temple, H.J. and Terry, A. (compilers). The Status and Distribution of European Mammals, Office for Official Publications of the European Communities, Luxembourg. [http://ec.europa.eu/environment/nature/conservation/species/redlist/downloads/European\\_mammals.pdf](http://ec.europa.eu/environment/nature/conservation/species/redlist/downloads/European_mammals.pdf).

IUCN (2009a). Temple, H.J. and Cox, N.A. European Red List of Amphibians, Office for Official Publications of the European Communities, Luxembourg. [http://ec.europa.eu/environment/nature/conservation/species/redlist/downloads/European\\_amphibians.pdf](http://ec.europa.eu/environment/nature/conservation/species/redlist/downloads/European_amphibians.pdf).

IUCN, 2010a. IUCN Red List of threatened species. [www.iucnredlist.org/documents/summarystatistics/2009RL\\_Stats\\_Table\\_1.pdf](http://www.iucnredlist.org/documents/summarystatistics/2009RL_Stats_Table_1.pdf) and [www.iucnredlist.org/documents/summarystatistics/2010\\_1RL\\_Stats\\_Table\\_1.pdf](http://www.iucnredlist.org/documents/summarystatistics/2010_1RL_Stats_Table_1.pdf).

Markandya, A., González-Eguino, M., Criqui, P. and Mima, S. (2011). Low Climate Stabilisation under Diverse Growth and Convergence Scenarios. Working Papers 2011-08, BC3.

Markandya, A., Devillers, P., Barange, M., Buisman, C., Cassingena-Harper, J., Fritz, P., Iglesias, A., Le Dain, A.Y., Joyce, A., Kauppi, L., Knudsen, L., Ludden, J., Miedzinski, M., Ozdemiroglu, E. and Vereijken, T. (2012). DG Research and Innovation Dir I-ENV (Unit I-1: Horizontal) Group of Experts "State of the art and forward-looking analysis of environmental research and innovation", Common Strategic Framework for Research and Innovation.

McNeil, B. I. and Matear, R. J. (2008) Southern Ocean acidification: A tipping point at 450-ppm atmospheric CO<sub>2</sub>. Proceedings of the National Academy of Sciences 105(48), 18 860–18 864.

OECD (2012). Environmental Outlook to 2050: The Consequences of Inaction, <http://www.oecd.org/environment/indicators-modellingoutlooks/oecdenvironmentaloutlookto2050theconsequencesofinaction.htm>

Pimm, S. L., and Raven, P. (2000). Biodiversity: extinction by numbers. Nature, 403(6772), 843-845.

Rockström, J., Steffen, W., Noone, K., Persson, A., Chapin, F. S., Lambin, E. F., et al. (2009). A safe operating space for humanity. Nature, 461(7263), 472-475.

The Royal Society (2005). Ocean acidification due to increasing atmospheric carbon dioxide. ISBN 0 85403 617 2. 1 – 68.

Solomon S, Qin D, Manning M, Chen Z, Marquis M, et al. (2007). Climate Change 2007: The Physical Science Basis: Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. New York: Cambridge Univ. Press.

Steinacher, M., Joos, F., Frölicher, T. L., Plattner, G.-K. and Doney, S. C. (2009). Imminent ocean acidification in the Arctic projected with the NCAR global coupled carbon cycle-climate model. *Biogeosciences* 6(4), 515–533.

Turley, C. (2005). The other CO<sub>2</sub> problem. openDemocracy. [http://www.acamedia.info/sciences/sciliterature/globalw/reference/carol\\_turley.html](http://www.acamedia.info/sciences/sciliterature/globalw/reference/carol_turley.html)

Weitzman, M. (2009). Additive Damages, Fat-Tailed Climate Dynamics, and Uncertain Discounting. *Economics: The Open-Access, Open-Assessment E-Journal*, 5(2009-39). URL <http://dx.doi.org/10.5018/economics-ejournal.ja.2009-39>.

UN (2012a). MDG report 2012. We can end poverty 2015. <http://mdgs.un.org/unsd/mdg/Resources/Static/Products/Progress2012/English2012.pdf>

UN (2012b). World Urbanization Prospects, the 2011 Revision. The Population Division of the Department of Economic and Social Affairs of the United Nations [http://esa.un.org/unpd/wup/pdf/WUP2011\\_Highlights.pdf](http://esa.un.org/unpd/wup/pdf/WUP2011_Highlights.pdf), March 2012.

UN (2012c). Rio+20: The Future We Want. 2012.

UNEP (2012). Global Environment Outlook 5, <http://www.unep.org/geo/geo5.asp>

UNICEF and World Health Organization (2012). Progress on Drinking Water and Sanitation: 2012 Update, <http://www.unicef.org/media/files/JMPReport2012.pdf>

Whitehead, P. G., Wilby, R. L., Battarbee, R. W., Kernan, M. and Wade, A. J. (2009). A review of the potential impacts of climate change on surface water quality. *Hydrological Sciences Journal-Journal des Sciences Hydrologiques* 54, 101–123.

WWAP (World Water Assessment Programme) (2012). The United Nations World Water Development Report 4: Managing Water under Uncertainty and Risk. Paris, UNESCO, <http://www.unesco.org/new/en/naturalsciences/environment/water/wwap/wwdr/wwdr4-2012/>.

### Other useful references

Amanatidou, E., Poppe, R., and Techler, T. (2012). Drivers, Trends and Grand Challenges in Security, EFP Brief no. 248, European Foresight Platform, [www.foresight-platform.eu](http://www.foresight-platform.eu)

Anthoff, D., S. Rose, R.S.J. Tol and S. Waldhoff (2011), Regional and sectoral estimates of the social cost of carbon: an application of FUND, ESRI working paper no. 375, Dublin

Baumol, W. J. (1967). Macroeconomics of unbalanced growth: the anatomy of urban crisis. *The American Economic Review*, 57(3), 415-426.

Belt, R. van de, D. Piljic and H. Stegeman, Economische stagnatie als vooruitzicht, Me Judice, (2012). <http://www.mejudice.nl/artikelen/detail/economische-stagnatie-als-vooruitzicht> .

Biermann, F. (2012). Greening the United Nations Charter: World Politics in the Anthropocene. *Environment: Science and Policy for Sustainable Development*, 54(3), 6-17.

Blinder, A.S. (2005). Fear of off-shoring, CEPS Working Paper no. 119.

Borenstein, S. (2013). Natural disasters hit Okla. all too frequently. <https://hazdoc.colorado.edu/handle/10590/420>.

Bruyn, S. de, Markowska, A., de Jong, F., Blom, M. 2009, Resource productivity, competitiveness and environmental policies, CE Delft

Caldeira, K., & Wickett, M. E. (2003). Oceanography: anthropogenic carbon and ocean pH. *Nature*, 425(6956), 365-365.

Cambridge Econometrics, SERI and Wuppertal Institute (2011). Sustainability Scenarios for a Resource Efficient Europe, final report submitted to the European Commission (DG Environment), June 2011

De Mooij, R.A. and P.J.G Tang (2004), Four futures of Europe, CPB, Den Haag, <http://www.cpb.nl/en/publication/four-futures-europe>.

Deininger, K. W., & Byerlee, D. (2011). Rising global interest in farmland: can it yield sustainable and equitable benefits? . World Bank Publications.

de Jong, J., & Weeda, E. (2007). Europe, the EU and its 2050 energy storylines. Clingendael International Energy Programme.

Distelkamp, M., Meyer, B., Meyer, M. (2010). Quantitative and qualitative Effects of a forced Resource Efficiency Strategy. Summary Report of Task 5 within the framework of the "Material Efficiency and Resource Conservation" (MaRes) Project

Dole, R., Hoerling, M., Perlwitz, J., Eischeid, J., Pegion, P., Zhang, T., et al. (2011). Was there a basis for anticipating the 2010 Russian heat wave? . *Geophysical Research Letters*, 38(6).

European Commission. (2006). World Energy Technology Outlook 2050–WETO H2. Office for Official Publications of the European Communities, Brüssel.

European Commission (2011). Global Europe by 2050. Directorate-General for Research and Innovation, [http://ec.europa.eu/research/social-sciences/pdf/global-europe-2050-report\\_en.pdf](http://ec.europa.eu/research/social-sciences/pdf/global-europe-2050-report_en.pdf)

European Environment Agency (2009), Assessment of ground-level ozone in EEA member countries, with a focus on long-term trends

European Environment Agency (2010), The European environment – state and outlook 2010, EFP Brief no. 227, [www.foresight-platform.eu](http://www.foresight-platform.eu)

Goldewijk, K. K. (2001). Estimating global land use change over the past 300 years: the HYDE database. *Global Biogeochemical Cycles*, 15(2), 417-433.

Hallegatte, S. (2011). How economic growth and rational decisions can make disaster losses grow faster than wealth. World Bank Policy Research Working Paper Series, Vol.

Hawksworth, J. (2006). The world in 2050: implications of global growth for carbon emissions and climate change policy. PricewaterhouseCoopers.

Intergovernmental Panel on Climate Change (2000). IPCC Special Report: emissions scenarios, summary for policymakers, WMO/UNEP, [www.ipcc.ch](http://www.ipcc.ch).



IPCC (2007). Fourth Assessment Report of the Intergovernmental Panel on Climate Change.

IPCC special report on land use, land use change and forestry. (2000).

Jonkhoff, W., O. Koops, R.A.A. van der Krogt, G.H.P. Oude Essink and E. Rietveld (2008), Economische effecten van klimaatverandering – overstrooming en verzilting in scenario's, modellen en cases, TNO-rapport, Delft.

Living Planet Index Report (2012). Biodiversity, biocapacity and better choices, WWF International.

Loh, J., Green, R. E., Ricketts, T., Lamoreux, J., Jenkins, M., Kapos, V., & Randers, J. (2005). The Living Planet Index: using species population time series to track trends in biodiversity. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 360(1454), 289-295.

Loh, J., Collen, B., McRae, L., Deinet, S., De Palma, A., Manley, R., & Baillie, J. E. M. (2010). The Living Planet Index.

Markandya, A and Dale N. (2012). The Montreal Protocol and the Green Economy: Assessing the contributions and co-benefits of multilateral environmental agreement, UNEP.

McRae, L., Collen, B., Deinet, S., Hill, P., Loh, J., Baillie, J. E. M., & Price, V. (2012). The Living Planet Index.

MCRIT (2010), Forecast and quantitative scenarios, as evolution of the qualitative, PASHMINA deliverable 1.2, FP7, MCRIT, [www.pashmina-project.eu](http://www.pashmina-project.eu)

Meehl, G., Stocker, T., Collins, W., Friedlingstein, P., Gaye, A., Gregory, J., Kitoh, A., Knutti, R., Murphy, J., Noda, A., Raper, S., Watterson, I., Weaver, A., and Zhao, Z.-C. (2007). Global climate projections. *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. pages 747–846. URL <http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-chapter10.pdf>.

Mendelsohn, R. (2009). Climate change and economic growth, Commission on Growth and Development, working paper no. 60, World Bank, Washington DC Mendelsohn, R., A. Dinar and L. Williams, The distributional impact of climate change on rich and poor countries, *Environment and Development Economics* 11: 159–178

Miraglia, M., Marvin, H. J. P., Kleter, G. A., Battilani, P., Brera, C., Coni, E., et al. (2009). Climate change and food safety: an emerging issue with special focus on Europe. *Food and Chemical Toxicology*, 47(5), 1009-1021.

Nakicenovic, N., Alcamo, J., Davis, G., de Vries, B., Fenhann, J., Gaffin, S. et al. (2000). Special report on emissions scenarios: a special report of Working Group III of the Intergovernmental Panel on Climate Change (No. PNNL-SA-39650). Pacific Northwest National Laboratory, Richland, WA (US), Environmental Molecular Sciences Laboratory (US).

Nordhaus, W.D. (2010), *Economic Aspects of Global Warming in a Post-Copenhagen Environment*, Yale University, New Haven.

OECD 2012. Environmental Outlook to 2050: The Consequences of Inaction, <http://www.oecd.org/environment/indicators-modelling-outlooks/oecdenvironmentaloutlookto2050theconsequencesofinaction.htm>

OXFAM 2011. Oxfam Annual Report 2010-2011.

Pearce, D.W. (2003), The social cost of carbon and its policy implications, University College en Imperial College, London.

Pearce, D. W., Markandya, A., & Barbier, E. B. (1989). Blueprint for a green economy. Earthscan/James & James.

Peterson, T. C., Stott, P. A., and Herring, S. (2012). Explaining extreme events of 2011 from a climate perspective. Bulletin of the American Meteorological Society, 93(7), 1041-1067.

Pimm, S. L., Russell, G. J., Gittleman, J. L., & Brooks, T. M. (1995). The future of biodiversity. SCIENCE-NEW YORK THEN WASHINGTON-, 347-347.

Racherla PN, Adams PJ (2009) US ozone air quality under changing climate and anthropogenic emissions. Environ Sci Technol 43(3):571-577.

Raven, J., Caldeira, K., Elderfield, H., Hoegh-Guldberg, O., Liss, P., Riebesell, U., and others (2005). Ocean acidification due to increasing atmospheric carbon dioxide. The Royal Society.

Resilient people, resilient planet: a future worth choosing. 2012. UN secretary-general's high level panel on global sustainability.

Richardson, K., Steffen, W., Schellnhuber, H. J., Alcamo, J., Barker, T., Kammen, D. M., and others (2009). Synthesis report. In Climate Change Congress Global Risks, Challenges & Decisions. Copenhagen (Vol. 10, p. 12).

Robine, J. M., Cheung, S. L. K., Le Roy, S., Van Oyen, H., Griffiths, C., Michel, J. P., & Herrmann, F. R. (2008). Death toll exceeded 70,000 in Europe during the summer of 2003. Comptes rendus biologies, 331(2), 171-178.

Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F. S., Lambin, E. F., et al. (2009). A safe operating space for humanity. Nature, 461(7263), 472-475.

Rounsevell, M., et al. 2006. A coherent set of future land use change scenarios for Europe. Agriculture, Ecosystems and Environment, vol 114 (1), 57-68.

S. Poncet (2006), The long term growth prospects of the world economy: horizon 2050, CEPII, working paper 2006-16, Paris

Safina, C., & Klinger, D. H. (2008). Collapse of bluefin tuna in the western Atlantic. Conservation Biology, 22(2), 243-246.

Sachs, J. (2008). Common wealth: economics for a crowded planet. Penguin.

Schiermeier, Q. (2011). Increased flood risk linked to global warming. Nature, 470(7334), 316-316.

Sessa, C., A. Ricci, R. Enei and G. Giuffrè (2010), Qualitative scenarios, deliverable 1.1, PASHMINA, FP7, EC, ISIS, Rome, [www.pashmina-project.eu](http://www.pashmina-project.eu)

Shah, Anup. "Loss of Biodiversity and Extinctions." Global Issues. 03 Mar. 2013. Web. 06 Jun. 2013. <<http://www.globalissues.org/article/171/loss-of-biodiversity-and-extinctions>>.

Shell (2008), Shell energy scenarios to 2050, Den Haag

Spangenberg, J. H., Bondeau, A., Carter, T. R., Fronzek, S., Jaeger, J., Jylhä, K and others (2012). Scenarios for investigating risks to biodiversity. *Global Ecology and Biogeography*, 21(1), 5-18.

Solomon S, Qin D, Manning M, Chen Z, Marquis M, et al. (2007). *Climate Change 2007: The Physical Science Basis: Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. New York: Cambridge Univ. Press

Stern (2007), *Stern Review - the economics of climate change*, HM Treasury, London

Stott, P. A., Stone, D. A., & Allen, M. R. (2004). Human contribution to the European heatwave of 2003. *Nature*, 432(7017), 610-614.

Suddick, E. C., Whitney, P., Townsend, A. R., & Davidson, E. A. (2012). The role of nitrogen in climate change and the impacts of nitrogen-climate interactions in the United States: foreword to thematic issue. *Biogeochemistry*, 1-10.

TEEB (2013). *The economics of ecosystems and Biodiversity for Water and wet lands*, UNEP, [http://www.unep.org/pdf/TEEB\\_Water&Wetlands\\_Report\\_2013.pdf](http://www.unep.org/pdf/TEEB_Water&Wetlands_Report_2013.pdf)

Tol, R.S.J. (2002), *Estimates of the damage costs of climate change*, *Environmental and Resource Economics*, vol. 21, blz. 47-73

Tol, R.S.J. (2006), *The Stern Review of the economics of climate change: a comment*, *Economic and Social Research Institute*, Hamburg

Tol, R.S.J. (2008), *The Social Cost of Carbon: trends, outliers and catastrophes*, *Economics open access journal*, vol. 2, 2008-25.

UN (2012), *Global Environment Outlook 5, part 1: State and trends of the environment; chapter 16: Scenarios and sustainability transformation*, UNEP, <http://www.unep.org/geo/>

UNCSD (UN Commission for Sustainable Development) 2012 'The Future We Want', Zero Draft of the Rio+20 Outcome document, UNCSD, New York

UNEP 2012a. *Global Environment Outlook 5*, <http://www.unep.org/geo/geo5.asp>

UNEP, 2011. *Keeping track of our changing environment*. [http://www.unep.org/geo/pdfs/keeping\\_track.pdf](http://www.unep.org/geo/pdfs/keeping_track.pdf)

UNEP, 2012b. *21 Issues for the 21st Century: Result of the UNEP Foresight Process on Emerging Environmental Issues*. Alcamo, J., Leonard, S.A. (Eds.). United Nations Environment Programme (UNEP), Nairobi, Kenya, 56pp.

Van Drunen, M. A., van't Klooster, S. A., & Berkhout, F. (2011). Bounding the future: The use of scenarios in assessing climate change impacts. *Futures*, 43(4), 488-496.

Ward, K. (2011), *The world in 2050 – quantifying the shift in the global economy*, HSBC, London

Weel, B. ter, A. van der Horst and G. Gelauff (2010), The Netherlands of 2040, no. 88, Centraal Planbureau, Den Haag

Weel, B. ter, A. van der Horst and G. Gelauff (2010), The Netherlands of 2040, no. 88, Centraal Planbureau, Den Haag.

Weitzman, M. (2010). GHG Targets as Insurance Against catastrophic Climate Change. URL <http://www.economics.harvard.edu/faculty/weitzman/files/1A1A.InsuranceCatastrophicRisks.pdf>.

Weitzman, M. (2011). Fat-Tailed Uncertainty in the Economics of Catastrophic Climate Change. Review of Environmental and Economic Policy, 2(5): 275–292. URL <http://reep.oxfordjournals.org/content/5/2/275.abstract>.

WRR (2010), Uit zicht – toekomst verkennen met beleid, verkenningen nr. 24, Amsterdam University Press.

Wu S, Mickley LJ, Leibensperger EM, Jacob DJ, Rind D, Streets DG (2008). Effects of 2000–2050 global change on ozone air quality in the United States. J Geophys Res. 113(D6):D06302. doi:10.1029/2007jd008917

WWF Living Planet Report 2012.

Zee, F.A. van der, Manshanden, W.J.J., Brandes, F., and Jonkhoff, W. (2007), Delocalisation of EU industry – delocalization and the challenge of structural adjustment. A review of policy options, European Parliament Committee on Industry, Research and Energy (ITRE).

## 7.4 Global Governance Trends and Challenges

### Experts/references

Barnett, T.P.M. The Pentagon's New Map. War and Peace in the Twenty-First Century, New York: Berkley Books, 2004

Chalmers, D., European Union Public Law, Cambridge: Cambridge University Press, 2010

Dijk, J. Van, The World of Crime. Breaking the Silens on Problems of Security, Justice, and Development Across the World, Sage: New York, 2008

European Commission, The World in 2025. Rising Asia and socio-ecological transition, European Commission: Luxembourg, 2009

European Commission, Global Europe 2050, European Commission: Luxembourg, 2012

European Foresight Platform, 2<sup>nd</sup> EFP Mapping Report: Security Futures, 2012

Finland Futures Research Centre, Surfing the sixth wave. Exploring the next 40 years of global change, Turku: University of Turku, 2012

Friedman, G., The Next Decade. Where We've Been... and Where We're Going, New York: Doubleday, 2011

Friedman, T., The World is Flat. The Globalized World in the Twenty-First Century, London: Penguin Books, 2007



Government Office for Science, Foresight: Migration and Global Environmental Change. Future Scenarios, London: the Government Office for Science, 2011 ([www.foresight.gov.uk](http://www.foresight.gov.uk))

Kagan, R., The Return of History and the End of Dreams, New York: Alfred A. Knopf, 2008

National Intelligence Council, Global Trends 2030: Alternative Worlds, [www.dni.gov/nic/globaltrends](http://www.dni.gov/nic/globaltrends)

OECD, Future Global Shocks. Improving Risk Governance, Paris: OECD Publishing, 2011

Stelzenmüller, C., Transatlantic trends. Key Findings 2012, <http://trends.gmfus.org/>

Stevens, B., P.A. Schieb, The future of families to 2030: an overview of projections, policy challenges and policy options, in: OECD, The Future of Families to 2030, Paris: OECD Publishing, 2012

World Economic Forum, India and the World: Scenarios to 2025, Cologny/Geneva, 2005

World Economic Forum, China and the World: Scenarios to 2025, Cologny/Geneva, 2006

World Economic Forum, The Gulf Cooperation Council (GCC) countries and the World: Scenarios to 2025, Cologny/Geneva: World Economic Forum, 2007

World Economic Forum, The Future of the Global Financial System. A Near-Term Outlook and Long-Term Scenarios, Cologny/Geneva, 2009

World Economic Forum, The Future of the Global Financial System. Navigating the Challenges Ahead, Cologny/Geneva, 2010

World Economic Forum, Scenarios for the Mediterranean Region, Cologny/Geneva, 2011

World Economic Forum, Euro, Dollar, Yuan Uncertainties. Scenarios on the Future of the International Monetary System, Cologny/Geneva, 2012

World Economic Forum, Global Risks 2013, Cologny/Geneva, 2013a

World Economic Forum, Scenarios for the Russian Federation, Cologny/Geneva, 2013b

World Economic Forum, The Future Role of Civil Society, Cologny/Geneva, 2013c

Zakaria, F., The Post-American World – Release 2.0, New York: Wiley, 2012

## 7.5 Territorial Development Trends and Challenges

### Basic references

"| FuturICT FET Flagship." 2013. Accessed April 24. <http://www.futurict.eu/the-project>.

Adams, John. 2001. "The Social Consequences of Hypermobility."

Aerts, Jeroen. 2009. "Adaptation Cost in the Netherlands: Climate Change and Flood Risk Management." Climate Research Netherlands - Research Highlights. <http://www.climate-research-netherlands.nl/research-highlights>.

AG2020. 2009. "Foresight Analysis for World Agricultural Markets (2020) and Europe." <http://www.ag2020.eu/>.

Aramberri, Julio, and Chunmei Liang. 2012. "The Chinese Gaze: Imaging Europe in Travel Magazines." *Journal of China Tourism Research* 8 (3): 284–301. doi:10.1080/19388160.2012.704248.

Argophilia. 2012. "EU 'Seas' Rosy Future for Maritime: Ecologist Not Convinced." <http://www.argophilia.com/news/eu-seas/26924/>.

Barbé, Esther. 2004. "The Evolution of CFSP Institutions: Where Does Democratic Accountability Stand?" *The International Spectator: Italian Journal of International Affairs* 39 (2): 47–60.

Barca, Fabrizio. 2009. "An Agenda for a Reformed Cohesion Policy – A Place-based Approach to Meeting European Union Challenges and Expectations."

Bauman, Zygmunt. 2012. "Times of Interregnum." *Ethics & Global Politics* 5 (1) (February 27). doi:10.3402/egp.v5i1.17200. <http://www.ethicsandglobalpolitics.net/index.php/egp/article/view/17200>.

Beyond the horizon. 2006. "Beyond the Horizon - Anticipating Future and Emerging Informaion Society Technologies."

"Big Data, Big Impact: New Possibilities for International Development." 2013. *Big Data, Big Impact: New Possibilities for International Development | World Economic Forum*. Accessed April 23. <http://www.weforum.org/reports/big-data-big-impact-new-possibilities-international-development>.

Böhme, Kai, Philippe Doucet, Tomasz Komornicki, Jacek Zaucha, and Dariusz Świątek. 2011. "How to Strengthen the Territorial Dimension of 'Europe 2020' and EU Cohesion Policy. Report Prepared at the Request of the Polish EU Presidency." Polish Ministry of Regional Development. Warsaw.

Carrera, Sergio, Leonhard Den Hertog, and Joanna Parkin. 2012. "EU Migration Policy in the Wake of the Arab Spring: What Prospects for EU-Southern Mediterranean Relations?" SSRN Scholarly Paper ID 2135477. Rochester, NY: Social Science Research Network. <http://papers.ssrn.com/abstract=2135477>.

CCDA, and SICA. 2010. "Regional Strategy on Climate Change. Executive Document." [www.unccd2012.org/content/documents/regionalstrategyelsalvador.pdf](http://www.unccd2012.org/content/documents/regionalstrategyelsalvador.pdf).

CNN. 2008. "Sinking Island's Nationals Seek New Home." <http://edition.cnn.com/2008/WORLD/asiapcf/11/11/maldives.president/index.html>.

———. 2013. "Cyprus Is Sitting on a Natural Gas Gold Mine." *CNNMoney*. <http://money.cnn.com/2013/03/21/news/economy/cyprus-natural-gas/index.html>.

Coates Ulrichsen, Kristian. 2011. "Repositioning the GCC States in the Changing Global Order." *Journal of Arabian Studies* 1 (2): 231–247. doi:10.1080/21534764.2011.630894.

COM(2010) 2020. 2010. "Communication from the Commission to the Council, EUROPE 2020, A Strategy for Smart, Sustainable and Inclusive Growth. Luxembourg: Office for Official Publications of the European Communities." <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:2020:FIN:EN:PDF>.

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. 2013. "An EU Strategy on Adaptation to Climate Change."

Cullmann, and Geppert. 2012. "Socio-economic Trends and New Territorial Dynamics in the European Union: Convergence and Agglomeration." *NEUJOBS Working Paper*.

Dijkstra, L. 2009. "Metropolitan Regions in the EU." *Regional Focus* 01.

EFMN, and European Commission. 2009. *Final Report Monitoring Foresight Activities in Europe and the Rest of the World*. Luxembourg: Office for Official Publications of the European Communities.

Ernst & Young. 2011. "Tracking Global Trends. How Six Key Developments Are Shaping the Business World." <http://www.ey.com/GL/en/Issues/Business-environment/Six-global-trends-shaping-the-business-world---Rapid-technology-innovation-creates-a-smart--mobile-world>.

ESPON. forthcoming. "ESPON Synthesis Report 2". ESPON.

———. 2010a. "METROBORDER - Cross-border Polycentric Metropolitan Regions."

———. 2010b. "The Case for Agglomeration Economies in Europe". Final report.

———. 2011. "ESPON Climate. Climate Change and Territorial Effects on Regions and Local Economies."

———. 2012a. "ET2050. Territorial Scenarios and Visions for Europe". Interim Report.

———. 2012b. "ULYSSES. Using Applied Research Results from ESPON as a Yardstick for Cross-border Spatial Development Planning."

———. 2012c. "The Attractiveness of European Regions and Cities for Residents and Visitors". Inception report.

———. 2012d. "Emergence of Growth Poles. Network in South-East of Europe". Inception report.

———. 2012e. "Europe's Neighbourhood from a Territorial Perspective". Report from the ESPON Internal Seminar 2012 Cyprus.

———. 2012f. "TANGO - Territorial Approaches for New Governance". Interim report.

ESPON TIGER. 2012. "Territorial Impact of Globalization for Europe and Its Regions. Draft Final Report."

EU Observer. 2009. "EU Assigns Funds and Staff to 'Eastern Partnership'." <http://euobserver.com/foreign/27824>.

European Commission. 2009. "Regions 2020. The Climate Change Challenge for European Regions." [http://ec.europa.eu/regional\\_policy/sources/docoffic/working/regions2020/pdf/regions2020\\_climat.pdf](http://ec.europa.eu/regional_policy/sources/docoffic/working/regions2020/pdf/regions2020_climat.pdf).

———. 2012a. "Research and Innovation Strategies for Smart Specialisation." [http://ec.europa.eu/regional\\_policy/sources/docgener/informat/2014/smart\\_specialisation\\_en.pdf](http://ec.europa.eu/regional_policy/sources/docgener/informat/2014/smart_specialisation_en.pdf).

- . 2012b. "Blue Growth. Opportunities for Marine and Maritime Sustainable Growth."
- . 2013. "Guide to Social Innovation." [http://ec.europa.eu/regional\\_policy/sources/docgener/presenta/social\\_innovation/social\\_innovation\\_2013.pdf](http://ec.europa.eu/regional_policy/sources/docgener/presenta/social_innovation/social_innovation_2013.pdf).
- European Dialogue. 2012. "Eastern Partnership Policy." <http://www.eurodialogue.org/Eastern-Partnership-Policy>.
- Eurostat. 2013. "Harmonised Unemployment Rate by Sex." <http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&language=en&pcode=teilm020&tableSelection=1&plugin=1>.
- EUROSTAT. 2009. "Development of Econometric Methods to Evaluate the Gender Pay Gap Using Structure of Earnings Survey Data."
- Faludi A. 2012. "Multi-Level (Territorial) Governance: Three Criticisms." *Plann. Theory Prac. Planning Theory and Practice* 13 (2): 197–211.
- FAO. 2011. "The State of the World's Land and Water Resources for Food and Agriculture - Managing Systems at Risk". Rome.
- Flockhart T. 2010. "Europeanization or EU-ization? The Transfer of European Norms Across Time and Space." *J. Common Mark. Stud. Journal of Common Market Studies* 48 (4): 787–810.
- Goldman Sachs. 2013. "Transformation of the World Economy." March. <http://www.goldmansachs.com/our-thinking/focus-on/growth-markets/dataviz/index.html>.
- Gössling, Stefan, Magnus Bredberg, Anna Randow, Elin Sandström, and Patrik Svensson. 2006. "Tourist Perceptions of Climate Change: A Study of International Tourists in Zanzibar." *Current Issues in Tourism* 9 (4-5): 419–435.
- Gössling, Stefan, Jean-Paul Ceron, Ghislan Dubois, and Michael C. Hall. 2009. "Hypermobile Travellers." In *Climate Change and Aviation - Issues, Challenges and Solutions*, edited by Stefan Gössling and Paul Upham. London. [http://www.gci.org.uk/Documents/Aviation-and-Climate-Change\\_.pdf](http://www.gci.org.uk/Documents/Aviation-and-Climate-Change_.pdf).
- Greeks Gutenberg Google: Ivar Gjørup at TEDxAthens 2012. 2013. [http://www.youtube.com/watch?v=PGLb-DZyhy0&feature=youtube\\_gdata\\_player](http://www.youtube.com/watch?v=PGLb-DZyhy0&feature=youtube_gdata_player).
- "Hållbar Stad." 2013. *Hållbar Stad*. Accessed March 15. <http://www.hallbarstad.se/>.
- Hollanders, Léon, and Roman. 2012. "Regional Innovation Scoreboard 2012."
- Hubacek, Klaus, Dabo Guan, and Anamika Barua. 2007. "Changing Lifestyle and Consumption Patterns in Developing Countries." *FUTURES* 39 (9): 1084–1096.
- Huber, Wolf. 2011. "Multi-system Governance or Multi-level Government in EU Cohesion Policy?" In Vienna.
- Kunzmann, Klaus R. 2010. "After the Global Economic Crisis: Policy Implications for the Future of the European Territory." *Informationen Zur Raumentwicklung* 8: 601–612.
- Le Monde diplomatique. 2009. *Atlas Der Globalisierung*. Berlin: taz Verlags- und Vertriebs GmbH.



Lechtenböhmer, Stefan, Maïke Bunse, Adriaan Perrels, Karin Arnold, Stephan Ramesohl, Anja Scholten, and Nikolaus Supersberger. 2008. "A Quantitative Scenario Study on Future Energy Systems for the EU25 for 2030." Foresight Brief No. 140. EFMN: The European Foresight Monitoring Network. [http://www.foresight-platform.eu/wp-content/uploads/2011/02/EFMN-Brief-No.-140\\_-Security-of-Energy-Supply.pdf](http://www.foresight-platform.eu/wp-content/uploads/2011/02/EFMN-Brief-No.-140_-Security-of-Energy-Supply.pdf).

Leivestad, Pernille. "Produktive Pusterom." Plan, Tidsskrift for Samfunnsplanlegging, Bolig Og Byplan Og Regional Utveklng 2013 (1): 30–35.

Leonardi, Robert, and Raffaella Nanetti. "Multi-level Governance in the EU: Contrasting Structures and Contrasting Results in Cohesion Policy." In Vienna.

Lin, Justin Yifu, and David Rosenblatt. 2012. "Shifting Patterns of Economic Growth and Rethinking Development." *Journal of Economic Policy Reform* 15 (3): 171–194. doi:10.1080/17487870.2012.700565.

Lohr, Steve. 2012. "Big Data's Impact in the World." *The New York Times*, February 11, sec. Sunday Review. <http://www.nytimes.com/2012/02/12/sunday-review/big-datas-impact-in-the-world.html>.

Maritime Innovative Territories International Network. 2013. "The Concept of Blue Growth." <http://www.mitin-network.org/Blue-Growth-1432-0-0-0.html>.

Markoff, John. 2013. "Project Seeks to Build Map of Human Brain." *The New York Times*, February 17, sec. Science. <http://www.nytimes.com/2013/02/18/science/project-seeks-to-build-map-of-human-brain.html>.

Miller, Claire Cain. 2013. "Universities Offer Courses in a Hot New Field: Data Science." *The New York Times*, April 11, sec. Education / Education Life. <http://www.nytimes.com/2013/04/14/education/edlife/universities-offer-courses-in-a-hot-new-field-data-science.html>.

Mitchell. 2007. "Intelligent Cities". Inaugural lecture of the UOC's 2007-2008 Academic year. <http://www.uoc.edu/uocpapers/5/dt/eng/mitchell.html>.

Mitchell, William John. 2000. *E-Topia: Urban Life, Jim-But Not As We Know It*. MIT Press.

National Intelligence Council. 2012. "Global Trends 2030: Alternative Worlds."

Nordic Council of Ministers. 2011a. *Megatrends*. Copenhagen: Nordic Council of Ministers. <http://www.norden.org/en/publications/publikationer/2011-527>.

———. 2011b. *Megatrends*. Copenhagen: Nordic Council of Ministers. <http://www.norden.org/en/publications/publikationer/2011-527>.

Nuttall, Mark. 2012. "Introduction: Politics, Science and Environment in the Polar Regions." *The Polar Journal* 2 (1): 1–6. doi:10.1080/2154896X.2012.679553.

OECD. 2006. *Competitive Cities in the Global Economy*. Paris: Organisation for Economic Co-operation and Development. <http://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=184113>.

———. 2011a. *OECD Reviews of Regional Innovation Regions and Innovation Policy*. OECD Pub. <http://www.mylibrary.com?id=313070&ref=toc>.

———. 2011b. OECD Regional Outlook 2011 Building Resilient Regions for Stronger Economies. [Paris]: OECD.

Öir, Spatial Foresight, BBSR, Pöry, and BOKU-Met. 2011. "Regional Challenges in the Perspective of 2020 – Phase 2: Deepening and Broadening the Analysis. The Impact of the Economic Crisis on Regional Disparities and Vulnerabilities,"

PASHMINA. 2010. "Forecast and Quantitative Scenarios, as Evolution of the Qualitative". 1.2.

Posey, John. 2011. "The Local Economy Movement: An Alternative to Neoliberalism?" *Forum for Social Economics* 40 (3): 299–312. doi:10.1007/s12143-011-9097-6.

Schier, Michaela, and Karin Jurczyk. 2008. "'Familie Als Herstellungsleistung' in Zeiten Der Entgrenzung." *soFid Familienforschung* 1: 9–18.

Schoeman, Maxi. 2011. "Of BRICs and Mortar: The Growing Relations Between Africa and the Global South." *The International Spectator* 46 (1): 33–51. doi:10.1080/03932729.2011.549753.

Skordili, Sophia. 2013. "Economic Crisis as a Catalyst for Food Planning in Athens." *International Planning Studies* 18 (1): 129–141. doi:10.1080/13563475.2013.770635.

Smith, Laurence C. 2011. *The New North: The World in 2050*. London: Profile Books.

Smith, Michael Harrison. 2005. *The Natural Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century*. Earthscan.

*State of the Future 2012*. 2012. Millennium Project.

Steinmüller, Angela, and Karlheinz Steinmüller. 2003. *Ungezügelmte Zukunft: wild cards und die Grenzen der Berechenbarkeit*. München: Gerling Akademie Verlag.

Strategic Foresight Initiative. 2011. "Climate Change - Long Term Trends and Their Implications for Emergency Management."

TA 2020. 2011. "Territorial Agenda of the European Union 2020. Towards an Inclusive, Smart and Sustainable Europe of Diverse Regions. Agreed at the Informal Ministerial Meeting of Ministers Responsible for Spatial Planning and Territorial Development on 19th May 2011 Gödöllő, Hungary."

The Atlantic. 2012. "Turkey, Europe's Economic Rising Star, Could Be Pulled Down by Euro Crisis." *The Atlantic*. February 14. <http://www.theatlantic.com/international/archive/2012/02/turkey-europes-economic-rising-star-could-be-pulled-down-by-euro-crisis/253031/>.

The Guardian. 2012. "Let's Start the Foodie Backlash." *The Guardian*, September 28, sec. Books. <http://www.guardian.co.uk/books/2012/sep/28/lets-start-foodie-backlash>.

The Times. 2012. "How to Cash in on Future Consumer Trends." *The Times (London)*, August 10, sec. Money. <http://www.thetimes.co.uk/tto/money/investment/article3504052.ece>.

TSPEU. 2011. "The Territorial State and Perspectives of the European Union. Background Document for the Territorial Agenda of the European Union 2020."

United Nations ESCAP. "Green Growth." <http://www.greengrowth.org/?q=static-page/sat-10012011-1104/about-green-growth>.

US National Intelligence Council. 2012. "Global Trends 2030: Alternative Worlds". Office of the director of national intelligence.

Van der Lippe, Tanja, Laura de Dulk, Anneke van Doorne-Huiskes, Joop Schippers, Linda Lane, and Margareta Bäck-Wiklund. 2009. "Final Report: Quality of Life in a Changing Europe".  
Universiteit Utrecht.  
[http://www.projectquality.org/files/Final%20Report\\_2009.pdf](http://www.projectquality.org/files/Final%20Report_2009.pdf).

William Engdahl, F. 2013. "The New Mediterranean Oil and Gas Bonanza." *Global Research*.  
<http://www.globalresearch.ca/the-new-mediterranean-oil-and-gas-bonanza/29609>.

World Bank. 2012. Inclusive Green Growth: The Pathway to Sustainable Development. Washington, D.C: World Bank.

Z-Punkt. 2008. "MEGATRENDS."

### **Additional references for Governance**

AGNEW, John (2011). Dualisme contre polyphonie dans la gouvernance territoriale contemporaine in Giuseppe Bettoni (dir.). *Gouverner les territoires: antagonismes et partenariats entre acteurs publics*. Paris: Comité pour l'histoire économique et financière de la France, Institut de la Gestion Publique et du Développement Économique (IGPDE), pp. 5 – 26.

<http://igpde.revues.org/131?file=1>

BÖRZEL, Tanja A. and RISSE, Thomas (2010). Governance without a state: Can it work?. *Regulation & Governance*, 4, pp. 113–134.

BRENNER, Neil (2003). Metropolitan institutional reform and the rescaling of state space in contemporary Western Europe. *European Urban and Regional Studies*, 10 (4), pp. 297-324.

BRENNER, Neil (2004). Urban governance and the production of new state spaces in western Europe, 1960–2000. *Review of International Political Economy*, 11 (3), pp. 447-488.

COX, Kevin R (2010). The problem of metropolitan governance and the politics of scale. *Regional Studies*, 44 (2), pp. 215-227.

ESPON & Nordregio (2012), ESPON TANGO –Territorial Approaches for New Governance Interim Report, Version 29/06/2012

[http://www.espon.eu/export/sites/default/Documents/Projects/AppliedResearch/TANGO/ESPON\\_TANGO\\_Interim\\_Report\\_final.pdf](http://www.espon.eu/export/sites/default/Documents/Projects/AppliedResearch/TANGO/ESPON_TANGO_Interim_Report_final.pdf)

FALUDI, Andreas (2012). Multi-Level (Territorial) Governance: Three Criticisms. *Planning Theory & Practice*, 13:2, pp. 197-211

FARINÓS DASI, J. (ed.) (2007). *Governance of Territorial and Urban Policies from EU to Local Level*. Final Report of ESPON Project 2.3.2. Esch-sur- Alzette: ESPON Coordination Unit.

HARVEY, David (1989). From managerialism to entrepreneurialism: the transformation in urban governance in late capitalism. *Geografiska Annaler Series B – Human Geography*, 71B (1), pp. 3-17.

HEALEY, Patsey (2006). Transforming governance: challenges of institutional adaptation and a new politics of space. *European Planning Studies*, 14 (3), pp. 299-320.

HÉRITIER, Adrienne and LEHMKUHL, Dirk (2011). New modes of governance and democratic accountability. *Government and Opposition*, Vol. 46, N° 1, pp. 126-144.

HUBER, Wolf (2011), "Multi-system Governance or Multi-Level Government in EU Cohesion Policy?", Paper prepared for the RSA Research Network on Effectiveness, Added Value and Future of EU Cohesion Policy. First Workshop on 'Multi-level governance and partnership in the EU cohesion policy' organized by the Institute for European Integration Research (EIF) of the Austrian Academy of Sciences, Vienna, 28-29 November, 2011

<http://www.sciencespo.fr/coesionet/sites/default/files/Huber%20-%20Key%20Note%20Address%20-%20multi-level%20governance%20or%20multi-level%20government.pdf>

JESSOP, Bob (2002). Liberalism, neoliberalism, and urban governance: a state-theoretical perspective. *Antipode*, 34 (3), pp. 452-472.

LE GALÈS, Patrick (1998). Regulations and governance in European cities. *International Journal of Urban and Regional Research*, 22 (3), pp. 482-506.

LE GALÈS, Patrick (2002). *European cities: social conflicts and governance*. Oxford: Oxford University Press.

JANSSEN-JANSEN, Leonnie B. and HUTTON, Thomas A (2012). Rethinking the metropolis: reconfiguring the governance structures of the twenty-first-century city-region. *International Planning Studies*, 16:3, pp. 201-215.

LEFÈVRE, Christian (1998). Metropolitan government and governance in western countries: a critical review. *International Journal of Urban and Regional Research*, 21 (4), pp. 9-25.

LEONARDI, Robert and NANETTI, Raffaella Y. (2011), "Multi-level Governance in the EU: Contrasting Structures and Contrasting Results in Cohesion Policy", Paper prepared for the RSA Research Network on Effectiveness, Added Value and Future of EU Cohesion Policy. First Workshop on 'Multi-level governance and partnership in the EU cohesion policy' organized by the Institute for European Integration Research (EIF) of the Austrian Academy of Sciences, Vienna, 28-29 November, 2011

<http://www.sciencespo.fr/coesionet/sites/default/files/Leonardi%20MLG in the Eu%20Paper for Vienna conference.pdf>

LOWNDES, Vivien and PRATCHETT, Lawrence (2012). Local governance under the coalition government: austerity, localism and the 'Big Society'. *Local Government Studies*, 38 (1), pp. 21-40.

PINSON, Gilles (2006). Projets de ville et gouvernance urbaine. Pluralisation des espaces politiques et recomposition d'une capacité d'action collective dans les villes européennes. *Revue Française de Science Politique*, 56 (4), pp. 619-651.

PINSON, Gilles (2011). *Urbanismo y gobernanza de las ciudades europeas*. Valencia: Publicacions de la Universitat de València.



ROSENEAU, J.N. e CZEMPIEL E-O (eds) (1992). *Governance without government: order and change in world politics*. Cambridge: Cambridge University Press.

SWYNGEDOUW, Erik (2005). Governance innovation and the citizen: The Janus face of governance-beyond-the-state, *Urban Studies*, 42 (11), pp. 1991–2006.

TEWDWR-JONES, Mark (2012). *Spatial planning and governance. Understanding UK planning*. Hampshire: Palgrave Macmillan.

WEALE, Albert (2011). New modes of governance, political accountability and public reason. *Government and Opposition*, Vol. 46, N° 1, p. 58–80. 2011.

WHITEHEAD, Mark (2003). In the 'shadow of hierarchy': meta-governance, policy reform and urban regeneration in the West Midlands. *Area*, 35 (1), p. 6-14.

## 8.- ANNEX III - Economic Forecast Tables

### Real GDP growth rates up to 2025. The Conference Board, Global Economic Outlook, May 2013

	2010	2011	2012	2013-2018	2019-2025
Austria	2.1%	2.7%	0.8%	1.1%	0.7%
Belgium	2.4%	1.8%	-0.2%	1.4%	1.3%
Cyprus	1.3%	0.5%	-2.3%	0.7%	1.5%
Finland	3.3%	2.7%	0.1%	1.0%	0.9%
France	1.7%	1.7%	0.2%	0.9%	1.0%
Germany	4.2%	3.0%	0.7%	1.6%	1.3%
Greece	-4.9%	-7.1%	-6.0%	-0.4%	1.5%
Ireland	-0.8%	1.4%	0.4%	2.5%	3.1%
Italy	1.8%	0.4%	-2.3%	0.5%	0.9%
Luxembourg	2.9%	1.7%	0.4%	2.3%	2.4%
Malta	2.7%	1.6%	1.0%	2.0%	1.8%
Netherlands	1.6%	1.0%	-0.3%	1.0%	1.5%
Portugal	1.9%	-1.6%	-3.0%	0.8%	1.5%
Spain	-0.3%	0.4%	-1.4%	0.8%	1.7%
Czech Republic	2.5%	1.9%	-1.3%	1.9%	2.5%
Denmark	1.6%	1.1%	0.6%	1.6%	1.4%
Hungary	1.3%	1.6%	-1.2%	1.8%	2.4%
Poland	3.9%	4.3%	2.4%	1.9%	1.5%
Sweden	6.6%	3.7%	1.1%	1.9%	1.7%
United Kingdom	1.8%	0.8%	-0.3%	0.8%	0.8%
Canada	3.2%	2.4%	2.0%	2.0%	1.7%
Japan	4.7%	-0.6%	0.6%	0.9%	0.9%
South Korea	6.3%	3.6%	2.2%	2.6%	1.3%
United States	2.4%	1.8%	2.2%	2.3%	2.0%
Brazil	7.5%	2.7%	1.0%	3.1%	2.7%
China	10.4%	9.2%	7.8%	5.8%	3.7%
India	8.4%	6.5%	5.5%	4.7%	3.8%
Indonesia	6.1%	6.5%	5.8%	5.2%	4.5%
Mexico	5.6%	3.9%	3.9%	3.2%	3.0%
Russian Federation	4.3%	4.3%	3.7%	2.1%	1.3%
Turkey	9.2%	8.5%	3.3%	2.2%	2.0%
World	--	--	3.2%	3.1%	2.6%

Figure 89 - Real GDP growth rates up to 2025. The Conference Board, Global Economic Outlook, May 2013

## Long-run potential GDP growth to 2060. OECD Economy Outlook, Long-run growth, May 2013

Table 4.1. Growth in total economy potential output and its components  
*Annual averages, percentage change*

	Output Gap 2012	Potential real GDP growth				Potential labour productivity growth (output per worker)				Potential employment growth				Real GDP growth 2012-2017
		2001-2007	2012-2017	2018-2030	2031-2060	2001-2007	2012-2017	2018-2030	2031-2060	2001-2007	2012-2017	2018-2030	2031-2060	
Australia	-0.9	3.2	3.3	3.0	1.9	1.1	1.9	2.1	1.5	2.1	1.4	0.9	0.5	3.5
Austria	-1.6	2.1	1.7	1.8	1.3	1.1	1.0	1.6	1.3	1.0	0.7	0.1	-0.1	1.7
Belgium	-0.8	1.8	1.5	2.2	1.8	0.8	0.8	1.9	1.4	0.9	0.6	0.3	0.3	1.3
Canada	-0.4	2.6	2.0	2.2	1.9	0.8	1.1	1.7	1.5	1.7	0.9	0.4	0.3	2.0
Chile	0.2	4.0	5.0	3.3	1.4	1.7	2.9	2.2	1.5	2.3	2.0	1.1	0.0	5.0
Czech Republic	-2.5	3.6	2.1	2.9	1.6	3.4	2.0	3.1	2.0	0.3	0.2	-0.2	-0.4	1.9
Denmark	-3.2	1.4	1.0	1.8	1.9	0.9	0.8	1.6	1.8	0.5	0.2	0.1	0.1	1.2
Estonia <sup>2</sup>	-1.7	5.1	3.0	3.0	1.7	4.4	2.9	3.2	2.2	0.7	0.1	-0.2	-0.4	3.4
Finland	-1.4	2.7	1.5	2.1	1.4	1.5	1.4	2.3	1.4	1.1	0.1	-0.2	0.1	1.5
France	-2.4	1.7	1.5	2.3	1.4	0.8	1.2	2.1	1.2	0.8	0.4	0.2	0.1	1.6
Germany	0.1	1.2	1.2	0.9	0.7	0.8	1.0	1.5	1.4	0.4	0.2	-0.6	-0.7	1.1
Greece	-11.7	2.8	-0.5	3.2	1.3	1.6	0.2	2.6	1.6	1.1	-0.8	0.6	-0.3	0.1
Hungary	-3.3	2.7	1.3	3.1	1.8	2.9	1.1	3.0	2.4	-0.2	0.2	0.1	-0.6	1.4
Iceland	-4.2	3.7	0.8	2.2	2.0	2.2	0.4	1.5	1.7	1.4	0.4	0.7	0.3	1.6
Ireland	-7.9	5.4	1.4	3.0	1.6	2.4	1.1	1.7	0.9	2.9	0.4	1.2	0.7	2.5
Israel	1.0	3.5	3.5	2.8	2.5	0.9	1.2	1.2	1.4	2.6	2.2	1.5	1.2	3.2
Italy	-4.5	1.1	0.1	2.0	1.4	0.2	0.0	1.6	1.5	0.9	0.1	0.4	-0.1	0.3
Japan	-0.8	0.7	0.8	1.1	1.1	0.9	1.2	1.7	1.8	-0.2	-0.4	-0.5	-0.7	1.2
Korea	-3.1	4.5	4.1	3.3	0.6	3.2	3.4	3.4	1.3	1.2	0.7	0.0	-0.7	4.1
Luxembourg	-2.5	4.1	2.6	2.6	1.5	0.5	0.2	1.5	1.2	3.6	2.4	1.0	0.4	2.6
Mexico	-0.4	2.4	3.2	3.6	2.7	0.7	1.0	1.9	2.3	1.7	2.1	1.6	0.4	3.5
Netherlands	-2.7	1.9	1.4	2.1	1.5	0.9	0.9	2.1	1.6	1.0	0.5	0.0	-0.1	1.3
New Zealand	-1.5	3.1	2.4	2.4	1.9	0.7	1.4	1.6	1.5	2.4	1.0	0.8	0.4	2.8
Norway <sup>1</sup>	-0.5	3.0	2.7	2.4	1.6	1.7	1.6	1.9	1.2	1.2	1.2	0.5	0.4	3.0
Poland	0.7	4.1	2.9	2.2	0.8	3.4	2.9	2.7	1.7	0.7	0.0	-0.5	-0.9	2.5
Portugal	-6.7	1.6	0.2	2.1	1.5	1.2	0.5	1.8	1.9	0.4	-0.3	0.3	-0.4	0.5
Slovak Republic	-0.5	4.4	3.2	2.4	0.9	3.8	3.0	2.8	1.7	0.6	0.2	-0.4	-0.8	2.8
Slovenia	-3.3	3.2	1.1	2.8	1.5	2.6	1.4	2.9	1.9	0.7	-0.3	-0.1	-0.3	0.9
Spain	-7.7	3.3	0.8	3.0	1.5	0.6	1.1	1.8	1.6	2.8	-0.3	1.2	-0.1	1.4
Sweden	-1.4	2.6	2.7	2.5	1.5	2.0	1.9	2.2	1.2	0.6	0.8	0.3	0.2	2.6
Switzerland	-0.9	1.9	2.1	2.2	1.6	0.8	1.0	1.9	1.7	1.0	1.1	0.3	-0.1	2.0
United Kingdom	-2.1	2.5	1.7	2.6	2.0	1.6	0.9	2.0	1.6	0.9	0.8	0.6	0.4	1.8
United States	-3.0	2.4	2.0	2.1	1.7	1.7	1.5	1.7	1.1	0.7	0.5	0.4	0.5	2.5
Turkey	-2.1	4.0	5.1	4.3	1.9	2.6	2.5	2.5	1.6	1.3	2.5	1.7	0.3	4.8
Argentina <sup>2</sup>	6.7	3.7	3.8	3.1	2.3	0.6	2.1	1.8	2.1	3.1	1.6	1.2	0.2	2.3
Brazil	-1.1	3.0	3.7	3.6	2.0	0.8	2.2	2.7	2.4	2.2	1.4	0.8	-0.4	3.3
China	0.1	10.2	8.4	5.4	2.1	9.2	7.9	5.8	3.0	0.9	0.5	-0.3	-0.9	8.1
Indonesia	0.5	4.1	6.0	5.2	3.4	2.1	4.0	4.2	3.6	1.9	1.9	1.0	-0.1	6.0
India	0.1	7.0	6.9	6.8	4.3	5.2	5.0	4.9	3.7	1.7	1.8	1.8	0.6	6.3
Russian federatic	-1.7	5.4	3.3	2.8	1.3	4.6	4.4	3.5	2.0	0.7	-1.1	-0.7	-0.7	3.5
South Africa	-2.5	3.1	4.6	4.9	2.3	2.0	2.7	2.8	1.9	1.1	1.9	2.0	0.4	4.7
Euro area <sup>2</sup>	-2.9	1.7	1.0	2.0	1.3	0.8	0.9	1.8	1.5	1.0	0.1	0.2	-0.2	1.2
OECD <sup>2</sup>	-2.3	2.1	1.9	2.3	1.6	1.3	1.3	1.8	1.5	0.9	0.6	0.4	0.1	2.2
Non-OECD	0.7	7.1	6.8	5.3	2.8	5.7	5.7	4.6	2.9	1.3	1.0	0.6	-0.2	6.4
World <sup>2</sup>		3.5	3.7	3.6	2.2	2.3	2.8	3.0	2.3	1.2	0.9	0.6	-0.1	3.8

1. Based on measures of mainland GDP.

2. Reported growth for 2001-2007 starts in 2002. For Argentina, it starts in 2003.

Source: OECD Economic Outlook 93 long-term database.

Figure 90 - Long-run potential GDP growth to 2060. OECD Economy Outlook, Long-run growth, May 2013

## Real GDP growth rates to 2050. CEPII, The World economy in 2050, 2012

		1990-2007	2008-2015	2015-2030	2030-2050
Eurozone	Austria	2.3%	1.0%	1.3%	1.1%
	Belgium	2.1%	0.8%	1.1%	1.3%
	Cyprus	n/a	n/a	n/a	n/a
	Estonia	2.9%	2.0%	5.0%	4.0%
	Finland	2.4%	0.7%	1.4%	1.3%
	France	1.9%	0.9%	1.7%	1.6%
	Germany	1.7%	0.6%	0.5%	0.9%
	Greece	3.1%	-0.9%	2.8%	2.3%
	Ireland	6.4%	-0.1%	2.2%	1.7%
	Italy	1.4%	-0.3%	0.3%	0.8%
	Luxembourg	4.7%	1.7%	2.3%	1.6%
	Malta	3.6%	1.5%	2.2%	2.0%
	Netherlands	2.6%	0.4%	1.3%	1.3%
	Portugal	2.1%	-0.3%	1.6%	1.6%
	Slovak Republic	2.8%	2.5%	3.5%	2.8%
	Slovenia	n/a	n/a	n/a	n/a
	Spain	3.1%	0.3%	2.1%	2.1%
	Eurozone	2.1%	0.4%	1.2%	1.4%
Other EU	Bulgaria	1.2%	1.4%	2.9%	2.4%
	Croatia	n/a	n/a	n/a	n/a
	Czech Republic	2.0%	1.5%	2.9%	2.9%
	Denmark	2.2%	0.4%	1.2%	1.3%
	Hungary	2.0%	0.9%	3.0%	2.8%
	Latvia	1.9%	0.3%	5.0%	4.6%
	Lithuania	1.2%	1.8%	5.1%	3.8%
	Poland	3.9%	3.4%	3.1%	2.7%
	Romania	1.4%	1.6%	3.6%	3.0%
	Sweden	2.3%	1.9%	1.7%	1.6%
	United Kingdom	2.5%	0.8%	2.1%	1.7%
	European Union	2.2%	0.6%	1.5%	1.6%
Developed countries	Canada	2.8%	1.6%	2.5%	2.2%
	Japan	1.4%	0.6%	1.9%	1.1%
	Korea	5.5%	4.0%	3.8%	2.5%
	United States	2.9%	1.3%	1.6%	1.7%
Emerging countries	Brazil	2.9%	3.4%	3.1%	2.5%
	China	10.4%	8.7%	6.1%	4.1%
	India	6.4%	7.3%	6.0%	4.9%
	Mexico	3.0%	2.3%	3.4%	2.9%
	Russia	0.3%	2.5%	4.2%	3.6%
	Turkey	4.1%	3.8%	4.2%	3.5%

Figure 91 - Real GDP growth rates to 2050. CEPII, The World economy in 2050, 2012



## EU real GDP growth rates and components contribution to GDP growth, 2005-2014. DG EFCIN, 2013

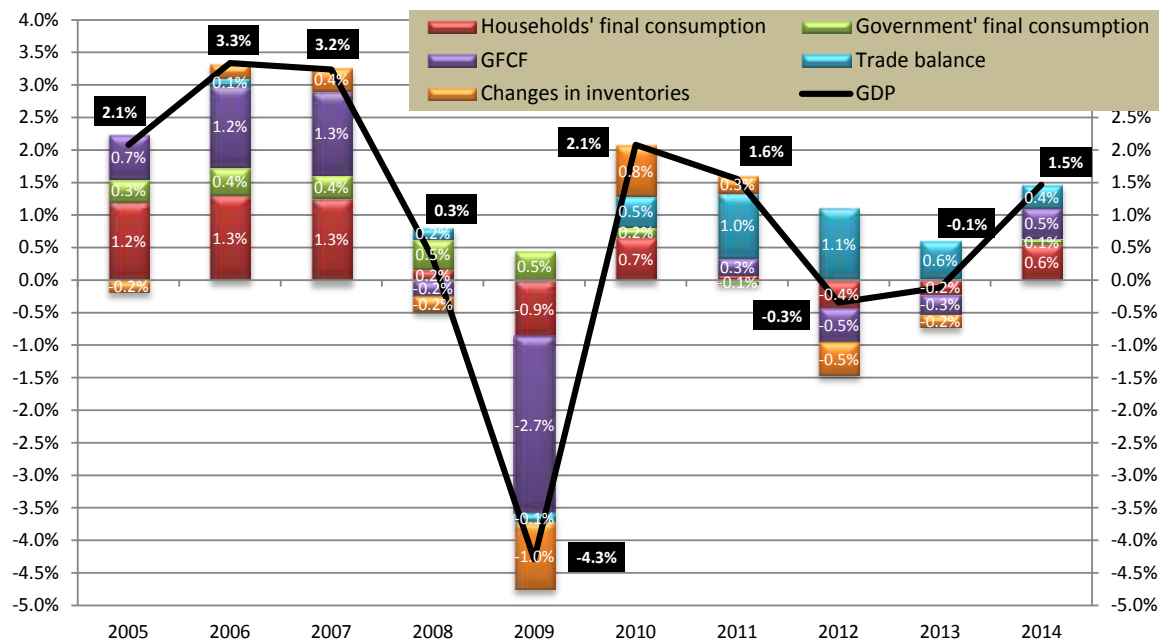


Figure 92 - EU real GDP growth rates and components contribution to GDP growth, 2005-2014. DG EFCIN, 2013

## GDP components to real GDP growth rate, in DG ECFIN Forecasts

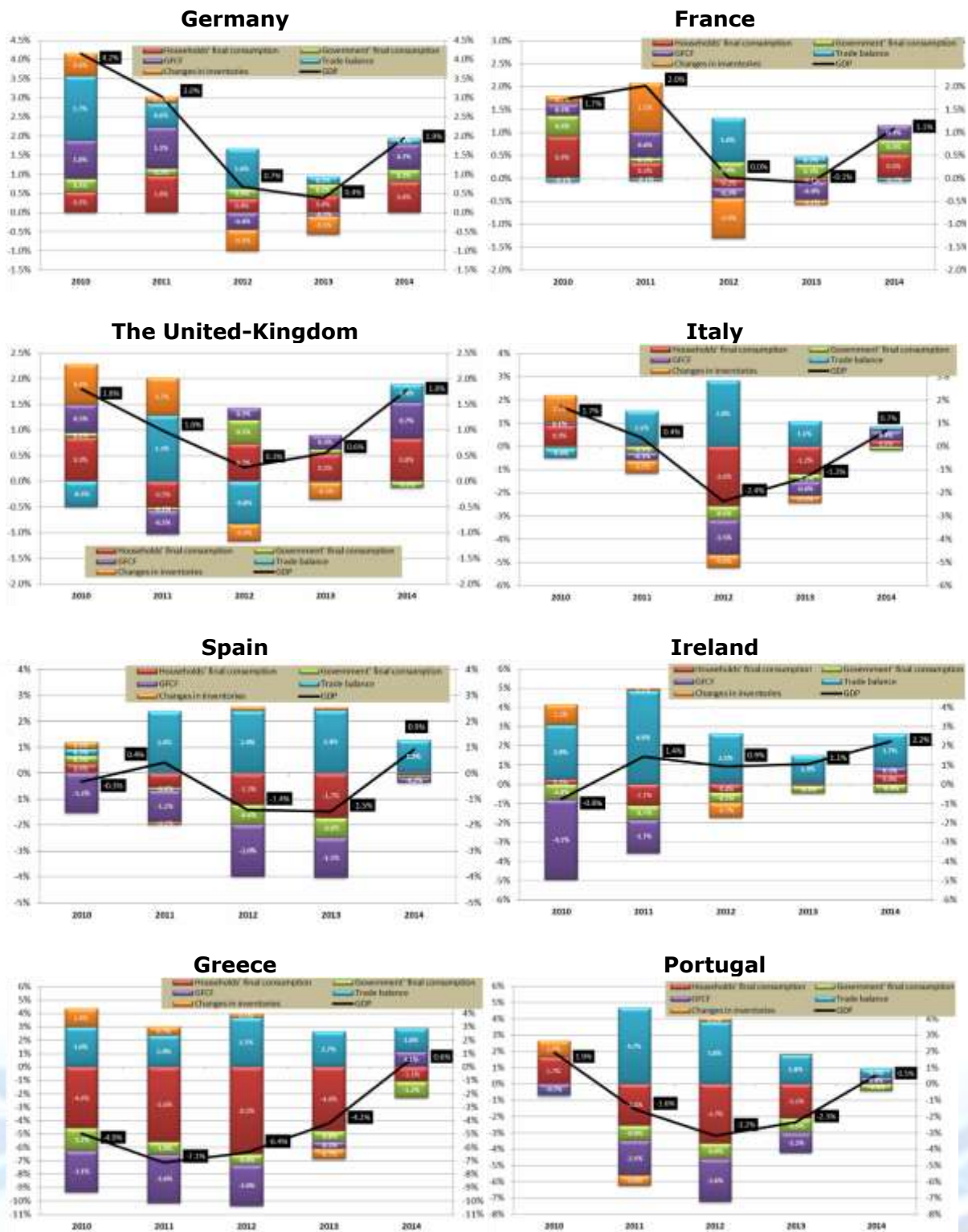


Figure 93 - GDP components to real GDP growth rate, in DG ECFIN Forecasts

## Contributions to real GDP growth rates. OECD, 2013 (1/2)

### Contributions to changes in real GDP in OECD countries Chain link calculations

	2011	2012	2013	2014		2011	2012	2013	2014
<b>Australia</b>					<b>France</b>				
Final domestic demand	4.2	4.6	2.4	3.1	Final domestic demand	0.9	-0.2	-0.2	0.5
Stockbuilding	0.4	-0.1	-0.2	0.0	Stockbuilding	0.8	-0.8	-0.1	0.0
Net exports	-2.2	0.1	0.4	0.0	Net exports	0.0	0.9	0.1	0.3
GDP	2.4	3.6	2.6	3.2	GDP	1.7	0.0	-0.3	0.8
<b>Austria</b>					<b>Germany</b>				
Final domestic demand	1.7	0.7	0.3	1.1	Final domestic demand	2.3	0.3	0.8	2.5
Stockbuilding	0.5	-0.3	-0.4	0.0	Stockbuilding	0.2	-0.6	0.0	0.0
Net exports	0.4	0.4	0.4	0.7	Net exports	0.6	1.2	-0.4	-0.6
GDP	2.7	0.8	0.5	1.7	GDP	3.1	0.9	0.4	1.9
<b>Belgium</b>					<b>Greece</b>				
Final domestic demand	1.2	-0.2	-0.1	0.7	Final domestic demand	-10.1	-10.4	-6.5	-3.9
Stockbuilding	0.7	-0.3	-0.2	0.0	Stockbuilding	0.6	0.1	0.9	0.0
Net exports	-0.1	0.2	0.3	0.4	Net exports	2.4	4.0	2.6	2.7
GDP	1.9	-0.3	0.0	1.1	GDP	-7.1	-6.4	-4.8	-1.2
<b>Canada</b>					<b>Hungary</b>				
Final domestic demand	2.7	1.8	1.4	2.2	Final domestic demand	-0.4	-1.9	-0.9	0.1
Stockbuilding	0.0	0.3	-0.1	0.0	Stockbuilding	0.6	-1.6	1.3	0.0
Net exports	-0.5	-0.4	0.0	0.1	Net exports	1.5	1.7	0.5	1.1
GDP	2.6	1.8	1.4	2.3	GDP	1.6	-1.8	0.5	1.3
<b>Chile</b>					<b>Iceland</b>				
Final domestic demand	8.7	7.0	6.0	5.1	Final domestic demand	3.1	2.0	0.7	3.6
Stockbuilding	-0.2	-0.1	-1.1	0.0	Stockbuilding	0.6	-0.2	0.0	0.0
Net exports	-2.6	-1.3	-0.4	0.1	Net exports	-0.8	-0.1	1.2	-1.0
GDP	5.9	5.5	4.9	5.3	GDP	2.9	1.6	1.9	2.6
<b>Czech Republic</b>					<b>Ireland</b>				
Final domestic demand	-0.2	-2.2	-1.2	0.5	Final domestic demand	-3.5	-0.9	0.2	0.1
Stockbuilding	0.1	-0.4	0.1	-0.1	Stockbuilding	0.4	-0.2	0.1	0.0
Net exports	1.9	1.4	0.1	1.0	Net exports	5.4	2.8	1.1	1.8
GDP	1.8	-1.2	-1.0	1.3	GDP	1.4	0.9	1.0	1.9
<b>Denmark</b>					<b>Israel</b>				
Final domestic demand	-0.2	0.7	1.0	1.7	Final domestic demand	5.7	3.0	2.2	2.8
Stockbuilding	0.5	-0.4	0.0	0.0	Stockbuilding	0.7	1.4	-0.2	0.0
Net exports	0.8	-0.8	-0.4	-0.1	Net exports	-1.9	-1.2	2.4	0.5
GDP	1.1	-0.5	0.4	1.7	GDP	4.6	3.2	3.9	3.4
<b>Estonia</b>					<b>Italy</b>				
Final domestic demand	7.1	7.5	3.3	4.0	Final domestic demand	-0.5	-4.8	-2.5	-0.7
Stockbuilding	2.1	-0.2	0.8	0.0	Stockbuilding	-0.5	-0.6	-0.6	0.0
Net exports	0.4	-2.9	-1.9	-0.4	Net exports	1.4	3.0	1.3	1.1
GDP	8.3	3.2	1.5	3.6	GDP	0.5	-2.4	-1.8	0.4
<b>Finland</b>					<b>Japan</b>				
Final domestic demand	2.7	0.5	0.1	1.2	Final domestic demand	0.8	2.8	1.7	0.6
Stockbuilding	1.7	-2.2	0.1	0.0	Stockbuilding	-0.5	0.1	-0.4	-0.2
Net exports	-1.2	1.0	-0.2	0.5	Net exports	-0.9	-0.9	0.3	0.9
GDP	2.8	-0.2	0.0	1.7	GDP	-0.6	2.0	1.6	1.4

Source: OECD Economic Outlook 93 database.

Figure 94 - Contributions to real GDP growth rates. OECD, 2013 (1/2)



## Contributions to real GDP growth rates. OECD, 2013 (2/2)

Contributions to changes in real GDP in other OECD countries (cont'd)  
 Chain link calculations

	2011	2012	2013	2014		2011	2012	2013	2014
<b>Korea</b>					<b>Slovenia</b>				
Final domestic demand	1.3	1.0	1.8	3.5	Final domestic demand	-1.3	-3.8	-3.6	-1.7
Stockbuilding	0.7	-0.1	0.0	0.0	Stockbuilding	0.7	-1.9	-0.9	0.0
Net exports	1.8	1.0	0.8	0.5	Net exports	1.3	3.3	2.3	1.8
GDP	3.7	2.0	2.6	4.0	GDP	0.6	-2.3	-2.3	0.1
<b>Luxembourg</b>					<b>Spain</b>				
Final domestic demand	2.9	2.7	2.0	1.2	Final domestic demand	-1.8	-3.9	-4.2	-1.7
Stockbuilding	1.4	-0.8	-1.4	0.0	Stockbuilding	-0.1	0.0	0.0	0.0
Net exports	-1.7	-0.5	2.7	0.5	Net exports	2.3	2.5	2.6	2.0
GDP	1.7	0.3	0.8	1.7	GDP	0.4	-1.4	-1.7	0.4
<b>Mexico</b>					<b>Sweden</b>				
Final domestic demand	4.8	3.5	3.1	3.5	Final domestic demand	2.6	1.8	1.4	2.3
Stockbuilding	-1.0	0.4	0.4	0.0	Stockbuilding	0.4	-1.1	-0.3	0.0
Net exports	0.1	0.1	-0.1	0.2	Net exports	0.9	0.4	-0.1	0.2
GDP	3.9	3.9	3.4	3.7	GDP	3.8	1.2	1.3	2.5
<b>Netherlands</b>					<b>Switzerland</b>				
Final domestic demand	0.6	-1.4	-1.7	0.0	Final domestic demand	1.7	1.5	1.7	1.9
Stockbuilding	-0.1	0.1	0.2	0.0	Stockbuilding	-0.1	-0.2	-0.6	0.0
Net exports	0.5	0.4	0.4	0.7	Net exports	0.3	-0.4	0.3	0.1
GDP	1.1	-1.0	-0.9	0.7	GDP	1.9	1.0	1.4	2.0
<b>New Zealand</b>					<b>Turkey</b>				
Final domestic demand	2.2	2.5	3.6	3.8	Final domestic demand	9.6	-0.2	3.4	5.3
Stockbuilding	0.3	0.1	-1.2	-0.1	Stockbuilding	-0.1	-1.2	0.1	0.0
Net exports	-1.0	0.2	-0.1	-0.6	Net exports	-1.2	4.1	0.3	-0.8
GDP	1.3	3.0	2.6	3.1	GDP	8.8	2.2	3.1	4.6
<b>Norway</b>					<b>United Kingdom</b>				
Final domestic demand	2.9	3.3	3.1	3.4	Final domestic demand	-1.0	1.5	0.9	1.2
Stockbuilding	0.1	-0.1	-0.6	0.0	Stockbuilding	0.4	-0.1	0.0	0.0
Net exports	-1.8	0.0	-1.1	-0.3	Net exports	1.4	-1.0	0.1	0.3
GDP	1.2	3.2	1.3	3.0	GDP	1.0	0.3	0.8	1.5
<b>Poland</b>					<b>United States</b>				
Final domestic demand	3.0	0.3	0.1	1.6	Final domestic demand	1.9	2.0	2.0	3.1
Stockbuilding	0.7	-0.5	0.0	0.0	Stockbuilding	-0.1	0.2	0.0	0.0
Net exports	0.8	2.2	1.2	0.7	Net exports	0.1	0.0	-0.1	-0.3
GDP	4.5	2.0	0.9	2.2	GDP	1.8	2.2	1.9	2.8
<b>Portugal</b>					<b>Euro area</b>				
Final domestic demand	-5.6	-7.2	-5.1	-1.4	Final domestic demand	0.3	-1.7	-1.0	0.5
Stockbuilding	-0.7	0.2	0.6	0.0	Stockbuilding	0.2	-0.5	-0.1	0.0
Net exports	4.6	4.0	1.8	1.6	Net exports	0.9	1.6	0.6	0.5
GDP	-1.6	-3.2	-2.7	0.2	GDP	1.5	-0.5	-0.6	1.1
<b>Slovak Republic</b>					<b>Total OECD</b>				
Final domestic demand	1.8	-1.3	-0.3	1.1	Final domestic demand	1.6	1.0	1.1	2.1
Stockbuilding	-0.7	-1.6	-0.1	0.0	Stockbuilding	0.0	-0.2	-0.1	0.0
Net exports	2.0	5.2	1.8	1.0	Net exports	0.2	0.5	0.2	0.2
GDP	3.2	2.0	0.8	2.0	GDP	1.9	1.4	1.2	2.3

Source: OECD Economic Outlook 93 database.

Figure 95 - Contributions to real GDP growth rates. OECD, 2013 (2/2)



## Real GDP growth rate short-term forecast to 2014. OECD, 2013

Annex Table 1. Real GDP  
Percentage change from previous year

	2010	2011	2012	2013	2014
Australia	2.4	2.3	3.7	3.0	3.2
Austria	2.2	2.7	0.6	0.8	1.8
Belgium	2.4	1.8	-0.1	0.5	1.6
Canada	3.2	2.6	2.0	1.8	2.4
Chile	6.1	5.9	5.2	4.6	5.4
Czech Republic	2.5	1.9	-0.9	0.8	2.4
Denmark	1.6	1.1	0.2	1.4	1.7
Estonia	3.3	8.3	3.1	3.7	3.4
Finland	3.3	2.7	0.7	1.1	2.2
France	1.6	1.7	0.2	0.3	1.3
Germany	4.0	3.1	0.9	0.6	1.9
Greece	-4.9	-7.1	-6.3	-4.5	-1.3
Hungary	1.3	1.6	-1.6	-0.1	1.2
Iceland	-4.0	2.6	2.5	2.7	2.7
Ireland	-0.8	1.4	0.5	1.3	2.2
Israel	5.0	4.6	3.1	2.9	3.9
Italy	1.8	0.6	-2.2	-1.0	0.6
Japan	4.5	-0.7	1.6	0.7	0.8
Korea	6.3	3.6	2.2	3.1	4.4
Luxembourg	2.9	1.7	0.6	1.2	2.0
Mexico	5.6	3.9	3.8	3.3	3.6
Netherlands	1.6	1.1	-0.9	0.2	1.5
New Zealand	0.9	0.5	1.6	2.4	2.9
Norway	0.7	1.4	3.3	2.5	2.0
Poland	3.9	4.3	2.5	1.6	2.5
Portugal	1.4	-1.7	-3.1	-1.8	0.9
Slovak Republic	4.4	3.2	2.6	2.0	3.4
Slovenia	1.2	0.6	-2.4	-2.1	1.1
Spain	-0.3	0.4	-1.3	-1.4	0.5
Sweden	6.3	3.9	1.2	1.9	3.0
Switzerland	3.0	1.9	0.8	1.1	2.3
Turkey	9.2	8.5	2.9	4.1	5.2
United Kingdom	1.8	0.9	-0.1	0.9	1.6
United States	2.4	1.8	2.2	2.0	2.8
Euro area	1.9	1.5	-0.4	-0.1	1.3
Total OECD	3.0	1.8	1.4	1.4	2.3

Figure 96 - Real GDP growth rate short-term forecast to 2014. OECD, 2013

### Real GDP growth rates (2010-2018), IMF Forecasts

		2010	2011	2012	2013	2014	2015	2016	2017	2018
Eurozone	Austria	2.1%	2.7%	0.8%	0.8%	1.6%	1.6%	1.6%	1.4%	1.3%
	Belgium	2.4%	1.8%	-0.2%	0.2%	1.2%	1.3%	1.4%	1.5%	1.6%
	Cyprus	1.3%	0.5%	-2.4%	n/a	n/a	n/a	n/a	n/a	n/a
	Estonia	3.3%	8.3%	3.2%	3.0%	3.2%	3.4%	3.5%	3.6%	3.7%
	Finland	3.3%	2.8%	-0.2%	0.5%	1.2%	1.5%	2.0%	2.0%	2.0%
	France	1.7%	1.7%	0.0%	-0.1%	0.9%	1.5%	1.7%	1.8%	1.9%
	Germany	4.0%	3.1%	0.9%	0.6%	1.5%	1.3%	1.3%	1.3%	1.2%
	Greece	-4.9%	-7.1%	-6.4%	-4.2%	0.6%	2.9%	3.7%	3.5%	3.3%
	Ireland	-0.8%	1.4%	0.9%	1.1%	2.2%	2.7%	2.7%	2.7%	2.7%
	Italy	1.7%	0.4%	-2.4%	-1.5%	0.5%	1.2%	1.4%	1.4%	1.2%
	Luxembourg	2.9%	1.7%	0.1%	0.1%	1.3%	1.7%	2.2%	2.2%	2.2%
	Malta	2.9%	1.7%	0.8%	1.3%	1.8%	2.0%	2.1%	1.9%	1.9%
	Netherlands	1.6%	1.0%	-0.9%	-0.5%	1.1%	1.6%	1.8%	1.9%	2.1%
	Portugal	1.9%	-1.6%	-3.2%	-2.3%	0.6%	1.5%	1.8%	1.8%	1.8%
	Slovak Republic	4.4%	3.2%	2.0%	1.4%	2.7%	3.2%	3.5%	3.5%	3.5%
	Slovenia	1.2%	0.6%	-2.3%	-2.0%	1.5%	1.9%	1.9%	2.0%	2.0%
	Spain	-0.3%	0.4%	-1.4%	-1.6%	0.7%	1.4%	1.5%	1.5%	1.6%
	Eurozone	2.0%	1.4%	-0.6%	-0.3%	1.1%	1.4%	1.6%	1.6%	1.6%
Other EU	Bulgaria	0.4%	1.8%	0.8%	1.2%	2.3%	3.5%	3.5%	3.5%	3.5%
	Croatia	-2.3%	0.0%	-2.0%	-0.2%	1.5%	2.0%	2.0%	2.5%	2.5%
	Czech Republic	2.5%	1.9%	-1.2%	0.3%	1.6%	2.7%	2.8%	3.0%	3.0%
	Denmark	1.6%	1.1%	-0.6%	0.8%	1.3%	1.5%	1.5%	1.5%	1.5%
	Hungary	1.2%	1.7%	-1.7%	0.0%	1.2%	1.5%	1.6%	1.6%	1.6%
	Latvia	-0.9%	5.5%	5.6%	4.2%	4.2%	4.2%	4.0%	4.0%	4.0%
	Lithuania	1.5%	5.9%	3.6%	3.0%	3.3%	3.5%	3.7%	3.8%	3.8%
	Poland	3.9%	4.3%	2.0%	1.3%	2.2%	2.7%	3.3%	3.5%	3.7%
	Romania	-1.1%	2.2%	0.3%	1.6%	2.0%	2.3%	2.9%	3.3%	3.5%
	Sweden	6.3%	3.8%	1.2%	1.0%	2.2%	2.3%	2.4%	2.4%	2.4%
	United Kingdom	1.8%	0.9%	0.2%	0.7%	1.5%	1.8%	1.9%	2.1%	2.5%
	European Union	2.0%	1.6%	-0.2%	0.0%	1.3%	1.7%	1.8%	1.9%	2.0%
Advanced countries	Canada	3.2%	2.6%	1.8%	1.5%	2.4%	2.5%	2.4%	2.4%	2.2%
	Japan	4.7%	-0.6%	2.0%	1.6%	1.4%	1.1%	1.2%	1.2%	1.1%
	Korea	6.3%	3.6%	2.0%	2.8%	3.9%	4.0%	4.0%	4.0%	4.0%
	United States	2.4%	1.8%	2.2%	1.9%	3.0%	3.6%	3.4%	3.3%	2.9%
	Adv. economies	3.0%	1.6%	1.2%	1.2%	2.2%	2.6%	2.6%	2.6%	2.5%
Emerging countries	Brazil	7.5%	2.7%	0.9%	3.0%	4.0%	4.1%	4.2%	4.2%	4.2%
	China	10.4%	9.3%	7.8%	8.0%	8.2%	8.5%	8.5%	8.5%	8.5%
	India	11.2%	7.7%	4.0%	5.7%	6.2%	6.6%	6.9%	6.9%	7.0%
	Mexico	5.3%	3.9%	3.9%	3.4%	3.4%	3.3%	3.3%	3.3%	3.3%
	Russia	4.5%	4.3%	3.4%	3.4%	3.8%	3.7%	3.6%	3.6%	3.6%
	Turkey	9.2%	8.5%	2.6%	3.4%	3.7%	4.3%	4.4%	4.5%	4.5%
	Em. economies	7.6%	6.4%	5.1%	5.3%	5.7%	6.0%	6.1%	6.1%	6.2%
World	Total	5.2%	4.0%	3.2%	3.3%	4.0%	4.4%	4.5%	4.5%	4.5%

Figure 97 - Real GDP growth rates (2010-2018), IMF Forecasts

## Unemployment rates in EU. EC FIN 2013

	5-year averages							Spring 2013 forecast			Winter 2013 forecast	
	1993-97	1998-02	2003-07	2008	2009	2010	2011	2012	2013	2014	2013	2014
Belgium	9.4	7.8	8.2	7.0	7.9	8.3	7.2	7.4	8.0	8.0	7.7	7.7
Germany	8.6	8.5	10.1	7.5	7.8	7.1	5.9	5.5	5.4	5.3	5.7	5.6
Estonia	8.7	11.4	7.6	5.5	13.8	16.9	12.5	10.2	9.7	9.0	9.8	9.0
Ireland	12.8	5.1	4.5	6.4	12.0	13.9	14.7	14.7	14.2	13.7	14.6	14.1
Greece	9.2	11.1	9.5	7.7	9.5	12.6	17.7	24.3	27.0	26.0	27.0	25.7
Spain	19.7	12.5	9.7	11.3	18.0	20.1	21.7	25.0	27.0	26.4	26.9	26.6
France	10.9	9.3	9.0	7.8	9.5	9.7	9.6	10.2	10.6	10.9	10.7	11.0
Italy	10.8	9.9	7.4	6.7	7.8	8.4	8.4	10.7	11.8	12.2	11.6	12.0
Cyprus	:	3.8	4.5	3.7	5.4	6.3	7.9	11.9	15.5	16.9	13.7	14.2
Luxembourg	2.9	2.4	4.4	4.9	5.1	4.6	4.8	5.1	5.5	5.8	5.4	5.7
Malta	5.5	7.0	7.1	6.0	6.9	6.9	6.5	6.4	6.3	6.1	6.4	6.2
Netherlands	6.1	3.3	4.5	3.1	3.7	4.5	4.4	5.3	6.9	7.2	6.3	6.5
Austria	4.1	4.0	4.7	3.8	4.8	4.4	4.2	4.3	4.7	4.7	4.5	4.2
Portugal	6.7	5.1	8.1	8.5	10.6	12.0	12.9	15.9	18.2	18.5	17.3	16.8
Slovenia	:	6.8	6.1	4.4	5.9	7.3	8.2	8.9	10.0	10.3	9.8	10.0
Slovakia	:	17.3	15.4	9.6	12.1	14.5	13.6	14.0	14.5	14.1	14.0	13.6
Finland	15.1	9.9	8.2	6.4	8.2	8.4	7.8	7.7	8.1	8.0	8.0	7.9
Euro area	:	9.0	8.7	7.6	9.6	10.1	10.2	11.4	12.2	12.1	12.2	12.1
Bulgaria	:	16.5	10.4	5.6	6.8	10.3	11.3	12.3	12.5	12.4	12.2	11.9
Czech Republic	4.2	7.9	7.3	4.4	6.7	7.3	6.7	7.0	7.5	7.4	7.6	7.3
Denmark	7.1	4.7	4.7	3.4	6.0	7.5	7.6	7.5	7.7	7.6	8.0	7.9
Latvia	16.0	13.5	9.2	8.0	18.2	19.8	16.2	14.9	13.7	12.2	13.7	12.2
Lithuania	6.0	15.1	8.1	5.3	13.6	18.0	15.3	13.3	11.8	10.5	11.4	9.8
Hungary	:	6.6	6.8	7.8	10.0	11.2	10.9	10.9	11.4	11.5	11.1	11.1
Poland	12.9	15.6	16.1	7.1	8.1	9.7	9.7	10.1	10.9	11.4	10.8	10.9
Romania	:	6.5	7.1	5.8	6.9	7.3	7.4	7.0	6.9	6.8	6.9	6.8
Sweden	9.4	6.5	7.0	6.2	8.3	8.6	7.8	8.0	8.3	8.1	8.0	7.8
United Kingdom	8.5	5.5	5.0	5.6	7.6	7.8	8.0	7.9	8.0	7.9	8.0	7.8
EU	:	8.9	8.6	7.1	9.0	9.7	9.7	10.5	11.1	11.1	11.1	11.0
Croatia	:	13.1	12.2	8.4	9.1	11.8	13.5	15.9	19.1	20.1	15.9	14.9
USA	5.8	4.7	5.2	5.8	9.3	9.6	8.9	8.1	7.7	7.2	7.6	7.0
Japan	3.1	4.8	4.5	4.0	5.1	5.1	4.6	4.3	4.3	4.2	4.3	4.2

<sup>1</sup> Series following Eurostat definition, based on the labour force survey.

Figure 98 - Unemployment rates in EU. EC FIN 2013

## Unemployment rates in EU. OECD, 2013

Annex Table 13. Unemployment rates: commonly used definitions  
Per cent of labour force

	2009 Unemployment thousands	2010	2011	2012	2013	2014
Australia	649	5.2	5.1	5.2	5.5	5.5
Austria	205	4.4	4.1	4.4	4.7	4.7
Belgium	388	8.3	7.2	7.4	7.7	7.7
Canada	1 519	8.0	7.5	7.3	7.2	6.9
Chile	804	8.1	7.1	6.5	6.8	6.8
Czech Republic	353	7.3	6.7	6.9	7.2	7.1
Denmark	178	7.2	7.3	7.5	7.4	7.3
Estonia	96	16.8	12.5	9.9	9.1	8.7
Finland	222	8.4	7.8	7.7	8.0	7.8
France	2 576	9.3	9.2	9.9	10.7	10.9
Germany	3 240	6.8	5.8	5.3	5.5	5.6
Greece	471	12.5	17.7	23.6	26.7	27.2
Hungary	421	11.1	10.9	11.1	11.1	10.8
Iceland	13	7.6	7.1	6.1	5.4	5.1
Ireland	258	13.6	14.5	14.8	14.7	14.6
Israel	319	8.3	7.1	6.9	7.4	6.9
Italy	1 948	8.4	8.4	10.6	11.4	11.8
Japan	3 354	5.1	4.6	4.4	4.4	4.3
Korea	889	3.7	3.4	3.4	3.6	3.4
Luxembourg	12	5.8	5.6	6.1	6.6	6.7
Mexico <sup>1</sup>	2 575	5.4	5.2	5.0	5.0	4.9
Netherlands	327	4.4	4.3	5.2	5.8	6.1
New Zealand	142	6.5	6.5	6.9	6.6	6.0
Norway	80	3.5	3.2	3.1	3.1	3.0
Poland	1 411	9.6	9.6	10.1	10.5	10.7
Portugal	530	10.8	12.7	15.5	16.9	16.6
Slovak Republic	323	14.4	13.5	13.7	13.6	13.0
Slovenia	61	7.2	8.2	8.5	9.7	9.8
Spain	4 150	20.1	21.6	25.0	26.9	26.8
Sweden	408	8.4	7.5	7.7	7.9	7.6
Switzerland	193	4.4	3.9	3.9	4.1	4.0
Turkey	3 471	11.7	9.6	9.0	9.3	8.7
United Kingdom	2 391	7.9	8.1	8.0	8.3	8.0
United States	14 301	9.6	8.9	8.1	7.8	7.5
Euro area	14 807	9.9	10.0	11.1	11.9	12.0
Total OECD	48 278	8.3	8.0	8.0	8.2	8.0

1. Based on National Employment Survey.

Source: OECD Economic Outlook 92 database.

Figure 99 - Unemployment rates in EU. OECD, 2013



### Unemployment rate (2010-2018). IMF forecasts

		2010	2011	2012	2013	2014	2015	2016	2017	2018
Eurozone	Austria	4.4%	4.2%	4.4%	4.6%	4.5%	4.1%	4.0%	4.0%	4.0%
	Belgium	8.3%	7.2%	7.3%	8.0%	8.1%	8.1%	7.8%	7.6%	7.4%
	Cyprus	6.4%	7.9%	12.1%	n/a	n/a	n/a	n/a	n/a	n/a
	Estonia	17.3%	11.7%	9.8%	7.8%	6.2%	5.6%	5.0%	5.0%	5.0%
	Finland	8.4%	7.8%	7.7%	8.1%	8.1%	7.9%	7.7%	7.5%	7.5%
	France	9.7%	9.6%	10.2%	11.2%	11.6%	11.4%	10.9%	10.6%	10.4%
	Germany	7.1%	6.0%	5.5%	5.7%	5.6%	5.6%	5.6%	5.6%	5.6%
	Greece	12.5%	17.5%	24.2%	27.0%	26.0%	24.0%	21.0%	18.6%	16.2%
	Ireland	13.9%	14.6%	14.7%	14.2%	13.7%	12.9%	11.9%	11.1%	10.4%
	Italy	8.4%	8.4%	10.6%	12.0%	12.4%	12.0%	11.2%	10.4%	9.8%
	Luxembourg	5.8%	5.7%	6.0%	6.3%	6.4%	6.3%	6.2%	6.0%	5.9%
	Malta	6.9%	6.5%	6.3%	6.4%	6.3%	6.2%	6.1%	6.1%	6.0%
	Netherlands	4.5%	4.4%	5.3%	6.3%	6.5%	6.3%	6.0%	5.8%	5.5%
	Portugal	10.8%	12.7%	15.7%	18.3%	18.5%	18.1%	17.5%	16.9%	16.3%
	Slovak Republic	14.5%	13.6%	14.0%	14.3%	14.3%	13.7%	12.9%	12.0%	11.1%
	Slovenia	7.3%	8.2%	9.0%	9.8%	9.4%	9.0%	8.6%	8.0%	7.5%
	Spain	20.1%	21.7%	25.0%	27.0%	26.5%	25.6%	24.7%	23.8%	22.9%
	Eurozone	10.1%	10.2%	11.4%	12.3%	12.3%	11.9%	11.4%	10.9%	10.5%
Other EU	Bulgaria	10.3%	11.4%	12.4%	12.4%	11.4%	8.9%	7.4%	7.4%	7.4%
	Croatia	12.2%	13.7%	15.0%	15.2%	14.7%	13.9%	12.5%	11.0%	9.8%
	Czech Republic	7.3%	6.7%	7.0%	8.1%	8.4%	8.2%	5.5%	5.5%	6.5%
	Denmark	7.5%	7.6%	7.6%	7.6%	7.2%	7.0%	6.8%	6.6%	6.4%
	Hungary	10.9%	11.0%	11.0%	10.5%	10.9%	10.8%	10.6%	10.3%	10.0%
	Latvia	18.7%	16.2%	14.9%	13.3%	12.0%	10.9%	9.9%	9.3%	9.0%
	Lithuania	17.8%	15.2%	13.2%	12.0%	11.0%	10.0%	10.0%	10.0%	10.0%
	Poland	9.6%	9.6%	10.3%	11.0%	11.0%	10.3%	9.7%	9.4%	9.0%
	Romania	7.3%	7.4%	7.0%	7.0%	6.9%	6.8%	6.6%	6.5%	6.3%
	Sweden	8.6%	7.8%	7.9%	8.1%	7.8%	6.9%	6.6%	6.5%	6.4%
	United Kingdom	7.9%	8.0%	8.0%	7.8%	7.8%	7.4%	6.9%	6.6%	6.5%
	European Union	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Advanced countries	Canada	8.0%	7.5%	7.3%	7.3%	7.2%	7.1%	7.0%	6.8%	6.8%
	Japan	5.1%	4.6%	4.4%	4.1%	4.1%	4.1%	4.1%	4.0%	4.0%
	Korea	3.7%	3.4%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%
	United States	9.6%	8.9%	8.1%	7.7%	7.5%	6.9%	6.3%	5.9%	5.6%
	Adv. economies	8.3%	7.9%	8.0%	8.2%	8.1%	7.7%	7.3%	7.0%	6.8%
Emerging countries	Brazil	6.7%	6.0%	5.5%	6.0%	6.5%	6.5%	6.5%	6.5%	6.5%
	China	4.1%	4.1%	4.1%	4.1%	4.1%	4.1%	4.1%	4.1%	4.1%
	India	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Mexico	5.4%	5.2%	4.8%	4.8%	4.5%	4.5%	4.5%	4.5%	5.5%
	Russia	7.5%	6.6%	6.0%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%
	Turkey	11.9%	9.8%	9.2%	9.4%	9.5%	9.5%	9.5%	9.5%	9.5%
	Em. economies	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
World	Total	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Figure 100 - Unemployment rate (2010-2018). IMF forecasts

### Assumptions for NEUJOBS scenarios, the case of Energy transition (Fisher-Kowalski, et al., 2012)

	Friendly	tough
Energy transition		
Demand	Roughly at today's levels <sup>39</sup> (ER 2010, EREC/Greenpeace Energy [R]evolution Scenarios)	Increases by up to 40% <sup>40, 41</sup> (EIA 2011, EIA High Oil Price Case)
Supply	<p>Oil: Can keep up with demand due to new discoveries of conventional and unconventional oil, increased recovery rates</p> <p>Nuclear energy stagnating</p> <p>Biofuels: Progress in second generation biofuels lessens conflicts over land for food production</p>	<p>Oil: Shortages due to peak oil (in 2008 or even earlier) and delayed investment in new production (Alekkett et al. 2010)</p> <p>Nuclear energy slowly phasing out due to increased risks</p> <p>Biofuels: no progress in second generation biofuels, first generation biofuels require substantial share of agricultural land competing with food production over land</p>
Prices	<p>Oil price at around USD100 (WEO 2011, IEA 450 Scenario)</p> <p>Due to improved price finding mechanisms and management of stocks reduced oil price volatility</p> <p>CO<sub>2</sub> price of around USD70 (estimation based on WEO, IEA 450 Scenario)</p>	<p>Oil price approaching USD200 (EIA 2011, EIA High Oil Price Case)</p> <p>Oil price volatility remains high and negatively affects investment and economic activity</p> <p>No or low CO<sub>2</sub> price of USD35</p>
EROI <sup>42</sup>	of global oil and gas production decreases to 20:1 (Gagnon et al. 2009)	of global oil and gas production decreases to 10:1 (Gagnon et al. 2009)
CCS <sup>43</sup>	very limited in scale	failing

Figure 101 - Assumptions for NEUJOBS scenarios, the case of Energy transition  
Source: Fisher-Kowalski, et al., 2012