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Insight Report

The Europe 2020 Competitiveness Report: Building a More Competitive Europe

2012 Edition

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The terms country and nation as used in this report do not in all cases refer to a territorial entity that is a state as understood by international law and practice. The terms cover well-defined, geographically self-contained economic areas that may not be states but for which statistical data are maintained on a separate and independent basis.

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Preface

Børge Brende
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World Economic Forum

In recent years Europe has faced a myriad of economic and social difficulties, with continued financial troubles, fear of outright sovereign defaults, and rising unemployment and social tensions in several European economies. These concerns have led many to question the very viability of the euro and have raised the need to rethink the European Union project itself. Given the gravity of the crisis, and the ever-present fear that financial contagion may spread from Greece to other southern European countries and the rest of Europe, creating a major economic and financial meltdown, these issues have captured the world's headlines and European policy-makers' attention. However, amid concerted efforts to stem the short-term financial consequences, the efforts of Europe should not be further diverted from achieving the fundamental longer term goal of creating a highly competitive, inclusive and sustainable society to better enable Europe's economies to absorb shocks and ensure stable economic performance going into the future.

Competitive economies are those that are able to provide high and rising living standards, allowing all members of a society to contribute to and benefit from these levels of prosperity. In addition, competitive economies are those that are sustainable – meeting the needs of the present generation while maintaining the ability to meet those of future generations. The World Economic Forum has been studying Europe's competitiveness for more than three decades. Indeed, at its inception in 1979, *The Global Competitiveness Report* focused on how the region's competitiveness compared with that of the United States. Over the years the Forum has carried out a number of Europe-specific competitiveness reports. This culminated most recently with the Lisbon Review series, which assesses Europe's progress in accomplishing its competitiveness agenda over the first decade of this century.

Recognizing that they had not met the competitiveness goals set out in the Lisbon Agenda, in 2010 Europe's leaders devised a new strategy, which has been coined the Europe 2020 Strategy. The goal of the strategy is to encourage "smart, sustainable, inclusive growth brought about through greater coordination of national and European policy." *The Europe 2020 Competitiveness Report* is the first in a series that will assess Europe's competitiveness progress based on the Europe 2020 Strategy every two years until the end of the present decade.

As this Report indicates, Europe at present trails other advanced economies in creating a smart, highly productive economy. However, much variation in performance exists across EU Member States, with some countries performing very well in all areas and others still trailing behind. The Report also shows that countries with relatively high levels of economic prosperity but lagging in building a knowledge-based, highly productive economy are those that have suffered the highest losses in terms of employment, salaries or both. In other words, high levels of prosperity in Europe cannot be sustained over time without high levels of competitiveness. The results show that much remains to be achieved in order to fully harness Europe's economic potential.

As Europe and the world slowly emerge from the most significant economic crisis in a half century, accelerating the reform process articulated through competitiveness-based strategies will be critical to ensuring that the region gets back to growth. The World Economic Forum will continue to monitor and assess Europe's progress through this and other competitiveness research.

I wish to thank the authors of *The Europe 2020 Competitiveness Report*, Beñat Bilbao-Osorio, Jennifer Blanke, Roberto Crotti, Margareta Drzeniek Hanouz, Stephen Kinnock and Caroline Ko, for their energy and commitment to producing this study, as well as the other members of the Competitiveness and Europe teams. I am also grateful to the members of our Advisory Board who have provided important intellectual support in this endeavour.

Finally, we would like to convey our sincere gratitude to our network of Partner Institutes worldwide, without whose enthusiasm and hard work the annual administration of the Executive Opinion Survey and this Report would not be possible.

Executive Summary

The European Union (EU) is going through one of the most difficult periods since its establishment, with multiple challenges facing the region's policy-makers. While many countries are struggling to recover from the worst financial and economic downturn since the Great Depression and some economies are even facing sovereign default for the first time in 60 years, political discontent is mounting. Some gloomy forecasts portend a lost decade for growth unless decisive action is taken at scale and speed to address the bottlenecks to reform that are strangling economic development.

The global financial crisis has taken its toll on Europe's economies in recent years. It has exposed the extent to which growth patterns in several countries have been unsustainable, leading to sharp adjustments in the labour markets with rapid falls in employment, salaries or both, as well as creating much stress in the financial markets. Various short- and medium-term efforts aimed at dealing with these financial challenges have been adopted and these issues have captured the world's headlines as well as the European public's attention.

However, amid all of the short-term fire fighting, it is critical not to lose sight of the fact that to address the underlying concerns in the region, Europe must become more competitive. Competitive economies are those that are able to provide high and rising livings standards, allowing all members of a society to contribute to and benefit from high levels of prosperity.

Following the well established methodology the World Economic Forum uses to analyse and measure competitiveness, this Report researches and monitors to what extent the EU is making progress to achieve the competitiveness goals set in its "Europe 2020" Strategy to achieve "smart, sustainable and inclusive growth". In addition to a set of country-specific analyses that points out individual competitiveness strengths and weaknesses for all 27 Member States and six acceding and candidate countries, overall the Report finds that:

In comparative terms, the EU tends to perform better than other advanced economies in ensuring inclusive and sustainable societies...

The EU fares better in building inclusive societies than the United States but worse than Japan and Canada. The European socio-economic model has traditionally been based on building inclusive societies by developing strong welfare states that would support people during difficult times. To a certain extent, the sharp rise in long-term unemployment in some countries of the EU has put the model under duress and reduced the ability of these economies to provide gainful employment on a sustainable basis. In terms of sustainability, the EU performs relatively well-above the United States and above Japan. Only Canada, among the comparator countries, outperforms Europe in this dimension.

... but lags behind in terms of becoming a smarter place, hindering therefore its capacity to shift towards truly differentiated, higher value added activities and sustain its economic competitiveness.

Europe is trailing behind the United States, Japan and Canada in building a smarter economy that can help facilitate the transition to higher value added, more productive activities. The gap is particularly wide vis-à-vis the United States.

A more nuanced analysis shows that in terms of inclusion, Europe provides better social cohesion policies but fails to provide the right conditions for gainful employment for large shares of its population...

The European model provides better social cohesion policies but demonstrates weaknesses in providing the right conditions for gainful employment for large shares of its population. Overall Europe has managed to provide relatively good social protection mechanisms during economic downturns by creating social safety nets. However, at the same time, the strong and persistent effects of the financial and economic crisis coupled with comparatively stronger rigidities in the labour markets of several European countries have resulted in sharp increases in unemployment, of a long-term nature in many cases, thus depriving a wide segment of the population of gainful employment. Moreover, the severe fiscal imbalances in several European countries, especially those hit more strongly by the economic crisis, are placing increasing stress on the capacity of governments to support the existing social protection models, calling into question their sustainability unless comprehensive reforms are implemented.

... and underperforms in every single pillar that builds a smarter, knowledge-intensive society.

The gap in creating a knowledge-based economy is evident in building a highly skilful, digital savvy, innovative economy with favourable business conditions for entrepreneurship, where the EU clearly falls short compared with other advanced economies. Given the strong interconnections and complementarities among all these areas, the combined result of these weaknesses is even stronger than when analysed by individual dimensions.

The aggregate data for the EU masks large national disparities. A tale of four very different Europes emerges and shows the important competitiveness divide in the EU, with the Nordic countries leading the way internationally and several southern, central and eastern European countries falling behind...

The EU is not a homogeneous entity in terms of competitiveness. On the contrary, large disparities exist among Member States, with some countries performing much better than others and well above the EU average or other advanced economies, such as the United States. Four broad groups of countries with distinctive competitive performances seem to emerge. These four "Europes" are: (1) Nordic Europe, (2) Western Europe and Estonia, (3) Southern and Eastern Europe, and (4) Southeast Europe.

... as well as most accession and candidate countries.

In general, accession and candidate countries, with the exception of Iceland, have a low competitiveness profile, lagging in virtually all analysed dimensions. Preparing them for accession will require the addressing of their specific competitiveness weaknesses.

From this analysis, a number of policy insights can be derived for both individual Member States and the European Union as a whole. The ten key findings and recommendations are highlighted in the box below.

Ten Key Findings And Recommendations

1. High levels of economic prosperity cannot be sustained without high levels of competitiveness.

Defining a comprehensive reform agenda that identifies key measures to address the main competitiveness weaknesses is needed.

2. While addressing fiscal imbalances is crucial for short-term stability and to regain confidence, improving competitiveness is essential to supporting medium- and long-term prosperity.

Fiscal rebalancing should be accompanied by a reform agenda that addresses the main competitiveness weaknesses and preserves those investments, e.g. in education, R&D and innovation, that are crucial to building a smarter economy and regaining growth.

3. The European Union on average trails the world's most advanced economies on building a smarter economy, hindering competitiveness. Building a knowledge-based society should be a priority to build a truly differentiated offer.

Further investments in generating new knowledge activities that facilitate the creation of more and freer movement of knowledge, via the construction of a European Research Area or a European Education Area should be further encouraged. This should be reflected in the Multiannual Financial Framework 2014-2020.

4. A competitiveness divide exists in the European Union. The likely result will be a lack of sufficient economic and social convergence across Member States.

The fact is that while some European economies are among the most competitive in the world, the weaker performance of others is negatively impacting the bloc as a whole. If global market confidence in Europe is to return, then top priority must be given to supporting the weaker performers through their reform and investment programmes. To encourage convergence, cohesion policy and structural funds could be better targeted at addressing the main competitiveness weaknesses of those countries and regions receiving these funds. More emphasis in effectively supporting innovation, information and communications technology (ICT) development and education would be propitious areas of focus as these are the key areas where some member countries are trailing and need more time and effort to catch up.

5. In general, candidate countries face important competitiveness challenges.

Enlargement policies should support the build-up of a competitiveness agenda in those countries that are slated to join the European Union. Only by doing so will they be able to build competitive advantage.

6. There are no necessary trade-offs between building a smart economy and achieving an inclusive or environmentally sustainable society.

Competitiveness agendas do not need to—and should not—favour one specific dimension at the expense of one of the others. In the long run, all three dimensions are likely to be mutually reinforcing.

7. Fragmentation in the internal market for tradable services, insufficient openness to trade and administrative and cultural barriers for an effective free movement of people hinder overall competitiveness in Europe.

European policies that can improve the conditions for business activity and competition, e.g. eliminating the barriers to a single market in tradable services or further opening to trade, should also be supported. In addition, the removal of administrative barriers for the free movement of people, creating a larger and more efficient labour market, should be implemented.

8. There is a sense of urgency and scale to undertake the necessary investments and implement the necessary reforms to boost competitiveness and avoid a lost decade for Europe. Innovative financing mechanism need to be further explored.

The comprehensiveness and depth of these reforms, as well as the speed of implementation will be critical to ensuring momentum and avoiding half-hearted attempts that fall short within the desired time frame. The risk of a lost generation is real. Capital investments in building a knowledge-based society will require funding. Innovative financing mechanisms, e.g. a more active role of the European Investment Bank or utilizing the unused funds of the European Financial Stabilisation Mechanism, leveraging private financing and building public-private-partnerships, should be explored.

9. The necessary reforms will require political leadership to overcome vested interests and to create shared commitment by all agents of the economy so that the effects of the reforms are perceived as fair and worth the necessary pain.

Implementing reforms must be a shared responsibility of all agents in a society. A shared engagement, with give and take by the government, the business community and civil society will be crucial to ensuring societal support for reform programmes.

10. Efforts to raise competitiveness need to be coordinated and sequenced in a way that they generate public support within the political cycle.

The competitiveness agendas of individual Member States and European institutions should be aligned through an enhanced method of European economic governance in order to avoid duplication of efforts and raise the efficiency of resources. More generally, reforms provide short-term specific pains in exchange for future generic gains that may be difficult to communicate to and be understood by the population. The governance of the competitiveness agenda should follow a long-term agenda that moves beyond political cycles while providing the necessary time to maturity for investments and reforms to pay off in the short to medium term.

Building a More Competitive Europe: Findings from the Europe 2020 Competitiveness Report

By Beñat Bilbao-Osorio, Jennifer Blanke, Roberto Crotti, Margareta Drzeniek Hanouz, Stephen Kinnock and Caroline Ko, World Economic Forum

Introduction

The European Union (EU) is going through one of the most difficult periods since its establishment, with multiple challenges facing the region's policy-makers. While many countries are struggling to recover from the worst financial and economic downturn since the Great Depression and some economies are even facing sovereign default for the first time in 60 years, political discontent is mounting. Electorates increasingly judge their political leaders unable or unwilling to adopt measures to place their economies on firmer ground, potentially placing the entire European project in jeopardy. Some gloomy forecasts portend a lost decade for growth unless decisive action is taken at scale and speed to address the bottlenecks to reform that are strangling economic development.

The global financial crisis has taken its toll on Europe's economies in recent years. Cheap financing fuelled asset bubbles in the real estate markets of countries such as Ireland and Spain, as well as excessive public spending in others, such as Greece, Portugal and Italy.

The financial crisis has exposed the extent to which growth patterns in these countries have been unsustainable, leading to sharp adjustments in the labour markets with rapid falls in employment, salaries or both, as well as creating much stress in the financial markets. Various short- and medium-term efforts aimed at dealing with these financial challenges have included national efforts such as massive bank bailouts, sharp public austerity measures, as well as regional and international efforts to address the sovereign debt crisis, with an International Monetary Fund (IMF) intervention, the buying of sovereign debt by the European Central Bank and the creation of the European Financial Stabilisation Mechanism. Given the gravity of the crisis, and the ever-present fear that financial contagion may spread from Greece and other Southern European countries to the rest of Europe, these issues have captured the world's headlines as well as the European public's attention.

BOX 1: Fiscal imbalances and competitiveness in Europe

In recent years a number of European economies have faced fiscal imbalances so severe that the threat of sovereign default in Europe has become a possibility for the first time in 60 years. The severity of the crisis has led to sizeable interventions to avoid default in southern European countries and Ireland, which have been accompanied by massive cuts in government spending and the design of reform programmes. While the jury is still out on the results of these measures, it has become increasingly apparent that in most concerned countries the combination of low competitiveness and the related poor growth outlooks make debt repayment very difficult going forward. It is therefore crucial that European policy-makers remain mindful of the importance of competitiveness-enhancing reforms and investments amidst short-term fiscal consolidation efforts.

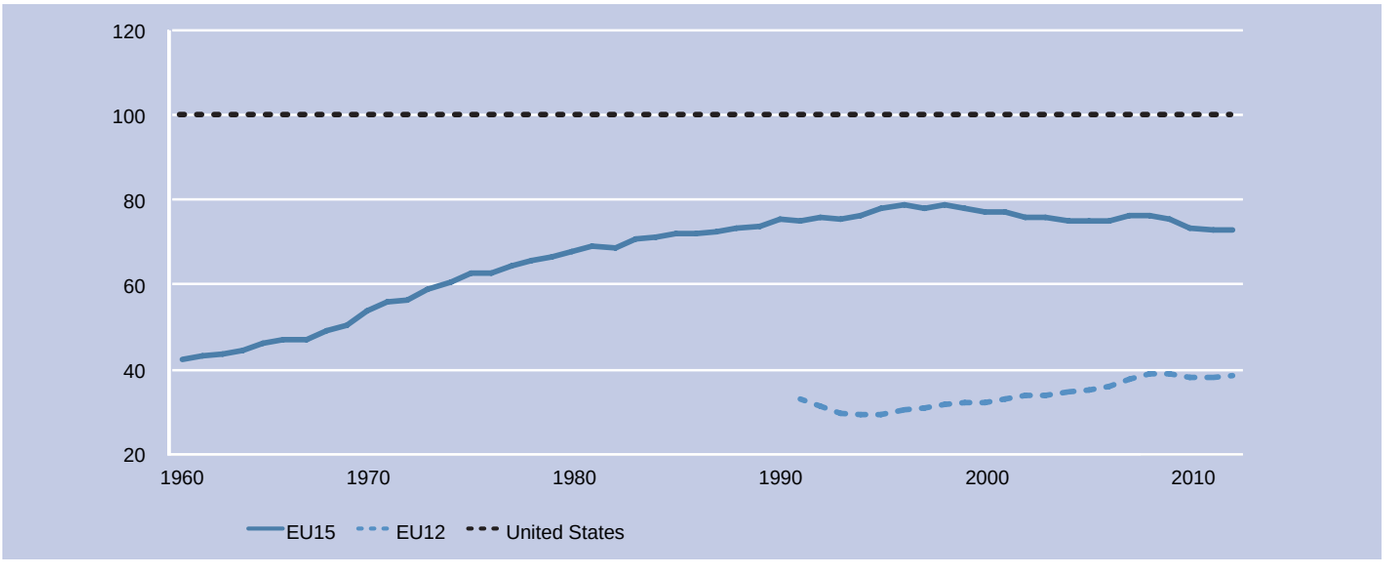
There is no doubt that these severe fiscal imbalances could endanger the EU's competitiveness in the shorter term. Given the interconnectedness of the financial sectors in the region, the sovereign default of one country would further undermine the stability of the still fragile banking systems across the European Union, potentially spreading to other countries. Moreover, as public debt levels rise, governments are under pressure to raise taxes, which may be distortive or can further stifle business activity. Higher public debt levels generally also bring about higher interest rates across the economy, which in turn raise the cost of finance for businesses while crowding out private investment.

In addition to these relatively short-term effects, high public debt can negatively affect competitiveness and Europe's future growth performance in the longer term as well. In general, the impact of public debt on competitiveness depends to a large extent on how it is being spent. Public debt can arguably enhance competitiveness if it is used to finance investments that raise productivity and help countries move towards a knowledge-based economy, such as upgrading schools or supporting research. However, if debt is simply used to finance present consumption, it burdens the economy in the longer term. Indeed, in addition to crowding out private investment, which may also reduce growth, higher debt implies that interest payments and debt service will take up a bigger share of the government budget, forcing a reduction in public spending in other areas.

Preventing sovereign default in the EU economies concerned calls for fiscal consolidation measures. However, these measures must not deteriorate countries' longer term competitiveness. There is no doubt that reducing public investments in areas such as health, education, research and development or maintaining infrastructure will erode competitiveness over the medium to longer term, particularly in European countries where research and development and education are among the areas that are most important for competitiveness.

Given the importance of public investment in competitiveness-enhancing areas such as education and innovation, policy-makers face a difficult trade-off. Reducing such investments would have the unfortunate effect of turning short-term financial difficulties into longer term competitiveness weaknesses, unless private investment can be leveraged more efficiently. On the other hand, reducing other types of targeted social spending may give rise to social tensions in the immediate term. However, focusing on measures that enhance competitiveness would create a virtuous cycle and would strengthen countries' growth potential and thus improve the budgetary situation over the medium to longer term. In a number of European countries this has not been clearly articulated to the public by their political leaders.

Figure 1: EU-US productivity gap



Source: The Conference *Board Total Economy Database*™, January 2012, http://www.conference-board.org/data/economydatabase/

However, amid all of the short-term fire-fighting, it is critical not lose sight of the fact that to address the underlying concerns in the region, Europe must become more competitive. Competitive economies are those that are able to provide high and rising livings standards and gainful employment to their citizens. In other words, competitiveness and rising levels of productivity are the crucial force behind sustained levels of economic progress. Significant room for improvement remains in Europe in this respect, as recent data show that productivity in Europe is more than 20% lower than in the United States and that the productivity gap has widened since the mid-1990s among the EU15 countries (see figure 1).[1]

Measuring Europe's Competitiveness

Over the years, the EU has devised a number of strategies to make its economies more competitive. In 2000, the EU launched the Lisbon Strategy, aimed at making Europe the most dynamic and competitive economy by 2010. This deadline came and went without seeing a major improvement in Europe's competitiveness, and with the strategy itself criticized in retrospect for being too broad, covering too many issues, and with no compliance mechanism to give the recommendations "bite".

Recognizing that they had not met their goals, in 2010 Europe's leaders devised a new competitiveness strategy, which has been coined the *Europe 2020 Strategy*. The goal of the strategy is to encourage national and regional policies that provide growth and jobs in the coming decade. However, as mentioned earlier, over recent years, much of the attention of policy-makers has been distracted by the shorter term fire-fighting of the financial and sovereign debt crisis, without paying sufficient attention to the measures needed to boost competitiveness in the region. This lack of focus led to the drafting of a recent open letter by twelve heads of state and government to the presidents of the European Commission and European Council calling for "a new plan for growth in Europe"[2] to focus Europe's attention on those measures that could further unleash competitiveness in Europe by building on the Europe 2020 Strategy.

For its part, the World Economic Forum has been studying Europe's competitiveness for more than three decades. Indeed the flagship *Global Competitiveness Report* was, at its inception in 1979, primarily concerned with Europe's competitiveness compared with that of the United States. More recently, The Lisbon Review series, which has been carried out every two years over the past decade, has reviewed Europe's progress in meeting the Lisbon goals.

Building on past work, this Report, *The Europe 2020 Competitiveness Report: Building a More Competitive Europe*, is the first in a series that will assess Europe's competitiveness based on the Europe 2020 Strategy every two years until the end of this decade. The goal of this Report is to provide a platform for ongoing dialogue between business, civil society, governments and European institutions on the areas requiring attention in order to improve Europe's competitiveness. The aim is to encourage positive policy reform and the necessary investments required to further Europe's economic and social progress.

This Report complements a more macroeconomic-focused report being released in parallel by the World Economic Forum, entitled *Euro*, *Dollar*, *Yuan Uncertainties*. Both reports contribute to the World Economic Forum's *Remodelling Europe Initiative*, a multi-stakeholder endeavour to explore the future of the European project as well as to analyse new growth strategies for the European Union.

The Europe 2020 Strategy: Dimensions of Reform and Monitoring Mechanisms

Launched by the European Commission in March 2010, "Europe 2020" is the EU's 10-year growth strategy. It seeks to enhance the delivery of growth and jobs for the present decade. At the heart of the agenda is the achievement of "smart, sustainable, inclusive growth brought about through greater coordination of national and European policy." The three axes of the strategy are:

- Smart growth: developing an economy based on knowledge and innovation
- Sustainable growth: promoting a more resource-efficient, greener and more competitive economy
- Inclusive growth: fostering a high employment economy delivering social and territorial cohesion

The strategy identifies seven flagship initiatives the EU should take to boost growth and jobs:

1. *Innovation Union* to improve framework conditions and access to finance for research and innovation to ensure that innovative ideas can be turned into products and services that create growth and jobs
2. *Youth on the Move* to enhance the performance of education systems and facilitate the entry of young people into the labour market
3. *A Digital Agenda for Europe* to speed up the roll-out of high-speed Internet and reap the benefits of a digital single market for households and firms
4. *Resource-efficient Europe* to help decouple economic growth from the use of resources, support the shift towards a low-carbon economy, increase the use of renewable energy sources, modernize the transport sector and promote energy efficiency
5. *An Industrial Policy for the Globalization* Era to improve the business environment, notably for SMEs, and to support the development of a strong and sustainable industrial base able to compete globally
6. *An agenda for New Skills and Jobs* to modernize labour markets and empower people by developing their skills throughout the life cycle with a view to increase labour participation and better match labour supply and demand, including through labour mobility
7. *European Platform against Poverty* to ensure social and territorial cohesion such that the benefits of growth and jobs are widely shared and people experiencing poverty and social exclusion are enabled to live in dignity and take an active part in society.

The EU monitors its progress along these initiatives and towards the Europe 2020 targets as part of the *European Semester*, its annual cycle to align fiscal, economic and structural policy coordination launched in the aftermath of the economic crisis. Within the framework of the European semester, the Commission monitors developments along the dimensions of macroeconomic factors, public finances and growth-enhancing reforms, with the Europe 2020 strategy belonging to the latter. Each year the European Semester is initiated by the publication of the European Commission's *Annual Growth Survey*, which highlights the EU's priorities for the coming 12 months and serves as a basis for discussion around the Europe 2020 strategy at the spring meeting of the European Council.

Following the first Annual Growth Survey launched in 2011, this year's Annual Growth Survey for the first time allows for a quantitative assessment of how far the EU has been progressing towards its Europe 2020 targets.[3] Overall, the Report,[4] which was endorsed by the European Council in March 2012, recognizes that progress made by Member States towards reaching these goals has been disappointing. Table 1 shows the slow progress the EU27 has made in the past few years towards reaching its Europe 2020 targets. The European Commission specifically considers that individual country targets—set by Member States and endorsed by National Reform Programmes in April 2011—are too low to meet the EU headline targets by 2020.

This monitoring mechanism thus allows for a very high level view of how Europe is doing in meeting its targets. However, many of the drivers of competitiveness require a more nuanced picture of the factors that underpin progress in these broad areas. In this context, an assessment based in large part on the views of those people making the major investments in each country is valuable.

The Europe 2020 Competitiveness Report therefore differs from those that are regularly carried out by the EU and other organizations in that it is largely based on the results of the World Economic Forum's Executive Opinion Survey (EOS). This survey is carried out among CEOs and top executives in each of the countries under analysis.[5] The results can therefore be interpreted largely as the business community's perspective on the relative performance of European countries in meeting the Europe 2020 goals.

Table 1: Europe 2020 Progress

	2009	2010	EU headline target	Estimated EU achievements based on current national commitments
Employment rate, %	69	68.6	75	73.7 - 74
R&D, % of GDP	2.01	2	3	2.65-2.72
Greenhouse gas emissions (1990=100)	83	n/a	minus 20%	minus 20%
Share of renewables in gross final energy consumption, %	11.7	n/a	20	20
Gross inland consumption of energy, % of GDP	165.72	167.99	20% increase	206.9
Early school leaving, %	14.4	14.1	10	10.3-10.5
Tertiary education,% *	32.3	33.6	40	37.5-38.0
Reduction of population at risk of poverty or social inclusion (1,000 persons)	113,716	115,790	20 million	12 million

*Calculation does not include International Standard Classification of Education (ISCED) 4 for Germany and Austria. Results with ISCED 4: 39.9%- 40.4%

Source: Eurostat, European Commission Annual Progress Report 2012

The *Europe 2020 Competitiveness Report* Framework

The seven key dimensions of the Europe 2020 Strategy described above, with some adjustments for presentational purposes, can be represented in a seven-pillar framework (see Figure 2). Each pillar is populated by a number of variables that help measure Europe's progress along this key dimension. Combined, these seven pillars create the Europe 2020 Competitiveness Index (see appendix). The Index is organized around three sub-indexes that monitor Europe's progress towards becoming an increasingly (1) smart, (2) inclusive, and (3) sustainable economy. Each of these sub-indexes is composed of a number of pillars that reflect the spirit of the seven flagship initiatives, as follows:

Smart Europe

The Smart Europe sub-index aims to measure the extent to which European countries are developing economies based on knowledge and innovation. It is made up of four pillars that capture various aspects of Europe's ability to develop smart economies: the enterprise environment, digital agenda, innovative Europe and education and training. Each is described below.

Pillar 1: Enterprise environment

A prerequisite for improving the prospects of growth and employment in the EU is improving the overall enterprise environment. Critical to achieving this goal is enhancing competition through channels such as effective antitrust policy and appropriate regulation.

Another key objective is to stimulate entrepreneurship and facilitate business creation by improving the business start-up environment. This can be achieved by reducing the administrative impediments to doing business in the EU and reducing distortionary or burdensome taxes, as well as by making it cheaper and easier to start a business and ensuring access to capital for new and growing businesses. The EU has taken an important step in this area by making it possible to start a business within a week in most EU countries, and facilitating the process through a one-stop shop. Yet, the enterprise environments vary greatly across member countries and much remains to be achieved in this area.

Pillar 2: Digital agenda

This dimension measures the extent to which an economy has harnessed information and communication technologies (ICT) to share knowledge and enhance the productivity of its industries. ICT has evolved into the "general purpose technology" of our time,[6] given the critical spillovers to other economic sectors, their capacity to transform business practices and economic activities, and their role as efficient infrastructure for commercial transactions.

Countries with companies that aggressively integrate these new technologies into their production processes tend to see better productivity improvements than others. Further, countries with governments that strongly prioritize the adoption of ICTs have often leapfrogged in this direction. To create a true information society that ensures maximum productivity gains from ICT adoption, all stakeholders in the economy (individuals, businesses and governments) must use these tools.

This dimension of the Europe 2020 Strategy offers an excellent opportunity for exchange in information and experience between the strong and weaker performers.

Pillar 3: Innovative Europe

Innovation is critical, especially for those countries that have moved very close to the technology frontier, as is the case of most EU economies. As well as making maximum use of existing technologies, as discussed in the pillar above, these countries must have the necessary framework to ensure that they are at the forefront of innovation. Firms in these countries must design and develop cutting-edge products and processes to maintain a competitive edge.

This progression requires an environment that is conducive to innovative activity, supported by both the public and the private sectors. In particular, it entails sufficient investment in research and development (R&D), especially by the private sector; the presence of high-quality scientific research institutions; extensive collaboration in research between universities and industry; and sophisticated business practices. In light of the recent sluggish recovery and rising fiscal pressures faced by advanced economies, it is important that public and private sectors resist pressures to cut back on the R&D spending and other innovation-driven activities that will be so critical for sustainable growth going into the future.

Pillar 4: Education and training

Quality higher education and training is crucial for economies that want to move up the value chain beyond simple production processes and products. In particular, today's globalizing economy requires countries to nurture pools of well-educated workers who are able to adapt rapidly to their changing environment and the evolving needs of the production system. This pillar measures secondary and tertiary enrolment rates as well as the quality of education provided. The extent of staff training is also taken into consideration because of the importance of vocational and continuous on-the-job training—which is neglected in many economies—to ensuring a constant upgrading of worker skills.

While the Report portrays the results for these four dimensions separately for presentational purposes, it has to be noted that they are closely interconnected. The capacity of an economy to shift towards more knowledge intensive, higher value added activities will depend on its capacity to generate new knowledge through better performing innovation and educational systems and the effective use of technologies, including ICT, as much as on the business conditions that facilitate or hinder the ability to bring this new knowledge into the market in a timely and effective manner.

Inclusive Europe

The Inclusive Europe sub-index captures the extent to which every member of society can contribute to and benefit from Europe's growth and development. This is captured through two pillars, one measuring the labour market and employment conditions and the second measuring social inclusion more generally.

Pillar 5: Labour market and employment

This pillar gauges the capacity of an economy to mobilize all human resources to contribute to the economic growth of a society. The efficiency and flexibility of the labour market are critical to ensuring that workers are allocated to their most efficient use in the economy and provided with incentives to give their best effort in their jobs.

Labour markets must therefore have the flexibility to shift workers from one economic activity to another rapidly and at low cost, and to allow for wage fluctuations without much social disruption. The importance of the latter has been dramatically highlighted by the recent events in some southern European countries, where rigid labour markets are an important cause of high youth and long-term unemployment, the root cause of the recent unrest.

Efficient labour markets must also ensure a clear relationship between worker incentives and their efforts to promote meritocracy in the workplace, and they must provide equity in the business environment between women and men. Taken together these factors have a positive effect on worker performance and the attractiveness of the country for talent, two aspects that are growing more important as talent shortages loom on the horizon.

Pillar 6: Social inclusion

This pillar aims to capture the extent to which all members of society have the opportunity to benefit from economic growth in their country. This is critical because higher median disposable incomes create demand and savings pools for investment, and inclusive societies, which allow opportunities for all, will tend to be more stable and thus more conducive to economic activity and prosperity. It is measured here by the extent of inequality in the economy as reflected by the Gini coefficient, the government's efforts to reduce poverty and inequality, including the existence of effective social safety net protection, as well as access to healthcare services within the country.

As is the case of the smart sub-index, policies to enhance labour market participation, employment and social inclusion are very closely intertwined, as the best manner to secure social inclusion is by ensuring gainful employment for a large share of the population. To a large extent this sub-index therefore reflects the capacity of an economy to provide security of employment rather than security of jobs and is closely associated with the concept of "flexicurity" that several Nordic countries have been successfully promoting in the past years.

Sustainable Europe

The sustainable Europe sub-index is made up of just one pillar, measuring the extent to which the natural environment is contributing to overall national competitiveness and the preservation of a pollution-free environment.

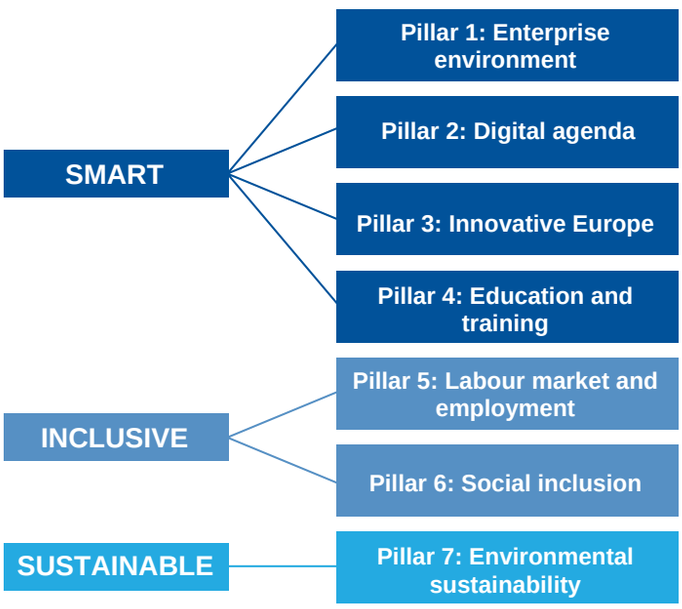
Pillar 7: Environmental sustainability

A high-quality and well-managed physical environment is important for competitiveness through a variety of channels. The efficient use of energy and other resources lowers costs and directly boosts productivity by virtue of making better use of inputs. Further, a high-quality natural environment supports a healthy workforce, avoiding the illness and lower human capital productivity that can be brought about by pollution and other environmental degradation. Finally, related to the last point, environmental degradation can also directly reduce the productivity of sectors such as agriculture, which in turn lowers output and potentially the ability for a country to meet the food needs of the population.

In the index this dimension is assessed by taking into account the share of renewable energy consumption, the enforcement of environmental legislation, the ratification of international environmental treaties and the quality of the natural environment, including through the level of air pollution as measured through CO2 intensity and PM25 emissions.[7]

Figure 2 presents a graphical representation of the Europe 2020 Competitiveness Report framework.

Figure 2: "Europe 2020" Competitiveness Report Framework



Source: World Economic Forum

The multidimensionality of the Europe 2020 strategy reflects the multiple forces driving economic growth and development.

Calculating the Europe 2020 Competitiveness Report Scores: Data, Methodology and Country Coverage

Data sources

The assessment of Europe's competitiveness is based on publicly available hard data from respected institutions, such as Internet penetration rates and unemployment rates, and data from the World Economic Forum's Executive Opinion Survey (EOS). The EOS is a survey of business leaders, conducted annually in over 140 countries, that provides data for a variety of qualitative issues for which hard data sources are scarce or frequently nonexistent (e.g. the quality of the educational system, the government's prioritization of information and communications technologies).

The EOS also allows us to capture the critical perspective of business leaders on the state of their operating environments on a variety of issues. Most of the hard data dates from the end of 2011, which is the most recent end-of-year data available. The EOS was carried out in the spring of 2010 and 2011.[8]

Methodology

The overall scores for each country are calculated as an unweighted average of the individual scores in the seven pillars. We have also calculated the index values as they would have appeared in 2010 in order to begin to carry out inter-year comparisons and provide a sense of the dynamics of Europe's performance. The scores and rankings of the countries covered by the Report are extracted from a database covering 142 countries. The precise structure of the index, including details on the specific hard and survey data used in making the calculations, is shown in Appendix A: Composition of the Europe 2020 Competitiveness Index of this Report.

Country coverage

The 27 Member States of the European Union (EU), which are meant to be striving towards the Europe 2020 goals, are at the core of the analysis. These countries are Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, the Slovak Republic, Slovenia, Spain, Sweden and the United Kingdom. Their performance according to the Europe 2020 Competitiveness Index is compared among each other to assess which countries are leading in achieving the goals, and which are trailing behind.

In addition, six countries have filed their candidature to become members of the EU, and therefore it is important to gauge their level of competitiveness as they may become full members at some point and must then abide by the EU's overall goals. These countries are: Croatia, Iceland, Macedonia FYR, Montenegro, Serbia and Turkey.

Finally, the Report also provides information on the European Union as a political and economic entity and compares its position in all dimensions vis-à-vis a set of other advanced economies, notably the United States, but also Japan, Canada, and large emerging economies, i.e. Brazil, the Russian Federation, India and China (BRICs).

Table 2: *Europe 2020 Competitiveness Report 2012* coverage

European Union's membership and relationships with selected countries				
Economy	**EU code**	**Status/ Relationships with EU**	**Since**	**GDP p.c. (in current €), 2011**
Austria	AT	Member €	1995	35,764
Belgium	BE	Member €	1952	33,765
Bulgaria	BG	Member	2007	5,211
Cyprus	CY	Member €	2004	22,161
Czech Republic	CZ	Member	2004	15,012
Denmark	DK	Member	1973	43,056
Estonia	EE	Member €	2004	11,947
Finland	FI	Member €	1995	35,297
France	FR	Member €	1952	30,478
Germany	DE	Member €	1952	31,415
Greece	EL	Member €	1981	19,221
Hungary	HU	Member	2004	10,028
Ireland	IE	Member €	1973	34,775
Italy	IT	Member €	1952	26,126
Latvia	LV	Member	2004	8,805
Lithuania	LT	Member	2004	9,428
Luxembourg	LU	Member €	1952	81,201
Malta	MT	Member €	2004	15,426
Netherlands	NL	Member €	1952	36,532
Poland	PL	Member	2004	9,721
Portugal	PT	Member €	1986	16,160
Romania	RO	Member	2007	6,047
Slovak Republic	SK	Member €	2004	12,872
Slovenia	SI	Member €	2004	17,441
Spain	ES	Member €	1986	23,248
Sweden	SE	Member	1995	40,856
United Kingdom	UK	Member	1973	27,797
EU accession and candidate countries				
Croatia		Accession country	2011	10,396
Iceland		Candidate country	2010	31,764
Macedonia, FYR		Candidate country	2005	3,532
Montenegro		Candidate country	2010	5,364
Serbia		Candidate country	2012	4,699
Turkey		Candidate country	1999	7,455
Comparator countries				
BRIC		Comparator group		
Canada		Comparator country		36,945
Japan		Comparator country		33,435
United States		Comparator country		34,334

€ Member of the eurozone

Source. European Commission, European Commission DG ECFIN AMECO Database. Figures for Serbia come from the IMF World Economic Outlook Database, April 2012, converted by the official US$/EUR exchange rate as of 31 Dec 2011

Table 3: Rankings and scores of the EU Member States in 2010 and 2012

Economy	Rank 2012	Score	Rank 2010	Score	Change
Sweden	1	5.77	1	5.77	→
Finland	2	5.71	2	5.61	→
Denmark	3	5.60	3	5.52	→
Netherlands	4	5.46	4	5.34	→
Austria	5	5.33	6	5.25	↑
Germany	6	5.28	5	5.25	↓
United Kingdom	7	5.23	7	5.10	→
Luxembourg	8	5.13	8	5.05	→
Belgium	9	5.04	9	5.02	→
France	10	4.98	10	5.00	→
Estonia	11	4.74	13	4.67	↑
Ireland	12	4.66	11	4.71	↓
Slovenia	13	4.59	12	4.69	↓
Portugal	14	4.59	15	4.52	↑
Spain	15	4.52	16	4.50	↑
Czech Republic	16	4.49	14	4.54	↓
Cyprus	17	4.40	17	4.47	→
Malta	18	4.39	18	4.38	→
Latvia	19	4.36	21	4.20	↑
Lithuania	20	4.31	20	4.22	→
Italy	21	4.30	19	4.23	↓
Slovak Republic	22	4.13	22	4.17	→
Poland	23	4.08	23	4.06	→
Hungary	24	4.06	24	4.04	→
Greece	25	3.95	25	3.92	→
Romania	26	3.79	26	3.84	→
Bulgaria	27	3.76	27	3.79	→
EU		**4.94**		**4.88**	
EU accession and candidate countries					
Croatia		4.01		4.01	
Iceland		5.34		5.38	
Macedonia, FYR		3.60		3.67	
Montenegro		4.39		4.24	
Serbia		3.53		3.48	
Turkey		3.75		3.63	
Comparator countries					
BRIC		3.95		3.86	
Canada		5.22		5.27	
Japan		5.04		4.97	
United States		4.95		4.93	

Source: World Economic Forum

Table 4: Rankings on the smart sub-index

	SMART		PILLARS							
			1. Enterprise environment		2. Digital agenda		3. Innovative Europe		4. Education and training	
Country/Economy	**Rank**	**Score**	**Rank**	**Score**	**Rank**	**Score**	**Rank**	**Score**	**Rank**	**Score**
Austria	7	5.13	11	4.26	10	5.52	6	5.39	8	5.35
Belgium	8	5.11	7	4.41	15	5.03	7	5.24	2	5.77
Bulgaria	26	3.69	24	3.55	26	4.30	26	2.96	27	3.95
Cyprus	20	4.29	10	4.27	22	4.49	18	3.69	20	4.71
Czech Republic	16	4.38	16	3.88	17	4.86	17	3.98	16	4.82
Denmark	4	5.49	6	4.58	6	5.86	3	5.90	5	5.64
Estonia	11	4.79	12	4.13	5	5.94	16	4.07	12	5.03
Finland	2	5.71	2	4.77	4	6.07	2	5.98	1	6.01
France	9	5.09	9	4.34	9	5.62	10	5.05	9	5.33
Germany	6	5.29	8	4.35	7	5.69	5	5.51	6	5.61
Greece	25	3.85	27	3.27	25	4.32	23	3.32	24	4.48
Hungary	22	4.06	23	3.61	21	4.60	20	3.53	23	4.51
Ireland	12	4.69	13	4.12	18	4.76	11	4.61	10	5.29
Italy	17	4.37	14	4.04	19	4.60	14	4.11	18	4.73
Latvia	23	4.05	21	3.69	20	4.60	24	3.30	22	4.61
Lithuania	19	4.29	25	3.53	11	5.35	21	3.49	17	4.81
Luxembourg	10	5.05	3	4.74	8	5.68	9	5.06	19	4.71
Malta	18	4.36	15	3.93	13	5.19	19	3.63	21	4.71
Netherlands	3	5.51	4	4.74	3	6.09	4	5.54	4	5.68
Poland	21	4.09	22	3.65	23	4.44	22	3.39	14	4.89
Portugal	13	4.54	17	3.74	12	5.27	12	4.30	15	4.85
Romania	27	3.64	26	3.44	27	4.08	27	2.89	26	4.14
Slovak Republic	24	3.91	20	3.70	24	4.34	25	3.23	25	4.36
Slovenia	15	4.41	19	3.73	16	4.88	15	4.08	13	4.95
Spain	14	4.51	18	3.74	14	5.06	13	4.23	11	5.03
Sweden	1	5.76	1	5.05	2	6.13	1	6.12	3	5.75
United Kingdom	5	5.38	5	4.61	1	6.16	8	5.18	7	5.55
EU		**4.98**		**4.26**		**5.44**		**4.90**		**5.30**
EU accession and candidate countries										
Croatia		3.86		3.30		4.72		3.14		4.27
Iceland		5.03		3.82		5.31		5.43		5.56
Macedonia, FYR		3.60		3.70		4.17		2.72		3.84
Montenegro		4.17		3.95		4.74		3.62		4.37
Serbia		3.45		3.12		4.10		2.79		3.81
Turkey		3.87		3.90		4.27		3.29		4.01
Comparator countries										
BRIC		3.90		3.71		4.30		3.39		4.19
Canada		5.12		4.67		5.57		4.56		5.66
Japan		5.18		4.50		5.41		5.45		5.35
United States		5.36		4.67		5.85		5.27		5.66

Source: World Economic Forum

Table 5: Rankings on the inclusive sub-index

	INCLUSIVE		PILLARS			
			5. Labour market and employment		6. Social inclusion	
Country/Economy	**Rank**	**Score**	**Rank**	**Score**	**Rank**	**Score**
Austria	4	5.56	3	5.02	5	6.11
Belgium	8	5.12	18	4.16	6	6.08
Bulgaria	26	3.98	15	4.32	27	3.64
Cyprus	11	4.83	12	4.62	15	5.04
Czech Republic	10	4.84	14	4.35	11	5.34
Denmark	1	5.98	1	5.66	2	6.31
Estonia	16	4.66	9	4.66	20	4.66
Finland	3	5.60	4	4.96	3	6.23
France	13	4.78	23	3.93	9	5.64
Germany	7	5.31	7	4.88	8	5.75
Greece	27	3.91	26	3.47	22	4.36
Hungary	21	4.24	22	3.97	21	4.52
Ireland	15	4.68	13	4.39	16	4.98
Italy	23	4.06	27	3.36	19	4.76
Latvia	18	4.39	5	4.94	25	3.84
Lithuania	22	4.22	8	4.69	26	3.75
Luxembourg	6	5.34	10	4.65	7	6.03
Malta	12	4.83	17	4.16	10	5.50
Netherlands	2	5.65	2	5.09	4	6.22
Poland	25	3.99	19	4.01	24	3.97
Portugal	17	4.42	21	4.00	17	4.85
Romania	24	4.02	20	4.00	23	4.03
Slovak Republic	20	4.35	24	3.92	18	4.78
Slovenia	14	4.73	16	4.26	14	5.19
Spain	19	4.39	25	3.51	13	5.26
Sweden	5	5.53	11	4.65	1	6.40
United Kingdom	9	5.11	6	4.92	12	5.31
EU		**4.88**		**4.33**		**5.43**
EU accession and candidate countries						
Croatia		3.89		3.55		4.24
Iceland		5.55		5.54		5.55
Macedonia, FYR		3.67		3.98		3.36
Montenegro		4.73		4.67		4.79
Serbia		3.69		3.53		3.85
Turkey		3.72		3.42		4.01
Comparator countries						
BRIC		4.00		4.34		3.67
Canada		5.45		5.27		5.62
Japan		4.95		4.84		5.05
United States		4.62		5.03		4.21

Source: World Economic Forum

Table 6: Rankings on the sustainable sub-index

	SUSTAINABLE		PILLARS 7. Environmental sustainability	
Country/Economy	**Rank**	**Score**	**Rank**	**Score**
Austria	3	5.64	3	5.64
Belgium	16	4.58	16	4.58
Bulgaria	27	3.61	27	3.61
Cyprus	24	3.95	24	3.95
Czech Republic	22	4.17	22	4.17
Denmark	5	5.28	5	5.28
Estonia	14	4.67	14	4.67
Finland	2	5.96	2	5.96
France	10	4.93	10	4.93
Germany	6	5.16	6	5.16
Greece	20	4.43	20	4.43
Hungary	25	3.70	25	3.70
Ireland	18	4.50	18	4.50
Italy	19	4.48	19	4.48
Latvia	4	5.53	4	5.53
Lithuania	15	4.59	15	4.59
Luxembourg	9	5.03	9	5.03
Malta	26	3.64	26	3.64
Netherlands	11	4.86	11	4.86
Poland	21	4.20	21	4.20
Portugal	7	5.11	7	5.11
Romania	23	3.97	23	3.97
Slovak Republic	17	4.58	17	4.58
Slovenia	8	5.04	8	5.04
Spain	13	4.82	13	4.82
Sweden	1	6.31	1	6.31
United Kingdom	12	4.85	12	4.85
EU		**4.90**		**4.90**
EU accession and candidate countries				
Croatia		4.83		4.83
Iceland		6.15		6.15
Macedonia, FYR		3.47		3.47
Montenegro		4.60		4.60
Serbia		3.49		3.49
Turkey		3.32		3.32
Comparator countries				
BRIC		4.03		4.03
Canada		5.20		5.20
Japan		4.71		4.71
United States		3.93		3.93

Source: World Economic Forum

Gauging Europe's efforts to support sustainable and inclusive competitiveness

As described above, in order to gauge the EU's efforts to become a smart, inclusive and sustainable society, this Report carries out three types of analyses.

First, it assesses EU competitiveness vis-à-vis a set of highly advanced benchmarking countries such as the United States and Japan. This analysis provides the global framework to identify the overall strengths and weaknesses to build a highly competitive Europe. In addition, we also perform a comparative analysis against the large emerging economies—Brazil, Russia, India and China (BRICs)—that in recent years have rapidly become global players and are regarded as a benchmark for a large number of European economies.

Second, it describes the performance of individual EU members, analysing their competitiveness profiles and identifying their strengths and weaknesses. It also takes stock of the change in relative performances of individual countries since 2010 to measure relative progress.

Third, the study assesses the economic competitiveness of the EU accession and candidate countries, providing a sense of the challenges they currently face, and the extent to which they will likely contribute to overall European competitiveness.

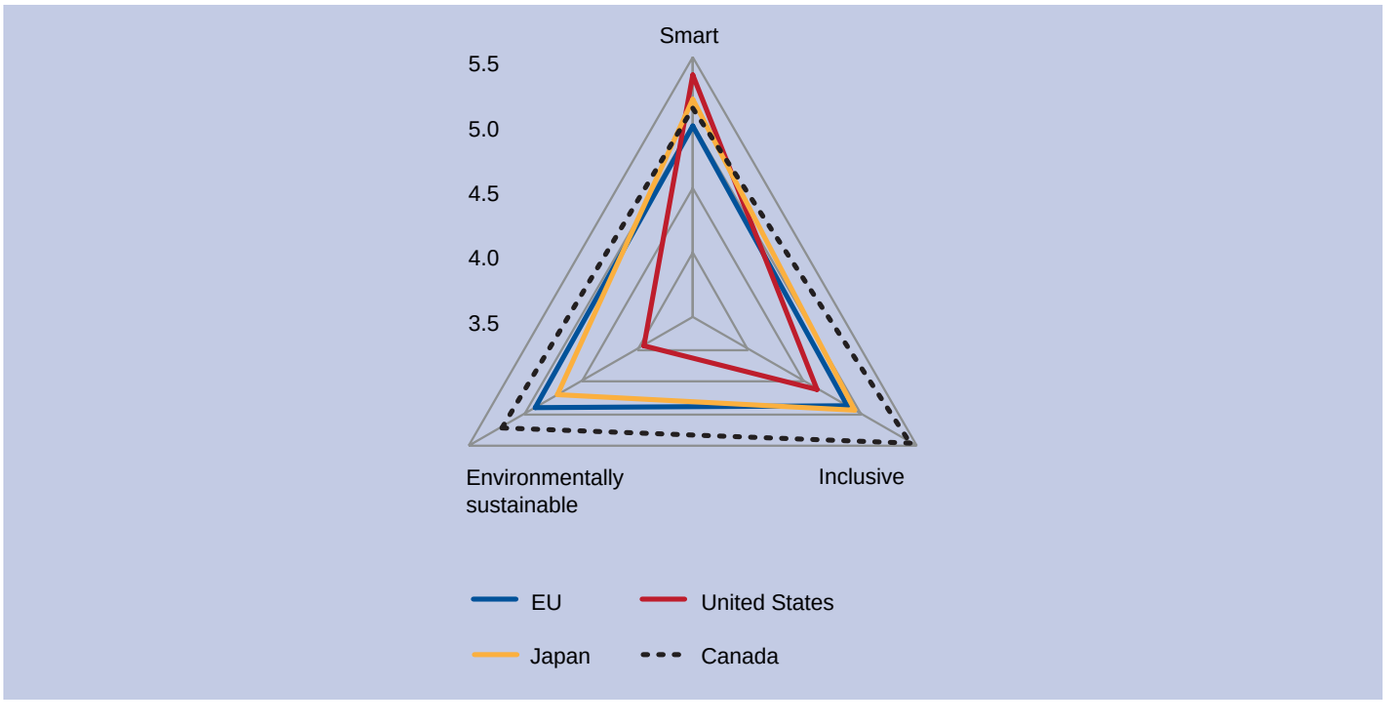
All the scores are presented on a scale from one to seven, where higher values indicate stronger performance.

How does the EU stack up against other advanced economies?

With an average value of 4.88 on the inclusive sub-index, the EU fares better than the United States (4.62), although it performs less well than Japan (4.95) and especially Canada (5.45). The European socio-economic model has traditionally been based on building inclusive societies by developing strong welfare states that would support people during difficult times. Other advanced economies have followed this model to a greater, (e.g. Canada) or lesser (e.g. the United States) degree and this is reflected in their scores. To a certain extent, the sharp rise in long-term unemployment in some EU countries has put the model under duress and reduced the ability of these economies to provide gainful employment on a sustainable basis. This can partially explain the larger gap vis-à-vis Canada, which is regarded as a largely inclusive economy.

In terms of sustainability, the EU performs relatively well with a score of 4.90, almost a point higher than the United States (3.93) and above Japan (4.71). Only Canada among the comparator countries outperforms Europe in this dimension. Europe, however, is trailing behind all three country comparators in building a smarter economy that can help facilitate the transition to higher value added, more productive activities. The gap is particularly wide vis-à-vis the United States, where a difference of almost 0.40 is sizeable. The gap with Canada (5.12) and Japan (5.18) is narrower, but still significant.

Figure 3: Comparison in smart, inclusive and sustainable sub-indexes

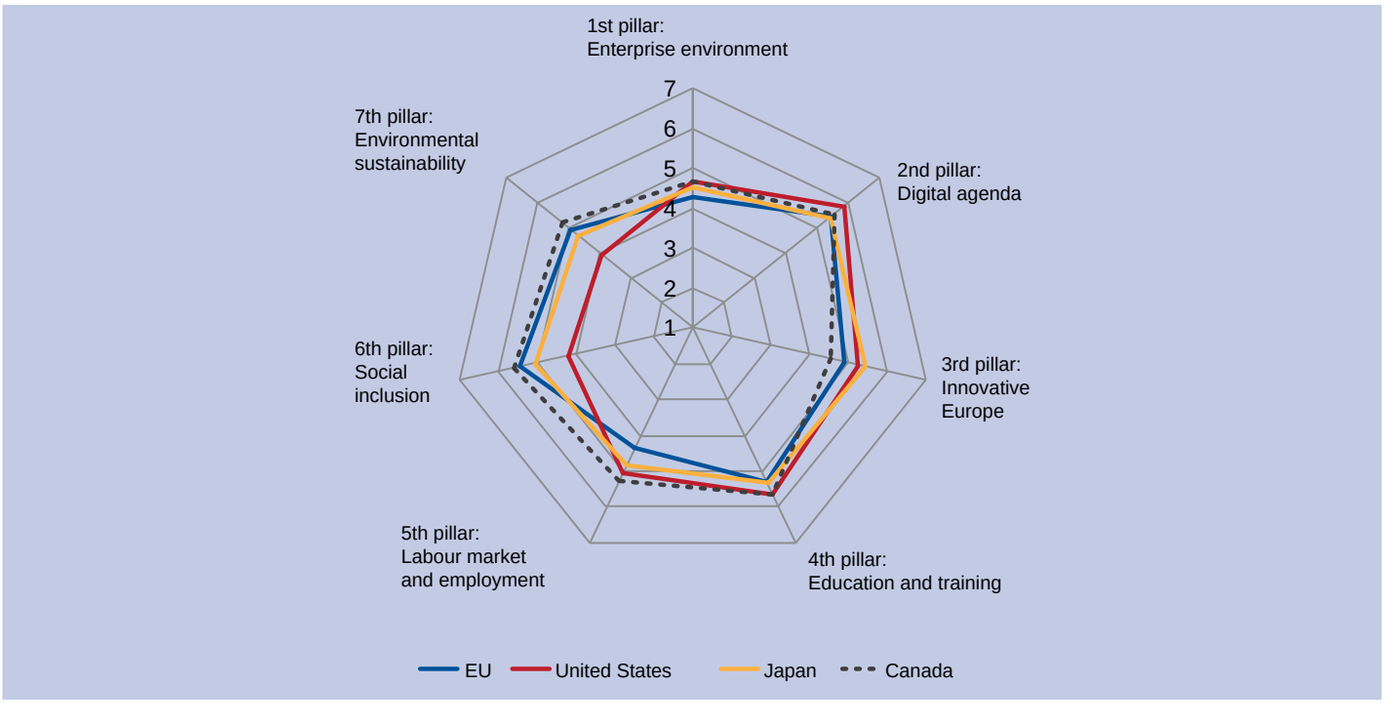


Source: World Economic Forum

A more nuanced analysis shows that in terms of inclusion, the European model provides better social cohesion policies but demonstrates weaknesses in providing the right conditions for gainful employment for large shares of its population. As mentioned earlier, the welfare state model predominating in Europe has managed to provide relatively good social protection during economic downturns by creating social safety nets. However, at the same time, the strong and persistent effects of the financial and economic crisis coupled with comparatively stronger rigidities in the labour markets of several European countries have resulted in sharp increases in unemployment, of a long-term nature in many cases, thus depriving a wide segment of the population of gainful employment. Moreover, the severe fiscal imbalances in several European countries, especially those hit more strongly by the economic crisis, are placing increasing stress on the capacity of governments to support the existing models, calling into question their sustainability unless comprehensive reforms are implemented.

The gap in creating a knowledge-based economy is evident in all four pillars that make up the smart sub-index, where the EU clearly falls short compared to other advanced economies. Given the strong interconnections and complementarities among the four pillars necessary to create a truly smart economy, addressing these weaknesses will require a coordinated effort in all four dimensions.

Figure 4: Performance benchmark on Europe 2020 Competitiveness Index pillars



Source: World Economic Forum

Are countries converging in terms of competitiveness? Are there intraregional differences?

The EU is not a homogeneous entity in terms of competitiveness. On the contrary, large disparities exist among Member States, with some countries performing much better than others and well above the EU average or that of other advanced economies, such as the United States. The dispersion in performance across European countries in the seven dimensions analysed is plotted in the chart in Figure 5. The spread in performance across European countries is particularly stark in areas such as innovation, where a three point gap (on a scale of one to seven) separates the best from the worst performer.

These differences in competitiveness performance across Member States can also be represented in the map shown in Figure 6. Four broad groups of countries with distinctive competitive performances seem to emerge. These four "Europes" are:

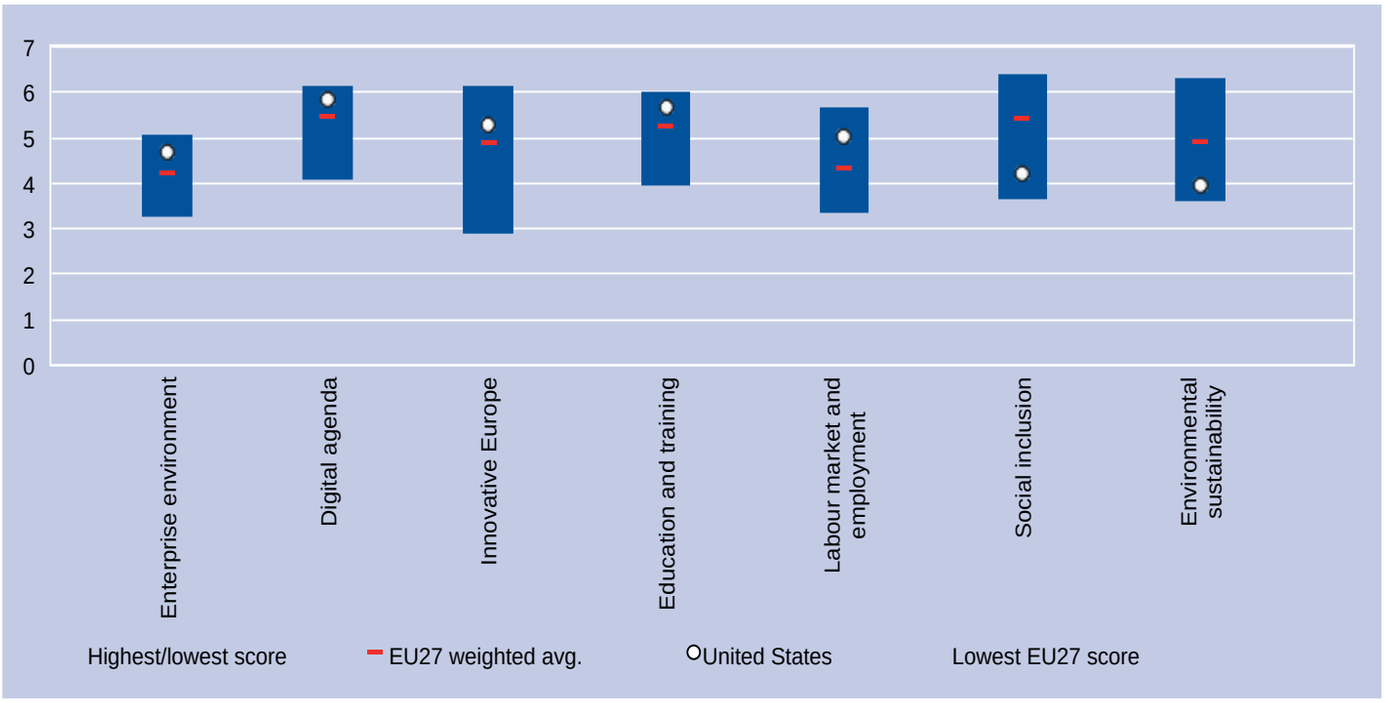
- Nordic Europe, composed of Sweden, Finland and Denmark
- Western Europe (and Estonia), composed of the Netherlands, Austria, Germany, United Kingdom, Luxembourg, Belgium, France, Estonia and Ireland
- Southern and Eastern Europe, composed of Slovenia, Portugal, Spain, the Czech Republic, Cyprus, Malta, Latvia, Lithuania, Italy, Slovak Republic, Poland and Hungary
- Southeast Europe, composed of Greece, Romania and Bulgaria.

Only Estonia seems to be the notable exception from this rule. This divide is all the more stark when looking at the results of the smart sub-index, where only ten Western European countries obtain a score above 5.0, with the rest of the economies falling well below this threshold, and with Estonia at 11th position, at 4.79.

These results point to the complexity and difficulties of bridging the competitiveness divides in Europe and raise questions about the sustainability of the income convergence that many European economies have experienced in recent decades. The recent declines in income of previously converging economies such as Spain, Greece and Portugal, where an important competitiveness divide persists, suggest that stable economic convergence may only be possible if decisive actions to address the competitiveness weaknesses of these countries are adopted.

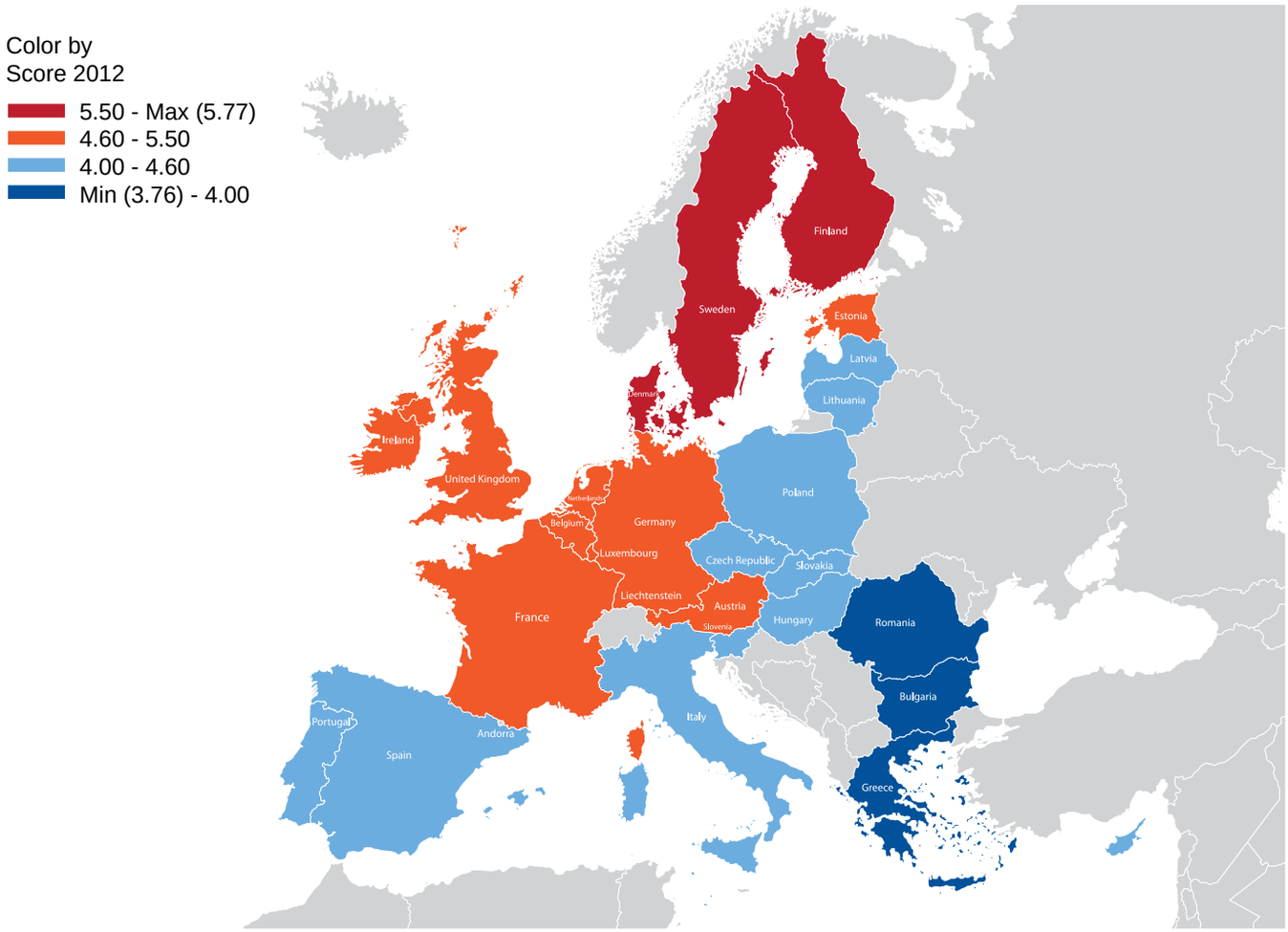
Figure 7 highlights the differences of the "four Europes" across the seven pillars. The results show that all four groups follow similar patterns, where countries that perform better in building a smarter economy also manage to achieve more inclusive and environmentally sustainable societies. This is true for all four groups of countries and suggests a complementary relationship between the three broad objectives of the Europe 2020 Strategy, rather than a competing one. Box 2 analyses these relationships in more detail.

Figure 5: Score dispersion among EU countries



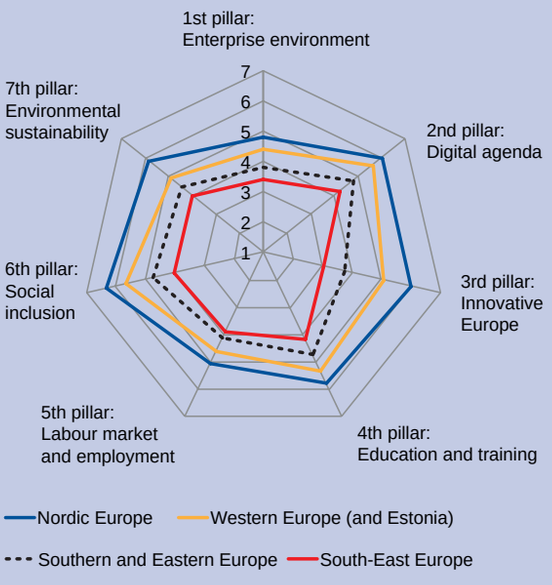
Source: World Economic Forum

Figure 6: The competitiveness divide in Europe



Source: World Economic Forum

Figure 7: Competitiveness profiles of four European groups



Source: World Economic Forum

Box 2: Mapping the relationship between smart, inclusive and sustainable Europe - Complementing rather than competing forces

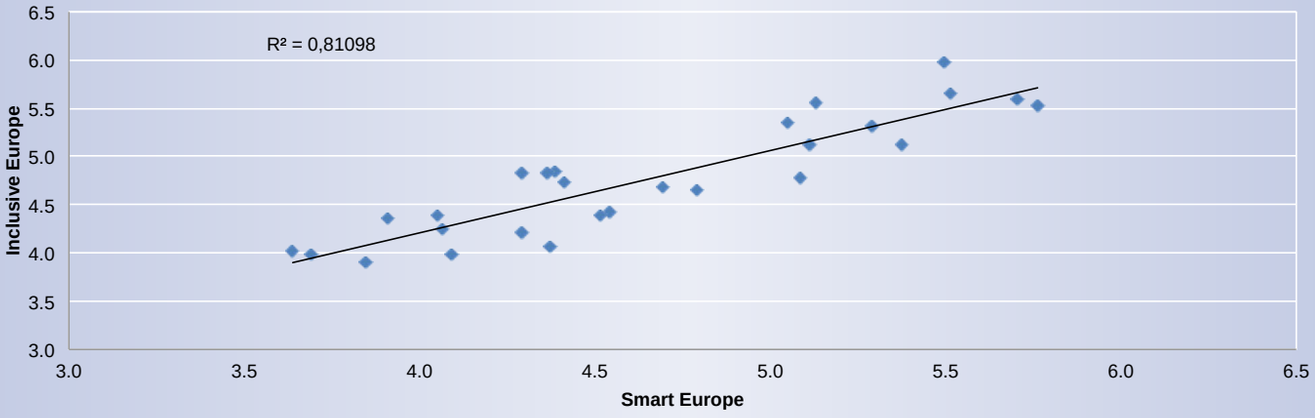
The European Union, with its 10-year "Europe 2020 Strategy", is aiming at three broad objectives that define its vision for the type of economy and society it desires to become by the end of this decade. These three broad objectives are to achieve smart, inclusive and environmentally sustainable societies, which are the three axes structuring the European development model. Some observers have questioned the capacity to achieve all three goals simultaneously, and wondered if on the contrary, trade-offs between these three dimensions should be acknowledged and choices made. More precisely, some observers have wondered if creating a smarter Europe, i.e. a more knowledge-based economy, may not result in having winners and losers within a society, leaving those segments of the populations more poorly equipped to fully participate and benefit from this shift of economic activity worse off and therefore reducing the inclusion and cohesion of individuals within a country. Similar questions have been raised regarding the relationship between economic growth and the depletion of natural resources, where more economic activity is associated with a more intensive use of existing resources and increased levels of pollution that citizens may need to face in exchange for higher levels of economic prosperity.

The relationship between the three dimensions is far from straightforward. Little academic or empirical research has been carried out in this field, and it is likely that any results would be contingent on the stage of development of an economy and the policies put in place to create the enabling conditions to achieve the three dimensions.

This Report analyses the progress of different Member States in achieving the three goals. While it is impossible to determine the direction of causality due to the difficulties in specifying such a model, the close interconnection of the different factors, and the lack of sufficient data, a correlation analysis suggests that there is a strong relationship between smart and inclusive societies (see Figure 8).

Figure 8 shows a correlation coefficient of over 80% between the smart and inclusive sub-indexes, suggesting that there does not seem to be a trade-off between the two. On the contrary, those economies that are more innovative are also those societies that provide more inclusion. In fact, in the long run, highly developed economies are those that need to stay competitive through innovation and, therefore, those capable of potentially providing better employment opportunities to their citizens,

Figure 8: Correlation between smart and inclusive sub-index



Source: World Economic Forum

which is crucial for inclusiveness. In turn, the more people are active in highly productive sectors, the more human resources will be active in contributing to further innovations.

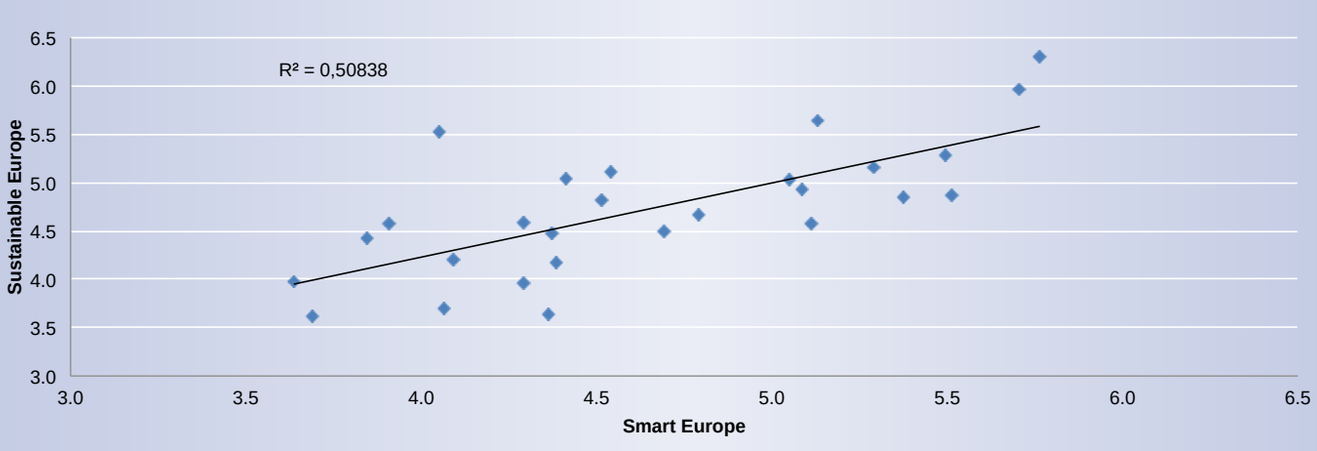
Regarding the smart and sustainable sub-indexes, the relationship once again depicts a positive, albeit looser, correlation.

Although the causality is again impossible to establish, one way to interpret this relationship is that economies that benefit from higher degrees of innovation can also count on technological developments to allow for more environmentally sustainable practices.

The Nordic countries have shown that the most advanced economies can and do excel in all three dimensions, securing high investments in knowledge generation, granting social security systems that allow their populations to contribute to and benefit from economic activity that is respectful of the environment.

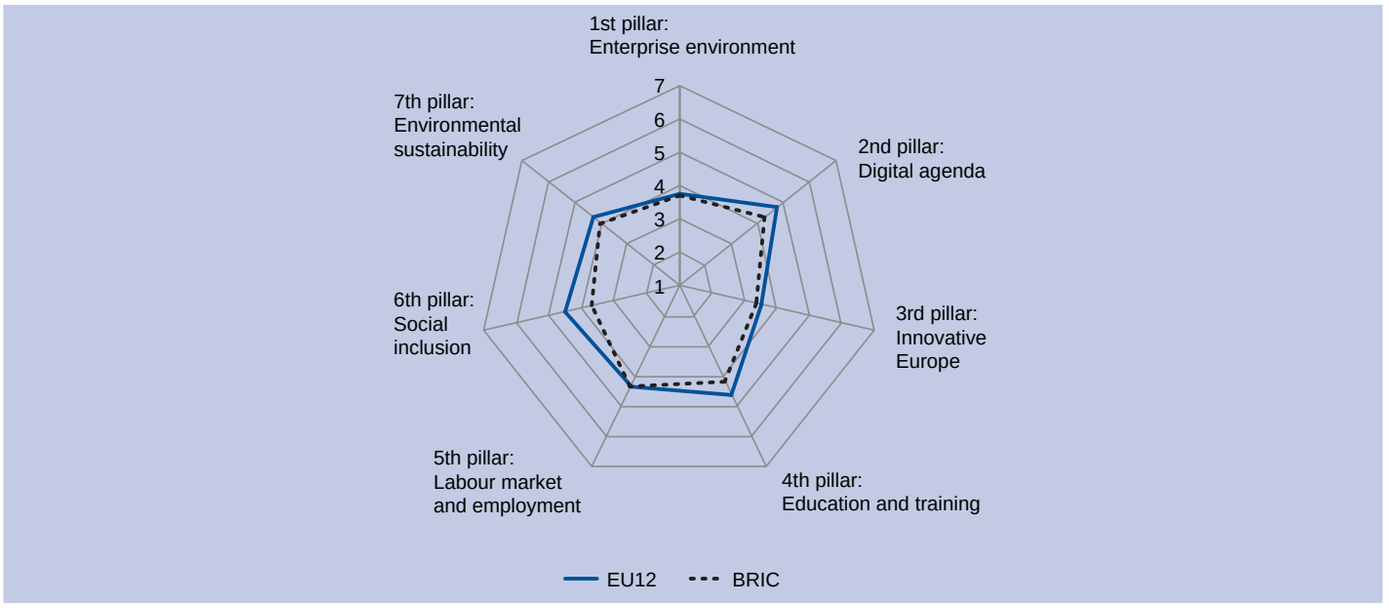
This analysis, while static and partial, highlights the possibility of achieving these three objectives simultaneously and that there does not seem to be a necessary trade off between them. Policies and actions can contribute to creating a virtuous and reinforcing circle among the three dimensions ensuring smart, inclusive and sustainable development.

Figure 9: Correlation between smart and sustainable indexes



Source: World Economic Forum

Figure 10: Competitiveness performance of EU12 and BRICs by pillar



Source: World Economic Forum

Figure 10 shows the comparative competitiveness profiles of the BRIC economies and the twelve countries that have joined the EU since 2004. Overall, both groups of countries exhibit similar profiles, especially in terms of developing smart economies, where the values for the enterprise environment and innovation pillars are very similar. The biggest difference among the two groups appears on the social inclusion pillar, where emerging economies still face a considerable gap.

In order to identify the singular competitiveness position of each Member State and identify their strengths and weaknesses, an individual analysis needs to be carried out.

The Nordic countries hold the top three places in the index, with **Sweden** ranked first, maintaining the lead also held in 2010. Sweden holds the top spot for the "smart" component of the index. This is driven by a large focus on education and training to skill its workforce, as well as an excellent enterprise environment (ranked 1st in this pillar) with healthy competition in the national market, a strong culture of entrepreneurship, well developed clusters, and financing that is more readily available than in many other parts of Europe. Sweden also has made great strides to encourage the uptake of the latest digital technologies to enhance productivity and innovation (ranked 2nd in the digital agenda pillar). Such emphasis over the years on creating the conditions for innovation-led growth has paid off in Sweden's number one ranking in the "innovative Europe" pillar, with very sophisticated business techniques, high spending on R&D, and excellent collaboration between universities and the private sector in research, leading to much innovation output making it to market. Sweden is also ranked 1st in the environmental sustainability component of the index, demonstrating that sustainability and innovation can very well go hand in hand, with well enforced environmental regulations, and much lower pollution levels than in many other parts of the world.

Sweden is somewhat less strong in the "inclusive" component of the index, ranked 5th for this sub-index. Although the country ranks first in the social inclusion pillar, with low inequality and a strong provision of health and social services, Sweden's score is pulled down by its result in the labour market and employment pillar, where it is ranked a much lower 11th out of 27. This is related to a lack of flexibility in the labour market, some concerns about the relationship between pay and productivity in the country, as well as a notably high youth unemployment rate of 25.2%, placing Sweden a low 20th out of 27 countries on this indicator.

Finland ranks 2nd in the overall index, with a profile similar to that of Sweden. Finland's enterprise environment (ranked 2nd) fosters business creation, supported by readily available finance for business investment. It also occupies the top position in the higher education and training pillar, the result of a strong focus on education over recent decades. This has provided the workforce with the skills needed to adapt rapidly to a changing environment and has laid the groundwork for high levels of technological adoption and innovation. Finland is one of the innovation powerhouses in Europe, ranking 2nd in the innovative Europe pillar behind only Sweden. Finland also receives a strong assessment in the "inclusive Europe" component (ranked 3rd), with a well functioning labour market and relatively strong labour market participation, as well as strong social inclusion (ranked 3rd), based on low inequality in the country and the provision of social services. Finland's strong showing on the sustainability component (ranked 2nd) demonstrates that its economic prowess is not at the expense of environmentally sustainable practices and outcomes.

Denmark is ranked 3rd in the index. While the country receives strong marks for its innovative capacity (ranked 4th for the overall smart Europe sub-index and 3rd on the innovative Europe pillar), it stands out most particularly for its top rank in the area of "inclusive

Europe". This represents a marked difference with regard to the other Nordic countries, with Denmark continuing to distinguish itself through the benefits of its flexicurity system as it has one of the most efficient labour markets internationally, combined with a strong social safety net. This has led to very high labour market participation, including among the young, at a time when many other European countries are struggling in this area. Denmark also receives a relatively strong assessment for sustainability, although less so than the other Nordics, and with some concerns related to the amount of protected land area and relatively high CO2 emissions.

Despite the current financial and economic difficulties that the **Netherlands** faces, the country places 4th and demonstrates one of the strongest competitiveness performances in Europe. This should provide a solid base for a recovery in economic growth. Overall, the country has been able to build a highly productive, knowledge-intensive, service-based economy (3rd). A high-quality educational and training system (4th) coupled with a good uptake of technology and innovation (4th) and innovative business practices have provided the foundations for doing so. In addition, good business conditions (4th), with high levels of competition (2nd), available finance (4th) and entrepreneurial culture (6th) bring new knowledge into the market via new or improved products and services in an effective manner. As a result, the country has managed to remain highly competitive, securing one of the highest labour participation scores (2nd) and one of the lowest unemployment rates in Europe, despite some rigidity in the labour market both in terms of hiring and firing practices (18th) and the perceived disconnect between pay and productivity (19th). Addressing these rigidities based on the successful experience of some of the Nordic countries to implement a "flexicurity" model would facilitate adjustments to business cycles should economic conditions temporarily deteriorate without giving rise to higher unemployment rates. Moving forward, the country needs to regain its macroeconomic stability by reducing its high deficits, and a process of smart fiscal consolidation should be put in place to do so. Public and private investments in education, training schemes, ICT development and innovation, despite relatively low levels of R&D, have been instrumental in ensuring the high productivity of the national economy and will continue to do so even more, and therefore should be preserved. The experience of the Nordic countries that made their way out of the 1990s financial crisis by further supporting education, technology and innovation could serve as an example.

Austria is ranked 5th in the index, having moved up one spot since the 2010 assessment and thus overtaking Germany. Austria's greatest strength relates to the environmental sustainability component of the index, ranked 3rd on this pillar, with extensive use of renewable energy in the country and well enforced environmental regulations, as well as an unpolluted environment and relatively low CO2 emissions. Austria is ranked a similarly respectable 4th for social inclusion, based on the strong provision of social services in the country, and strong labour market participation, particularly among the young (ranked a high 2nd for its relatively low youth unemployment). With regard to areas for improvement, a more flexible labour market to encourage more job creation, as well as stronger private sector employment of women would further enhance this positive picture. Austria's greatest challenge will be further improving its innovation capacity, ranked 7th out of 27 for the smart Europe component. Of most concern compared with other European countries is the country's enterprise environment. Its rank of 11th in this pillar is primarily pulled down by the many procedures and the significant time required to start a business in Austria, constraining business creation (Austria is ranked 24th in the entrepreneurship sub-pillar). Improvements in this area would give a significant boost to the country's innovation potential.

Germany is ranked 6th in the index, down one spot but with a slight increase in score since the 2010 assessment. German companies are among the most innovative in the world, spending heavily on R&D (5th) and displaying a high capacity for innovation (1st)—complemented by the country's harnessing of the digital agenda for higher productivity (7th). Germany is also relatively successful in its environmental sustainability efforts (ranked 6th in this component of the index), with well-enforced environmental legislation leading to rather strong environmental outcomes. On a less positive note and despite some efforts, Germany's labour market remains rigid (22nd for rigid hiring and firing practices), and with still relatively low participation of women in the labour market. While these rigidities have certainly kept unemployment low during recent economic difficulties, and some German practices such as job sharing have been shown useful under difficult circumstances, rigid rules continue to hinder job creation and more flexibility would place the country on a more solid footing going forward.

With a highly developed, service-oriented economy, the **United Kingdom** is positioned at 7th place in the ranking, though it scores 5th in terms of building a smart economy, right behind the Nordic countries and the Netherlands. This has been possible thanks to strong leveraging of ICT (1st), which is instrumental in supporting business innovation in the services sector, high levels of training (3rd) and favourable business conditions (5th) related to high levels of competition (4th) and available financing via local equity markets (3rd) and venture capital (6th). Despite this relatively strong position, the country still faces some problems in providing gainful employment for some segments of the population, especially for youth, who face unemployment rates of nearly 20% (12th) despite quite flexible labour markets (3rd). This points to some areas that require improvement in order to continue competing successfully and spreading the benefits to all segments of society. More precisely, while the performance of the scientific system is good (4th) thanks to world class universities, the technological and innovation uptake (7th and 8th respectively) is relatively low due in part to low rates of corporate R&D. While the economic structure of the country may partially justify these lower rates, several manufacturing industries may need to increase their investments in order to improve their innovative potential. Moreover, the overall quality of the educational system, while fairly good, scores behind many other European countries (7th) and enrols fewer students in tertiary education (20th). Finally, in order to ensure a more harmonious development process, greater focus should be placed on several dimensions supporting environmental sustainability (12th).

Luxembourg, placed at 8th position, presents a competitiveness profile that can be regarded as in transition. With an economy largely driven by the financial sector, the country has embarked on a diversification strategy aimed at developing ICT and innovation as new sources of economic growth and employment. Overall, despite benefiting from very favourable conditions for business activity (3rd), the country still trails neighbouring countries in building a smart economy (10th). The strong efforts to build a scientific and

technological system are beginning to pay off with levels of scientific and technological production similar to the EU average, despite a shortage of available scientists and engineers in the economy (24th). However, the poor performance of the educational system (26th), both in terms of quantity and quality, is the main area of concern for transitioning towards a higher knowledge-based society. In terms of building an inclusive society (6th), the country has performed well. While the employment activity rate is low (20th) and some rigidities exist in the labour market, the industrial relations system scores quite high (5th) resulting in a fairly efficient labour market (8th). Moreover, the government has successfully achieved a reduction in poverty (3rd) and the presence of a strong social safety net (3rd) ensures that most of the population does not fall outside the system.

At 9th position, **Belgium** presents a competitiveness profile that reflects in many ways the average position of Western Europe, with strengths in many pillars and the need to improve in a number of others in order to create a smart, inclusive and sustainable economy. The country has traditionally benefited from a very high-quality education and training system (2nd) that has provided a skilful labour force, including a large number of scientists and engineers (4th) and a strong scientific base (3rd). In general, pro-business policies, despite the very high taxation system (26th), have provided the right conditions for businesses to develop their activities (7th). However, ICT uptake and its impacts on innovation remain comparatively low and the innovation capacity of local firms remains below that of more advanced economies. In terms of building an inclusive society, the government's policies to address inequality and the existence of a very dense social safety net (1st) have fostered a fairly high level of social inclusion (6th). However, to continue maintaining this high social inclusion in times of fiscal constraints, the country will need to ensure higher rates of labour market participation (18th), both by fostering higher activity rates (21st) and eliminating rigidities in the labour market (21st) that affect employment, during the low periods of the business cycle. Finally, in terms of sustainability, the country should take note of some of the main dimensions that can have a negative impact on the environment, as the country ranks 16th within the EU.

France is ranked 10th in the overall index, with a stronger performance in the "smart Europe" and environmental sustainability components than in those measuring inclusiveness. A relatively strong education and training system (ranked 9th) has provided the basis for a business sector that is aggressive in adopting digital technologies for productivity enhancements (it is ranked 9th for the digital agenda). These attributes have resulted in a relatively innovative business culture (ranked 10th in the innovative Europe pillar), with high R&D spending, highly qualified scientists and engineers available in the country, and with a strong culture of marketing that helps to get new ideas picked up by the market. On the other hand, France ranks a lower 13th for the inclusive Europe component, pulled down in particular by inefficiencies in the labour market (ranked 22nd), and low labour participation overall, with high youth unemployment (ranked 17th) and particularly low labour force participation by women (ranked 26th).

Estonia ranks 11th in the overall index, up two places since the 2010 assessment, effectively swapping places with Ireland. Estonia's greatest strength relates to the country's digital agenda (ranked 5th), driven by strong ICT laws, high government prioritization and strong company use of ICT, lifting the country up to an overall 11th place in the "smart Europe" component. Its enterprise environment is supportive overall, with the country ranking first in Europe on the entrepreneurship sub-dimension. However, improving the availability of finance and a more competitive environment could help leverage the digital agenda to a greater extent. By the same token, its strong digital agenda has not yet translated into an equally strong performance in the innovative business culture (ranked 16th in the innovative Europe pillar), where the country is being pulled down by low R&D spending, a lack of available researchers, low registration in patents and industrial designs and little collaboration between universities and the private sector in research. This is also reflected in the education and training pillar, where the country does relatively well in educating its citizens, but could improve by upgrading training schemes. The economy is further characterized by a good performance in the labour market and employment pillar (9th place), driven by high labour market efficiency (ranked 2nd), which has translated into high labour participation, but with a notable exception of young people whose employment rate—similar to other European countries—has fallen drastically during the recession. This pulls down the country's otherwise good performance in this area. On the other hand, Estonia still needs to undertake more efforts towards building an inclusive society, where it ranks a low 20th place, and in promoting greener growth, where it performs well below neighbouring Latvia, as evidenced by its very high CO2 emissions (ranked 27th), limited ratification of environmental treaties and its high dependence on non-renewable resources (20th).

Ireland, until recently a European "poster child" of rapid growth, is ranked 12th, demonstrating a need to create better conditions for innovation in order to regain a sustainable growth path. The country can count on a range of good assets to do so. A traditionally good quality and well performing educational system (8th) has created a dynamic and skilful labour force, including scientists and engineers, who are instrumental in boosting the technological capacity of the country. Moreover, the dense network of national universities has also managed to create a scientific base that scores high at the European level (7th), and pro-business policies have facilitated the creation of a highly entrepreneurial culture (5th). However, entrepreneurship is constrained due to the lack of financial resources (27th) following the severe financial crisis of 2008. Corporate efforts to embrace innovation more decisively will need to be recognized as the way out of the crisis, and higher investments to improve the innovation capacity (14th) and raise the number of staff trained (10th) will be necessary. One of the worst financial and economic crises in its history has taken a toll on the capacity to create an inclusive and cohesive society (15th). Although the country can count on fairly flexible labour markets (5th) the high levels of unemployment, especially in particular segments of the population, including the young (22nd), coupled with the inability of both governments and individuals to provide comprehensive safety nets due to their high levels of debt, have caused a severe deterioration in this area.

Slovenia's strong 13th position in the Europe 2020 Competitiveness Index, ahead of Portugal and Spain and in second place (after Estonia) among the countries that joined the EU in 2004, mirrors the country's strong competitiveness positioning. Slovenia's educational system turns out large numbers of graduates with fairly good skills and knowledge, and the country has a stronger capacity for

innovation than most countries from the region, due to high levels of R&D expenditure, many available scientists and engineers and numerous patent applications. Coupled with the absence of administrative barriers to setting up new businesses that facilitates entrepreneurial activity, these factors ensure solid progress towards building a knowledge-based economy. The country has also managed to distribute its prosperity in an inclusive manner—it boasts the lowest income inequality in the EU—and manages its natural environment in a sustainable manner (8th). Yet the considerable downturn the country experienced in 2009 also points to areas for improvement in order to make economic performance more sustainable. The availability of finance for business ventures remains constrained (25th), FDI is held back by rules and regulations (26th) and competition suffers from the small size of the domestic market, which gives rise to dominance in the market by few firms (23rd). Last but not least, labour markets are considered rigid and inefficient (25th) in comparison with the EU and may endanger social inclusion going forward.

Ranked at 14th position, **Portugal**'s competitiveness remains somewhat mediocre after a lost decade of economic growth. Creating an innovation-driven economy will require several reforms and important investments in knowledge generation areas, such as education and training or R&D, which may be difficult to attain in a period of sharp fiscal consolidation. In terms of reforms, the country needs to improve the efficiency of the educational (15th) and innovation (12th) systems. While enrolment rates are reasonably high, especially in secondary education (8th), the quality of the overall educational system lags behind other European countries (15th), failing to provide the skills that are needed for a knowledge-based society. Along the same lines, scientific (14th) and technological performance (20th) continue to trail the rest of Western Europe, affecting the innovation capacity of local firms (17th). In addition, reforms in the goods market will be needed in order to improve the level of local competition (19th) and decrease the market dominance of a handful of companies (26th). Finally in terms of ICT, the good development of ICT infrastructure (3rd) has not been followed by a significant uptake of these tools in society (21st), which has kept the country from reaping its full benefits. As is the case of all Member States severely hit by the financial and economic crisis, the level of inclusiveness has been strongly affected. Rising levels of unemployment, partially due to the economic downturn, but also to the severe rigidities in the labour market (26th), have affected the capacity of large segments of the population to participate in the economy. Moreover, the financial constraints of a government with little margin to develop effective policies against poverty (18th) may accentuate the risk of a social divide within the country. Implementing successful labour market reforms will be crucial to alleviating the situation in the future.

At 15th position, **Spain** has not managed to fully shift towards a knowledge-based economy. The rapid economic growth that Spain experienced over the past fifteen years came to an end with the financial and economic crisis that brought to light the country's competitiveness weaknesses. These hinder its capacity to sustain economic growth and have caused strong employment adjustments in the population. The disproportional importance that the construction sector enjoyed in recent decades diverted human, capital and financial resources from other economic activities. Reversing this situation will take time and sustained effort. Improving the quality of the educational system (24th) so that it provides the right set of skills and boosts the innovation capacity, both technological and non technological, of a larger share of enterprises will require sustained investments and reforms to increase the efficiency of these investments. Vision and commitment from both government and businesses to make education, training and innovation a strong priority will be crucial, despite the difficult financial situation of the country and the need to reduce fiscal deficits. In addition, facilitating entrepreneurship by cutting red tape (26th) and improving access to finance (18th), following a deep restructuring of a banking system severely exposed to the housing crash, will also require important reforms to be implemented. In terms of inclusion, Spain achieves one of the lowest rates in Europe (19th). The excessively high unemployment rate, which has risen up to over 23% and almost 50% for the young, is seriously hindering the opportunity of a very large segment of the population to contribute to and benefit from national economic activity. The very pronounced rigidities in the labour market (27th) have provoked a sharp rise in unemployment, affecting those who are less protected by the existing system. The labour market reform recently adopted aims to ease this situation.

The **Czech Republic** is ranked 16th in the index, down 2 positions since the 2010 assessment. Positioned close to the EU's average performance, the country is characterized by an inclusive economy (among the top 10 European economies), led by low income inequality as measured by Gini coefficient (4th) and an efficient labour market with a healthy relationship between pay and productivity (7th). In terms of "smart growth", the Czech Republic ranks 16th; its enterprise environment attains a performance similar to the European average with relevant strengths in local competition (9th), openness to foreign investments (9th) and non-distortive taxation (8th). However, government regulations are somewhat burdensome (21st), the time and procedures required to start new businesses are still relatively long, and venture capital is not easily obtainable. Consequently the business environment presents room for improvement. Finally, the lack of innovation is one of the main weaknesses of the country as the Czech Republic trails the EU average, especially in terms of patent applications and the availability of the latest technologies (17th). The other main area for improvement is sustainability where it ranks 22nd due to high dependence on non-renewable energy sources, high levels of CO2 emissions per energy use (21st) and a relatively low commitment to international environmental treaties (26th).

Cyprus is ranked 17th in the index with a good inclusive Europe performance (11th). Labour market efficiency (10th) and labour participation (11th) are the main drivers of the country's inclusive economy. Flexibility on hiring and firing practices (8th) does not generate major frictions between labour and employers (10th) and youth unemployment is somewhat lower than in many other European economies (10th with 16.6%). In addition, the enterprise environment pillar is solid (ranking 10th) with outstanding entrepreneurship capacity (2nd), a low burden of government regulation (4th) and developed financial markets with financing through loans and venture capital relatively available (6th and 9th respectively) compared with elsewhere in Europe. However, the overall smart growth performance is undermined by unsatisfactory results in the digital agenda (22nd) as ICT is not fully used, both by businesses (24th) and individuals (23rd with only 53% of population using the Internet). Also the impact of ICT is limited (20th) and needs

to be further developed. Education and training and the availability of research and training (23rd) are other areas of improvement. Last but not least, environmental sustainability does not seem to be a priority as it ranks 24th, especially due to low renewable energy production (26th) and excessive CO2 emissions (26th).

Malta is 18th in the index and presents some similarities with the Cyprus profile. It performs well in terms of the inclusive measures, led by one of the lowest youth unemployment levels in Europe (4th), relatively low income inequality (11th) and widespread access to healthcare (11th). Compared to Cyprus, Malta has a sounder digital agenda (13th) with excellent government prioritization of ICT (2nd) and sizeable access to basic online services (5th). The enterprise environment ranks 15th with mixed results between comparatively high availability of finance (5th) and a somewhat competitive environment (11th) but low cluster development (17th). Education and training could also be better harnessed for the country's competitiveness, especially by increasing the availability of research and training (21st). Finally, the low score obtained in the environmental pillar represents the main limiter of Malta's performance, especially due to little commitment to international environmental treaties (27th) and concerns about the quality of the natural environment (26th).

Latvia ranks 19th behind Malta and ahead of Lithuania. While the country outperforms most EU27 economies on the sustainable dimension (4th), Latvia is not sufficiently geared towards a knowledge-based economy (23rd). And despite efficient labour markets (5th) considerable segments of society do not benefit from rising prosperity (25th on social inclusion). Putting growth on a more stable footing will require reforms and investments in a number of areas. In particular, Latvia's low innovative capacity does not bode well for the future (24th). It is constrained by a lack of scientists and engineers (27th) and inefficiencies related to scientific output, which is not recognized internationally. At the same time, competitiveness would benefit from more sophisticated businesses practices, such as marketing (25th), which would enable the local business sector to move up on the value chain (19th). Over the longer term, moving towards a knowledge-based economy will require considerable efforts in education in order to increase participation, in particular at the tertiary level, as well as quality.

Following right after Latvia, **Lithuania** occupies the 20th position; its profile is, however, considerably different than Latvia's. Lithuania's moderately efficient labour market (15th) ensures comparatively high employment in the country (7th) and benefits from the largest share of women in the labour force in the EU. The cornerstones of the country's productivity are the progressive digital agenda (11th), which ensures that the latest technologies have the desired impact (9th) as well as solid results on education and training (17th), reflecting in particular the country's high enrolment in tertiary institutions (4th). However, Lithuania's good labour market outcomes do not translate into high levels of social inclusion, with the highest level of income inequality in the EU and a low overall rank on social inclusion (26th). Improving educational quality (22nd on the OECD Programme for International Student Assessment—PISA) and removing administrative obstacles to entrepreneurial activity are two areas that would help the country move towards a knowledge-based economy while increasing social inclusion. The country would in general benefit from an overhaul of its enterprise environment, which remains stifled by low levels of competition (24th), and limited access to finance to fund business growth as well as start up activity (24th).

Italy is ranked 21st in the index, dropping 2 positions since 2010. Notwithstanding its low overall performance, Italy still has some strengths in its enterprise environment (14th), in particular its well developed clusters (1st), broad presence in the value chain (8th) and corporate activity spread among many firms (7th), ensuring competition. Also, Italy is characterized by good innovation potential, ranked 5th both for the number of industrial designs produced and its ability to compete based on its unique products and processes rather than on low costs or natural resources. Additionally, Italy ranks 12th for its capacity for innovation and number of citations in scientific articles, and achieves a relatively high tertiary enrolment rate (10th). However, Italy's potential is not fully leveraged due to lack of competition within its enterprise environment (22nd), with burdensome government regulation and red-tape (27th) representing important obstacles to competitiveness. Further, the country's innovation capacity is not fully exploited, as R&D expenditure (1.2% of the GDP), and the absorption of technology at firm level (25th) are not in line with the country's advanced stage of development. Moreover, Italy's competitiveness is hindered by an inefficient labour market (27th) with a misalignment between the cost of labour and its productivity, low participation rates and high youth unemployment.

The Slovak Republic ranks 22nd among the 27 EU countries, performing somewhat better on the sustainable (17th) and inclusive dimensions (20th) than in the smart category (24th). The country's enterprise environment (20th) benefits from higher levels of competition (18th), better functioning clusters (19th) and a better framework for entrepreneurship (15th) than many other European economies. However, putting the Slovak Republic on a higher and more stable growth path will require more support for innovative activity and measures to more fully implement the digital agenda. The capacity for innovation is among the lowest in the EU and enterprises tend to produce on the lower end of the value chain (27th). And while ICT usage is increasingly common (15th), its impact remains low (25th) and the supporting environment for ICT is the lowest in the EU (27th). A third area that needs to be addressed in order to move the country towards a knowledge-based economy over the longer term is education. Educational outcomes trail behind most EU countries in terms of quantity and quality, and vocational training is well behind EU standards.

Poland occupies the 23rd position on the Europe 2020 Competitiveness Index with a fairly even performance across the three areas. Competitiveness is supported by the country's relatively good educational outcomes (14th) reflected in rather high tertiary enrolment rates and high quality of education, as assessed by the OECD's PISA study, as well as by a training system that benefits from numerous training institutions and enterprises providing on the job training to their employees. Compared with other EU members, Poland also performs fairly well in terms of labour market indicators, which mainly stems from a close link between pay and productivity. Making progress towards the Europe 2020 Agenda will require Poland to further intensify efforts in a number of areas, in particular by catching up with the EU in terms of social inclusion. It is more difficult for Polish citizens than their peers from other countries to access quality healthcare (26th) and social safety net protection is the weakest in the entire EU. Addressing social inclusion should go hand in hand with measures aimed at improving the smart dimension (21st) in order to ensure stable growth performance based on knowledge-intensive sectors going into the future. In this respect, despite its solid results on education, Poland has not yet managed to develop

strong innovative capacity (22nd). Patent applications are few, firms are less able to adopt new technology within their operations and latest technologies are more difficult to access in Poland than in other countries of the Union. In addition to building a more robust innovative capacity, Poland should continue improvements to the business environment (22nd), for example by making it easier and less expensive to start businesses in the country, as well as fostering the use of digital technologies (23rd).

Hungary ranks 24th, right after Poland, in terms of progress towards Europe 2020 goals, showing a competitiveness landscape that is significantly different from Poland. Hungary's traditional strengths in innovation and ICTs are mirrored by good results in these two areas (innovative Europe and digital agenda). The country benefits from a good availability of scientists and engineers (12th), some collaboration between universities and industry (14th) and a capacity for innovation that is higher than in most East European economies (18th). The country's relatively strong innovative and technological capacity is complemented by an environment that is somewhat favourable to entrepreneurship (11th) and relatively efficient labour markets (11th) providing a base for the creation and growth of high-value-added enterprises. Moving towards the Europe 2020 goals will require Hungary to address a number of important challenges that currently constrain productivity. Important gaps in the country's education and training systems (23rd) should be addressed as they may undermine its innovative and technological capacity in the future. Fostering on the job training (24th) and supporting the growth and creation of training services (24th) are key to success in this respect. Moreover, access to finance remains an important obstacle to enterprise growth, ranked a low 26th. Measures to foster economic growth need to be complemented by more and better protection of the environment, a dimension on which Hungary ranks 25th, significantly lower than other countries from the region.

Greece ranks 25th in the overall Competitiveness Index, the lowest of the EU15 countries. Although Greece demonstrates some good performances on individual indicators (ranking 6th on availability of scientists and engineers, 2nd for the tertiary enrolment rate and 9th in terms of environmental protection efforts), it decidedly struggles in achieving both smart (25th) and inclusive growth (27th). The Greek business environment is weak on all four dimensions of the enterprise environment pillar, lacking competition (26th) and entrepreneurship (25th), with poor cluster development (26th) and a lack of availability of finance (23rd), the latter of which certainly deteriorated in the wake of the recent financial crisis. In addition, Greece's digital agenda, which could help address some of the traditional inefficiencies, trails behind most European economies (25th) with one of the lowest scores in terms of ICT usage (26th) both in individual and business terms. Inclusive growth is limited by labour market inefficiencies (24th) and by particular difficulties in participating in the labour market for women (25th) and youth (24th).

Romania ranks 26th overall, with a relatively better performance in the area of sustainable growth (23rd) thanks to a comparatively acceptable level of renewable energy production (9th) and CO2 intensity (16th). At the same time, it attains the lowest performance in the EU in the smart category (27th). Romania trails almost all EU economies in most of the pillars, with only a few relatively better results in the labour market and employment pillar where it ranks 20th. Romania's labour market is flexible (ranking 10th in terms of hiring and firing practices), with a relatively strong relationship between pay and productivity (14th) and an above average participation of women in the private sector (12th). In terms of "smart growth", the performance of Romania shows that the country still needs to concentrate on developing sound institutions and market structures before it will become as competitive as the most advanced economies. Romania ranks only 26th in the enterprise environment pillar, and 27th in the digital agenda and innovation pillars. Despite a positive entrepreneurial attitude (6th), improvements need to be made on the competition front (25th), the development of clusters (27th) and availability of finance (19th) in order to generate a more conducive business environment. Also, performance on the digital agenda and the innovative Europe pillars needs to be reinforced. Romania's ranking is 27th on both, with few specific indicators ranking above the 20th position. Taking a holistic approach to building up different areas of development is necessary to enable Romania to close the gap between its competitiveness and European targets.

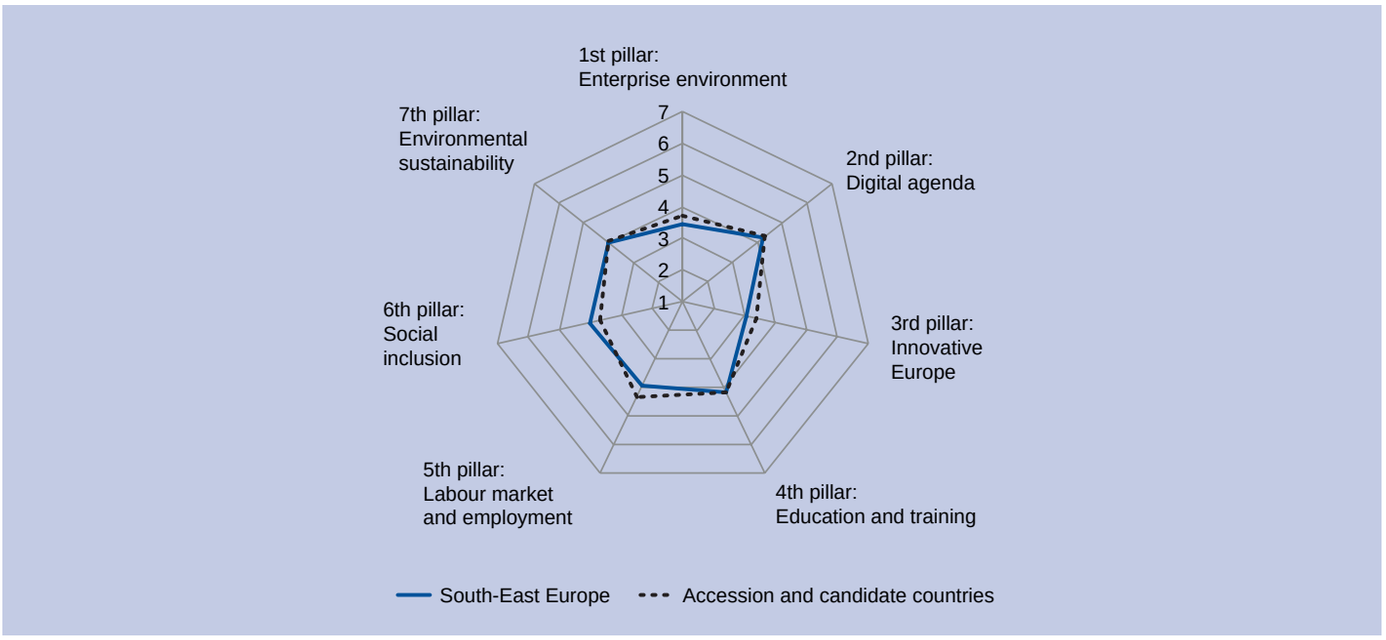
Bulgaria ranks 27th overall, attaining the lowest position in the Europe 2020 Competitiveness Index ranking. Similarly to Romania, Bulgaria is still in the process of reinforcing its institutions. The labour market and employment area (15th) represents Bulgaria's main strength. Flexibility in hiring and firing practices (6th) and a healthy relationship between pay and productivity (11th) make the labour market relatively efficient (14th), while the relatively high participation of women in the labour force (10th) is a competitive strength. Bulgaria also can count on a relatively sound environment for entrepreneurship (13th) characterized by a somewhat accepting attitude towards entrepreneurial failure (14th) and non-distortive taxation (11th). However, Bulgaria trails other EU countries in terms of competition policy (ranking 27th), as well as in the use and impact of ICT, which reflect low performance on the digital agenda pillar (26th). Education and training are other relevant area for improvement, ranking 27th on both of the sub-pillars, indicating that it is necessary to work on both the access to education and the quality of the system. Its environmental performance is also the lowest in the European Union, with a particularly low assessment of the capacity to enforce environmental regulations (26th) and concerns about the quality of the natural environment (27th).

Are accession and candidate countries getting ready to join the EU in terms of competitiveness?

In general, accession and candidate countries, with the exception of Iceland, depict a competitiveness profile that is similar to that of the least competitive countries in Europe. This lag is virtually similar in all seven dimensions analysed. Preparing them for accession will require addressing their specific competitiveness weaknesses. The competitiveness profile of each of these countries is described below.

An official candidate country since 2010, **Iceland** distinguishes itself from the other candidate countries through its membership in the European Economic Area, through which the country has been participating in the European single market since 1994. As a result, a large number of community laws have already been incorporated into the country's legislation. Since the official start of the negotiation meetings in June 2011, 11 chapters of the EU acquis have been opened, of which eight are officially closed, among those Chapter 25 on Science and Research and Chapter 26 on Education and Culture. Iceland's frontrunner role in these areas is corroborated by its outstanding performance in the areas of innovative Europe and

Figure 11: Competitiveness performance of South-East Europe and accession and candidate countries by pillar



Source: World Economic Forum

education and training, where the country performs on par with the Nordics as well as the Netherlands and Germany. Iceland's great strength is in the environmental sustainability, as well as the labour market and employment components of the index, which are characterized by a highly efficient labour market and very strong labour participation in particular. With regards to areas for improvement, Iceland performs below the EU27 average in the area of enterprise environment, driven by limited access to finance and poor performance in the competition sub-dimension. The country also needs to scale up efforts to improve its digital agenda, where its score is being particularly dragged down by low e-participation.

In a customs union with the EU since 1995, **Turkey** holds strong trade ties with the EU: half of its trade takes place with the EU and there is already some alignment with EU policies, such as competition and intellectual property law. Since the beginning of the accession negotiations in October 2005, 12 chapters have been opened, including those on company law, enterprise and industry, and one – Science and Research has been closed. With regards to the Europe 2020 strategy, Turkey performs close to the EU average in the area of enterprise environment, driven by intense local competition and low barriers to the creation of new businesses, as evidenced by a low number of procedures and limited amount of time it takes to start a business. The country has also experienced a notable improvement in its digital agenda since 2010, driven by increased government prioritization of ICT as further reflected in its progress in the use of government online services since 2010. However, important steps remain to be taken to catch up with the EU average. Turkey needs to build its human resource base by advancing its education and training system as well as improving its labour market efficiency and raising opportunities for its citizens to participate in the labour market, particularly for women and youth. In parallel, investing in innovation-led growth is critical. While Turkish companies do well in absorbing the latest technology, a stronger focus on innovation-led investments and innovative products would provide important impetus towards improving long-term productivity and could be leveraged by its solid enterprise environment. Turkey faces the challenge of embarking on significant efforts with regards to environmental sustainability, particularly the ratification of environmental treaties as well as lowering its CO2 emissions and improving its air quality in order to converge to the EU average.

Croatia is scheduled to become the 28th member state on 1 July 2013 after six years of negotiations. While the country's performance is close to the EU average in terms of environmental sustainability, it faces many challenges to strengthen its competitive environment and to converge towards the EU along all other pillars. This holds particularly true for the smart Europe sub-index. Despite some modest improvements since 2010 along all pillars in this component, the country has a long way to go towards becoming a more knowledge-based economy. Increased competition is particularly hampered by a weak enterprise environment that is characterized by difficulties in obtaining finance and weak competition in the local market. The private sector considers cumbersome government regulation and an inefficient tax system and labour market as among the many impediments, indicative of the myriad reform efforts that will be needed to increase Croatia's competitiveness. The education and training system will also require reforms in order to develop the country's human resources base—which is currently a recipient of about a tenth of EU financial aid granted under the Instrument for Pre-Accession Assistance (IPA)—in order to lay the groundwork for an innovative economy that would allow both the public and private sectors to engage in innovation-oriented investments. As well as addressing inefficiencies in the

labour market, as evidenced by the high level of youth unemployment and low overall participation rate, Croatia must work towards improving its overall accessibility to healthcare services and ramp up its social safety net in order to achieve not only smart, but also inclusive growth.

In **Montenegro**, a candidate country since 2010, accession negotiations are scheduled to be opened in June 2012. In terms of its performance along the Europe 2020 Competitiveness Index, Montenegro performs on par with Malta and Cyprus and ahead of most members of the EU12. Its economy is characterized by an enterprise environment almost at par with the EU average and well ahead of other candidate countries, fostered by few administrative procedures and little time required to start a business. The country has also advanced its digital agenda along all sub-dimensions compared with 2010 and performs slightly above the EU average in the labour market and employment pillar. Going forward, further steps towards building its knowledge-base economy would be needed, including improvements captured by the "innovative Europe" pillar, where it registers the largest difference to the EU average, as well as the education and training pillar. EU financial assistance has so far focused on building institutional capacity (accounting for almost 90% of financial aid), but as of 2012 the allocation of funds covers all five areas, with the EU providing assistance of about EUR 9 million to improve the country's education and training system.

Serbia is the most recent candidate country as of March 2010. To increase its competitiveness, significant efforts along all pillars of the Europe 2020 Competitiveness Index will be needed. Serbia scores lower than its neighbouring peers, including the member states of Bulgaria and Romania, in all areas captured by the index. While the country made notable improvements in its digital agenda compared to 2010, raising its performance to a level comparable to those of Bulgaria and Romania, comprehensive reform efforts are required to improve the enterprise environment and education and training as a basis for smarter growth. Nonetheless, a first priority will be to build the institutional capacity in the country, an area to which the largest part of EU financial aid is being allocated. Considerable room for improvement also remains along the "inclusive Europe" dimension in view of severe rigidities in the labour market (characterized by a mismatch between productivity and pay, weak labour-employer relations and a high youth unemployment rate) as well as within the environmental sustainability pillar.

For **Macedonia**, FYR, a candidate country since 2005, accession negotiations have yet to be opened. Similar to its neighbouring peers, the country's most imminent challenge will be to advance its institutional capacity as a basis towards a knowledge-based economy. The country achieves scores similar to its candidate peers for its enterprise environment, where the private sector has seen slight improvements in obtaining financial resources since 2010. Improvements in ICT infrastructure, such as mobile phones and Internet bandwidth and use, have helped the country advance its digital agenda. However, Macedonia faces multiple challenges in the areas of education and training, innovation and environmental sustainability. It is also notable that Macedonia registered deterioration along the inclusive Europe sub-index, driven by a dramatic rise in youth unemployment and the business sector perceiving a worsening in labour-employer relations and pay and productivity alignment since 2010.

These findings suggest a series of considerations for EU policies that are analysed in Box 3.

Box 3: Defining European policies to unleash competitiveness

Unleashing competitiveness in Europe will primarily require that individual Member States build on their competitiveness strengths and address their main challenges by adopting the necessary reforms and undertaking the investments that will allow them to improve their competitive edge.

In addition, European Institutions, notably the European Commission, also have an important role to play in creating the right conditions for competitiveness, especially in those areas where they hold specific competences. More precisely, the European Commission, among other duties, behaves as a regulatory body safeguarding the full implementation of the internal market for the free movement of goods, services, people and capital. It can provide sanctions and undertake measures to eliminate those barriers that impede the conclusion of the internal market and that hinder high levels of internal competition. In addition, the European Commission is also responsible for negotiating external trade agreements and develops important policies and programmes related to competitiveness in areas such as education, innovation and regional policy, with a dedicated budget that is negotiated for a period of seven years.

In this context, there is wide consensus that despite delays in the implementation of some directives and the malfunctioning of some implementation instruments, e.g. the principle of mutual recognition, the internal market for goods yields good benefits. However, the picture is different for the tradable services sector, which remains fragmented due to national regulations and a lack of a harmonized certification scheme for several liberal professions. Moreover, in order for EU firms to thrive in the global economy, well designed external trade policies that ensure compliance with fair-trade rules are essential to reaping the full benefits of the internal market and increasing competition. In turn, higher degrees of competition enable an efficient allocation of resources and act as a catalyst for innovation, improving competitiveness.

Moreover, in terms of achieving a full internal market, existing barriers in terms of administrative obstacles, e.g. pension and unemployment schemes, to the free movement of people still remain and should also be removed.

In addition, a fifth new freedom has recently been unofficially added to the list: the free movement of knowledge. As mentioned throughout the Report, knowledge has become a crucial factor underpinning economic competitiveness; although the barriers to the flow of knowledge are less tangible, they exist and hinder the capacity of businesses and researchers to access knowledge generated elsewhere in Europe, and where strong spillover effects can accrue. The construction of a European research area creating the conditions for the free movement of scientific and technological knowledge aims to address these barriers, and policies supporting the construction of joint research infrastructure, free movement of researchers or collaborative research programmes have been adopted. Further work in this direction is still needed.

In terms of implementing European policies, a multiannual budget allocates resources to different policy areas. At present, the Multiannual Financial Framework 2014-2020, i.e. the budget for the next seven years, is being discussed and negotiated. Based on the competiveness analysis presented in this Report, a number of considerations can be highlighted going forward:

- The EU continues to lag behind in terms of creating a smarter economy. Further resources should be considered for those areas that aim to bridge this gap at the European level and create important European added value by generating intra-European spillover effects. Education and training policies, research and innovation, the three corners of the knowledge triangle, fall under this category.
- Regional policies, including cohesion and structural funds, aimed at reducing the disparities across Member States and regions within the European Union should follow a competitiveness agenda in order to ensure sustained economic convergence. More emphasis on addressing the strong knowledge lag of these countries and regions by further supporting efficient investments in education and training, research and innovation should be considered.
- Enlargement policy aiming to facilitate accession of these countries should also be centred around addressing their competitiveness weaknesses, including institutional build-up, thus setting their economies on a more solid footing that can better facilitate their integration.

Conclusions

This Report assesses the capacity of the EU as a whole, and of its 27 Member States, to become a smart, inclusive and sustainable economy according to the seven dimensions of the Europe 2020 strategy. As a whole, while the EU performs well vis-à-vis other advanced economies in building inclusive and sustainable societies, it trails significantly in the critical area of smart growth. This raises concerns about its innovation capacity, its ability to boost competitiveness and its potential to continue providing high and rising living standards. The recent sharp adjustments in labour markets with rapid falls in employment, salaries or both in several southern European economies and Ireland have made all too clear the imperative of addressing competitiveness weaknesses in order to promote stable economic progress over time. High levels of economic prosperity cannot be sustained without high levels of competitiveness.

The Report also shows that there are great disparities in performance across European countries, with some at the world's forefront and others in need of significant improvement. More precisely, the Nordic countries continue to lead the way, with some southern and eastern European economies rounding out the bottom of the ranking.

Further analysis of EU candidate and accession countries demonstrates that for most of them, efforts will need to be made across multiple areas in order to prepare them to contribute to a prosperous and sustainable EU.

Based on this analysis, a number of important policy insights can be inferred for both individual Member States and the European Union as a whole. The overarching conclusion is that competitiveness should lie at the heart of Europe's economic agenda. Competitive economies are endowed with the characteristics needed to help them ride out and recover from economic difficulties. Amid their present urgent financial and fiscal concerns, Europe's leaders must not lose sight of the importance of reinforcing the region's competitiveness. Only in this way will European countries ensure their capacity to grow sustainably into the future while better preparing to ride out the next crisis.

Unleashing competitiveness for sustainable and inclusive growth in Europe will primarily require that individual Member States build on their competitiveness strengths and address their main challenges by adopting the necessary reforms and undertaking the investments that can set their economies on a stronger footing.

In terms of European policies, fostering competitiveness will require further improvements in eliminating the barriers to a truly integrated internal market for services and ensuring compliance with fair-trade rules in trade policy so that the right conditions for EU firms to thrive in the global economy are created. Moreover, the EU should also prioritize its investments to foster a smarter European economy by creating an integrated European innovation system that would require further investments in education and training, research and innovation policies. In addition, enabling a sustainable convergence process over time across Member States and regions within the EU will require that regional policy structures address the main competitiveness weaknesses that these countries and regions face. Improving their innovation capacity, which requires sustained investments and time to build, should rank high on the list of priorities.

Adopting the necessary reforms will not be easy. However, there is a sense of urgency and scale to do so in order to avoid a lost decade for economic growth that could endanger the social cohesion model that Europe has built over the past decades. Reforms will require political leadership to overcome vested interests and to create a sense of shared commitment among all agents so that the effects of the reforms are perceived as fair and worth the necessary pain.

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Endnotes

[1] EU15 includes those countries that became members before 2004, i.e. Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and United Kingdom. EU12 includes those countries that became members after 2004, i.e. Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovak Republic, and Slovenia

[2] Available at http://www.number10.gov.uk/news/a-plan-for-growth-in-europe/

[3] Available at http://ec.europa.eu/europe2020/pdf/ags2012_en.pdf

[4] Available at http://ec.europa.eu/economy_finance/articles/eu_economic_situation/pdf/2011/com2011_11_annex1_en.pd

[5] More information on the coverage and characteristics of the Executive Opinion Survey can be found in chapter 1.3 of the *Global Competitiveness Report 2011-2012* at www.weforum.org/gcr

[6] A general purpose technology (GPT), according to Trajtenberg (2005), is one which, in any given period, makes a particular contribution to the overall economy's growth thanks to its ability to transform the methods of production in a wide array of industries. Examples of GPTs are the invention of the steam engine and the electric dynamo.

[7] Measuring environmental sustainability is current work in progress within the World Economic Forum's Sustainable Competitiveness Index. The sub-index uses the most renowned and reliable indicators (e.g. World Bank Data and data used in the Yale Environmental Performance Index). Yet, measuring environmental sustainability is still in its infancy and improvements in quality, reliability and coverage are needed.

[8] We use a moving average of survey data collected over the two years. For more information on the EOS survey procedure and the calculation of country-level values, see Chapter 1.3 of *The Global Competitiveness Report 2010-2011*.

[9] Croatia is officially an acceding country, set to become the 28th Member State in July 2013.

[10] These countries are Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Malta, Latvia, Lithuania, Poland, Romania, Slovak Republic, and Slovenia.

[11] The standard formula for converting each hard data variable to the 1-to-7 scale is

$$6\times\frac{\text{(country score - sample minimum)}}{\text{(sample maximum - sample minimum)}}+1$$

The sample minimum and sample maximum are the lowest and highest scores of the overall sample, respectively. For those hard data variables for which a higher value indicates a worse outcome (e.g. tariff barriers, road congestion), we rely on a normalization formula that, in addition to converting the series to a 1-to-7 scale, reverses it, so that 1 and 7 still correspond to the worst and best possible outcomes, respectively:

$$-6\times\frac{\text{(country score - sample minimum)}}{\text{(sample maximum - sample minimum)}}+7$$

In some instances, adjustments were made to account for extreme outliers in the data.

Appendix A: Composition of the Europe 2020 Competitiveness Index

This appendix provides details about the construction of the Europe 2020 Competitiveness Index.

The Index is composed of seven pillars: Enterprise environment, Digital agenda, Innovative Europe, Education and training, Labour market and Employment, Social inclusion and Environmental sustainability. Each pillar has the same weight (1/7) in the overall Europe 2020 Competitiveness Index score.

The pillars are organized also across three sub-indexes:

- Smart growth: Composed of the Enterprise environment, Digital agenda, Innovative Europe, Education and training pillars
- Inclusive growth: Composed of the Labour market and Employment and Social inclusion pillars
- Sustainable growth: Environmental sustainability pillar

The calculation of scores for each of the three sub-indexes provides additional insight for the analysis. However, these scores are not directly used as components of the overall Europe 2020 Competitiveness Index score, which is an aggregate of the pillar level results.

The Europe 2020 Competitiveness Index is based on both survey and external quantitative data. The survey data are mainly derived from the responses to the World Economic Forum's Executive Opinion Survey and range from 1 to 7. The external quantitative data are collected from various recognized sources, such as the World Bank, the United Nations Educational, Scientific and Cultural Organization (UNESCO), the International Telecommunication Union (ITU) and the International Labour Organization (ILO). All datasets used are described in detail in appendix B: Technical Notes and Sources at the end of this Report. All of the data used in the calculation of the Europe 2020 Competitiveness Index can be found on the website of the Report (www.weforum.org/Europe 2020).

In order to aggregate survey data and other quantitative indicators, the latter are normalized to a 1-to-7 scale using a max-min methodology. Each of the pillars has been calculated as an unweighted average of the individual component variables. In the case of the Enterprise environment, Digital agenda, Education and training and Labour market and Employment pillars, the indicators are first aggregated in sub-pillars using simple averages, and in a second step, the sub-pillars are averaged to obtain the pillar scores.

The variables and the composition of pillars are described below. An asterisk (*) identifies the indicators obtained from external sources.

The Europe 2020 Competitiveness Index

Pillar 1: Enterprise environment 14%

A.01.01 Competition 25%

1.01 Intensity of local competition
1.02 Effectiveness of antitrust policy
1.03 Extent of market dominance
1.04 Agricultural policy cost
1.05 Impacts of rules on FDI
1.06 Distortive effects on competition of taxes and subsidies
1.07 Burden of government regulation

A.01.02 Clusters 25%

1.08 State of cluster development
1.09 Value chain breadth

A.01.03 Entrepreneurship 25%

1.10 Number of procedures to start a business*
1.11 Time required to start a business*
1.12 Extent and effect of taxation
1.13 Attitude towards entrepreneurial failure

A.01.04 Availability of financing 25%

1.14 Ease of access to loans
1.15 Venture capital availability
1.16 Financing through local equity market

Pillar 2: Digital agenda 14%

A.02.01 ICT readiness 33%

2.01 Government prioritization of ICT
2.02 Mobile phone subscriptions*
2.03 Internet bandwidth*
2.04 Laws relating to ICT

A.02.02 ICT usage 33%

2.05 Government online service index*
2.06 Individual using Internet*
2.07 Extent of Internet use by business

A.02.03 ICT impact 33%

2.08 ICT access for all to basic services
2.09 ICT and business model creation
2.10 E-participation index

Pillar 3: Innovative Europe 14%

- 3.01 R&D expenditure*
- 3.02 Researchers in R&D*
- 3.03 Availability of scientists and engineers
- 3.04 Highly cited scientific articles*
- 3.05 PCT patent applications*
- 3.06 Firm-level technology absorption
- 3.07 University-industry collaboration in R&D
- 3.08 Capacity for innovation
- 3.09 Government procurement of advanced technology products
- 3.10 Availability of latest technologies
- 3.11 Extent of marketing
- 3.12 Willingness to delegate authority
- 3.13 Industrial design application*
- 3.14 Nature of competitive advantage

Pillar 4: Education and training 14%

A.04.01 Education.....50%

- 4.01 Quality of overall education
- 4.02 PISA scores on education quality*
- 4.03 Tertiary education enrolment rate*
- 4.04 Secondary education enrolment rate*

A.04.02 Training 50%

- 4.05 Local availability of specialized research and training services
- 4.06 Quality of management schools
- 4.07 Extent of staff training

Pillar 5: Labour market and employment 14%

B.05.01 Labour market.....50%

- 5.01 Hiring and firing practices
- 5.02 Cooperation in labour-employment relations
- 5.03 Pay and productivity

B.05.02 Labour participation 50%

- 5.04 Labour participation activity rate*
- 5.05 Women's participation in labour force*
- 5.06 Private sector employment of women
- 5.07 Youth unemployment rate*

Pillar 6: Social inclusion 14%

- 6.01 Accessibility of healthcare services
- 6.02 Gini coefficient*
- 6.03 Government effort to reduce poverty and inequality
- 6.04 Social safety net

Pillar 7: Environmental sustainability..... 14%

- 7.01 Renewable electricity production*
- 7.02 Terrestrial Biome protection*
- 7.03 Environmental treaty ratification*
- 7.04 Enforcement of environmental regulations
- 7.05 Quality of natural environment
- 7.06 CO2 emission per energy use*
- 7.07 Particulate matter (PM25) concentration*

The composition of the three sub-indexes

Smart growth

Enterprise environment 25%
Digital agenda.....25%
Innovative Europe.....25%
Education and training.....25%

Inclusive growth

Labour market and employment..... 50%
Social inclusion..... 50%

Sustainable growth

Environmental sustainability 100%

Appendix B: Technical Notes and Sources

The data in this Report represent the best available estimates from various national authorities, international agencies, and private sources at the time the Report was prepared. It is possible that some data will have been revised or updated by the sources after publication. The following notes provide sources for all the indicators listed in the Country Profiles. Throughout the Report, "n/a" denotes that the value is not available, or that the available data are unreasonably outdated or do not come from a reliable source. For each indicator, the title appears on the first line, preceded by its number to allow for quick reference. The numbering is the same as the one used in Appendix A

Below is a description of each indicator or, in the case of Executive Opinion Survey data, the full question and associated answers. If necessary, additional information is provided underneath.

1st Pillar: Enterprise environment

1.01 Intensity of local competition

How would you assess the intensity of competition in the local markets in your country? (1 = limited in most industries; 7 = intense in most industries) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

1.02 Effectiveness of anti-monopoly policy

To what extent does anti-monopoly policy promote competition in your country? (1 = does not promote competition; 7 = effectively promotes competition) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

1.03 Extent of market dominance

How would you characterize corporate activity in your country? (1 = dominated by a few business groups; 7 = spread among many firms) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

1.04 Agricultural policy costs

How would you assess the agricultural policy in your country? (1 = excessively burdensome for the economy; 7 = balances the interests of taxpayers, consumers, and producers) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

1.05 Business impact of rules on FDI

To what extent do rules governing foreign direct investment (FDI) encourage or discourage it? (1 = strongly discourage FDI; 7 = strongly encourage FDI) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

1.06 Distortive effect on competition of taxes and subsidies

In your country, to what extent do government subsidies and tax breaks distort competition? (1 = significantly distort competition; 7 = Do not distort competition) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

1.07 Burden of government regulation

How burdensome is it for businesses in your country to comply with governmental administrative requirements (e.g. permits, regulations, reporting)? (1 = extremely burdensome; 7 = not burdensome at all) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

1.08 State of cluster development

In your country's economy, how prevalent are well-developed and deep clusters? (1 = nonexistent; 7 = widespread in many fields) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

1.09 Value chain breadth

In your country, do exporting companies have a narrow or broad presence in the value chain? (1 = narrow, primarily involved in individual steps of the value chain (e.g. resource extraction or production); 7 = broad, present across the entire value chain (i.e. do not only produce but also perform product design, marketing sales, logistics, and after-sales services)) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

1.10 Number of procedures required to start a business

Number of procedures required to start a business | 2011

A *procedureis* defined as any interaction of the company founders with external parties (e.g. government agencies, lawyers, auditors, or notaries). For details about the methodology employed and the assumptions made to compute this indicator, visit http://www.doingbusiness.org/methodologysurveys/.

Source: World Bank/International Finance Corporation, [i]Doing Business 2012: Doing Business in a More Transparent World[i]

1.11 Time required to start a business

Number of days required to start a business | 2011

Time is recorded in calendar days. The measure captures the median duration that incorporation lawyers indicate is necessary in practice to complete a procedure with minimum follow-up with government agencies and no extra payments. For more details about the methodology employed and the assumptions made to compute this indicator, visit http://www.doingbusiness.org/methodologysurveys/.

Source: World Bank/International Finance Corporation, [i]Doing Business 2012: Doing Business in a More Transparent World[i]

1.12 Extent and effect of taxation

What impact does the level of taxes in your country have on incentives to work or invest? (1 = significantly limits incentives to work or invest; 7 = has no impact on incentives to work or invest) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

1.13 Attitudes towards entrepreneurial failure

In your country, how is a failed entrepreneurial project regarded? (1 = An embarrassment; 7 = A valuable learning experience) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

1.14 Ease of access to loans

How easy is it to obtain a bank loan in your country with only a good business plan and no collateral? (1 = very difficult; 7 = very easy) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

1.15 Venture capital availability

In your country, how easy is it for entrepreneurs with innovative but risky projects to find venture capital? (1 = very difficult; 7 = very easy) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

1.16 Financing through local equity market

How easy is it to raise money by issuing shares on the stock market in your country? (1 = very difficult; 7 = very easy) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

2nd Pillar: Digital agenda

2.01 Government prioritization of ICT

How much priority does the government in your country place on information and communication technologies? (1 = Weak priority; 7 = High priority) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

2.02 Mobile phone subscriptions

Mobile telephone subscriptions (post-paid and pre-paid) per 100 population | 2010

A *mobile telephone subscription* refers to a subscription to a public mobile telephone service that provides access to the Public Switched Telephone Network using cellular technology, including number of pre-paid SIM cards active during the past three months. This includes both analogue and digital cellular systems (IMT-2000, Third Generation, 3G) and 4G subscriptions, but excludes mobile broadband subscriptions via data cards or USB modems. Subscriptions to public mobile data services, private trunked mobile radio, telepoint or radio paging, and telemetry services are also excluded. It includes all mobile cellular subscriptions that offer voice communications.

Source: International Telecommunication Union, *ITU World Telecommunication/ICT Indicators Database 2011* (December 2011 edition)

2.03 International Internet bandwidth per internet user

International Internet bandwidth (kb/s) per Internet user | 2010

International Internet bandwidth is the sum of capacity of all Internet exchanges offering international bandwidth measured in kilobits per second (kb/s).

Source: International Telecommunication Union, [i]*World Telecommunication/ICT Indicators 2011*[i] (retrieved February 13, 2012 edition)

2.04 Laws relating to ICT

How would you assess your country's laws relating to the use of information technology (e.g. electronic commerce, digital signatures, consumer protection)? (1 = non-existent; 7 = well-developed) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

2.05 Government Online Service Index

The Government Online Service Index assesses the quality of government's delivery of online services on a 0-1 (best) scale | 2012

This Index captures a government's performance in delivering online services to the citizens. There are four stages of service delivery (*Emerging*, *Enhanced*, *Transactional*and *Connected*). Online services are assigned to each stage according to their degree of sophistication, from the more basic to the more sophisticated. In each country, the performance of the government in each of the four stages is measured as the number of services provided as a percentage of the maximum services in the corresponding stage. Examples of services include online presence, deployment of multimedia content, governments' solicitation of citizen input, widespread data sharing, and use of social networking. For more details about the methodology, visit the UN's Global E-Government Survey 2012's page at http://www2.unpan.org/egovkb/global_reports/12report.htm.

Source: United Nations, *UN E-Government Survey 2012: E-Government for the People*

2.06 Internet users

Percentage of individuals using the internet | 2010

Internet users are people with access to the worldwide network.

Source: International Telecommunication Union, *ITU World Telecommunication/ICT Indicators Database 2011* (December 2011 edition)

2.07 Extent of business Internet use

To what extent do companies within your country use the Internet in their business activities (e.g. buying and selling goods, interacting with customers and suppliers)? (1 = Not at all; 7 = Extensively) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

2.08 ICT access for all to basic services

To what extent do information and communication technologies enable access for all citizens to basic services (health, education, financial services etc.) in your country? (1 = Do not enable access at all; 7 = Enable access significantly) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

2.09 ICT and business model creation

To what extent are information and communication technologies creating new business models, services and products in your country? (1 = Not at all; 7 = A significant extent) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

2.10 E-Participation Index

The E-Participation Index assesses, on a 0-to-1 (best) scale, the quality, relevance, usefulness, and willingness of government websites for providing online information and participatory tools and services to their citizens | 2012

The E-Participation Index captures the extent to which governments create an environment in which citizens can be more active and support their governments. The index takes into account e-participation in all its aspects ranging from e-information to e-consultation and e-decision making. For more details about the methodology, visit the UN's Global E-Government Survey 2012's page at http://www2.unpan.org/egovkb/global_reports/12report.htm.

Source: United Nations, *UN E-Government Survey 20102: E-Government for the People*

3rd Pillar: Innovative Europe

3.01 R&D Expenditure

R&D Expenditure, % GDP | 2008 or most recent year available

Research and experimental development (R&D) comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications.

Source: The World Bank, *World Development Indicators Online* (retrieved February 10, 2012);

3.02 Researchers in R&D

Researchers in R&D, per million people | 2008 or most recent year available

Researchers in R&D are professionals engaged in the conception or creation of new knowledge, products, processes, methods, or systems and in the management of the projects concerned. Postgraduate PhD students (ISCED97 level 6) engaged in R&D are included.

Source: The World Bank, *World Development Indicators Online* (retrieved February 10, 2012);

3.03 Availability of scientists and engineers

To what extent are scientists and engineers available in your country? (1 = not at all; 7 = widely available) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey

3.04 Highly cited scientific articles

Scientific publications within the 10% most cited scientific publications worldwide as % of total scientific publications of the country | 2007 (Eurostat) and 2009 (US, Japan, China and Korea)

The indicator is a proxy for the efficiency of the research system as highly cited publications are assumed to be of higher quality. There could be a bias towards small or English speaking countries given the coverage of Scopus' publication data. Countries like France and Germany, where researchers publish relatively more in their own language, are more likely to underperform on this indicator as compared to their real academic excellence.

Source: DG Research and Innovation

3.05 PCT patent applications

Number of applications for patents filed under the Patent Cooperation Treaty (PCT) per million population | 2008–09 average

This measures the total count of applications filed under the Patent Cooperation Treaty (PCT), by priority date and inventor nationality, using fractional count if an application is filed by multiple inventors. The average count of applications filed in 2008 and 2009 is divided by population, using figures from the United Nations Division of Economic and Social Affairs (retrieved November 10, 2011).

Source: Organisation for Economic Co-operation and Development (OECD), *Patent Database,* December 2011

3.06 Firm-level technology absorption

To what extent do businesses in your country absorb new technology? (1 = not at all; 7 = aggressively absorb) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

3.07 University-industry collaboration in R&D

To what extent do business and universities collaborate on research and development (R&D) in your country? (1 = do not collaborate at all; 7 = collaborate extensively) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

3.08 Capacity for innovation

In your country, how do companies obtain technology? (1 = exclusively from licensing or imitating foreign companies; 7 = by conducting formal research and pioneering their own new products and processes) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

3.09 Government procurement of advanced technology products

Do government procurement decisions foster technological innovation in your country? (1 = no, not at all; 7 = yes, extremely effectively) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

3.10 Availability of latest technologies

To what extent are the latest technologies available in your country? (1 = not available; 7 = widely available) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

3.11 Extent of marketing

In your country, to what extent do companies use sophisticated marketing tools and techniques? (1 = very little; 7 = extensively) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

3.12 Willingness to delegate authority

In your country, how do you assess the willingness to delegate authority to subordinates? (1 = low – top management controls all important decisions; 7 = high – authority is mostly delegated to business unit heads and other lower-level managers) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

3.13 Industrial design counts in applications

Industrial design counts in applications per million population | 2010

This measures the total industrial design counts in applications by residents at domestic offices and abroad, while taking into account the multiplying effect for regional offices, for example, the EU's Office for Harmonization in the Internal Market (OHIM) and Benelux's BOIP. Applications received by these offices are multiplied by their respective numbers of member states. For example, an application filed by a US resident at OHIM is multiplied by 27 to take into account that this application is equivalent to filing for protection in all 27 EU member states. The industrial design counts are divided by population, using figures from the United Nations Division of Economic and Social Affairs (retrieved November 10, 2011).

Source: World Intellectual Property Organization (WIPO), Statistics Database (2010)

3.14 Nature of competitive advantage

What is the competitive advantage of your country's companies in international markets based upon? (1 = Low-cost or natural resources; 7 = Unique products and processes) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

4th Pillar: Education and training

4.01 Quality of the educational system

How well does the educational system in your country meet the needs of a competitive economy? (1 = Not well at all; 7 = Very well) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

4.02 PISA scores on education quality

Average performance for combined reading, mathematical and scientific literacy performance | 2009

The reported value corresponds to the average performance of pupils (age 15) in the key competencies of reading, mathematics and science. PISA scores on education quality are scaled such that the a posteriori distribution of student competences, with equal weight given to all OECD countries, has mean 500 and standard deviation 100.

Source: Organisation for Economic Co-operation and Development (OECD), 2009

4.03 Tertiary education enrolment rate

Gross tertiary education enrolment rate | 2011 or most recent year available

The reported value corresponds to the ratio of total tertiary enrolment, regardless of age, to the population of the age group that officially corresponds to the tertiary education level. Tertiary education (ISCED levels 5 and 6), whether or not leading to an advanced research qualification, normally requires, as a minimum condition of admission, the successful completion of education at the secondary level.

Source: UNESCO Institute for Statistics (accessed February 17, 2012)

4.04 Secondary education enrolment rate

Gross secondary education enrolment rate | 2011 or most recent year available

The reported value corresponds to the ratio of total secondary enrolment, regardless of age, to the population of the age group that officially corresponds to the secondary education level. Secondary education (ISCED levels 2 and 3) completes the provision of basic education that began at the primary level, and aims to lay the foundations for lifelong learning and human development, by offering more subject- or skills-oriented instruction using more specialized teachers.

Source: UNESCO Institute for Statistics (accessed February 21, 2012)

4.05 Local availability of specialized research and training services

In your country, to what extent are high-quality, specialized training services available? (1 = not available; 7 = widely available) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

4.06 Quality of management schools

How would you assess the quality of management or business schools in your country? (1 = poor; 7 = excellent – among the best in the world) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

4.07 Extent of staff training

To what extent do companies in your country invest in training and employee development? (1 = hardly at all; 7 = to a great extent) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

5th Pillar: Labour market & employment

5.01 Hiring and firing practices

How would you characterize the hiring and firing of workers in your country? (1 = impeded by regulations; 7 = flexibly determined by employers) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

5.02 Cooperation in labour-employer relations

How would you characterize labour-employer relations in your country? (1 = generally confrontational; 7 = generally cooperative) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

5.03 Pay and productivity

To what extent is pay in your country related to productivity? (1 = not related to worker productivity; 7 = strongly related to worker productivity) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

5.04 Labour participation activity rate

Ratio of the population ages 15 and older to the working-age population (ages 15+) | 2010

This measures the percentage of the population ages 15 and older that is economically active, i.e. all people who supply labour for the production of goods and services during a specified period.

Source: International Labour Organization, *Key Indicators of the Labour Markets Net* (retrieved March 5, 2012)

5.05 Female participation in labour force

Ratio of female participation in the labour force (%) to male participation in the labour force (%) | 2010

This measure is the percentage of women aged 15–64 participating in the labour force divided by the percentage of men aged 15–64 participating in the labour force.

Source: International Labour Organization, *Key Indicators of the Labour Markets Net* (retrieved March 5, 2012)

5.06 Private sector employment of women

In your country, to what extent do businesses provide women the same opportunities as men to rise to positions of leadership? (1 = Not at all, women have no opportunities to rise to positions of leadership; 7 = Extensive, women have equal opportunities for positions of leadership) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

5.07 Youth unemployment, %

Youth unemployment (% of total labour force ages 15-24) | 2010 or most recent year available

Youth unemployment refers to the share of the labour force ages 15-24 without work but available for and seeking employment. Definitions of labour force and unemployment differ by country.

Source: International Labour Organization, *Key Indicators of the Labour Markets Net* (retrieved March 5, 2012

6th Pillar: Social inclusion

6.01 Accessibility of healthcare services

How accessible is healthcare in your country? (1 = Limited – only the privileged have access; 7 = Universal – all citizens have access to healthcare) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

6.02 Gini coefficient

Income inequality measure (0=perfect equality; 1=perfect inequality) | 2010 or most recent year available

This indicator is defined as the relationship of cumulative shares of the population arranged according to the level of equivalised disposable income, to the cumulative share of the equivalised total disposable income received by them. A Lorenz curve plots the cumulative percentages of total income received against the cumulative number of recipients, starting with the poorest individual. The Gini index measures the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line. Thus a Gini index of 0 represents perfect equality, while an index of 1 implies perfect inequality.

Source: The World Bank, World Development Indicators & Global Development Finance Catalog (September 2011 edition); European Commission, Eurostat (retrieved March 5, 2012)

6.03 Government effectiveness in reducing poverty and inequality

In your country, how effective are the government's efforts to reduce poverty and address income inequality? (1 = Very ineffective; 7 = Very effective) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

6.04 Social safety net protection

In your country, does a formal social safety net provide protection from economic insecurity due to job loss or disability? (1 = Not at all; 7 = Fully) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

7th Pillar: Environmental Sustainability

7.01 Share of renewable energy production

Share of electricity produced from renewable sources (% of KWh) | 2010 or most recent year available

This indicator is the ratio of the total electricity production from renewable sources (hydropower, geothermal, solar, tides, wind, biomass, and biofuels) to the total electricity production from all sources (KWh). Electricity production is measured at the terminals of all alternator sets in a station. Production includes the output of electricity plants that are designed to produce electricity only as well as that of combined heat and power plants.

Source: Author's calculation based on The World Bank, *World Development Indicators Online* (retrieved February 10, 2012); International Energy Agency (IEA)

7.02 Terrestrial biome protection

The weighted percentage of terrestrial biomes under protected status, where the weight is determined by the relative size of biomes within a country. (Biomes are climatically and geographically defined as similar climatic conditions on the Earth, such as communities of plants, animals, and soil organisms, and are often referred to as ecosystems). | 2010 or most recent year available

This indicator is calculated by CIESIN (Columbia University's Center for International Earth Science Information Network) by overlaying the protected area mask on terrestrial biome data developed by WWF's Terrestrial Ecoregions of the World for each country. Scores are capped at 17% per biome such that higher levels of protection of some biomes cannot be used to offset lower levels of protection of other biomes, hence the maximum level of protection a country can achieve is 17%.

CIESIN uses time series of the World Database on Protected Areas (WDPA) developed by UNEP World Conservation Monitoring Centre in 2011, which provides a spatial time series of protected area (PA) coverage from 1990 to 2010. WCMC considers all nationally designated protected areas whose location and extent is known. Boundaries were defined by polygons where available, and where they were not available protected area centroids were buffered to create a circle in accordance with the PA size. WCMC removed all overlaps between different protected areas by dissolving the boundaries to create a protected areas mask.

Source: Yale University and Columbia University, Environmental Performance Index (EPI) 2012 edition based on WWF World Wildlife Fund USA and UNEP World Conservation Centre data

7.03 Environmental Treaty ratification

Total number of ratified environmental treaties | 2010

This variable measures the total number of international treaties from a set of 25 for which a state is a participant. A state becomes a "participant" by Ratification, Formal confirmation, Accession, Acceptance, Definitive signature, Approval, Simplified procedure, Consent to be bound, Succession, and Provisional application (which are here grouped under the term ratification, for reasons of convenience). The treaties included are: the International Convention for the Regulation of Whaling, 1948 Washington; the International Convention for the Prevention of Pollution of the Sea by Oil, 1954 London, as amended in 1962 and 1969; the Convention on Wetlands of International Importance especially as Waterfowl Habitat, 1971 Ramsar; the Convention Concerning the Protection of the World Cultural and Natural Heritage, 1972 Paris; the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 London, Mexico City, Moscow, Washington; the Convention on International Trade in Endangered Species of Wild Fauna and Flora, 1973 Washington; the International Convention for the Prevention of Pollution from Ships (MARPOL) as modified by the Protocol of 1978, 1978 London; the Convention on the Conservation of Migratory Species of Wild Animals, 1979 Bonn; the United Nations Convention on the Law of the Sea, 1982 Montego Bay; the Convention on the Protection of the Ozone Layer, 1985 Vienna; the Protocol on Substances that Deplete the Ozone Layer, 1987 Montreal; the Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, 1989 Basel; the international Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 London; the United Nations Framework Convention on Climate Change, 1992 New York; the Convention on Biological Diversity, 1992 Rio de Janeiro; the International Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, particularly Africa, 1994 Paris; the Agreement relating to the

Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982, 1994 New York; the Agreement relating to the Provisions of the United Nations Convention on the Lay of the Sea relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, 1995 New York; the Kyoto Protocol to the United Nations Framework Convention on the Climate Change, Kyoto 1997; the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, 1998 Rotterdam; the Cartagena Protocol of Biosafety to the Convention on Biological Diversity, 2000 Montreal; the Protocol on Preparedness, Response and Cooperation to Pollution Incidents by Hazardous and Noxious Substances,2000 London; the Stockholm Convention on Persistent Organic Pollutants, 2001 Stockholm; the International Treaty on Plant Genetic Resources for Food and Agriculture, 2001 Rome; and the International Tropical Timber Agreement 206, 1994 Geneva.

Source: The International Union for Conservation of Nature (IUCN) Environmental Law Centre ELIS Treaty Database

7.04 Enforcement of environmental regulations

How would you assess the enforcement of environmental regulations in your country? (1 = Very lax ; 7 = Among the world's most rigorous) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

7.05 Quality of natural environment

How would you assess the quality of the natural environment in your country? (1 = Extremely poor; 7 = Among the world's most pristine) | 2010–11 weighted average

Source: World Economic Forum, Executive Opinion Survey, 2010 and 2011 editions

7.06 CO2 intensity

(kg of CO2 per kg of oil equivalent energy use) | 2008 or most recent year available

Carbon dioxide emissions from solid fuel consumption refer mainly to emissions from the use of coal as an energy source.

Source: The World Bank, World Development Indicators & Global Development Finance Catalogue (December 2011 edition);

7.07 PM25 emission

Annual average PM2.5 (particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometers) concentration for 2001–05, population weighted by country | 2010 or most recent year available

This indicator is based on satellite data that are then converted to ground-level concentrations using the GEOS-Chem global chemical transport model to account for the meteorological and chemical factors that influence the spatially and temporally varying relationship between column and surface concentrations. The 0.1 x 0.1° resolution aerosol optical depth (AOD) values for 2001–05 are derived from the NASA Terra MODIS and MISR sensors, averaged to get a 6-year mean AOD for each grid cell, and then population-weighted to better represent human exposure by country. PM2.5 concentrations were averaged over the period 2001-2005 and the grid was re-sampled to match the Global Rural- Urban Mapping Project 1km population grid. The weighted average of the values in each grid cell was used to derive a country total exposure to PM2.5 in micrograms per cubic meter.

Source: Yale University and Columbia University, Environmental Performance Index (EPI) 2012 edition based on NASA MODIS and MISR data, processed by Dalhousie University (van Donkelaar et al. [2010]), Battelle

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