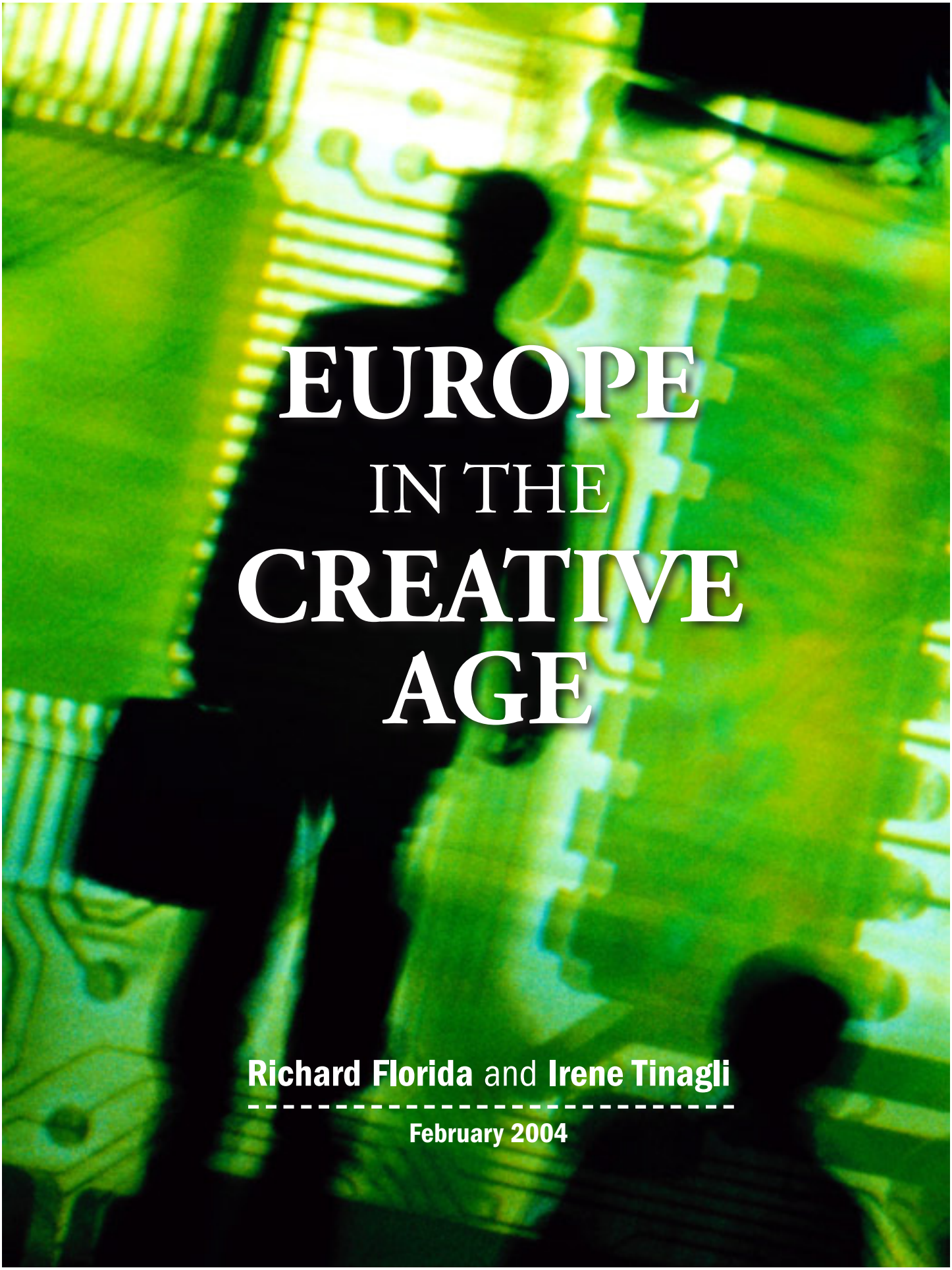

EUROPE IN THE CREATIVE AGE

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Executive Summary

Creativity has become a driving force of economic growth. The ability to compete and prosper in the global economy goes beyond trade in goods and services and flows of capital and investment. Instead, it increasingly turns on the ability of nations to attract, retain and develop creative people. This report extends the concepts and indicators introduced in *The Rise of the Creative Class* to the European context. It develops new indicators for the Creative Class and competitiveness that are based on the 3Ts of economic development—Technology, Talent and Tolerance — for 14 European, Scandinavian and Nordic countries and compares them to the United States. While these measures differ in significant respects from the indicators in *The Rise of the Creative Class*, the findings are just as illuminating and compelling.

- The Creative Class makes up more than 25 percent of the work force in seven of 14 European nations, and comprises nearly 30 percent of the workforce in three —the Netherlands, Belgium and Finland. Creative Class workers outnumber blue-collar workers in these three countries, and also in three others: the United Kingdom, Ireland, and Denmark.

- The Creative Class is growing at a fairly rapid pace in a majority of the European nations. Ireland outpaces all nations in Creative Class growth, with a 7 percent annual growth rate since 1995.

- Not all nations, however, appear to have made the shift to a creative economy and a creative occupations structure. Italy and Portugal, for example, have less than 15 percent of the workforce in the Creative Class.

- While the United States remains the world leader in technology and in its ability to attract top talent, a cluster of Northern European nations—Finland, Sweden, Denmark, the Netherlands, and Belgium—appear to have distinctive assets with which to compete. These countries have considerable technological capabilities, have invested and continue to invest in developing creative talent and also appear to have the values and attitudes that are associated with the ability to attract creative talent from the outside. A number of these countries, notably Sweden and the Netherlands, have liberalized their immigration policies and have attracted concentrations of foreign-born people. These nations and others still suffer from an inability to assimilate immigrants as quickly and seamlessly as the United States and to create the environment for their rapid upward mobility as has occurred with various groups in the U.S. and Canada. The fact the English is spoken widely across the population in these countries provides an additional asset in the global competition for creative people and they will continue to benefit from the freer flows of people across EU members states.

- Within Europe, the epicenter of competitiveness is shifting from the traditional powers, especially France, Germany and the United Kingdom, to a cluster of Scandinavian, Nordic and northern European counties.

■ Sweden is the top performer on the Euro-Creativity Index, outperforming not only all of the other European countries, but the United States as well.

■ Finland is also well-positioned to compete in the Creative Age with a high level of overall creative competitiveness and rapid growth in its creative capabilities.

■ The Netherlands, Denmark and Belgium also appear to have considerable assets with which to compete.

■ Ireland stands out as an up-and-coming nation, with significant growth in its Creative Class and its underlying creative capabilities since 1995.

■ The ability to attract people is a sensitive and dynamic process. New centers of the global creative economy can emerge quickly; established players can lose position. The world today stands at an intriguing inflection point. For years the United States possessed an unchallenged competitive advantage in its ability to attract the best and brightest from Europe, Scandinavia and around the world. For the first time, that advantage seems to be imperiled. Part of the reason clearly lies in the fact that a number of countries in Europe and elsewhere (notably Canada and Australia) have liberalized their immigration policies and increased their efforts to attract and retain talent. But it also lies in the fact that the climate for creative talent in the United States has chilled somewhat both as a result of direct policies which restrict scientific information and make it harder for people to get into and out of the country and also because of a widening perception of the U.S. as unilaterally aggressive and less friendly toward foreign-born people.

Foreward

The diplomatic conflict preceding war in Iraq questioned and dramatised Europe's weight in the world. In polarising differences with the strategy of its long-standing North Atlantic ally, it exposed new fault lines within a continent which has changed radically even since the end of the cold war.

Many have debated whether Europe carries distinctive 'values' onto the world stage, and whether it maintains any semblance of the geopolitical influence brought by its colonial past. But these questions are preceded by an issue which challenges policymakers and business leaders more directly: can European economic and productivity growth compete with the US?

Between 1992 and 2000, US GDP grew by 36% in real terms, compared to 19% for the combined EU countries. Despite the enormous structural changes undertaken in Europe in the last twenty years, including the integration and liberalisation of key markets across the EU, the birth of the Euro, the accession of a dozen new countries, Germany's reunification and the adoption of a 'growth and stability' pact limiting national budget deficits, economic growth has been sluggish in comparison to US performance.

Productivity is key both to the difference in performance and to future prospects. Recent data suggests that, while the technology-fuelled leap of the 1990s was unsustainable in many respects, US productivity growth has continued unabated, reaching a remarkable 4.8 per cent in 2002. Europe, by contrast, has struggled to maintain its own productivity improvements, despite the often-missed fact that output per hour is higher in Norway, Belgium, France, Ireland, the Netherlands and Germany than in the US.

Growing American concern about a 'jobless' recovery also points to the flipside of increasing productivity amid intensifying global competition. The innovation, investment and efficiency implied by relentless productivity improvement involve a process of turbulent and disruptive transition for many workers and firms, and increasingly dire consequences for those who find themselves casualties of economic change.

At this point the debate becomes both more interesting and more divisive. The possible diagnosis of Europe's problems ranges from the inflexibility of its labour markets and welfare systems to the quality of its research and innovation, from its rapidly ageing population to the difficulty of applying a single monetary regime to widely diverse countries and regions. But throughout the many-sided debate, few have doubted that the fundamentals of the US model - its enterprise culture, lightly regulated labour market, competition between states and regions, world class science and technology institutions and openness to migrants - provide the strongest position for competitiveness over the next generation.

'creative crescent' of smaller nations on the northern edge of the continent and the rest.

Florida's past work goes to the heart of what the shift to a 'new economy' really means. In *The Rise of the Creative Class* he helped to put that transition in its proper context; a long wave of change affecting every sector of the economy, in which competitiveness and wealth become determined increasingly by the capacity for innovation and creativity. The technology and finance-fuelled bubble of the 1990s was a short moment in that transition – not the main event – even though some of the hangover remains.

But most important, it highlights flaws in conventional assumptions about the relationship between investment, technology, human capital and growth. For industrialised economies, jobs and growth lie in sectors where value can be added through the creation and application of knowledge. But rather than people moving to where the investment and technology are concentrated, as much of the competitiveness literature assumes, Florida has shown that firms will increasingly follow the talent. Even more significant, the new 'creative class' is drawn to a particular quality of place: open, diverse communities where difference is welcome and cultural creativity is easily accessed. Result: the new economy thrives in places which combine what Florida calls the three T's of technology, talent and tolerance.

From this perspective, as the report shows, some parts of Europe are already positioned well to compete with the US. And as the authors note, America's current political environment may be undermining its competitive advantage, for example by restricting scientific research and making border entry harder: between 2001 and 2002, the number of US visas issued for foreign-born workers in science and technology fell by a staggering 55 per cent.

Can Europe capitalise on this opportunity? In the midst of the dot.com boom European leaders signed up to the "Lisbon agenda", committing their nations and the EU to the goal of becoming "the world's most competitive and dynamic knowledge economy by 2010". Four years on the agenda is struggling. A recent scorecard report by the Centre for European Reform showed that few countries are making the progress needed to fulfil their commitments, though Denmark and Finland have exceeded expectations.

The strategic importance of the knowledge-based economy has been knocked off-centre by a plethora of intractable political problems, most of them caused by the crunching effects of change. These include wrangling over the acceptability of budget deficits, entrenched opposition to pensions and labour market reform, deadlock over agricultural subsidy and the failure even to agree a workable constitutional form for the enlarged EU. What looked in the late 1990s like a resurgence of modernising social democracy in Europe has collapsed into a stalemate. In some countries centre left governments cling tentatively to power while struggling to frame and execute meaningful reform. In others like Denmark, France and the Netherlands a populist right-wing politics has re-asserted itself, though with precious little in the way of clear long term direction. What has emerged most clearly, however, is a powerful vein of anti-immigrant sentiment and public unease, exploited by some politicians and cautiously acknowledged by others.

The central tension is based on values, not wealth. Many Europeans identify strongly with a quality of life based on both social equality and secular liberalism. But economic transition and new global insecurity are forcing a painful reckoning. For many western European nations, tolerance and social protection were possible only within the sheltered spaces of the post-war national welfare state and the NATO security umbrella. As both have creaked, many have begun to feel exposed.

The data presented in this report shows that values associated with tolerance are more strongly held in Europe than in the US. This is striking, given American self-image. It contributes significantly for the potential for Europe to compete in drawing the best and brightest to its most dynamic regions. But this will only occur if Europeans are prepared to face a series of choices and challenges which could spread the wave of energy emanating from our Northern fringes.

There is an often forgotten second half to the Lisbon Agenda's bold top-line: a region "capable of sustainable economic growth with more and better jobs and greater social cohesion." That this is often forgotten is indicative of low status and weak articulation at EU level of issues - culture, education, social inclusion and cohesion – which are still widely regarded as second tier. But it also reflects the extent to which social and economic decision-making have become separated from each other, in language and in practice. The debate usually flows in one direction; that to finance social spending and protection, economic dynamism must be triggered, and that continental Europe's layered institutions of welfare, regulation and family support impede this in one way or another. But in identifying tolerance as a pillar of creative competitiveness, Florida and Tinagli question whether we should flip the assumption of cause and effect: dynamic knowledge-economies do not beget social cohesion; rather certain kinds of social cohesion can beget dynamic knowledge-economies.

The Nordic countries exemplify this combination of an intense, open and innovative enterprise culture with some of the most egalitarian social and civic cultures in the world. In doing so, they point to the crucial role of public infrastructure and leadership in underpinning the creative economy, and to the kinds of adaptive strategy and smart governance that reformers elsewhere should learn from. Nonetheless, they too face some thorny problems.

The most pressing issue is how to maintain the combination in the face of growing cultural and ethnic diversity. Northern European openness has historically fused high levels of social trust with very homogeneous populations. Finns, Danes and Swedes are all extremely unsure about how to respond to more radical change in the composition of their populations. This challenge also marks out the immigration debate elsewhere in Europe for particular attention. While several countries have recently liberalised their immigration policies to encourage the managed flow of skilled entrants, the backlash has left the debate unresolved and EU progress towards a coherent policy framework is excruciatingly slow. As Theo Veenkamp argued in a Demos report last year, an approach to migration based on people flow is only possible in conjunction with far-reaching, holistic reform of health, welfare and political institutions.

Equally critical is the need to move from a limited conception of tolerance as mutual non-interference towards the more active creation of social trust in fluid, pluralized societies. The approach to multiculturalism and anti-discrimination fashioned over the last two generations on both sides of the Atlantic is ill-equipped for this task. Equally, the hierarchical authority of public institutions and the solidarity of traditional communities are unlikely to withstand the pressures on trust already being caused by the shock of the new.

A growing literature on social capital and civic participation suggests that norms of trust and cooperation are highly influential in determining our opportunities and wellbeing. That trust is embedded in social relationships is its strength, but also the critical challenge for policy-makers and communities alike, because for many familiarity based on continuity is no longer an option. The challenge is to learn how new forms of active trust can be best generated and shared between different people.

Third, inclusive economic growth depends on finding more effective tools with which to address multiple deprivation proactively. From place management to social enterprise strategies, early childhood programmes to adult re-skilling, the search for competitiveness includes a race to define effective welfare for a new century.

Next, while attracting talent through competition is crucial, nurturing and spreading home-grown creative potential is equally important. We are only in the early stages of understanding how to remake public education systems so that they waste less talent and match more closely the contours of a creative economy and society. Generating the higher order skills and knowledge needed for the most specialised industries is only one, albeit major, element. Remodelling universal education systems around the personal profile of each individual learner will require more radical change.

Finally, perhaps most critical, is the recognition that in the economy Florida and Tinagli describe, the locus of competitiveness is the city-region, not the firm or the nation. The habitats of economic and social innovation are not shaped around our national systems of governance, even though we remain fixed on national identity and performance. As a major recent evaluation of European urban performance by Michael Parkinson for the English Core Cities Group shows, some European cities which have long considered engines of regional growth are being overhauled by outliers such as Helsinki and Barcelona, not least because of their creative milieux and innovation strategies. If city-regions are going to drive growth and renewal, we must refashion governance to reflect their needs on everything from universities to connectivity, fiscal incentives to planning. Deeper and faster learning between these networks of city-regions is also essential.

Europe may be positioned to prosper far more than conventional wisdom allows over the next generation. Demos is pleased to be working with Richard Florida and his team on the creative possibilities that lie ahead.

Tom Bentley
January 2004

Tom Bentley is Director of Demos.

He is a former ministerial adviser in the British Government. His publications include The Creative Age: knowledge and skills for the new economy (Demos, 1999) and The adaptive state: strategies for the personalisation of the public realm (with James Wilsdon, Demos 2003)

Introduction

Creativity is the motor force of economic growth. Roughly a century ago, the US and European economies and societies transitioned from agricultural to industrial systems. There was a massive movement of people from rural communities to rapidly growing urban industrial centers. This set in motion a whole series of sweeping demographic, social, economic and cultural shifts. Today, the US and Europe are again going through a period of sweeping economic and social transformation — this time from an industrial to a creative economy.

The creative economy has grown considerably over the past century with the most rapid and punctuated growth occurring over the past two decades or so. A hundred years ago, at the dawn of the 20th century, fewer than 10 percent of working people worked in the creative sector of the economy. Fewer than 15 percent of the workforce did so in 1950. But over the past two decades, creativity has become the driving force of our economy and the creative sector has exploded. Today, from between 25 to more than 30 percent of workers in the advanced industrial nations work in the creative sector of the economy, engaged in science and engineering, research and development, technology-based industries, in the arts, music, culture, aesthetic and design industries, or in the knowledge-based professions of health care, finance and law. In the United States, the creative sector accounts for nearly half of all wage and salary incomes, as much as the manufacturing and service sectors combined.

Indeed, the age we are living through is one of great economic and social transformation—as big as, or perhaps bigger, than the shift that Marx chronicled from an agricultural to an industrial capitalist system. That shift substituted one set of physical inputs (land and human labor) for another (raw materials and physical labor), while the current transformation is based fundamentally on human intelligence, knowledge and creativity. This is a huge change, and it should come as no surprise that it's shaping myriad transformations in our society, culture, workplaces, communities and everyday life. These transformations have been many decades in the making, and they'll be with us for decades to come.

Creativity is a basic element of human existence. Every single human being is creative and houses creative potential: Every single human being is creative in some way. Creative geniuses play their role, but creativity is a broad social process and requires teamwork. It's stimulated by human exchange and networks; it takes place in real communities and places. We can no longer prosper and grow by tapping and rewarding the creative talents of a minority. If we are to truly prosper, everyone must be brought fully into the system by employing them to do more value-adding creative work. Doing so will raise peoples wages and strengthen our national economy, while also helping to bring our regional economies — and our lives — into better balance.

Global competition in the creative economy is a wide-open game. While many assume that the United States has an unbeatable edge, its position is more tenuous than commonly thought. The United States certainly has many assets with which to compete. Over the past century, it built the most powerful and dynamic economy in the world. It did so by fostering entirely new industrial sectors, by maintaining a free and open society, by investing in scientific and cultural creativity, and most of all by drawing energetic and intelligent people from all over to its shores.

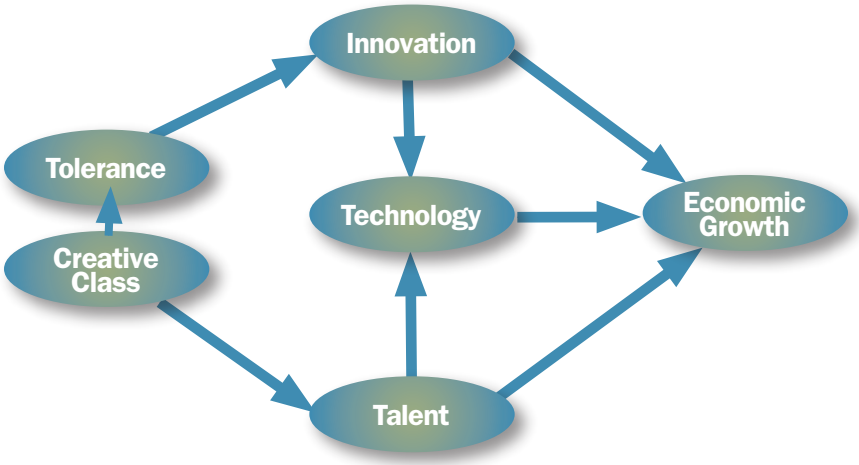
But economies are fluid — people move, leads are easily gained or lost — and creativity is an asset that has to be constantly cultivated and renewed. Even before the stock-market crash — in 1999, at the height of the boom, when it seemed that American high-tech ruled the world — the U.S. Council on Competitiveness issued a report warning that we were letting our "innovation infrastructure" decay, while "other nations are accelerating their own efforts." Since then the creativity gap has closed even further.

The key element of global competition is no longer the trade of goods and services or flows of capital, but the competition for people. This report starts from the premise that the economic leaders of the future will not likely be emerging giants like India or China that are becoming global centers for cost effective manufacturing and the delivery of basic business processes. Rather, they will be the nations and regions within nations that can best mobilize the creative capacities of their people and attract creative talent from around the world.

This report reflects and builds upon the theory of economic growth advanced in *The Rise of the Creative Class*. It argues that economic growth and development turns upon 3Ts—technology, talent and tolerance. Traditional models say that economic growth comes from companies or jobs or technology. This report argues that these models are good starting points but they are incomplete. Technology is important. It is a central element of the 3Ts. But other factors come into play as well. Talent is the second T. Human capital theorists have long argued that educated people are the key driver of economic development. Following *The Rise of the Creative Class*, we use measures of creative occupations as well as measures of human capital based on educational attainment, such as the percentage of the workforce with a bachelor's degree or above.

Tolerance is the third T. It critically affects the ability of nations and regions to mobilize their own creative capacities and compete for creative talent. Clearly, the more tolerant or open a nation or region is, the more talent it is able to mobilize and attract. This is a critical dimension of economic competitiveness today—unfortunately, it's one that is nearly absent from conventional economic models. For most of human history, wealth came from a place's stock or endowment of resources -for example, fertile soil, natural resources or raw materials. But that metaphor fails us today. Both technology and the talented and creative people that create it are highly mobile economic resources. The key dimension of economic competitiveness no longer lies in large endowments of raw materials or natural resources or even labor cost advantages. Rather, it turns on the ability to attract, cultivate and mobilize creative assets. This report focuses on the underlying conditions which form the "ecosystem characteristics" of the creative economy that enable certain places to attract and mobilize more of these creative assets than others. Tolerance – openness to new people and ideas, what one can think of as "low barriers to entry for people" -- is a critical element of this environment.

Figure 1: Tolerance, Creativity & Economic Growth



This report extends these concepts originally developed and tested for the United States in The Rise of the Creative Class to the European context. It explores trends in creativity and economic growth in 14 European countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden and the United Kingdom. It provides new data on the extent of the Creative Class in these countries, provides measures for each of the 3Ts, and introduces a new composite measure of overall competitiveness performance—the Euro-Creativity Index. And it compares the performance of these European nations to that of the United States.

The Creative Class in Europe

Some suggest that the Creative Class is a peculiarly American development—that other advanced societies have much larger concentrations of working class and lower-end service class occupations. We used data from the International Labour Organization (ILO) to build comparable measures of the Creative Class for 13 EU nations1. The Euro-Creative Class Index is based on ILO occupational classifications that cover scientists, engineers, artists, musicians, architects, managers, professionals and others whose jobs deal with creative or conceptual tasks as a share of total employment. We feel it's comparable to the original Creative Class measures used in *The Rise of the Creative Class*. Figure 1 shows the percentage of the workforce employed in creative occupations, while Figure 2 charts the change in employment in these occupations since 1995. So how extensive is the Creative Class across the European nations? The short answer is *very extensive*.

- While the United States has the highest percentage of its national workforce employed in the Creative Class, roughly 30 percent, the Creative Class comprises a comparable portion of the workforce in Belgium (29.97 percent), the Netherlands (29.5 percent) and Finland (28.6 percent). Creative class workers outnumber blue-collar workers in all of these countries (and also in the UK, Ireland and Denmark).

- The Creative Class comprises more than a quarter of the workforce in five countries.

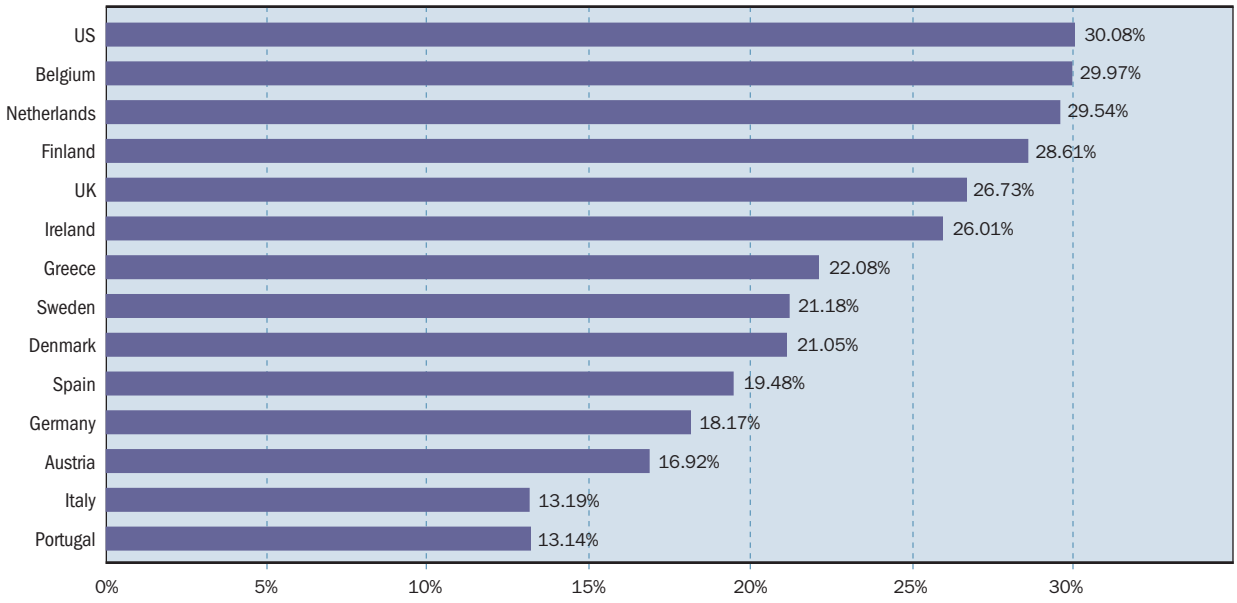
- Not all nations, however, appear to have made the shift to a creative economy and a creative occupational structure. Italy and Portugal, for example, have less than 15 percent of their national workforce in Creative Class occupations.

- Ireland has seen far and away the greatest growth in creative occupations—experiencing a 7.6 percent average annual growth rate since 1995. The Netherlands, Sweden and Denmark have experienced roughly a 2 percent annual rate of growth in creative occupations. Only Portugal has experienced negative growth in creative occupations.

[1] Unfortunately, ILO data for France were not available: therefore, it was not possible to build a creative class index for France.

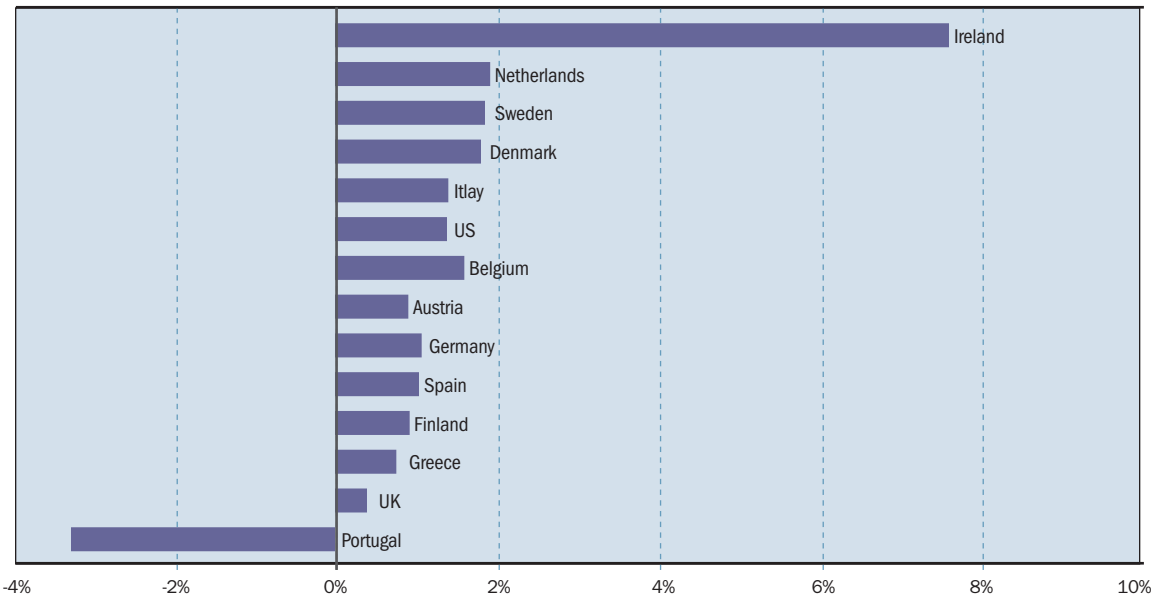
Figure 2: The Euro-Creative Class Index

Creative Occupations as a percent of Total Employment (2000)



Source: ILO, LABORSTA Labour Statistics Database, http://laborsta.ilo.org for European countries, US Bureau of Labor Statistics for the United States. Note: All the data referring to European countries are classified according the ISCO-88 standard. Last available year for Ireland, United Kingdom, US: 1999, Belgium: 1998; all other countries refer to year 2000.

Figure 3: Growth in the Euro-Creative Class
Change in Creative Occupations (1995-latest avail. year)



Note: Change is measured from the year 1995 to the latest available year. Denmark, Netherlands and United Kingdom: 1995-1998; Belgium: 1995-1998; Ireland and Finland: 1995-1999; Sweden: 1998-2000. All other countries: 1995-2000.
Source: Elaborated from ILO, LABORSTA Labour Statistics Database, http:laborsta.ilo.org;

The Euro-Talent Index

We combined the Creative Class Index with two other talent measures to build an overall Euro-Talent Index. In addition to the Creative Class Index, the Euro-Talent Index includes two sub measures: the Human Capital Index which is based on the percentage of population age 25-64 with a bachelor degree or above (degrees of at least four years); and the Scientific Talent Index, which is based on the number of research scientists and engineers per thousand workers.

Table 1 shows how the European nations perform on the overall Euro-Talent Index. Figure 4 shows their scores on the Human Capital and Scientific Talent measures. Figures 5 supplements this, showing the relationship between these two indicators and the Creative Class, respectively.

Not surprisingly, there tends to be a close association among the various talent measures. Nations with high levels of creative occupations also tend to have high levels of human capital and scientific talent. The key findings

are as follows.

- The top performers are Finland and the Netherlands, which follow closely on the heels of the United States on the Euro-Talent Index. Three other nations --Belgium, United Kingdom and Sweden —also do very well.
- Three countries score highly on creative occupations and human capital —the United States, the Netherlands and Belgium, closely followed by the UK. These nations are in very good position to mobilize and harness creative assets.
- Five countries do well on creative occupations and scientific talent. Finland and Sweden are tops here, followed by the United States, Denmark and Belgium.
- Four countries -- Ireland, Denmark, Spain and Germany— occupy the middle ground with respect to talent overall.
- Five nations are laggard: France, Greece, Austria, Italy and Portugal.
- Ireland stands out for its considerable ability to grow creative occupations in a relatively short period.

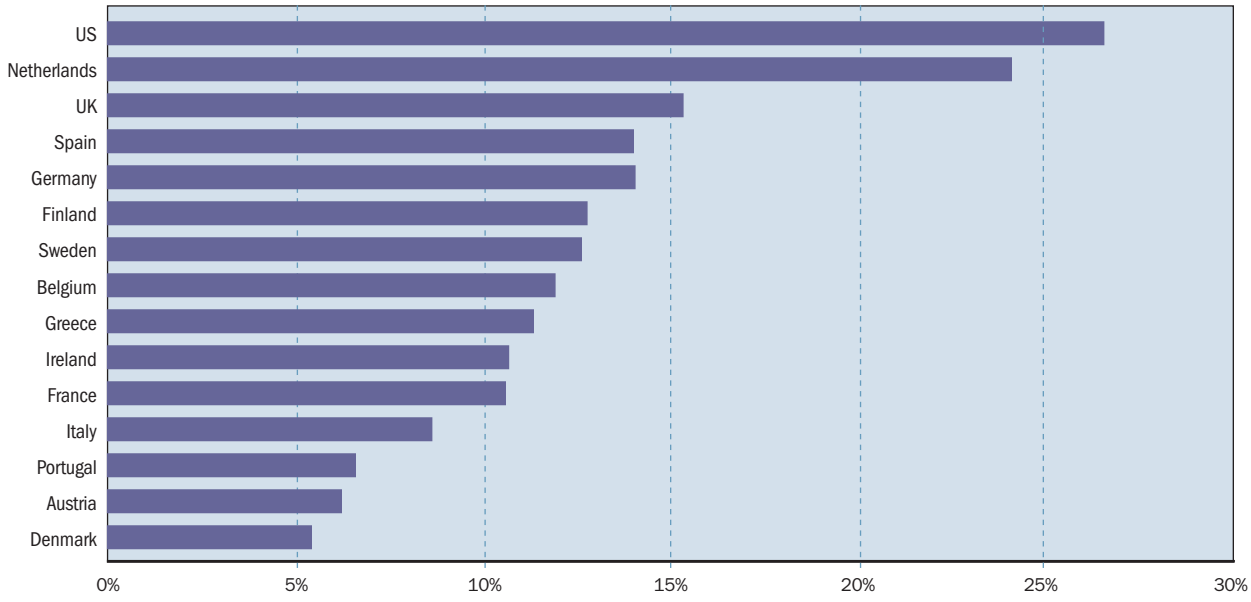
Table 1: The Euro-Talent Index

Euro-Talent Index		Creative Class	Human Capital*	Scientific Talent
Rank	Score			
1. United States	15.00	15.00	15.00	11.41
2. Finland	13.22	14.27	7.22	15.00
3. Netherlands	12.86	14.73	13.65	7.13
4. Belgium	10.95	14.95	6.65	8.63
5. United Kingdom	10.81	13.33	8.68	7.82
6. Sweden	10.72	10.56	7.11	11.92
7. Ireland	9.48	12.97	5.98	7.23
8. Germany	9.25	9.06	7.89	8.57
9. Spain	8.31	9.72	7.89	5.32
10. Denmark	8.21	10.50	3.05	9.12
11. France	7.93	n.a.	5.92	8.67
12. Greece	7.61	11.01	6.37	3.63
13. Austria	6.81	8.44	3.50	6.86
14. Italy	5.86	6.58	4.91	4.70
15. Portugal	5.37	6.55	3.67	4.62

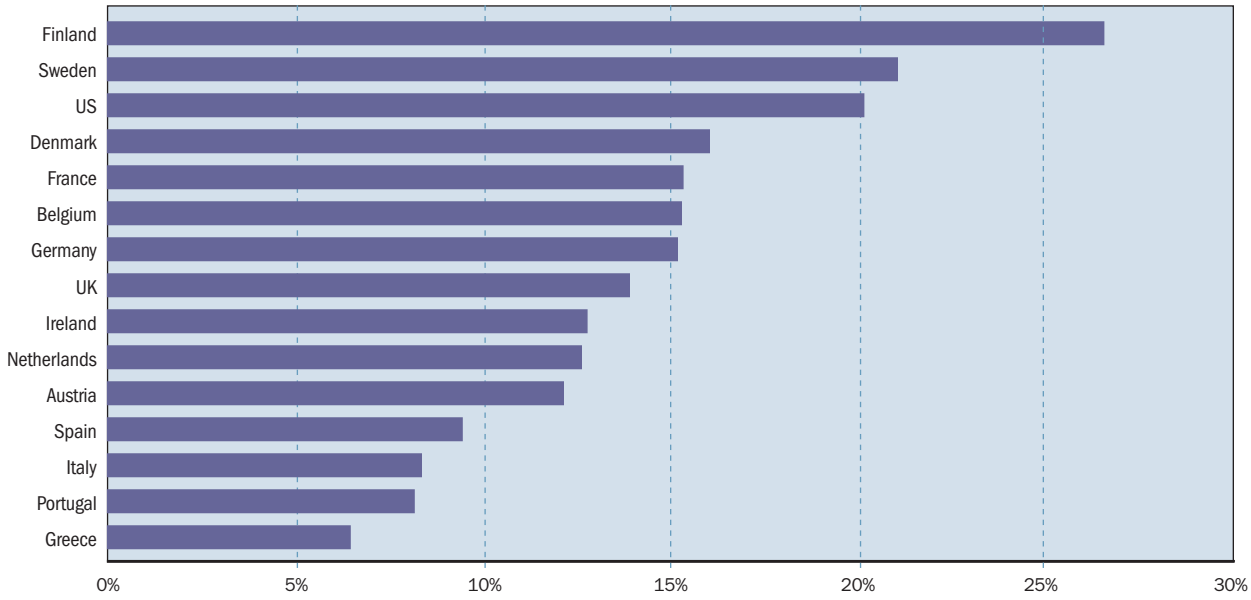
Note: The numbers in column 2 represent the overall Talent score of each country on a scale from 0 to 15 points. The numbers in columns 3-5 represent the score on the single indicators. Sources: Creative Class Index: ILO, Laborsta, 2002; Human Capital: OECD, Education at a Glance, 2001 (data refer to 1998); Scientific Talent: Towards a European Research Area. Key Figures 2001. Special Edition Indicators for benchmarking of national research policies, European Communities, 2001, Figure 1.1.1, data refer to 2000 for Portugal, 1999 for Belgium, Greece, Ireland, Italy, Finland, Sweden, 1997 for the US, 1998 for all other countries).

***Authors' note:** The OECD has recently revised the way it classifies tertiary education, the basic indicator we use in our Human Capital Index. The 1998 measure that we use here is based on what the OECD calls Type A tertiary degrees, which are "long-term degrees of four years or more." More recent OECD reports redefine "tertiary education to include both Type A and Type B degrees. We use the earlier measure for reasons of data compatibility. A number of countries under the more recent OECD definition-- notably Belgium (which would improve from 8th to 3rd), Finland (from 6th to 2nd) and Denmark (from 15th to 9th). The revised measure does not, however, markedly change the ranking of nations on our overall Euro-Creativity Index.*

Figure 4: Human Capital and Scientific Talent in Europe



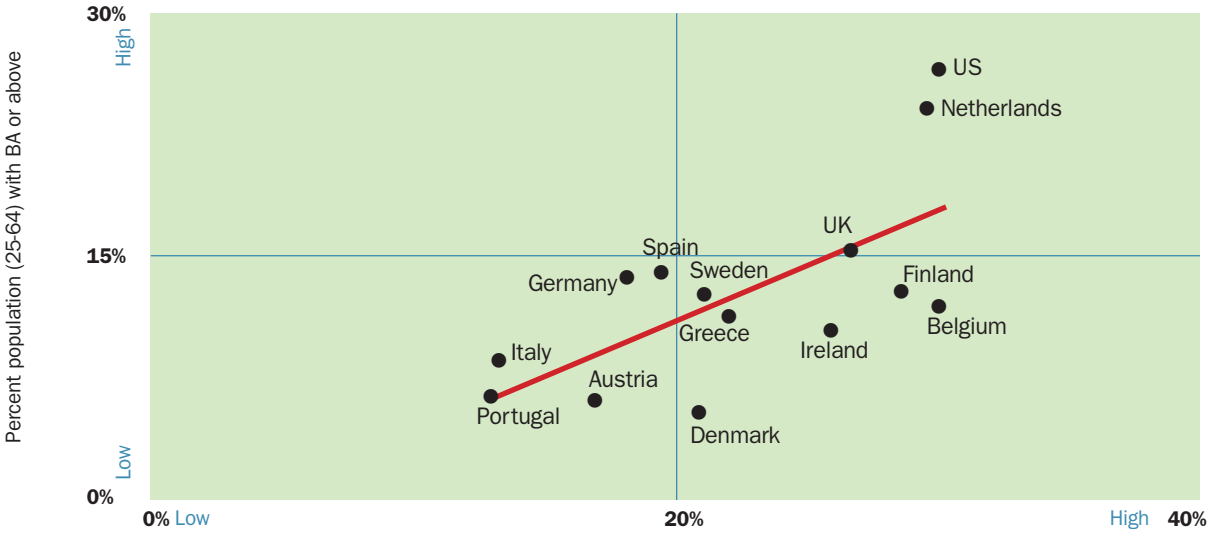
Human Capital Index
Percent population ages 25-64 with BA or above



Scientific Talent Index
Researchers per thousand workers

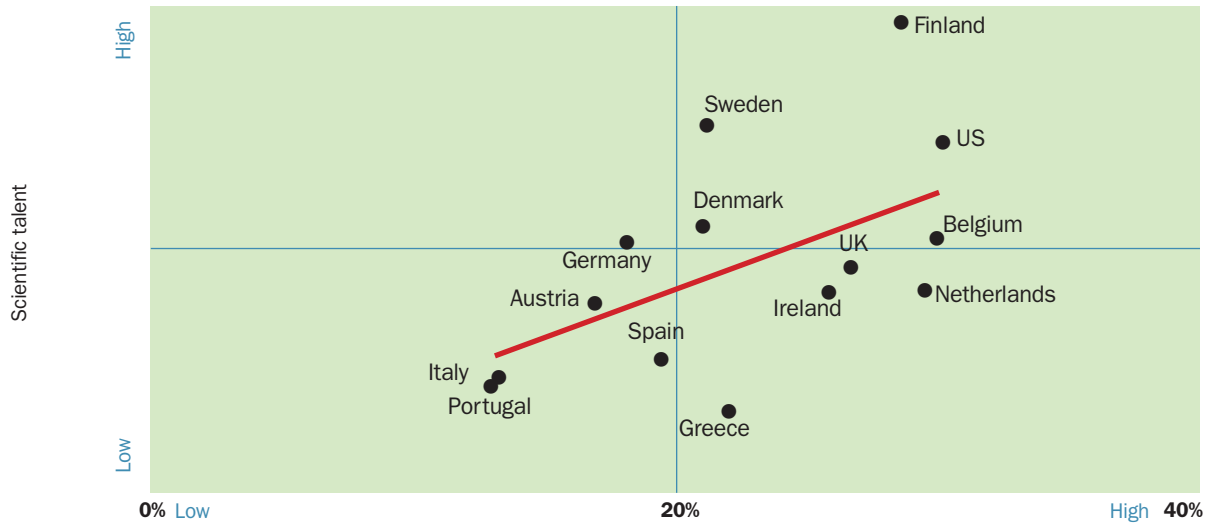
Figure 5: Talent and the Creative Class in Europe

The Human Capital Index and the Creative Class



Creative Class
Creative occupations as percent of total employment

The Scientific Talent Index and the Creative Class



Creative Class
Creative occupations as percent of total employment

The Euro-Technology Index

Theorists of economic growth from Karl Marx and Joseph Schumpeter to Robert Solow and Paul Romer have noted the role of technology as the motor force of economic growth. If anything, technology is even more important today. Nations with strong innovation capacity and strong high-tech industrial sectors enjoy a considerable advantage in generating new commercial products, new wealth and new jobs while sustaining their growth.

The Euro-Technology Index is based on three separate measures: an R&D Index based on research and development expenditures as a percent of Gross Domestic Product, an Innovation Index based on the number of patent applications per million population, and a High-Tech Innovation Index based on the number of high technology patents in fields such as biotechnology, information technology, pharmaceuticals and aerospace per million population. The latter two are based on data from the United States Patent and Trade Office (USPTO). We would have liked to have an indicator of actual high-tech business concentration as in *The Rise of the Creative Class*, but these data are unavailable in comparable format for these countries. We combine these to create an overall Technology Index.

Table 2 ranks the European nations on the Euro-Technology Index. Figure 6 shows their scores on the three key separate measures of technology: the R&D Index, the Innovation Index and the High-Tech Innovation Index. Figure 6 shows the relationship between the Creative Class and the R&D, Innovation and High-Tech Indexes, respectively.

- Sweden and Finland top the Euro-Technology Index, ranking just slightly behind the United States. Yet both outperform the US on the R&D Index, spending 3.70 percent and 3.30 percent of GPD on research and development compared to 2.62 percent for the United States.

- Six other nations score reasonably well on the Euro-Technology Index: Germany, Denmark, the Netherlands, Belgium, France and United Kingdom.

Table 2: The Euro-Technology Index

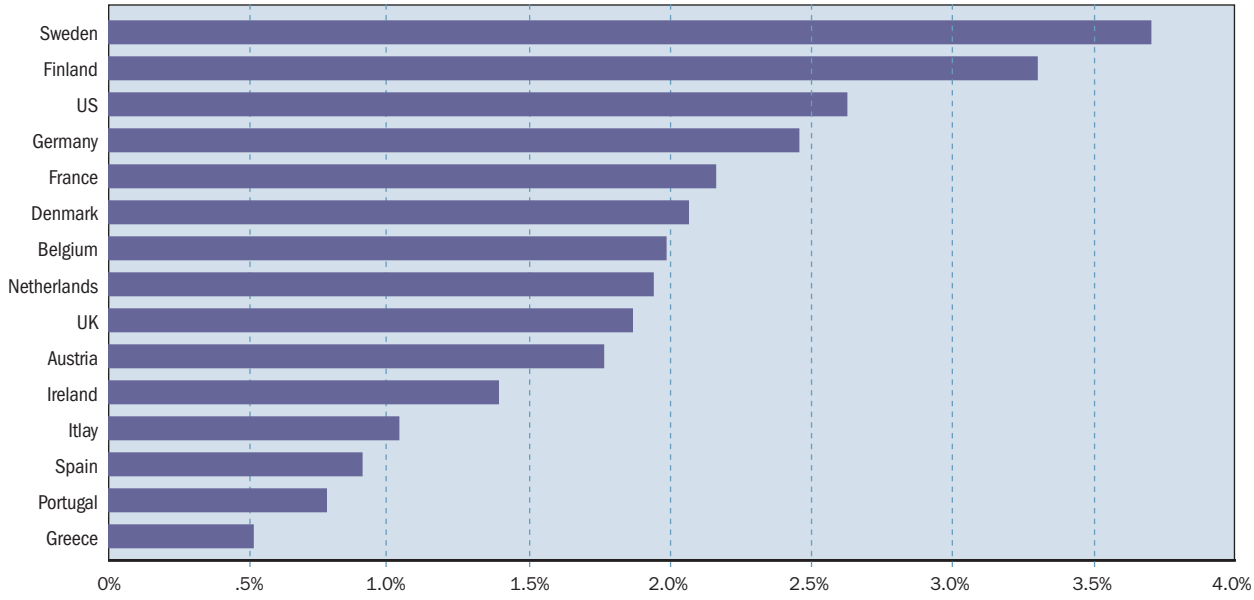
Technology Index		Innovation	High Tech Innovation	R&D
Rank	Score			
1. US	15.00	15.00	15.00	10.62
2. Sweden	10.92	9.33	5.25	15.00
3. Finland	9.57	6.14	6.39	13.38
4. Germany	6.97	6.33	2.56	9.97
5. Denmark	5.89	4.48	3.08	8.39
6. Netherlands	5.83	4.43	3.49	7.86
7. Belgium	5.35	4.19	2.28	8.03
8. France	5.34	3.29	2.37	8.80
9. United Kingdom	5.01	3.43	2.56	7.58
10. Austria	4.39	3.67	1.00	7.22
11. Ireland	3.09	2.05	0.68	5.64
12. Italy	2.40	1.52	0.75	4.22
13. Spain	1.55	0.38	0.18	3.65
14. Portugal	1.19	0.05	0.02	3.16
15. Greece	0.83	0.10	0.09	2.07

Note: The numbers in column 2 represent the overall Talent score of each country on a scale from 0 to 15 points. The numbers in columns 3-5 represent the score on the single indicators.

Sources: Innovation Index and R&D Index: USPTO data- as reported by: European Commission, DG Research, Towards a European Research Area. Key Figures 2001. Special Edition Indicators for benchmarking of national research policies, European Communities, 2001, figures 3.1.3 and 2.1.1; High Tech Innovation Index: USPTO data as reported by: European Commission, Commission Staff Working Paper, 2001 Innovation Scoreboard, Brussels, 14.09.2001 SEC(2001)1414, figure 2.3.2.

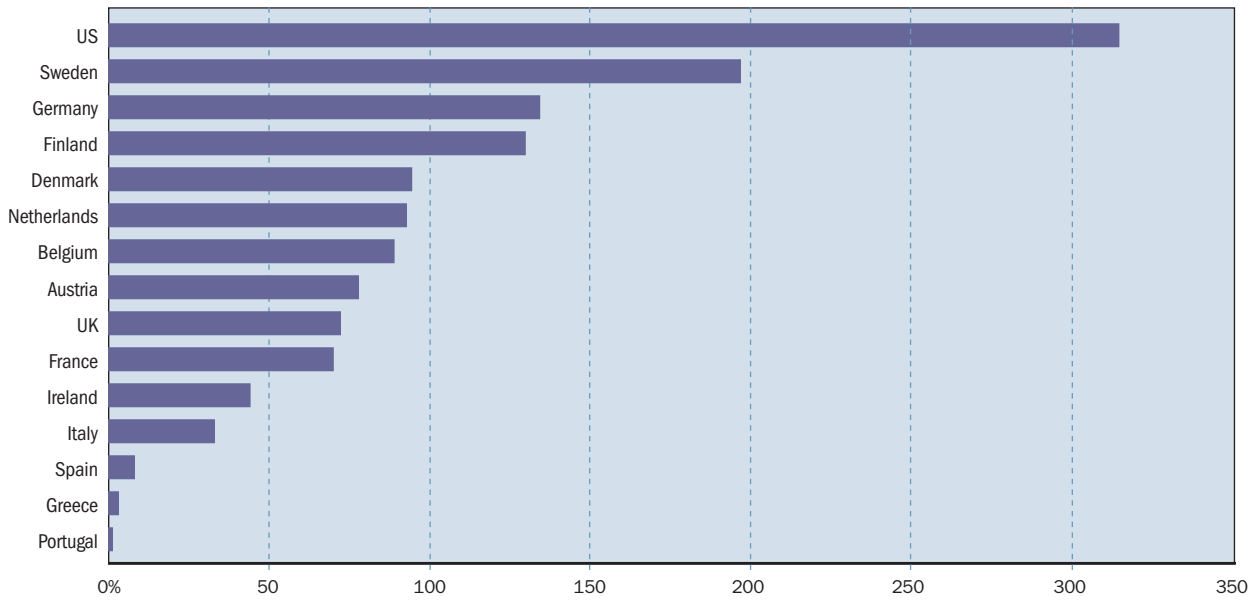
Figure 6: Technology Indicators for the EU Nations

R&D Index

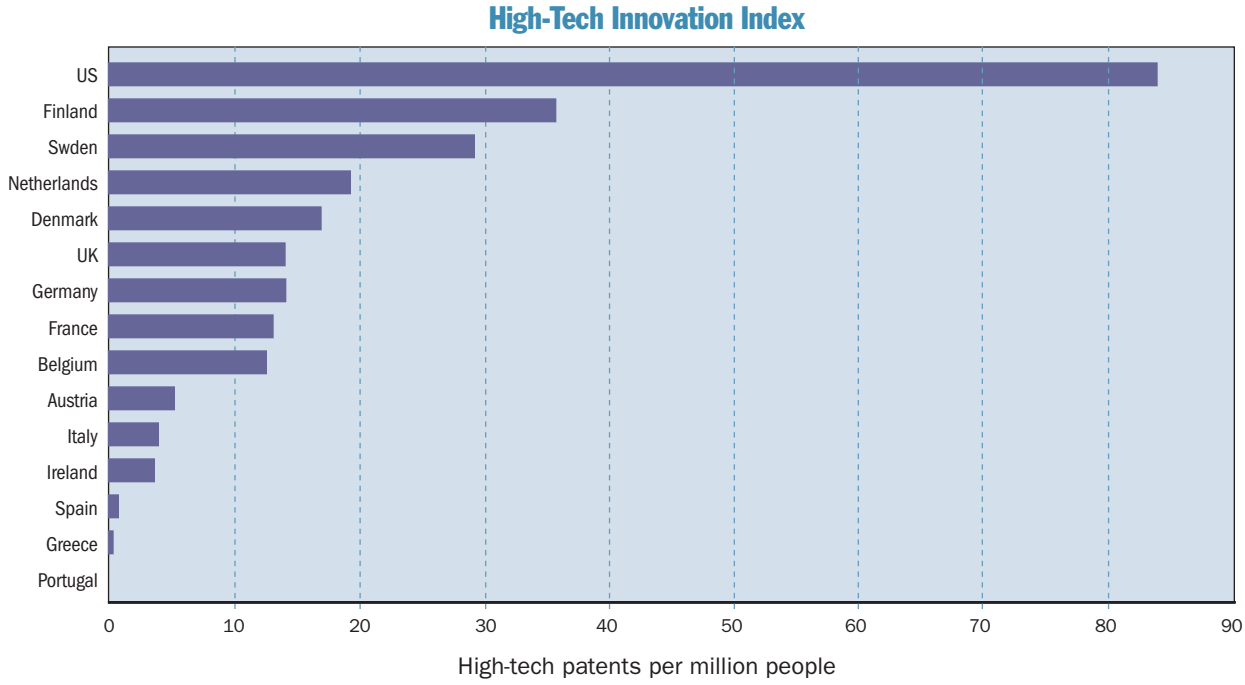


R&D expenditure as percent of GDP, latest available year

Innovation Index



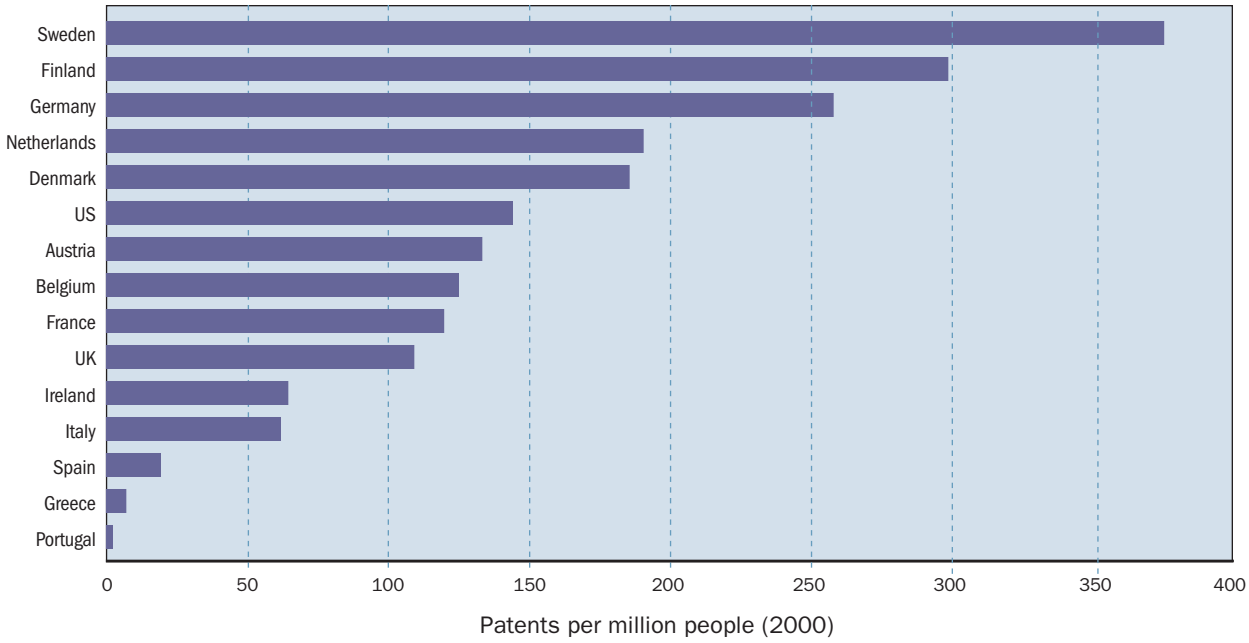
Patent applications per million people (2000)

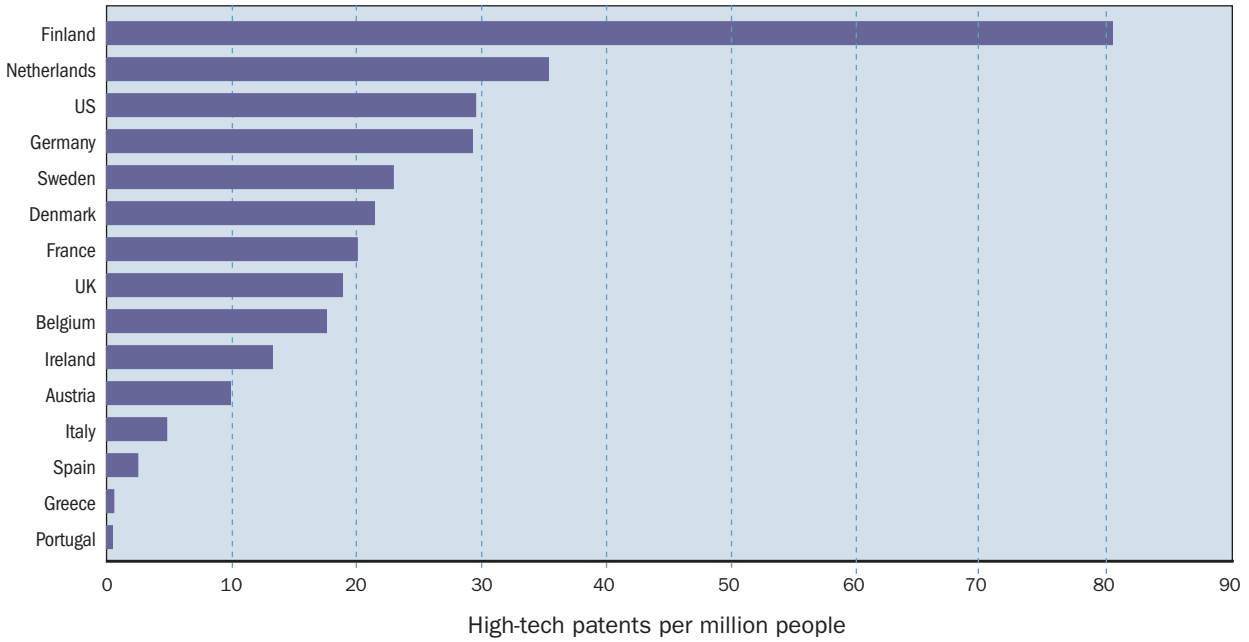


However, two caveats apply to these findings, especially the ranking of the United States.

- First, the underlying data for two key measures - the Innovation Index and the High-Tech Innovation Index — are from the U.S. Patent and Trademark Office, which tends to be biased in favor of the United States. When data from the European Patent and Trademark Office is used, the rankings are indeed different (see Figure 7). The United States ranks third in high-tech patents, significantly behind both the Netherlands and Finland, and sixth on overall patents when the EPO data is used.
- Second, these measures are based on levels that do not take into account rates of growth. The United States has in fact recorded one of the lowest average annual growth rates in terms of patents – 14th of 15 countries, as well as a fairly slow rate of growth on R&D investments, 7th of 15 countries (see the Euro-Creativity Trend Index).

Figure 7: European Patents and High Tech Patents

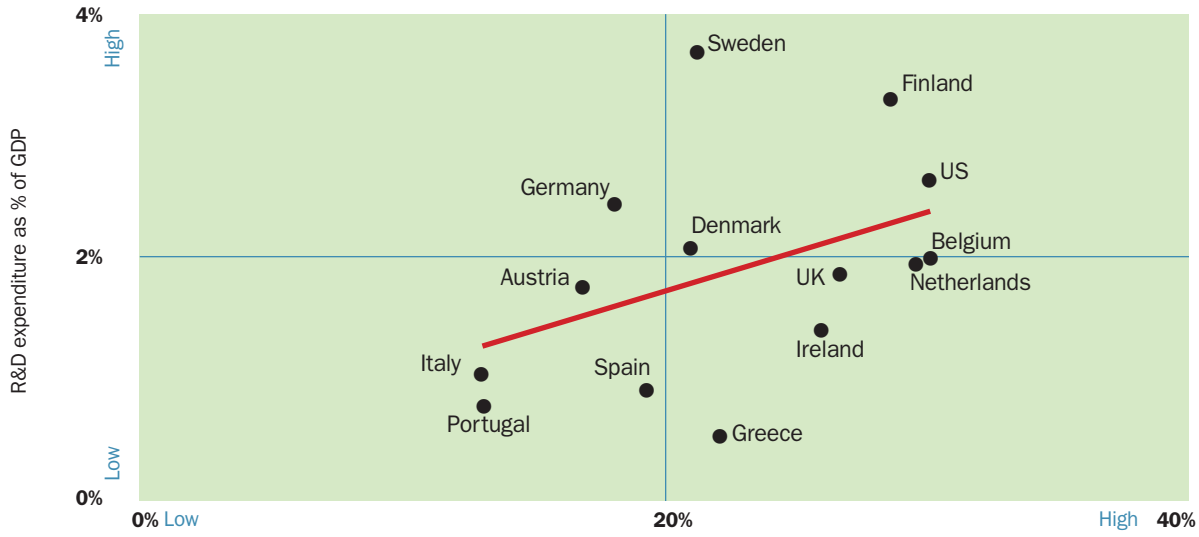




Sources: European Commission, DG Research, Towards a European Research Area. Key Figures 2001. Special Edition Indicators for benchmarking of national research policies, European Communities, 2001, figure 3.1.1; European Commission, Commission Staff Working Paper, 2001 Innovation Scoreboard, Brussels, 14.09.2001 SEC(2001)1414, figure 2.3.1.

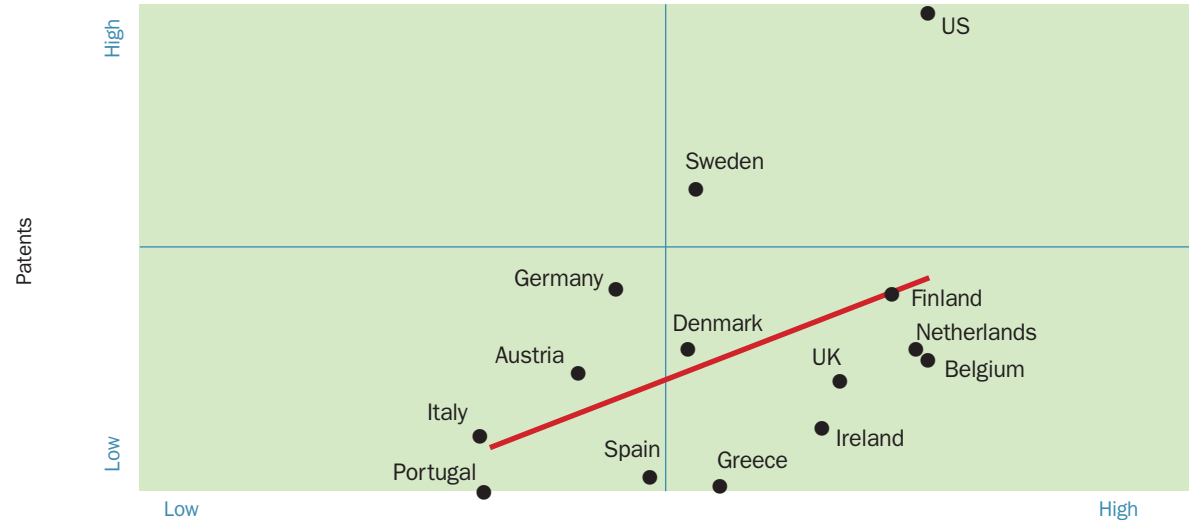
Figure 8: Technology and the Creative Class in Europe

The R&D Index and the Creative Class



Creative Class
Creative occupations as percent of total employment

The Innovation Index and the Creative Class



Creative Class
Creative occupations as percent of total employment

The High-Tech Innovation Index and the Creative Class

The Euro-Tolerance Index

Tolerance is the third T. It is critical for the ability of a region or nation to attract and mobilize creative talent. *The Rise of the Creative Class* found a strong relationship between openness to gays, bohemians, and immigrants and the ability of regions to innovate, generate high-tech industry and secure high-value added economic growth. A study of Canadian regions found these relationships to be even stronger in the Canadian context. Annalee Saxenian, of the University of California at Berkeley, found that roughly one-third of all high-tech businesses created in Silicon Valley during the 1990s were founded by new immigrants. Ronald Inglehart, of the University of Michigan, found a powerful connection between tolerance and both economic growth and political democracy in his comprehensive World Values Survey that covers more than two dozen nations over several decades. Inglehart found that openness to gays, immigrants and women was highly correlated with economic growth.

The point here is not that immigrants, gays or bohemians literally "cause" economic growth. Rather, their presence in large numbers is an indicator of an underlying culture that's open and conducive to creativity. The places that are open and tolerant —the places where gays, bohemians and immigrants feel at home and where there is greater racial integration -- tend to have a culture of tolerance and open-mindedness. These measures should be looked at as leading indicators of creative ecosystems – habitats open to new people and ideas, where people can easily network and connect, and where bright ideas are not stifled but are turned into projects, companies and

growth. Regions and nations that have such ecosystems - that do the best job of tapping the diverse creative talents of the most people - gain a tremendous competitive advantage.

The Euro-Tolerance Index differs in significant respects from the tolerance measures in *The Rise of the Creative Class* and related studies, which are based on the actual concentrations of immigrants, gays, bohemians and minority groups. Such data is unavailable for European nations. The Euro-Tolerance Index is based on larger-scale surveys of popular attitudes and is based on three measures.

Table 3: The Euro-Tolerance Index

Euro-Tolerance Index		Attitudes	Values	Self-Expression
Rank	Score			
1. Sweden	15.00	14.81	15.00	15.00
2. Denmark	12.09	12.47	10.41	13.24
3. Netherlands	11.42	12.66	7.59	13.85
4. Finland	9.49	13.83	7.50	7.03
5. Germany	9.45	10.32	10.59	7.30
6. Austria	7.76	11.10	2.06	10.00
7. United Kingdom*	7.70	11.30	2.44	9.26
8. France	7.38	10.91	4.59	6.55
9. Belgium	7.35	9.35	4.50	8.11
10. Italy	7.17	13.44	1.69	6.28
11. Spain	6.57	15.00	0.84	3.78
12. Greece	5.58	5.65	6.84	4.19
13. Ireland	4.22	12.66	-8.63	8.58
14. USA	3.07	n.a.	-4.97	11.08
15. Portugal	1.99	11.10	-8.34	3.18

Note: The numbers in column 2 represent the overall Talent score of each country on a scale from 0 to 15 points. The numbers in columns 3-5 represent the score on the single indicators.
** The scores on the Values Index and Self Expression Index refer to Britain (excluding Northern Ireland), Attitude Index refers to United Kingdom (Britain and Northern Ireland).*

Sources: European Monitoring Centre on Racism and Xenophobia, EUMC Information and Communication, Media Release 194-3-E-05/01; Vienna, 2001; Thalhammer et Al., (2001), Attitudes towards minority groups in the European Union - A special analysis of the Eurobarometer 2000 survey on behalf of the European Monitoring Center on Racism and Xenofobia, SORA, Vienna (Table 6); Ronald Inglehart, World Values Survey (http://wvs.isr.umich.edu)..

■ The Attitudes Index is an indicator of attitudes toward minorities based on the results of the Eurobarometer Survey conducted by the European Monitoring Centre on Racism and Xenophobia (EUMC) and on the classifications made for the EUMC by the SORA Institute for Social Research Analysis. SORA classifies the population of the European countries subject to the EUMC survey into four categories: intolerant, ambivalent, passively tolerant

and actively tolerant*. The Attitudes Index is the percentage of the respondents that have been classified by the EUMC as actively and passively tolerant.

- The Values Index measures to what degree a country reflects traditional as opposed modern or secular values. It is based on a series of questions covering attitudes toward God, religion, nationalism, authority, family, women's rights, divorce and abortion.
- The Self-Expression Index captures the degree to which a nation values individual rights and self-expression. It is based on questions covering attitudes toward self-expression, quality of life, democracy, science and technology, leisure, the environment, trust, protest politics, immigrants and gays.
- Both the Values Index and the Self-Expression Index are derived from the World Values Survey conducted by Ronald Inglehart (see Inglehart and Baker 2000). The survey covers the period 1995-1998 and is based on data for 65 countries. The survey sample is quite large, with an average of 1,400 respondents per country. The data was made available to us by Professor Inglehart and are available from the Inter-university Consortium for Policy and Social Research (ICPSR) survey data archive at the University of Michigan.
- These measures are combined in the overall Euro-Tolerance Index.

Table 3 shows how the European nations rank on tolerance. Figure 9 shows how they rank on the three separate tolerance measures. Figure 10 shows the relationships between the Creative Class and the Attitudes, Values and Self-Expression Indexes.

The results here are frankly surprising. It's frequently thought the United States is the most open and tolerant nation in the world. As Inglehart and Baker (2000) note, the United States stands as the base case for "modernization theory." This view, which also informs a great deal of the conventional wisdom, holds the United States not just as the model for openness and tolerance but as a base case toward which other nations are converging. But as Table 3 shows, European nations virtually across the board score higher than the U.S. on the Euro-Tolerance Index. While it may be true that the United States has a higher level of immigrants than most other advanced societies, the attitudes of Americans on a wide variety of issues from religion and nationalism to divorce, women's rights, immigrants and gays are far more conservative or traditional than those of the European nations. Inglehart and Baker summarize their findings as follows:

> *The United States is not a prototype of cultural modernization for other societies to follow, as some modernization writers of the postwar era naively assumed. In fact, the United States is a deviant case, having a much more traditional value system than any other advanced industrial society. On the traditional/secular dimension, the United States ranks far below other rich societies, with levels of religiosity and national pride found in developing societies. … The United States does rank among the most advanced societies along the survival/self-expression dimension, but even here, it does not lead the world, as the Swedes and the Danes seem closer to the cutting edge of cultural change than do the Americans.*
>
> *… It is misleading to view cultural change as "Americanization." Industrializing societies in general are not becoming like the United States. In fact, the United States seems to be a deviant case … its people hold much more traditional values and beliefs than those in any other equally prosperous society*
> ***(Inglehart and Baker 2000: 31, 49).*****

Here is how the nations compare in terms of tolerance.

- Sweden, Denmark and the Netherlands top the list on the Euro-Tolerance Index. Finland and Germany are close behind.
- The United States in fact ranks second from the bottom, ahead of only Portugal and close to Ireland on the Euro-Tolerance Index. Recent trends in the United States suggest that the values gap with Europe may be deepening.
- For these reasons, we believe the European nations, especially Sweden, Denmark, the Netherlands and Finland (see Figs 9-11), may have a distinctive competitive advantage in terms of tolerance. Of course, many of these

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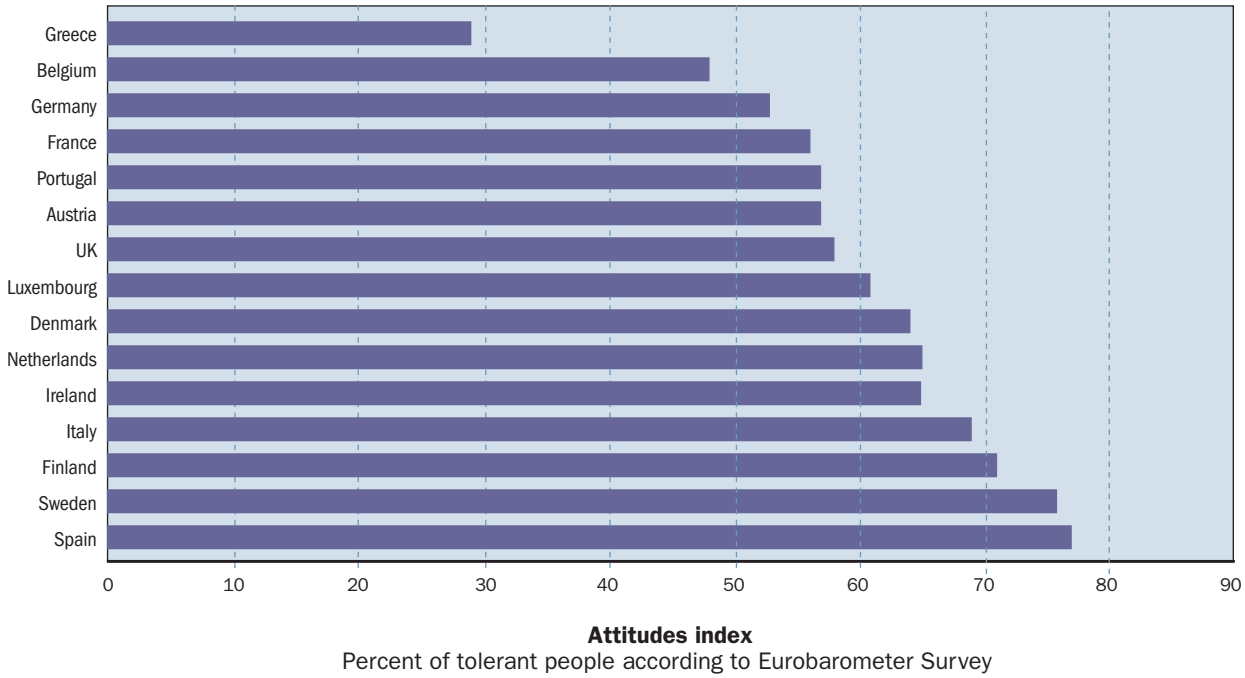
* Thalhammer et Al., (2001), Attitudes towards minority groups in the European Union - A special analysis of the Eurobarometer 2000 survey on behalf of the European Monitoring Center on Racism and Xenofobia, SORA, Vienna.

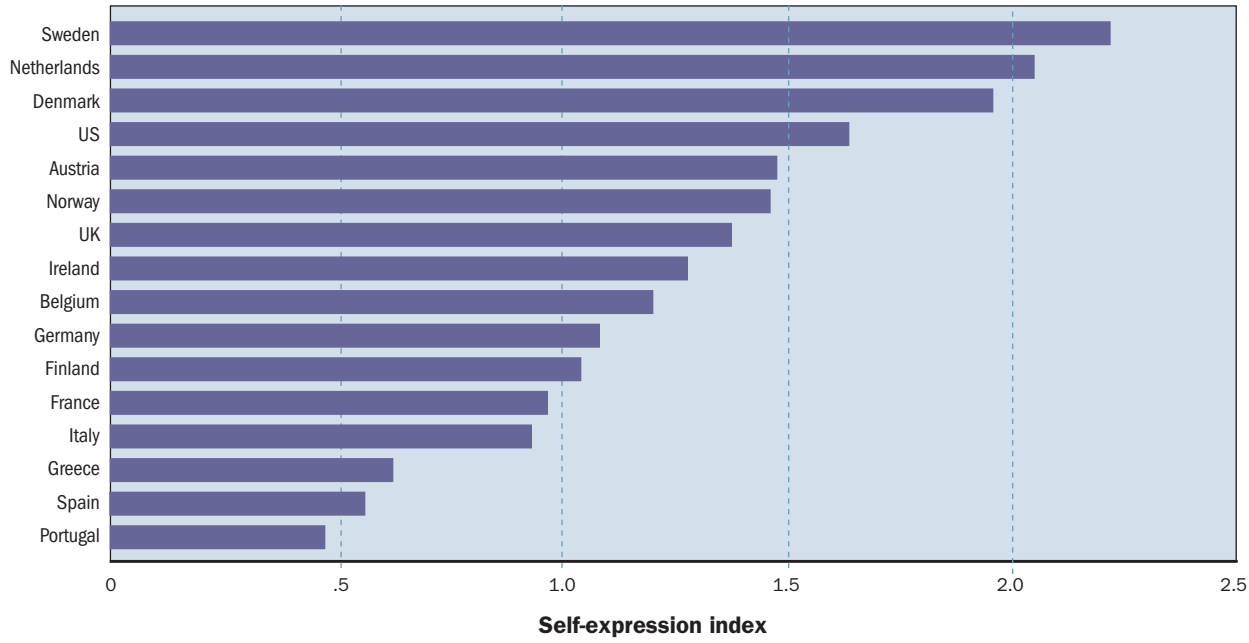
**Ronald Inglehart and Wayne E. Baker, "Modernization, Cultural Change, and the Persistence of Traditional Values," in American Sociological Review (February 2000)

nations continue to have restrictive policies toward immigration. To realize this latent advantage that stems for their underlying attitudes and values, these nations will have to liberalize their immigration policies and become more open to talent from around the world.

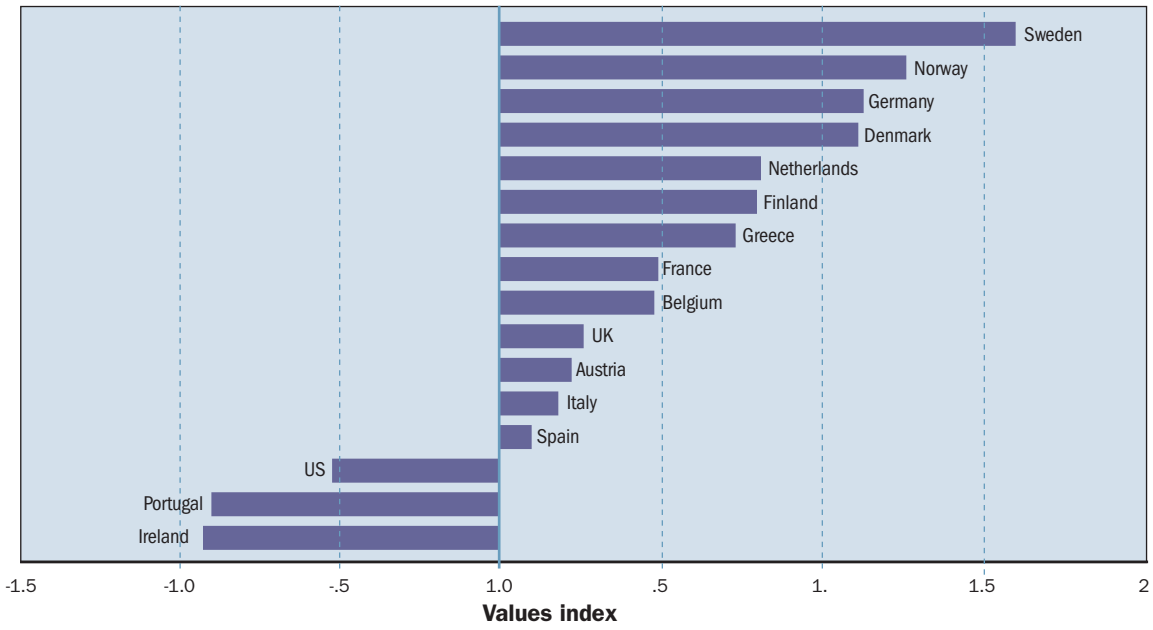
Figure 9: Tolerance Indicators for the EU Nations



Source: EUMC (2000)



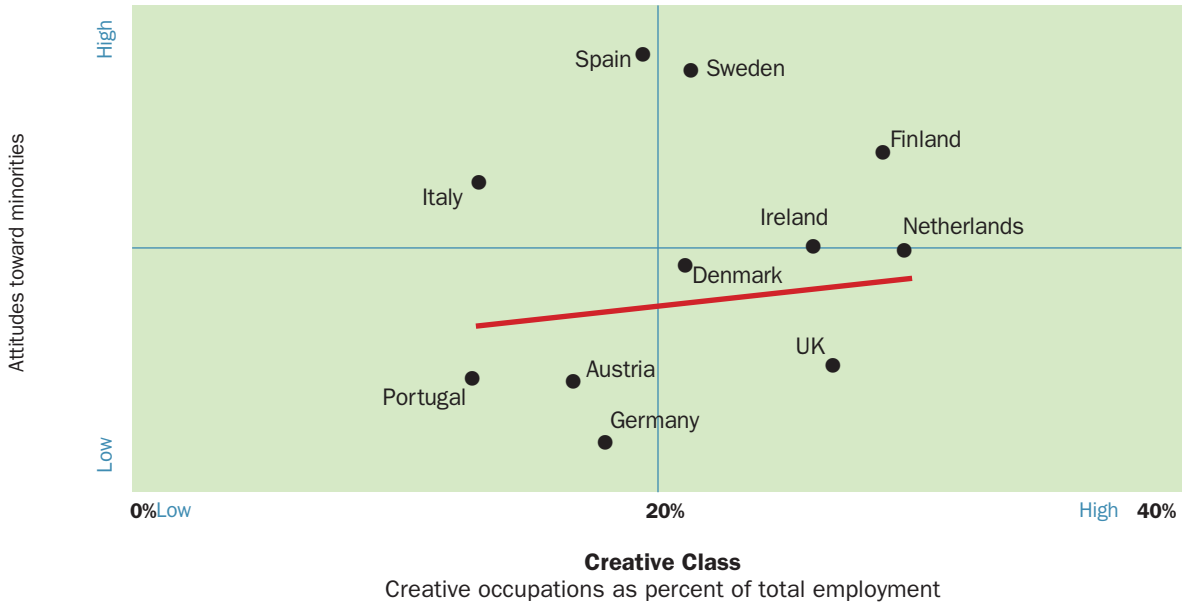
Source: Inglehart and Baker (2000)



Source: Inglehart and Baker (2000)

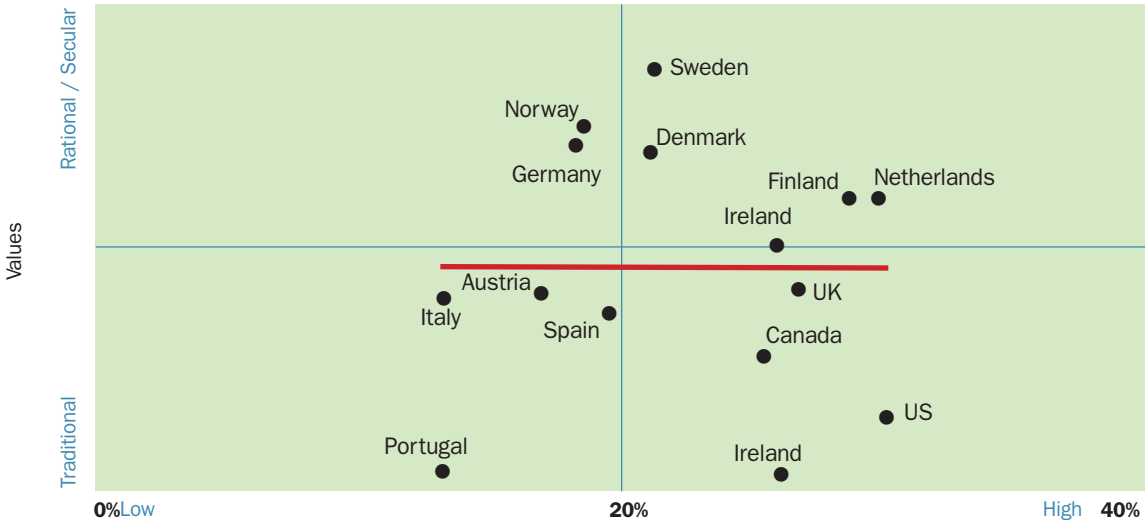
Figure 10: Tolerance and the Creative Class in Europe

The Attitudes Index and the Creative Class



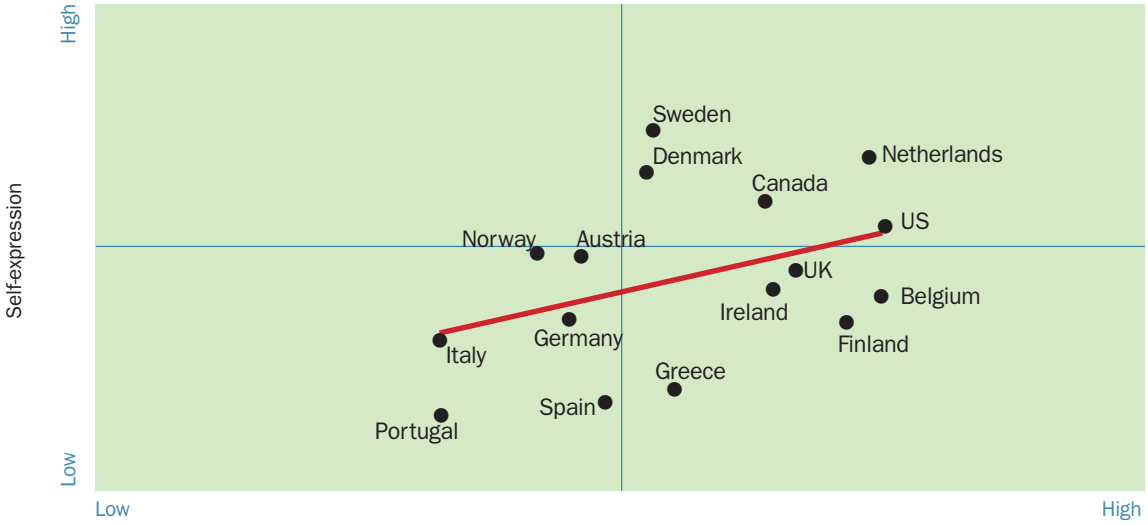
Note: The Attitude score for Greece is far below European average and falls outside the matrix.

The Values Index and the Creative Class



Creative Class
Creative occupations as percent of total employment

The Self-Expression Index and the Creative Class



Creative Class
Creative occupations as percent of total employment

Putting It All Together: The Euro-Creativity Index

We developed a new composite measure, the Euro-Creativity Index, or ECI, to provide a fuller assessment of national competitiveness in the Creative Age. The ECI is a composite based on the Euro-Talent, Technology and Tolerance Indexes discussed above. The ECI compares well to other leading competitiveness indicators, but we believe it is a considerable improvement over them. The conventional measures emphasize technology and in some cases include some indicators of talent. None include any measures of tolerance that is a clear source of competitive advantage. The ECI measures beyond them all by factoring all three Ts into account.

Table 4 ranks the European nations on the ECI. Figure 11 compares the ECI to other leading competitiveness measures, such as Michael Porter's Innovation Index and the World Competitiveness Index developed by IMD, while Figure 12 shows the association between it and GDP levels and GDP growth.

Consider how the European nations perform in on this overall Creativity Index.

- The Northern European nations —particularly the Scandinavian countries- appear to have a distinct competitive advantage.
- Sweden is the top-performer. In fact, it ranks ahead of the United States on the Euro-Creativity Index.
- Finland and the Netherlands also do exceptionally well, with competitiveness levels comparable to the United States.
- Denmark, Germany, Belgium and the United Kingdom make up the second tier.
- The remaining nations face considerable competitive challenges in the Creative Age.

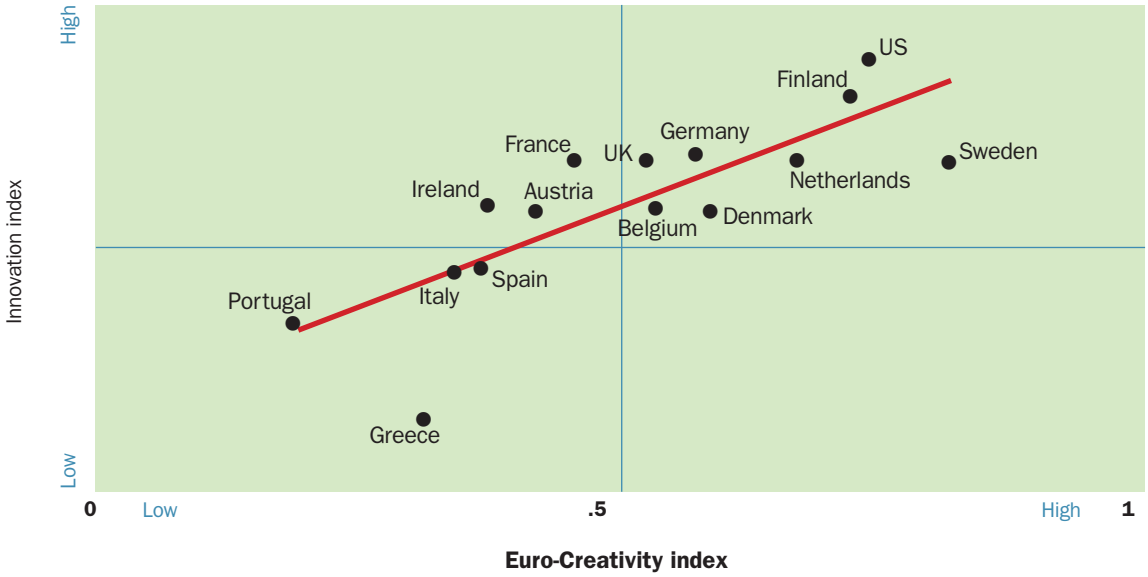
Table 4: The Euro-Creativity Index

		TALENT INDEX			TECHNOLOGY INDEX			TOLERANCE INDEX		
Euro-Creativity Index		Creative Class Index	Human Capital Index	Scientific Talent Index	Innov. Index	High Tech Innov. Index	R&D Index	Attitudes Index	Values Index	Self-Express Index
Rank	Score									
1. Sweden	0.81	8	7	2	2	3	1	2	1	1
2. USA	0.73	1	1	3	1	1	3	n.a.	13	4
3. Finland	0.72	4	6	1	4	2	2	3	5	10
4. Netherlands	0.67	3	2	10	6	4	8	5	4	2
5. Denmark	0.58	9	15	4	5	5	6	7	3	3
6. Germany	0.57	11	4	7	3	6	4	12	2	9
7. Belgium	0.53	2	8	6	7	9	7	13	8	8
8. UK*	0.52	5	3	8	9	6	9	8	9	6
9. France	0.46	n.a.	11	5	10	8	5	11	7	11
10. Austria	0.42	12	14	11	8	10	10	9	10	5
11. Ireland	0.37	6	10	9	11	12	11	5	15	7
11. Spain	0.37	10	4	12	13	13	13	1	12	14
13. Italy	0.34	13	12	13	12	11	12	4	11	12
14. Greece	0.31	7	9	15	14	14	15	14	6	13
15. Portugal	0.19	14	13	14	15	15	14	9	14	15

Note: The numbers in column 3-11 indicate the relative position of the specific country with respect to the dimension reported in the column header (i.e. number 1 on the Human Capital column indicates that the country ranks first on human capital dimension). In bold, tied results.
** The scores on the Values Index and Self Expression Index refer to Britain (excluding Northern Ireland), for all other indexes scores refer to United Kingdom (Britain and Northern Ireland)*

Figure 11: The ECI and Other Competitiveness Measures

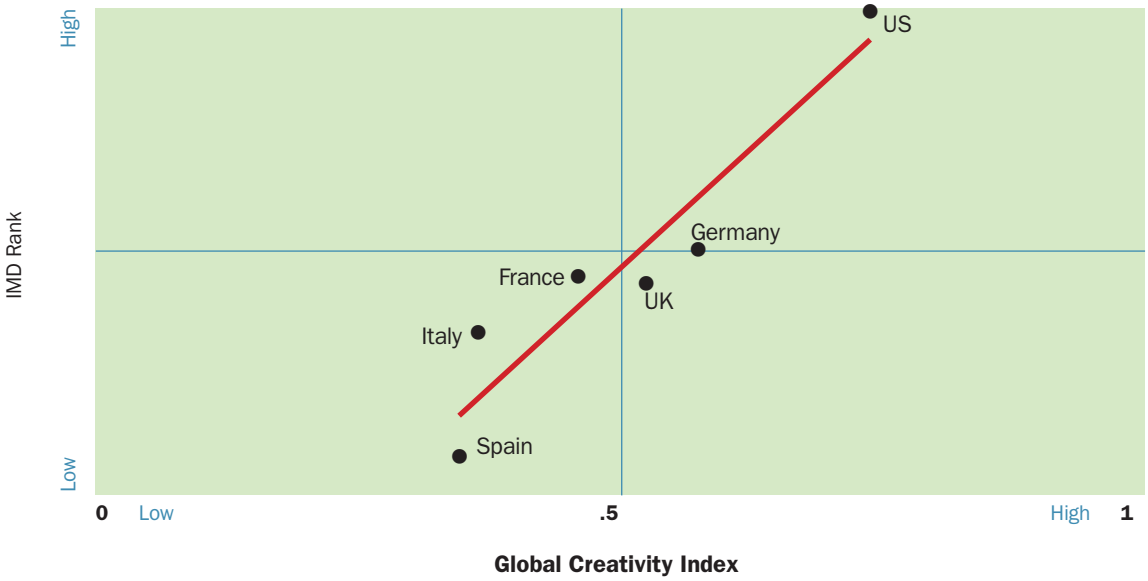
The ECI vs. Michael Porter's Innovation Index



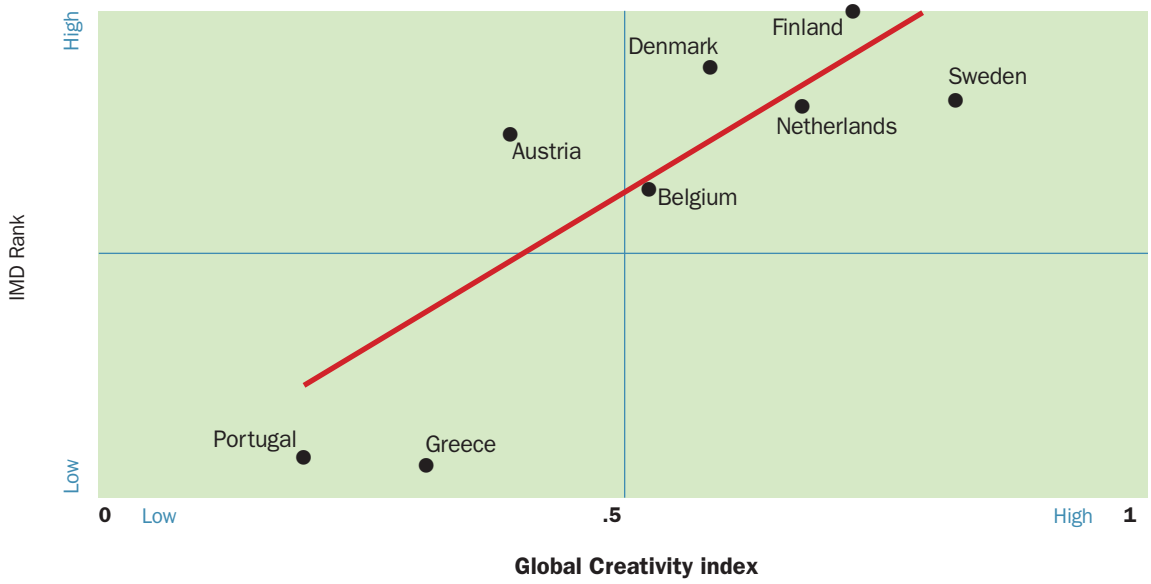
Source: Michael Porter, National Innovative Capacity, in The Global Competitiveness Report 2001, New York: Oxford University Press, 2001

The ECI and the IMD Competitiveness Index

For countries with populations greater than 20 million

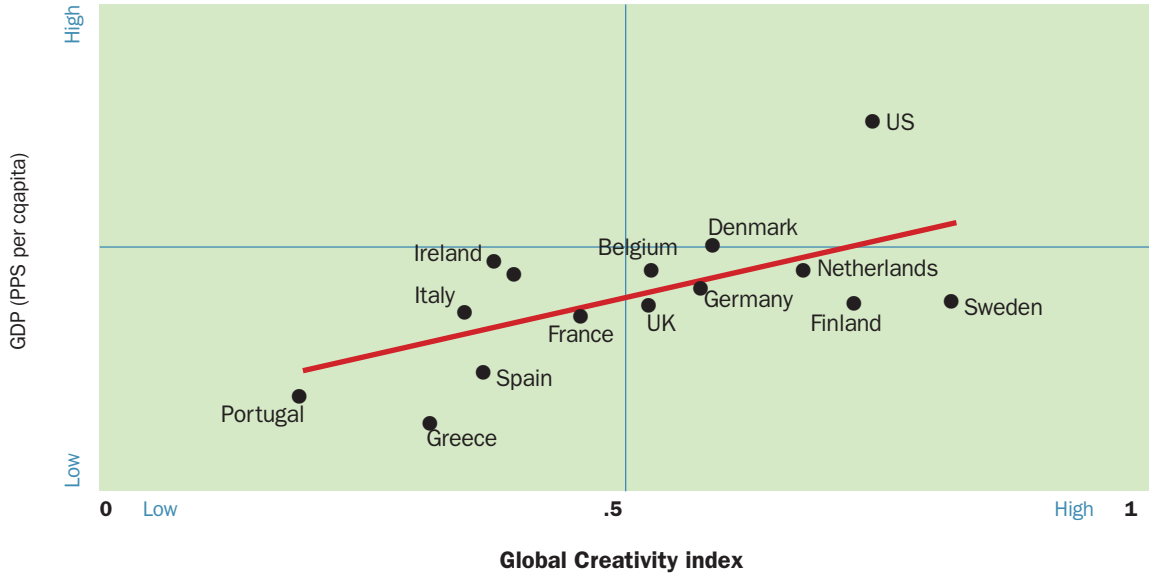


The ECI and the IMD Competitiveness Index
For Countries with populations less than 20 million



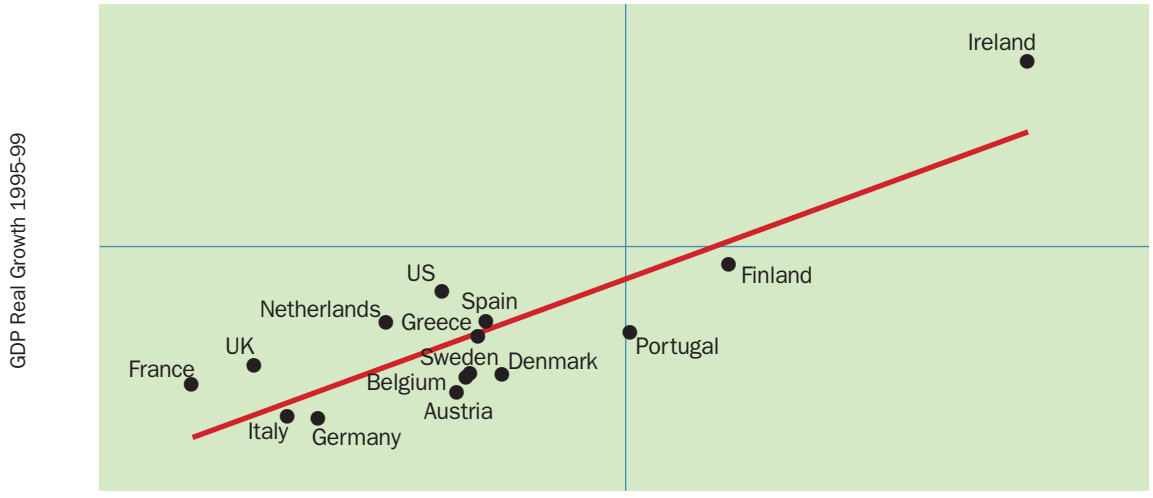
Source: IMD, http://www.imd.ch

Figure 12: The ECI and GDP
The ECI and GDP Per Capita



Source: European Commission, Towards a European Research Area; Science Technology and Innovation, Key Figures 2000.

The Euro-Creativity Trend Index and GDP growth 1995-99



The Euro-Creativity Trend Index

The Euro-Creativity Index is a static measure. It captures where nations stand at a particular point in time. We believe it's also important to get a sense of how various nations are progressing over time. It's particularly useful to know if some nations are increasing their creative capabilities at a faster rate than others. To derive this measurement, we developed the Euro-Creativity Trend Index, which tracks national performance on key dimensions of creativity since 1995. This measure is limited to just 2Ts - Technology and Talent - as trend data on Tolerance is not available. Table 5 presents the results.

- Ireland is the top-performer in terms of the Creativity Trend Index. But it's important to note that its position would be lower if tolerance data were available and included.

- Finland is particularly advantaged with high scores on both the ECI as well as the Trend Index. Both Finland and Ireland are performing far above the norm and much better than the United States.

- A cluster of nations — including the Scandinavian countries of Sweden and Denmark, northern European countries like Belgium, and southern European countries like Spain, Portugal and Greece – occupy a middle ground, with Trend Index scores comparable to the United States.

- Interestingly, the traditional European powers - France, Germany and the United Kingdom - fare poorly on the Creativity Trend Index, indicating that their historical advantage in Europe may be diminishing in the Creative Age.

Table 5: The Euro-Creativity Trend Index:
Trends in Talent and Technology growth since 1995

Euro-Creativity Trend Index		Growth in Creative Class	Growth in Scientific Talent	Growth in Patents	Growth in R&D
Rank	Score				
1. Ireland	0.89	1	1	2	2
2. Finland	0.60	10	2	6	1
3. Portugal	0.51	14	4	1	3
4. Denmark	0.38	4	11	3	6
5. Spain	0.37	9	5	8	4
6. Greece	0.36	12	6	4	9
7. Sweden	0.35	3	9	5	10
7. Belgium	0.35	5	10	7	5
9. Austria	0.34	10	3	9	8
10. US	0.33	7	7	14	7
11. Netherlands	0.27	2	8	10	12
12. Germany	0.20	8	14	12	11
13. Italy	0.18	6	15	11	13
14. United Kingdom	0.15	13	12	13	14
15. France	0.08	n.a.	13	15	15

Note: The "growth index" represents the average of the annual growth rates starting from 1995 to the latest available year. In some cases, the range starts from a later year. Precisely, the year range used for each dimension is:

Growth in Creative Class. Denmark, Netherlands, United Kingdom and Belgium: 1995-1998; Ireland and Finland: 1995-1999; Sweden: 1998-2000; all other countries: 1995-2000. Source: elaborated from ILO, LABORSTA Labour Statistics Database, http://laborsta.ilo.org; Statistical Abstract of the US.

Growth in Scientific Talent. Portugal: 1995-2000; Germany, Spain: 1995-99; Belgium, Greece, Ireland, Italy, Finland, Sweden : 1995-97; all other countries: 1995-1998.
Source: European Commission, DG Research, Towards a European Research Area. Key Figures 2001. Special Edition Indicators for benchmarking of national research policies, European Communities, 2001

Growth in Patents. All data refer to 1995-2000. Source: European Commission, DG Research, Towards a European Research Area. Key Figures 2001. Special Edition Indicators for benchmarking of national research policies, European Communities, 2001.

Growth in R&D expenditure. Germany, Austria, Portugal, Finland: 1995-2000; Netherlands: 1995-98; Greece, Ireland, Sweden: 1995-97; all other countries: 1995-99. Source: European Commission, DG Research, Towards a European Research Area. Key Figures 2001. Special Edition Indicators for benchmarking of national research policies, European Communities, 2001

The Euro-Creativity Matrix

As the final step in our analysis, we looked at the relationship between how a country scores on the ECI and its recent performance or trend. To do so, we developed the Euro-Creativity Matrix (see Figure 13). The Euro-Creativity Matrix is essentially a two-by-two chart that compares the ECI score to the Euro-Creativity Trend Index. It enables us to position the European nations and the United States in four groups or quadrants, as follows.

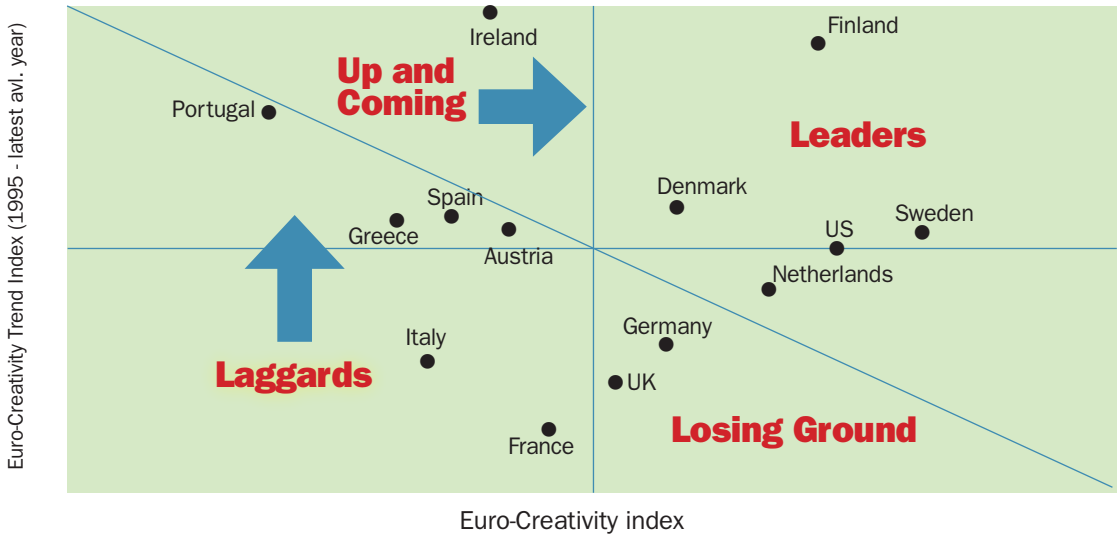
- **Leaders** combine strong ECI scores with high growth rates in creative capabilities. The top performers include Finland, Sweden and Denmark. Their competitive position overall is as good or, in the cases of Finland and Sweden, better than that of the United States. A second tier includes the Netherlands and Belgium. These countries are proving successful and are likely to continue to do well in the Creative Age.

- **Up and Comers** have lower ECI scores but relatively high rates of creative growth. Their position is improving. Ireland stands out among this group. It combines a reasonably high ECI score with extraordinary growth in its underlying creative capacities.

- **Losing Ground**—These nations have relatively high ECI scores but are failing to sustain growth in their creative capabilities. They are falling behind in competitive terms. Germany and the UK fall into this group.

- **Laggards** have low ECI scores and low rates of creative growth. They will find it hard to compete in the Creative Age. Italy is the classic case, although Spain, Austria, Portugal and Greece also appear to be in a difficult position. France also falls in this group, due to a relatively poor performance on the Euro-Creativity Index and to some of the lowest growth rates in both Talent and Technology.

Figure 13: The Euro-Creativity Matrix



Note: The separator axes between quadrants represent the average of the Index on the corresponding axis. For example, the right-hand quadrants include the countries whose score on the Euro-Creativity Index is above the average, while the left-hand quadrants include countries with below average scores. In this figure, the mean for the Euro-Creativity Trend Index is calculated excluding Ireland, because its extremely high growth values would have pushed the mean so high that all other countries would have fallen below it.

Conclusion

This report has extended and adapted the concepts and indicators introduced in *The Rise of the Creative Class* to the European context. It developed new indicators for the Creative Class and the 3Ts of economic development —Technology, Talent and Tolerance - for 14 European and Scandinavian countries and compared them to the United States. It also introduced a new overall measure of comparative creative performance, the Euro-Creativity Index, along with two additional measures designed to capture the short-run trends in creative capacity, the Euro-Creative Trend Index and the Euro-Creativity Matrix. These measures differ in several important aspects from the indexes originally used in *The Rise of the Creative Class*. The European data is limited at this point to the national level. The Euro-Technology Index only covers innovation capacity and lacks a measure of high-tech industry concentration. The Euro-Tolerance Index is based on attitudes and values, as opposed to the revealed locational concentrations of groups such as gays, immigrants and minorities. That said, we feel the results are compelling, useful and interesting.

The Creative Class makes up more than 25 percent of the work force in seven of 14 European nations, and comprises nearly 30 percent of the workforce in three—the Netherlands, Belgium and Finland. Creative Class workers outnumber blue-collar workers in six of the European countries analyzed. The Creative Class is growing at a fairly rapid pace in a majority of the European nations. Ireland outpaces all nations in Creative Class growth, with a 7 percent annual growth rate since 1995. Not all nations, however, appear to have made the shift to a creative economy and a creative occupational structure. Italy and Portugal, for example, have less than 15 percent of the workforce in the Creative Class.

Our analysis suggests that the competitive epicenter of Europe is shifting from the traditional powers, like France, Germany, and the UK, to a cluster of Scandinavian and northern European countries. Sweden is the top performer on the Euro-Creativity Index, outperforming not only all of the other European countries but the United States as well. Finland and the Netherlands also do exceptionally well, with competitiveness levels comparable to the United States. Finland in particular appears to be well-positioned to compete in the Creative Age with a high level of overall creative competitiveness and rapid growth in its creative capabilities. The Netherlands, Denmark and Belgium also appear to have considerable assets with which to compete in the Creative Age. Ireland stands out as an up-and-coming nation, with significant growth in its Creative Class and underlying creative capabilities since 1995. A number of nations are performing far below the norm. Italy is the classic case, although Spain, Portugal, Austria and Greece also appear to be in a difficult position. Unless they're able to dramatically improve their position, these countries will find it hard to compete in the Creative Age.

Our analysis further suggests that competitiveness in the Creative Age remains an open game. It would be a mistake to conclude, as some have done, that the United States is and will remain the unquestioned epicenter

of the creative economy. In our view, the key determinant of global competitiveness no longer turns simply on trade in goods and services or flows of investment and capital, but rather in flows of people. The winners and losers in the global creative economy will be those nations that are best able to attract, retain, and develop creative talent and harness their creative assets and capabilities.

The United States remains the clear the global leader in technology development and continues to benefit from its long-standing ability to attract top scientific, artistic and entrepreneurial talent from around the world. Our findings indicate that a number of European nations, particularly Finland, Sweden, Denmark, the Netherlands and Belgium, are evolving distinctive assets with which to compete effectively in the creative age. All have considerable advanced technological capabilities and have made ongoing investments in developing their creative talent. They are actively working to attract foreign-born talent as well.. The United Kingdom seems to be rapidly increasing its efforts and ability to attract global creative talent. All these countries share values, beliefs and attitudes that are closely associated with global talent attraction and, in the cases of Sweden, the Netherlands and the United Kingdom, have instituted more open immigration polices that have resulted in significant concentrations of foreign-born populations. However, almost all of the European nations suffer from assimilation challenges necessary to facilitate rapid upward mobility of their immigrant populations, as has occurred in the United States and Canada. But the fact that English is widely employed as a second language in these countries creates an additional advantage for them in the global talent marketplace. And all of the EU members will benefit from the freer flow of people across their borders.

Global talent attraction is a dynamic, sensitive and little-documented process. Traditional economic leaders can lose their position in the nascent creative economy as vibrant, new creative centers quickly emerge. We stand at an intriguing inflection point. The United States, which has for years enjoyed an undisputed eminence in attracting the best and brightest from Europe, Asia, Africa, India and all countries of the world, seems poised to surrender its lead. Our studies indicate that the United States' advantage seems to be shifting, in part due to the liberalized immigration polices of many European countries, Canada and Australia, which allows those countries to effectively attract and retain global talent.

But it also lies in the growing perception around the world that the United States acts in a unilaterally aggressive manner and is unwelcoming of foreign-born people; that its direct polices restricting the flow of individuals and scientific information has unintentionally chilled the climate for all creative talent.

Our analysis is very much a first step and remains quite provisional. Much more needs to be done to improve our indicators of technology, talent and especially tolerance where better measures of actual concentrations of gays, immigrants and minorities are badly needed. The sample of countries also needs to be extended to include Canada, Asian nations, Australia and New Zealand and still more countries from around the world. And we desperately need more and better measures that reach below the national level and cover cities and regions around the globe. It would be extremely interesting and useful to be able to see how London, Amsterdam, Berlin, Dublin and Rome, for example, compare to New York, Chicago, Toronto, Tokyo, Singapore and Sydney on the key dimensions of creative performance. Lastly, it is important to note that countries are just beginning to develop the most rudimentary strategies to actually attract and retain talent, bolster their underlying creative capabilities and develop their people climates. Much more research is needed on the nature, extent and efficacy of these emerging efforts.

Appendix:
Data and Methodology

This appendix provides a general description of discusses the data and methodology used in constructing the various measures in this report. More detailed information on sources and dates is provided in the notes at the bottom of the relevant figure and tables. The framework follows the 3 Ts' theory of economic development outlined in *The Rise of the Creative Class*.

Talent Measures:

- **Creative Class**: The measure of creative occupations is drawn from the International Labour Organization (ILO) database for the European countries and from the Bureau of Labor Statistics for the United States (BLS) and includes professionals, artists, musicians, scientists, economists, architects, engineers, managers and other workers whose jobs deal with creative, conceptual tasks. All the ILO data used in this work have been classified according to the international standard ISCO-88. This ensures a good degree of homogeneity and comparability of the data across European countries[2]. Comparisons between European countries and the United States require more caution as data comes from different sources (ILO and BLS, respectively).

- **The Human Capital Index** is based on the percentage of population age 25-64 with a bachelor's degree or above (= degrees of four years or more) and is based on OECD data. It is worth noting that national differences in the educational systems may affect the comparability of the data.

- **The Scientific Talent Index** is based on the number of research scientists and engineers per thousand workers and is based on data from the European Commission. It is based on the Frascati manual definition (paragraph 5.4.2.2) expressed in full time equivalents or FTEs.

The Euro-Talent Index combines these three measures. It is based on a 0-15 point scale where the best performing country is assigned 15 points and the other countries are assigned a number of points that reflects their relative distance form the top.

[2] It is important to remember that ILO data are collected and conferred to the ILO by the various National Statistical Institutes: despite they all use the same codification standards, it is still possible that some differences in data collection or classification may affect comparability.

Technology Measures:

- The **Innovation Index** is based on the number of patents per million people and is based on data from the U.S. Patent and Trademark Office (USPTO).

- The **High-Tech Innovation Index** is based on the number of high-tech patents per million people and is also based upon USPTO data.

- The **R&D Index** measures R&D expenditure as percentage of GDP and is drawn from European Commission data.

The **Euro Technology Index** combines these three measures. It is based on a 0-15 point scale where the best performing country is assigned 15 points and the other countries are assigned a number of points that reflects their relative distance from the top.

Tolerance Measures:

- The **Attitudes Index** is an indicator of attitudes toward minorities based on the results of the Eurobarometer Survey conducted by the European Monitoring Centre on Racism and Xenophobia (EUMC) and on the classifications made for the EUMC by the SORA Institute for Social Research Analysis. SORA classifies the population of the European countries subject to the EUMC survey into four categories: intolerant, ambivalent, passively tolerant and actively tolerant*. The Attitudes Index is the percentage of the respondents that have been classified by the EUMC as actively and passively tolerant.

- The **Values Index** measures to what degree a country reflects traditional as opposed modern or secular values. It is based on a series of questions covering attitudes toward God, religion, nationalism, authority, family, women's rights, divorce and abortion.

- The **Self-Expression Index** captures the degree to which a nation values individual rights and self-expression. It is based on questions covering attitudes toward self-expression, quality of life, democracy, science and technology, leisure, the environment, trust, protest politics, immigrants and gays. Both the Values Index and the Self-Expression Index are derived from the World Values Survey conducted by Ronald Inglehart (see Inglehart and Baker 2000). The survey covers the period 1995-1998 and is based on data for 65 countries. The survey sample is quite large, with an average of 1,400 respondents per country. The data was made available to us by Professor Inglehart and are available from the Inter-university Consortium for Policy and Social Research (ICPSR) survey data archive at the University of Michigan.

The **Euro-Tolerance Index** combines these three measures. It is based on a 0-15 point scale where the best performing country is assigned 15 points and the other countries are assigned a number of points that reflects their relative distance from the top.

The **Global Creativity Index** is the sum of the scores on these three indexes — Talent, Technology and Tolerance — divided by the maximum possible score.

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* Thalhammer et Al., (2001), Attitudes towards minority groups in the European Union - A special analysis of the Eurobarometer 2000 survey on behalf of the European Monitoring Center on Racism and Xenofobia, SORA, Vienna.

Appendix: List of indicators, description and sources

Index	Sub-Indexes	Description	Source
Talent	Creative Class	Employed in creative occupations as percentage of total employment	ILO (2002) [http://laborsta.ilo.org, data extracted on October 2002]
	Human Capital	Percentage of population 25-64 with a bachelor degree or above	OECD (2001)
	Scientific Talent	Number of researchers in scientific disciplines per thousand workforce	European Commission-Eurostat (2001)
Technology	Innovation Index	Patents applications to the US Patent Office per million population	USPTO as reported by the European Commission, DG Research, in:"Towards a European Research Area. Key Figures 2001".
	Technology Innovation Index	High-Tech Patents per million population (US Patent Office)	USPTO as reported by the European Commission, DG Research, in:"Towards a European Research Area. Key Figures 2001".
	R&D Index	R&D expenditure as percentage of GDP	European Commission-Eurostat (2001)
Tolerance	Attitudes Index	Percentage of population that express tolerant attitudes toward minorities	European Monitoring Centre on Racism and Xenophobia, EUMC and SORA Institute for Social Research Analysis (2001)
	Values Index	Degree to which a country is based on traditional values versus more rational/secular values	World Values Survey, University of Michigan [http://wvs.isr.umich.edu]
	Self Expression Index	Degree to which a country recognizes and accepts self expression values.	World Values Survey, University of Michigan [http://wvs.isr.umich.edu]

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