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Policy Brief

## **Innovation at Work: The European Human Capital Index**

By Peer Ederer





## Lisbon Council Policy Brief

### Innovation at Work: The European Human Capital Index

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in conjunction with  
Deutschland Denken! eV  
Zeppelin University gGmbH

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This paper is part of a research project undertaken by Peer Ederer, Philipp Schuller and Stephan Willms through the German think tank Deutschland Denken! and with the institutional support of Zeppelin University. Since 1999, analysts at Deutschland Denken! have researched long-term economic trends and devised public-policy recommendations. Recently, the group has focused on defining the role of human capital in economic growth. A forthcoming Deutschland Denken! publication will outline a “business plan” for Germany and Europe building on the analysis developed in *Geschäftsbericht Deutschland AG*, a similar study published in 1999. This research is supported by the innovation and growth project at Zeppelin University in Friedrichshafen, Germany, which formulates effective business strategies for responding to the regional and global challenges posed by long-term economic trends.

The opinions expressed in this paper are those of the author alone, and do not necessarily reflect the opinions of Zeppelin University, Deutschland Denken! or the Lisbon Council.

# 'Future policy making must be focused much more than is currently the case on investing in the individual citizen.'

Nothing will matter more to Europe's future than the ability of countries, governments, workers and companies to innovate – a process which will depend in no small degree on the efficiency of our decision-making and the quality of our human capital. These days, China and India engage Europe not in a race to the bottom, but in a race to the top – a contest where our workers', managers' and policy makers' capacity for developing and delivering ever higher value-added goods and services will determine our ability to generate the wealth needed to preserve our value-driven social model for generations to come. Against this backdrop – and taking note of Europe's ongoing demographic evolution – future policy making must be focused much more than is currently the case on investing in the individual citizen, on raising and enhancing his or her capabilities and on allowing him or her to realize his or her utmost potential.

These days, there is a growing consensus that Europe must do more to develop our citizens' knowledge and skills, to create an economy where "innovation" forms a core part of daily economic life.<sup>1</sup> But what are we actually doing to excel in that area? This paper will argue that – despite policy makers' willingness to talk up "innovation," as demonstrated at the informal European Council meeting in Lahti, Finland in October, 2006 – we are still doing painfully little to take the most necessary step in this process: developing and maintaining the human capital that will determine our future economic prosperity. Specifically, some countries – notably Germany and Italy – are courting disaster by allowing their human capital to stagnate through high workforce exclusion and chronic underinvestment in education and

training. Unless reversed, these trends will lead to a deterioration of human capital in those countries – countries which traditionally served as the engine of European economic success. That, in turn, will have devastating economic consequences for the citizens of those countries which can already be forecast today. For example, if current trends are not reversed, the citizens of Germany and Italy could find themselves with up to 50% lower gross domestic product per head (a standard measure of basic prosperity) than people in Sweden, Ireland or the United Kingdom by 2030 – an historic reversal of Europe's traditional pattern of economic distribution, brought on in no small part by the poverty of contemporary policies towards human capital in those countries.

In order to measure the development of human capital in Europe, the Lisbon Council and Deutschland Denken! have created the European Human Capital Index: a one-of-its-kind ranking of 13 European Union member states. The index looks at countries' ability to develop and deploy their human capital. We define human capital as the cost of formal and informal education expressed in euros and multiplied by the number of people living in each country (see the box on page 20 for a more detailed description of the methodology). We later account for some depreciation, deducting value due to the fact that some knowledge will become obsolete and that people will forget some of what they learn. We also adjust for ongoing demographic developments, provisioning for the loss of human capital due to declining populations and shifting employment patterns across the EU countries.

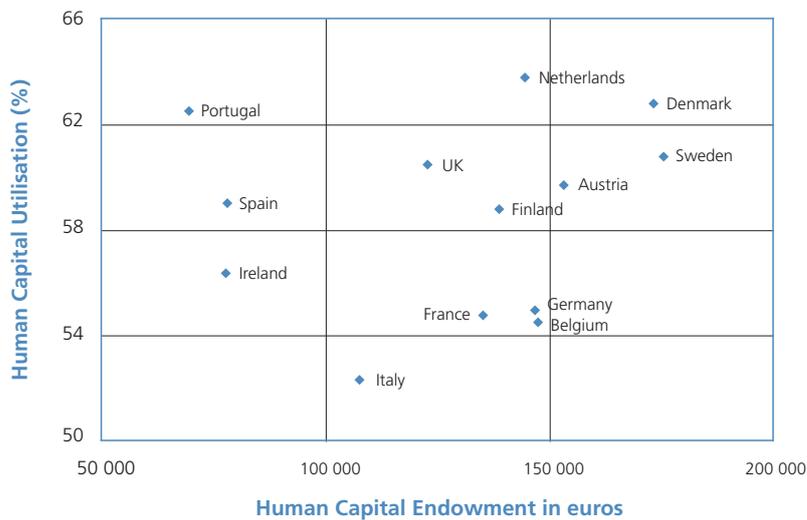
**Table 1: The European Human Capital Index**

Sweden tops the European Human Capital Index in 2006, while Germany and the Mediterranean countries mark the bottom. The overall ranking is based on how each country scores in each of four individual human capital categories. Four is the best possible score; 52 is the worst.

Rank	Country	Overall Score
1	Sweden	8
2	Denmark	14
3	United Kingdom	19
4	Netherlands	21
5	Austria	23
6	Finland	29
7	Ireland	30
8	France	30
9	Belgium	31
10	Germany	36
11	Portugal	37
12	Spain	38
13	Italy	48

**Table 2: Some countries have lots of human capital; others use their human capital well**

The most successful countries, like Denmark, Netherlands and Sweden, have lots of human capital and use it well. Human Capital Endowment per employed person (in euros) and Human Capital Utilisation (employed human capital / total human capital).



# 'Some countries are courting disaster by allowing their human capital to stagnate.'

The term human capital is well understood in economic circles, but it fares less well in policy circles, where some analysts believe it looks too rigidly at the inherently dynamic process of innovation in a modern economy. However, the fact that the decisive economic resources of the future will be knowledge and education is widely understood and broadly accepted. In using the term human capital, this paper aims to develop an analytical framework allowing the measurement and comparison of investment in knowledge and education between countries.

Specifically, the index identifies and defines four types of human capital and analyses the way they collectively contribute to the wealth of European citizens:

- 1) Human Capital Endowment. This figure measures the cost of all types of education and training in a particular country per person active in the labour force (i.e. employed person). Specifically, we look at five different types of learning for each active person: learning on the job, adult education, university, primary and secondary schooling and parental education. The figure is subsequently depreciated to account for obsolescence in the existing knowledge base and some level of forgetting.
- 2) Human Capital Utilisation. This figure looks at how much of a country's human capital stock is actually deployed. It differs from traditional employment ratios in that it measures human capital as a proportion of the overall population.
- 3) Human Capital Productivity. This figure measures the productivity of human capital. It is derived by dividing gross domestic product by all of the human capital employed in that country. This diverges

from traditional productivity measures, in that the figure takes account of how well educated employed labour is, instead of just how many hours are being worked.

- 4) Demography and Employment. This figure looks at existing economic, demographic and migratory trends to estimate the number of people who will be employed (or not employed) in the year 2030 in each country.

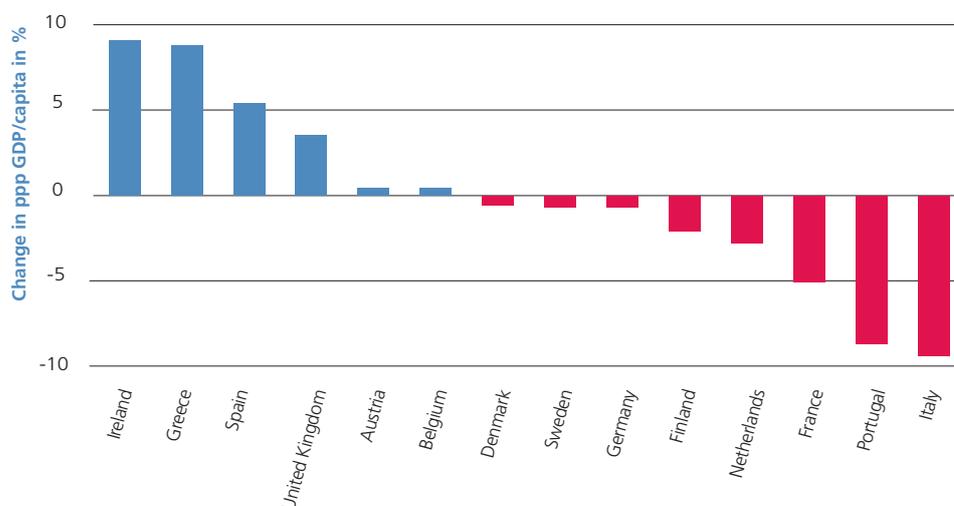
We chose these four components to be measured for the European Human Capital Index because they each represent one aspect of how human capital contributes to the generation of economic activity.<sup>2</sup> To compile the ranking, we scored 13 EU countries in each of these four areas.<sup>3</sup> Then, we compiled the four scores into a single composite score, giving each country a relative rank within Europe for its ability to develop and deploy its existing human capital. The result, which is available in Table 1, displays the relative level of human capital in those countries today, drawing partly on past and current trends in managing human capital as well as the demographic trends. In that way, it not only reflects today's situation, but also takes account of those countries' ability to improve the quality and quantity of their human capital in the future.

As economists have shown, wealth is the result of several things – natural, financial and human capital – and the productivity (or efficiency) with which these inputs are used, including innovation. The role financial capital can play in stimulating growth rates is well documented. In Europe, Ireland is a particularly good example of an economy which has grown rich by attracting high levels of inward investment. Today, the development of the internal market,

<sup>2</sup> The four aspects each represent one term of a conceptual mathematical formula to forecast economic potential: (The amount of human capital per capita available) x (how much of it is utilized for the economy) x (how productively it can be deployed) x (the growth or decline of working age population in a country) = forecast total economic activity of a country.

**Table 3: Significant economic growth differentials have led to changes in many countries's wealth, relative to others, in only five years**

Wealth growth or decline relative to EU average 2001-2006 as measured by GDP per capita in percent terms (ppp adjusted).



the euro and other measures make financial capital more or less freely available on equal terms throughout Europe. Financial capital can and does flow to the places where the prospect of returns is largest.

However, human capital is less mobile and therefore factors like the availability of human capital and the efficiency of its use are more likely to influence the success of individual countries in the long term. This makes policies for successfully developing human capital the principle arena in which future EU competitiveness and growth will be determined. Specifically, countries with a high rank in the European Human Capital Index have greater long-term potential economic growth than countries which score poorly.

If policy makers in Germany and Italy continue ignoring the human capital dimension of today's policy mix, economic power will inexorably seep from the centre to the periphery, thereby reversing the traditional economic hierarchy that has defined Europe for centuries. Long-term potential economic growth could start to diverge sharply among European nations, with Scandinavia, Netherlands, UK and Austria replacing "old Europe" as the core of the new European economy (see Table 2 for a closer look at the

high performers in Human Capital Endowment and Human Capital Utilisation).

Furthermore, in the future we may see even more divergence rather than convergence. For example:

- 1) Human Capital Endowment: Today, Sweden invests twice as many resources in school, university and adult education as Italy or Spain, with the result that Swedish employees possess twice as much human capital as measured by our index than their Italian or Spanish counterparts;
- 2) Human Capital Utilisation: Sweden, Denmark and Portugal employ around 63% of the human capital available in their economy, whereas Italy, Belgium and France employ only 53% of it; the likely outcome is lower economic growth and less prosperity for countries that make little use of their existing human capital;
- 3) Human Capital Productivity: France and Spain achieve 20% higher productivity of their human capital than Denmark or Netherlands;
- 4) Demography and Employment: The working age population of France and the Netherlands will have fallen by around 5% in 2030 – and by as much as 15% in Germany and Italy, if current birth and immigration trends continue.

<sup>3</sup> The analysis was conducted for 13 countries, the EU-15 without Greece and Luxembourg. Greece had to be excluded since there are too few historical data points available to make any meaningful statement. Luxembourg was excluded because its economy is so interdependent with its neighbours' that the historical data provides an insufficient picture of the domestic interaction between human capital and economic development. For the newly joined accession countries, long term historical data is either absent or unreliable.

# 'If current trends continue, the most likely outlook for countries at the bottom of the European Human Capital Index is long-term economic stagnation.'

## Understanding the Consequences

If current trends of Human Capital Utilisation and Human Capital Productivity continue, the most likely outlook for countries at the bottom of the European Human Capital Index is long-term economic stagnation. In 20 years, citizens in those countries will probably enjoy roughly the same standard of living as they have today. But their neighbours will have forged ahead, using the wealth generated by their successful use of human capital to run a prosperous, sustainable and socially-cohesive society and taking full advantage of the comforts modern life will provide. Innovation works both ways – it creates more wealth, and it creates new goods on which this wealth will be spent. For nations that do not increase their wealth, the innovations of the future will not be so readily available.

Health care and health treatment are good examples. As newer, more expensive treatments such as artificial organ transplants, cancer cures or cardiovascular therapy become obtainable over the years, people in stagnating economies will not be able to afford these operations through their solidarity-based health insurance systems. This, in turn, will force people to pay privately for the health care they need – or simply to do without the operations they want. Long-term cross country studies show that the cost increases associated with technological progress in health care grow 1% to 1.5% per annum faster than the output per head in the rest of the economy.<sup>4</sup> Countries that enjoy healthy economic growth will therefore be able to afford higher quality health care for their citizens than countries that have allowed their growth rates to slow and their human capital to wither.

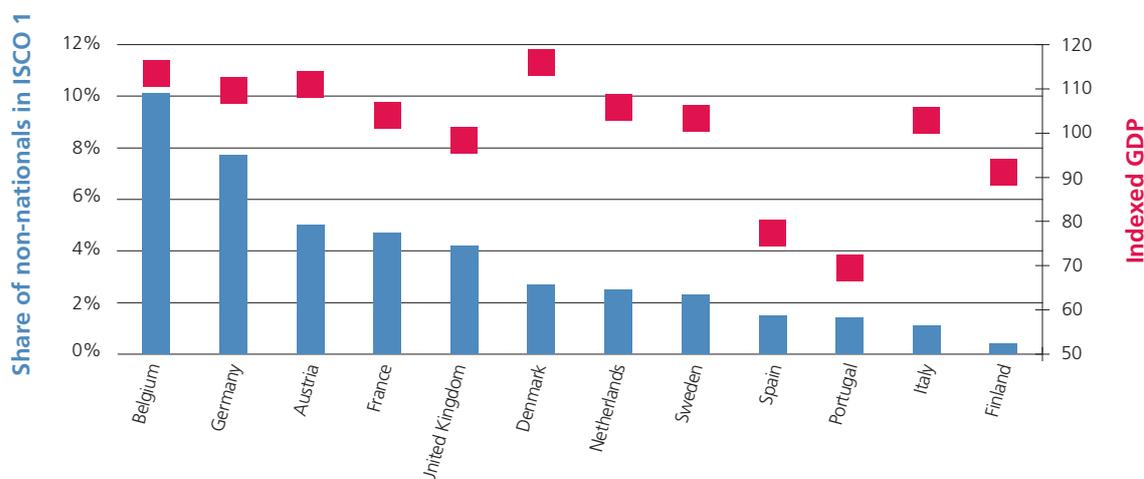
Economic growth rate differentials are common within the European Union and are the cause

for rapid shifts of relative wealth (see Table 3 for a look at changes in relative living standards in Europe between 2001 and 2006). These differentials are neither accidental nor merely cyclical, but also the result of structural, long-term trends. Over the next 20 years, we expect that the structural differences in human capital – as measured by the European Human Capital Index – will allow top-ranked economies like Sweden or Netherlands to outperform low-ranked economies. All else being equal, citizens in the top-performing countries will be able to afford nearly twice as much health care as the low performers – as well as twice as much of everything else. Other impairments in the progress of the quality of life – amenities in housing, affordability of cars, quality of foods or vacationing options – would be less drastic, but would in all likelihood be experienced by the population with noticeable discomfort. If divergence continues, some of today's rich countries could find themselves in a position relative to the rest of the EU similar to the one the new member states and accession countries experience today.

Moreover, the European Human Capital Index assumes that historical patterns of migration within the EU remain unchanged: typically, low-skilled labour has migrated from countries and regions without jobs to more prosperous regions, where higher paying jobs are abundant. However, the recent success of the EU in creating free mobility of labour through such measures as the harmonisation of academic qualifications and standardisation of business practices already enables high-skilled labour to maximize its income by emigrating to European regions with brighter economic growth prospects and the ability to pay attractive salaries (for more see the box on Francois S. and Table 4

**Table 4: High-skill immigrants go to countries that are prosperous and offer attractive job opportunities**

Share of non-nationals in employment in the highest skill category (ISCO1=managerial positions) in 1998 compared to GDP/capita adjusted for purchasing power in 1994 (EU15=100).



on Page 7). As growth and wealth diverge, highly-skilled citizens from stagnating economies are unlikely to merely watch their standard of living decline relative to their European neighbours. German doctors working in the Nordic economies, or London’s pull on financial-service workers, are examples of a phenomenon that is likely to become more widespread – with ultimately negative consequences for countries that are unable to attract and retain their best and brightest workers. This migration of highly-skilled labour will amplify economic divergence, reducing economic growth further in the economies at the bottom of the table and enhancing the position of those at the top.

### Components of the Human Capital Index and the Implications for Policy Makers

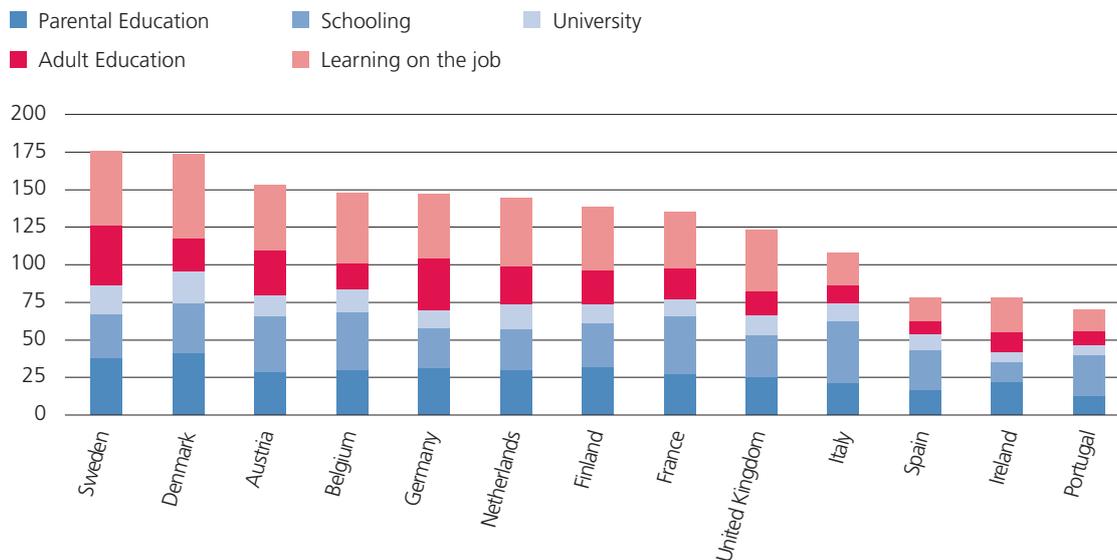
Of course, the current levels and trends of Human Capital Utilisation and productivity are open to policy intervention and do not need to stay the same. This section will look at the four principal areas we have identified for measuring human capital – and analyse the aspects which determined the winners and losers in the European Human Capital Index. We will look especially at the policies which made some countries strong, analyzing what those countries did to develop and deploy their human capital so successfully. We will also look at some of the aspects which caused other

#### The story of François S.

François S. is in his early thirties. After working seven years in Paris as a fund manager he is about to enter the most productive – and highly compensated – part of his career. Rather than stay in Paris, he will move to London to work for a hedge fund so that the returns on François’ human capital – invested from the French public purse – will accrue to the gross domestic product of the United Kingdom. The hedge fund world is very competitive and there is virtually no employment protection. If François makes it in this business – and breaks through to the ranks of the very well paid – he will stay in London. If it doesn’t work out, he is planning to return to France where his wife has a guaranteed job as a state-employed teacher.

**Table 5: Human Capital Endowment is heavily driven by adult education and learning on the job**

Composition of Human Capital Endowment per average employed by types of education received, in thousands of euros.



**Table 6: Human Capital Endowment Ranking**

Amount invested per person, in euros (2005).

Rank	Country	Overall Score
1	Sweden	175,530
2	Denmark	173,297
3	Austria	153,277
4	Belgium	147,489
5	Germany	146,902
6	Netherlands	144,601
7	Finland	138,857
8	France	135,283
9	United Kingdom	122,908
10	Italy	107,678
11	Spain	78,197
12	Ireland	77,815
13	Portugal	69,560

# 'Highly-skilled citizens from stagnating economies are unlikely to merely watch their standard of living decline.'

countries to fall to the bottom of the list. For reasons described above, these could lead to long-term stagnation or even decline in the standard-of-living and trigger grave social problems in those countries, if not addressed through policies that would more effectively raise the development and use of human capital.

## I. Human Capital Endowment

The human capital of an economy is made up of the Human Capital Endowment of an average person multiplied by the number of individuals participating in the economy. Throughout this study, the average Human Capital Endowment per capita is measured by calculating the level of investment in five different kinds of investment in skills used in the economy:

- 1) Informal parental education: general skills and cultural adaptation that parents teach their children;
- 2) Formal school education: general skills which children learn mostly in primary and secondary school;
- 3) Formal university and higher education: specific skills that students learn in university

- and vocational training institutions;
- 4) Formal and informal adult education: skills which adults acquire outside of their daily work environment, which are nevertheless either directly or indirectly job-related such as management trainings;
- 5) Informal learning on the job: skills acquired incidentally as part of the daily job activity and continuous adaptation to new requirements on the job.

These categories measure human capital by its input cost rather than its output value (see Table 5 on Page 8). So a high Human Capital Endowment does not automatically indicate high economic output. If an economy uses its human capital inefficiently – through, say, low levels of workforce participation or low productivity – the overall economic output can be low even when the Human Capital Endowment is high.

Typically, investment in human capital has a very long payback period. Investments in primary school education, for example, will not pay off for at least 20 years, by which time today's 10-year-old primary schoolers will have

### The Secret of Sweden's Success

- Swedish and Danish parents invest the most time in parental education, almost 30% higher than France where the least parental time is invested in children;
- Ninety percent of all 25 to 34 year olds and 80% of all 45- to 54-year-old Swedes have attained at least a secondary education qualification, the highest rates in Europe. In Portugal the respective figures are 38% and 18%, the lowest in Europe;
- Sweden spends 1.7% of its gross domestic product on tertiary education, third place behind Finland and Denmark. Italy spends only 0.9%;
- Swedish 44 to 64 year olds spend 358 hours per year in adult educational activities with job relevance, which is almost 50% more than the Germans who are ranked second, and three times as much as the Spanish who are last.

# 'Migration of highly-skilled labour will amplify economic divergence.'

settled into their careers and become productive contributors to the economy. This lag could be discouraging for policy makers. The good news is that countries that do particularly well on the Human Capital Endowment component of the European Human Capital Index do so mostly by fostering adult education and learning on the job – a fact which means the low Human Capital Endowment might be more easily and speedily reversible than it seems at first. Adult education and learning on the job both have much faster payback periods of only a few years (for more, see the box on page 9 on The Secrets of Sweden's Success.).

Formal-education systems are undoubtedly very important fields for policy action as they lay

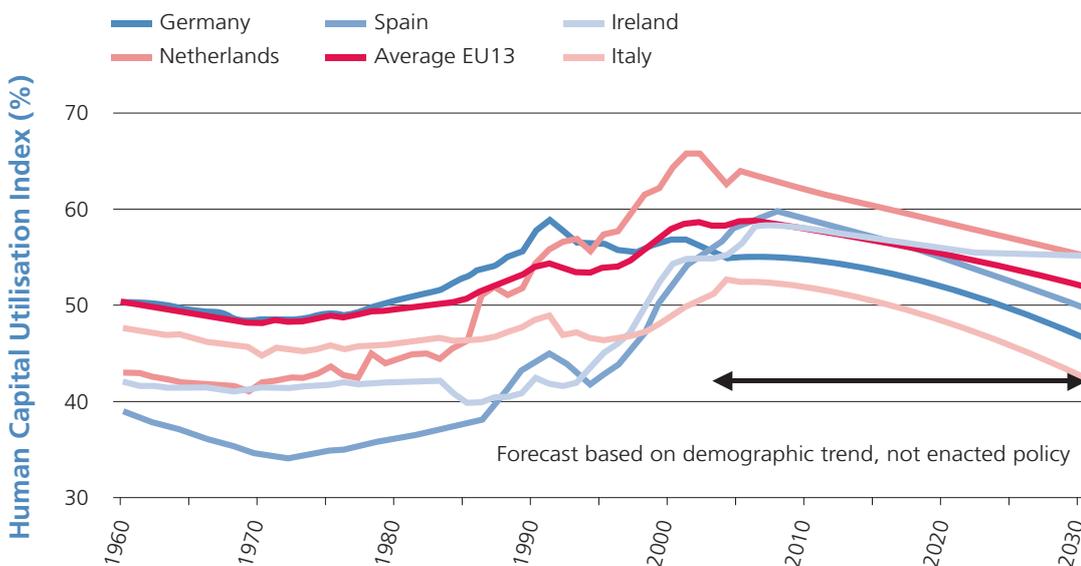
the groundwork for learning throughout the life cycle. Nevertheless, adult education and learning on the job are the areas where countries can increase their Human Capital Endowment most effectively within short and foreseeable investment horizons. This is also where the work force receives the skills to incorporate new technologies and innovation into their job environment. Poor investment rates in adult education will lead to poor utilisation of new technologies and vice versa.

## II. Human Capital Utilisation

Human Capital Utilisation measures how much of an economy's human capital is represented in the active workforce. The non-utilised portion of a country's human capital is comprised

**Table 7: Utilisation of human capital has been rising and converging in Europe. In the future, demography alone will cause it to fall and diverge**

Human Capital Utilisation from 1960 to 2030. The projections are based on changes in demography and employment patterns only.



**Table 8: Human Capital Utilisation Ranking**

Utilisation of total Human Capital Stock in percentage terms (2005).

Rank	Country	Utilisation Rate
1	Netherlands	64
2	Denmark	63
3	Portugal	62
4	Sweden	61
5	United Kingdom	60
6	Austria	60
7	Spain	59
8	Finland	59
9	Ireland	56
10	Germany	55
11	France	55
12	Belgium	54
13	Italy	52

of children and university students, the unemployed, non-working housewives and retirees. It differs from traditional employment ratios in that this measure takes into account different Human Capital Endowments for different age groups. For example, the participation rates of workers older than 50 who typically represent high human capital investments have an over-proportional impact on Human Capital Utilisation.

Table 8 shows how Human Capital Utilisation diverges significantly across European economies – varying from Italy with only 52% to Netherlands with 64%. However in the past the spread was even wider, with some countries utilising only 40% of their available human capital.

In the last two decades, Human Capital Utilisation throughout the EU has risen to 58%, up from an average of 50%. In that time, three countries have given a particularly stellar performance by rising from the bottom all the way to the top – the Netherlands, Spain and Ireland.

The most remarkable of these three is probably the Netherlands, as its increase took place against the background of an already high level of economic output – whereas in Spain and

Ireland the increase of utilisation was part cause and part effect of rapid economic growth during that period. The worst performer has been Germany, where Human Capital Utilisation has actually fallen or stagnated. Table 8 further illustrates a coming challenge for Europe, though it will hit different countries with differing degrees of severity. As populations age, more and more of a country's human capital is invested in people over 60 years old. If current retirement patterns do not change, the average Human Capital Utilisation will fall to 52% by 2030 based on current demographic trends. If this happens, it would roll back and reverse all of the achievements in effective Human Capital Utilisation in the last 20 years. Combined with other changes in Human Capital Endowment, this trend will lead to a proportional decrease in economic output – provided that Human Capital Productivity can't be made to pick up the slack.

Poor Human Capital Utilisation hits the economy – and the individuals excluded from the workforce – in two ways. Those who do not contribute to the economy are also shut out from the most effective means of acquiring new human capital, which is learning on the job. Shut out from this most important source of acquiring and mastering the new skills required

‘Countries that do particularly well do so mostly by fostering adult education and learning on the job – a fact which means low Human Capital Endowment might be easily and speedily reversible.’

by continuous innovation, they will find re-entry into the labour market increasingly difficult.

### III. Human Capital Productivity

Economic theory typically looks at labour productivity as output per hour worked, which has been increasing at a long-term pace of around 2% per year across most of the industrialised world thanks to technological change and increasingly available financial capital. For Europe in the 1990s, the growth was 1.95% per year. Various studies show that much of this increase in labour productivity is due to the improved quality of labour – or put differently, that this labour is endowed with more human capital and therefore more productive.<sup>5</sup>

By contrast, our measure of Human Capital Productivity looks at economic output for each euro of human capital invested. Its growth

rate is lower than that of classical labour productivity because the rapid expansion of Human Capital Utilisation across the EU has depressed the marginal returns on human capital investment. For example, if everyone went to work as doctors or lawyers or whatever their training allowed, the salaries of doctors and lawyers would probably go down. However, research in marginal returns on investment in additional education have often shown that additional human capital invested can actually increase the rate of return for a human capital investor – which if applied to the macro-economy would suggest a stable or rising level of Human Capital Productivity. Therefore, the challenge for policy makers is to open up the potential that is available from additional investment into human capital for the Human Capital Productivity of the economy as a whole. In other words, bringing older workers or women into the labour force will only help

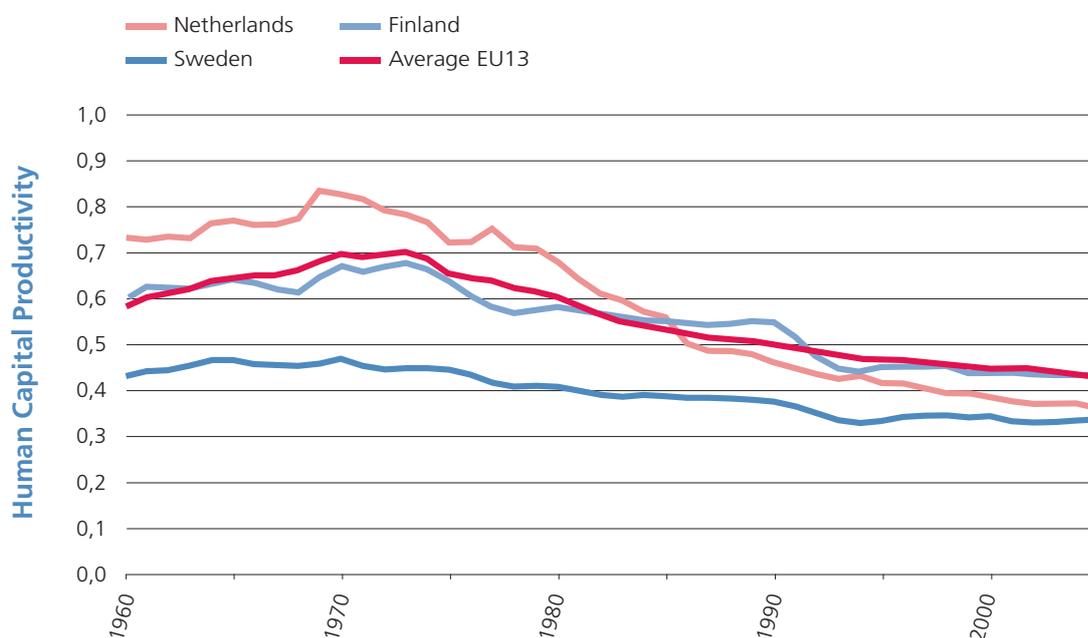
#### The Dutch Cure

The case of the Netherlands illustrates how Human Capital Utilisation can increase significantly – if society is ready to take the necessary steps. Over the years, Dutch policy makers and social partners have cooperated to overcome prejudice against new entrants and immigrants, retain mature workers in the workforce and make it easier for companies to hire disabled workers. Nor is the country resting on its laurels. Increasing quantity and quality of workforce participation is still a top policy priority and enjoys cross-partisan consensus. The following are recent initiatives to make best use of the economy’s existing resources:

- Cum l’Oude Prize – a national award for companies with age-friendly employment practices.
- Age Mirror – a questionnaire and check list for employers to create awareness of and remove prejudices towards older employees.
- Life Course Saving Scheme (LCSS) – allows Dutch citizens to save up to 12% of their pre-tax earnings for funding up to three years of future non-employment such as educational sabbaticals or parenting periods.
- Expertise Centre for Age and Society (LBL) – an information collection and distribution centre addressing age policy and age discrimination.
- 2004 Social Agreement – unions agreed to abolish all early retirement schemes.
- Revamped disability insurance – employers have to adapt the work environment so that employees with a disability of up to 35% can work.

**Table 9: European Human Capital Productivity is in long-term decline, but has held up better in some European economies than in others**

Human Capital Productivity from 1960 to 2005, GDP (euros, in real terms) per employed Human Capital Stock (euros, in real terms).



if there is additional investment into human capital simultaneously.

In addition, evidence is accumulating that poor regulatory and institutional environments prevent or slow down the take up of new technologies and innovation in some countries – and in this way retard the acquisition of new human capital and the productivity of all deployed human capital.<sup>6</sup> Table 9 shows how Human Capital Productivity has been steadily declining for almost every European economy, meaning that most countries are fighting an uphill battle to improve their economic welfare. Only Sweden and recently also Finland have managed to keep Human Capital Productivity stable, whereas other countries such as the Netherlands had to face a rapid decline in their Human Capital Productivity.<sup>7</sup>

Human Capital Productivity can be influenced in two ways:

- 1) Raising input efficiency: Improving education and informal learning that provides more readily employable skills for the economy will increase Human Capital

Productivity, as more output can be expected for the same amount of investment. This can be achieved through changes in content, pedagogy or educational pathways. Studies from the Organisation for Economic Co-operation and Development’s Programme for International Student Assessment (PISA) have amply shown that high levels of expenditure on schools does not necessarily predict high student performance.<sup>8</sup>

- 2) Improving output efficiency: Increasing the quality of a country’s institutional framework allows factors of production, e.g. human or financial capital, to trade more efficiently within the economy – and therefore creates more output for a given amount of input.

#### IV. Demography and Employment

The Human Capital Endowment described above looks at the various types of education received by an average employed person in a particular country. But how many participants will there be in these countries and how old will they be? Europe’s future human capital standing is strongly influenced by a number of demographic trends:

Table 9. Source: Deutschland Denken!

6 For instance, Paul Conway et al in, “Regulation, Competition and Productivity Convergence,” OECD, September 2006.

7 United Kingdom’s high performance on Human Capital Productivity is mostly due to exchange rate developments.

8 OECD, First Results from PISA 2003: Learning for Tomorrow’s World (Paris: OECD, 2004).

**Table 10: Human Capital Productivity Ranking**

Productivity Trend 1993-2005 in percentage terms per annum.

Rank	Country	Trend
1	Sweden	0.0
2	United Kingdom	-0.1
3	Finland	-0.3
4	Denmark	-0.4
5	Austria	-0.5
6	France	-0.7
7	Belgium	-0.7
8	Ireland	-0.8
9	Germany	-0.8
10	Netherlands	-1.2
11	Portugal	-1.3
12	Italy	-1.5
13	Spain	-1.5

**Table 11: Human Capital Demography Ranking**

Projected change in employed people (2005-2030), in percent terms

Rank	Country	Score
1	Ireland	17.3
2	Sweden	0.2
3	United Kingdom	0.1
4	Netherlands	-4.4
5	France	-4.6
6	Denmark	-4.7
7	Spain	-6.3
8	Belgium	-7.9
9	Austria	-8.0
10	Portugal	-8.8
11	Finland	-11.6
12	Germany	-14.4
13	Italy	-15.7

- In most countries birth rates are far below replacement levels, so that the native populations will start shrinking within the next generation;
- In all countries, life expectancy has been rising at a rate of two to three years per decade, and is expected to continue to rise as increasingly sophisticated medical treatments become available. Moreover, not only do people live longer, they also remain healthier longer; most empirical evidence shows that the additional years of life gained over the last few decades have been “healthy” years;<sup>9</sup>
- Political and social barriers in most countries

have made managed immigration at levels high enough to close the native demography gap very difficult;

- Finally, disadvantageous age structures in a number of European economies will make it more difficult to maintain high levels of Human Capital Utilisation.

The magnitude of these trends is quite different across Europe. For example, France and Ireland have been able to maintain birth rates at nearly replacement levels. For Germany and Italy, however, all available alarm bells are ringing. If current employment and immigration patterns

## Deutschland Über Alles?

Once a star economic performer, Germany today comes in as barely an average performer in Human Capital Productivity – a stunning result for a country that once stood as a role model of economic management. What should Germany do to halt or reverse the decline of its Human Capital Productivity? To the extent that the institutional quality of laws and institutions explain an economy’s productivity, there appears to be much scope for improvement in Germany. In various comparisons of the quality of economic and social institutions in industrialised economies, Germany typically occupies a low rank:

### Institutional Quality Study

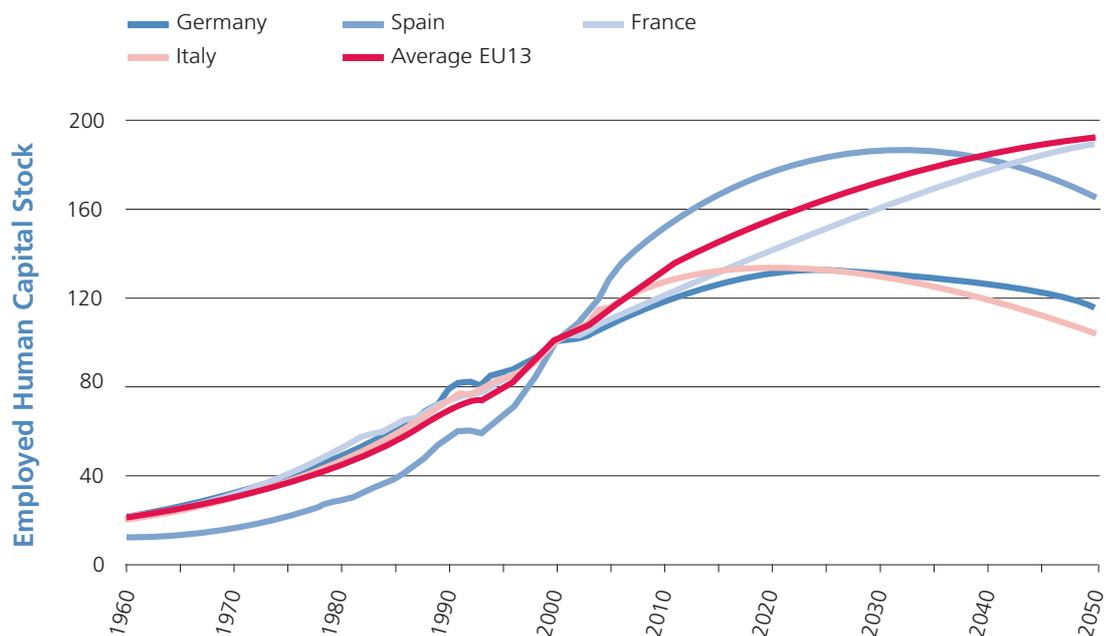
- UNDP Human Development Index
- Transparency International Corruption Index
- World Economic Forum Efficiency Enhancers Index
- World Economic Forum Growth Competitiveness Index
- Heritage Foundation Economic Freedom Index
- Cato/Fraser Economic Freedom of the World Index

### Germany’s Global Rank

- 20
- 16
- 19
- 15
- 19
- 17

**Table 12: Germany, Italy and Spain face a difficult demographic future**

Impact of demographic change on Human Capital Stock (2000=100).



**Table 13: In Italy, 60 year olds will outnumber 20 year olds by two to one in 2030**

Demographic structure of Italy in 2030 by age cohort.

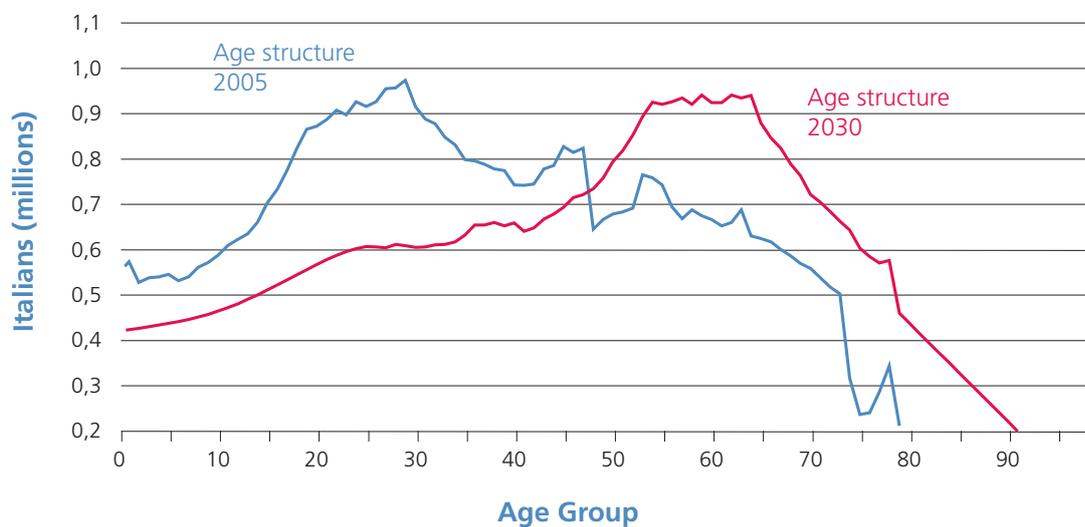


Table 12. Source: Deutschland Denken!  
Table 13. Source: Eurostat

# 'Europe's future human capital is strongly influenced by demographic trends.'

continue, the thirteen countries analyzed in the European Human Capital Index would lose 12.4 million employees by the year 2030, a loss of close to 8% of the workforce. Of those, Germany would lose 5.2 million and Italy 3.5 million employees, together accounting for 70% of the total European drop (see Table 12).

In Germany, the shortfall will be equivalent to about six age cohorts that should be working instead of retiring – or in other words the average effective retirement age would have to move to 66 by 2030, up from 60 today, in order to neutralize the demographic change. In Italy the shortfall is closer to seven age cohorts, and the effective retirement age would have to rise to 68 in 2030, up from 61 today (see Table 13).

The most obvious – but by no means easy – solution is immigration. Both the United Kingdom and the Netherlands are encouraging managed, high skills-based immigration. Can Europe attract, absorb and train 12.4 million non-European immigrants that are at least as equally endowed with human capital as the native population? Can these immigrants be persuaded to go where they are needed most or will they go to places where a better native demography also improves the chances for the newcomers? In 2005, the UK experienced record immigration levels, with the net inflow of 223,000 representing 0.4% of the population.

## Conclusions and Policy Recommendations

Human capital is an organic entity, made up of a wide variety of components. At its core are basic issues such as access to education, workforce participation and demography – areas which are affected by widely and broadly

different policy areas. Using the European Human Capital Index methodology as a guide, this section will look for concrete policy recommendations that could help countries better develop and deploy their human capital.

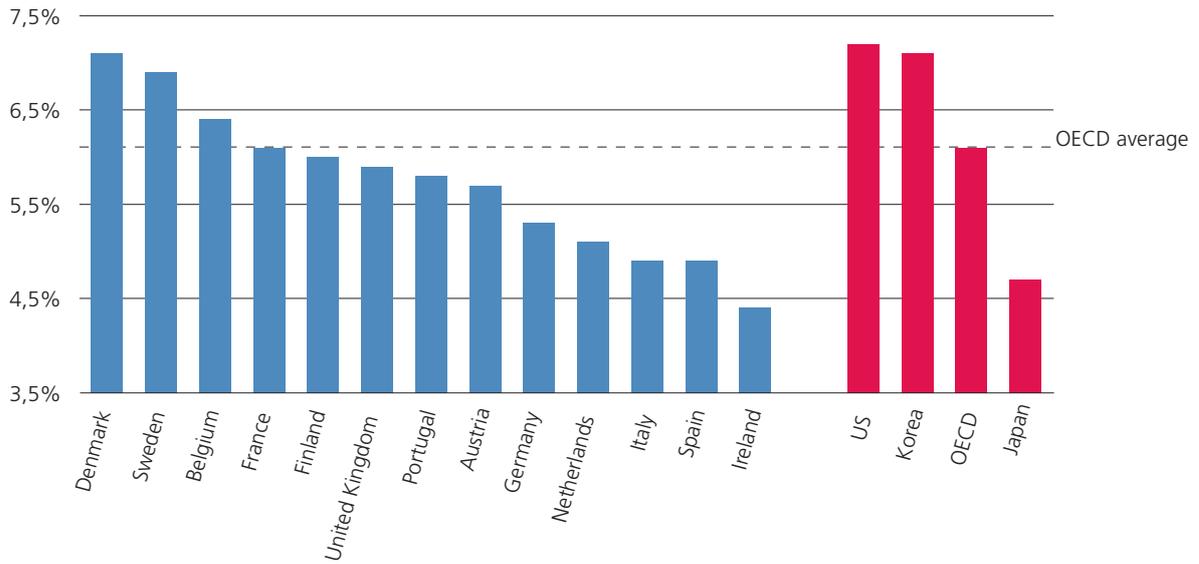
### 1) Improve public investment in education and skills

As is, Europe spends less on education than its OECD peers (see Table 14). The same observation is true for the component parts of this spending: Europe is falling short at virtually every level of human capital generation, from kindergartens to high technology laboratories. The gap is a matter of both the amount and the effectiveness of the money spent: cross-country benchmarking studies such as PISA or technology infrastructure surveys show the poor output from public investment in education and research. It is also clear that the high externalities that come with investments in basic early education and basic non-applied research mean that we cannot simply count on the private sector to pick up the slack. Europe's current competitive edge in a globalised world – its highly educated work force – will stay competitive only with higher and better public sector investment.

### 2) Encourage human capital investment in adults by the private sector

The largest gap among human capital investment rates within Europe are seen in the area of adult education and learning on the job. As both of these are private and informal activities – and moreover are also culturally influenced – there is little that public policy makers can do to increase these investment rates directly. However, it is possible to create recognition and certification systems for

**Table 14: Most European countries invest less in formal education than the OECD average**  
 Expenditure on educational institutions as a percentage of GDP, public and private 2002.



**Table 15: High Human Capital Utilisation leads to lower Human Capital Productivity, but some countries manage the trade-off better than others**  
 Performance of countries in managing the trade-off between Human Capital Utilisation and Human Capital Productivity in 2005.

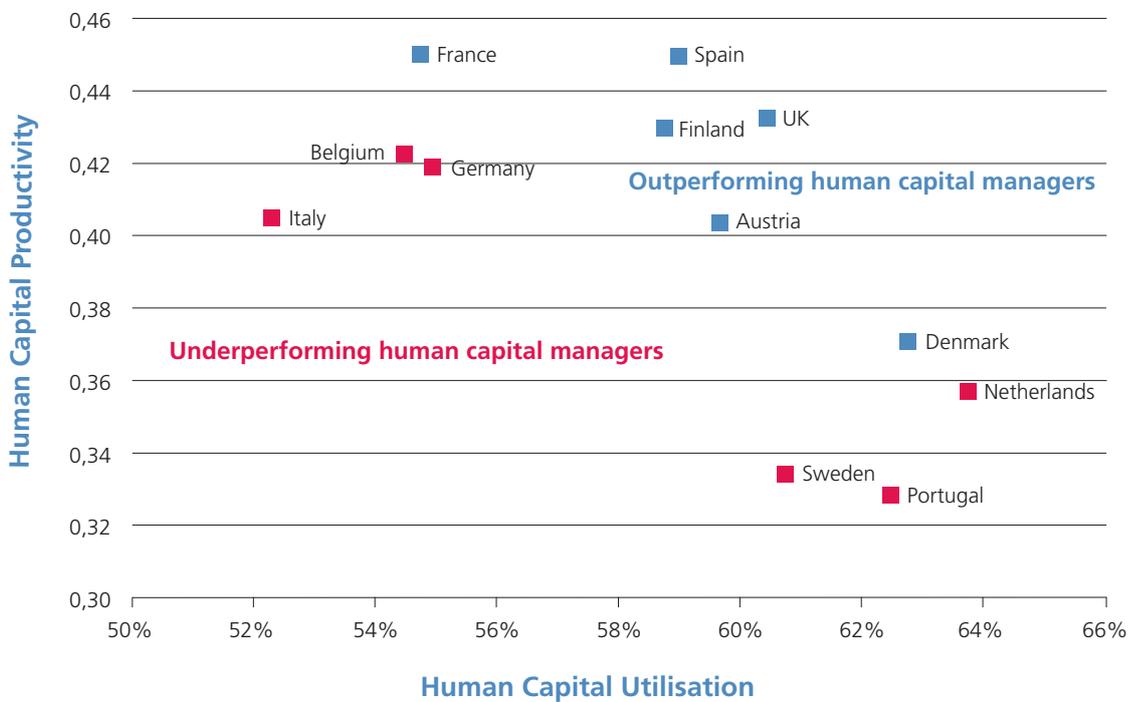


Table 14. Source: OECD  
 Table 15. Source: Deutschland Denken!

informal education and thereby turn this informal education into more transparent and tradable skills in the labour market. The harmonization of the tertiary education system as achieved by the Bologna process serves as an excellent example.<sup>10</sup> Policy makers can also create the legal and fiscal incentives to engage in private informal education by promoting time slots for these activities (e.g. sabbaticals), such as the Dutch LCSS (see box on page 12). Tightening the criteria for granting disability and unemployment benefits also appears to encourage workers whose jobs are threatened by obsolescence to increase their employability in other sectors through training before the event of unemployment occurs – as successful reform in Denmark has shown.

### 3) Raise Human Capital Utilisation

Poor utilisation rates are the result of high unemployment, late labour market entry, early retirement and low female labour participation, all of which result in human capital being left outside of productive economic life. While employment in the “core workforce” between ages 30 and 50 is high across Europe – with

the majority of countries in the 75-85% range – large differences are noticeable at the edges. Sweden keeps 60% of its 60 to 64 year olds employed, while Austria and Belgium manage only 15%. Similarly, Denmark and the UK have around 70% of their 20 to 24 year olds employed, while France and Italy manage less than 50% (the European average is around 55%). The main lesson from these differences appears to be that labour markets geared towards protecting “core workers” at the expense of new entrants are not flexible enough to attract labour on the fringes – thereby shutting new entrants out or making participation difficult. Increasing Human Capital Utilisation is primarily a task of increasing employment opportunities for the non-core workforce.

### 4) Improve Human Capital Productivity

Poor Human Capital Productivity per employee is partially the result of high Human Capital Utilisation. To the extent that lower average productivity is the result of the young, the old, the less skilled participating in the work force,

#### Demography as Fate – France and Italy

The birth rate for France is comparatively high at 1.89 births per woman. In 2030, France’s population will have grown by 8.1%. In that year there will be 753,000 twenty year olds preparing to enter the workforce, and 807,000 sixty year olds preparing to leave it.

The picture for Italy is drastically different. In 2030, there will be only 551,000 twenty year olds and 936,000 sixty year olds – a gap of almost 400,000 young people missing in the labour force. Can this gap be closed? In 2005, there were only

300,000 twenty-year-old women. Even if every one of these potential mothers could be convinced to give birth to one additional child, the numbers would still fail to match.

Demographic change has causes at many levels and affects countries in extremely long-term cycles. This makes it a notoriously difficult policy arena. Italy’s policy options to change the current situation expired in the 1980s. For all practical purposes, native demography may as well be accepted as fate.

# 'The German, Italian and Spanish mothers who could be giving birth to more children have themselves never been born.'

it is desirable. Nevertheless, comparison reveals that some countries manage the trade-off between Human Capital Productivity and Human Capital Utilisation significantly better than others (see Table 15). With the exception of Sweden and Finland, all other European countries must deal with declining Human Capital Productivity – largely by improving the quality of their economies' institutional framework. Changing poorly designed regulation, ceasing the protection of special interests and fixing poorly managed public institutions will allow all factor inputs – financial, natural and human capital – to be invested at higher levels of productivity.

## 5) Be open to immigration, especially of skilled workers

Poor demographic prospects will affect Germany, Italy and Spain most starkly. All other European economies will enjoy – either due to deliberate policy in the past or due to social and cultural advantages – a relatively benign situation. They can expect their overall human capital to be growing until well into the middle of the 21st century. On the other hand, Germany, Italy and Spain are virtually powerless in the face of native population decline. The German, Italian and Spanish mothers who could be giving birth to more children have themselves never been born. This leaves immigration as the most likely solution – and on a scale that is hard to imagine today, both in terms of the supply of suitable immigrants and the openness required from the host country. By 2030, can Germans or Italians learn to live in a society where every other 20-year-old is a foreigner?

## Quo Vadis Europe?

The prospect of widely diverging economic performances based on diverging results in human-capital development undermines what in the past has been a central premise and de facto *raison d'être* for European integration: the convergence of living standards between countries and among regions. Today, the integrationist response – more transfer payments from rich countries to poor regions, the harmonization of European social standards – has little chance of further success, given the palpable delay in further European integration in the wake of the “no” votes on the EU constitution. But it is equally difficult to imagine that past achievements like the free movement of capital and labour will be rolled back.

Perhaps it would be more productive to seek solutions to these challenges in the successful performance of countries that score well on the European Human Capital Index. For most of those countries, convergence in living standards has taken place not when Brussels decreed that it should occur, but when those countries (such as Netherlands or Finland) recognised their weaknesses and acted to address them. By encouraging competition among countries and regions to devise public-policy packages that promote the creation and utilisation of human capital and economic growth – and by making it easier for countries to use their own human capital and innovation to raise themselves out of seemingly intractable conditions – the EU can help the poorer economies catch up with the richer economies. It has been done successfully before. It can be done successfully again.

## A Note on Methodology

The analytical model deployed in this paper was developed by the German think tank Deutschland Denken! It measures human capital in terms of the cost of its creation. Formal education can be measured directly in terms of expenditures incurred – but informal education can only be indirectly inferred, in terms of opportunity cost to the parent or the adult who is engaging in informal education. This is done by assuming an opportunity cost for the time spent corresponding to the average net salary per hour received in that country in that time.

All data sources for modelling human capital trends have been derived from international data sources such as Eurostat, ILO or OECD. Even within the 13 countries analysed, data comparability is a significant problem. European data collection only began to be harmonized in the 1990s, and the process is still continuing. For instance, no officially agreed common definition of historical GDP for the EU 15 exists for the time before 1995. The data for expenditures for schooling, universities, time usage and employment patterns all suffer from various compatibility issues. The European Human Capital Index was built on the best data available.

The Human Capital Endowment referred to in this paper is the sum total of investment in five types of human capital development, including not only formal education but also, quite prominently, informal education of both children and adults. Each component is measured either in terms of direct expenditures or in terms of opportunity cost:

- 1) Parental education is measured in opportunity cost (lost wages) to the parent. This is especially high in the early years before formal schooling but continues until the children leave home. This type of education consists of essential cultural skills like speaking, trust, empathy, languages, taking responsibility, etc.
- 2) School education ranges from early childcare in formal settings such as kindergarten through primary and secondary school and consists of general skills such as reading, writing, quantitative reasoning, self-management and basic factual knowledge relevant to the economic participation in society. It is measured in terms of costs expended on teacher wages and educational facilities.

- 3) Investments in higher education refer to university and other tertiary education that is again measured in terms of input cost. It consists of the acquisition of sector-specific knowledge and skills that enable the student to participate in the discourse and mode of thinking of the chosen career.
- 4) Adult education is the formal and informal learning by adults and includes activities such as the employer-sponsored management course or the learning of a new software programme on one's own time. It is measured primarily in opportunity cost of lost wages. Unfortunately, transparency of this kind of human capital investment is much lower than for the categories listed above although a number of empirical studies exist.
- 5) Finally, adults re-invest in human capital when they perform their work. Every new technology, every new market requires investment into skills that may later produce returns. This type of human capital is also measured in opportunity cost.

The five component types of human capital differ in their respective longevity. Whereas the skills learnt as a child at home and in school can last a lifetime, those learnt on the job may become irrelevant after only a few years. As with every investment, the cost of investment must therefore be depreciated over time. Depreciation can occur in two ways: Either the skill has been forgotten over time, or it has become obsolete. In either case, its economic value has disappeared. The depreciation rates utilised in this analysis differ by the type of investment and are derived from observed patterns of either forgetting skills, or the speed at which skills become obsolete in different industrial sectors. Depreciation periods for parental education, school education, tertiary education, adult education and learning on the job are respectively: 40y, 30y, 20y, 10y and 10y. The maximum depreciation rates are respectively: 30%, 30%, 75%, 75% and 25%. Sensitivity analysis with these factors has shown that within relatively broad ranges of variation, the relative country results do not change significantly.

For more on the methodology, contact Peer Ederer at [peer.ederer@lisboncouncil.net](mailto:peer.ederer@lisboncouncil.net).

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