



RKW working paper

## **Development of an E-Training Programme on Productivity**

**Partner Report:  
*EUROPEAN UNION***

*April 2007*

**RKW**

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European Union  
 Source: CIA World Factbook 2007

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### **References**

***Long term productivity and competitiveness can only be achieved by countries and enterprises through "high road" strategies that are based on innovations, good work organization, consultation and participation, human resource development, social partnership and building the human and social capital essential to enhanced capacity to adapt to constantly changing market environment.***

ILO International Labour Organization:  
Productivity & Competitiveness Programme Mission Statement  
[\[http://www.ilo.org/dyn/empent/empent.portal?p\\_lang=EN&p\\_prog=M&p\\_subprog=PR\]](http://www.ilo.org/dyn/empent/empent.portal?p_lang=EN&p_prog=M&p_subprog=PR)

## **1 Introduction to European report**

As decided at 1<sup>st</sup> Euroductivity project meeting, besides the country reports a general report encompassing the whole Europe and regarding macro analysis of productivity problems in Europe should be prepared by RKW.

This comprehensive report summarizes some important aspects of productivity developments in the European Union [EU].

In the first two chapters we are giving basic information regarding EU and its history as well as geography, population, EU government and economy. Productivity developments in the EU are described in chapter 4 with special emphasis on the productivity comparison between EU and US economy.

Next we present - based on facts and figures published by European Central Bank [ECB] and the European Commission - selected macro-economic data on (labour) productivity growth in the EU and its member states. Special attention is given to productivity growth differences between groups of member states (chapter 6) followed by commentaries to methodological and empirical problems of measuring EU productivity (chapter 7) and a short list of important European organisations dealing with productivity.

## **2 History of the European Union**

Following the two World Wars of the first half of the 20th century, a number of European leaders in the late 1940s became convinced that the only way to establish a lasting peace was to unite the two chief belligerent nations - France and Germany - both economically and politically. In 1950, the French Foreign Minister Robert SCHUMAN proposed an eventual union of all Europe, the first step of which would be the integration of the coal and steel industries of Western Europe. The following year the European Coal and Steel Community (ECSC) was set up when six members, Belgium, France, West Germany, Italy, Luxembourg, and the Netherlands, signed the Treaty of Paris. The ECSC was so successful that within a few years the decision was made to integrate other parts of the countries economies. In 1957, the Treaties of Rome created the European Economic Community (EEC) and the European Atomic Energy Community (EURATOM), and the six member states undertook to eliminate trade barriers among themselves by forming a common market. In 1967, the institutions of all three communities were formally merged into the European Community (EC), creating a single Commission, a single Council of Ministers, and the European Parliament. Members of the European Parliament were initially selected by national parliaments, but in 1979 the first direct elections were undertaken and they have been held every five years since.

In 1973, the first enlargement of the EC took place with the addition of Denmark, Ireland, and the United Kingdom. The 1980s saw further membership expansion with Greece joining in 1981 and Spain and Portugal in 1986. The 1992 Treaty of Maastricht laid the basis for further forms of cooperation in foreign and defence policy, in judicial and internal affairs, and in the creation of an economic and monetary union - including a common currency. This further integration created the European Union (EU).

In 1995, Austria, Finland, and Sweden joined the EU, raising the membership total to 15. A new currency, the euro, was launched in world money markets on 1 January 1999; it became the unit of exchange for all of the EU states except the United Kingdom, Sweden, and Denmark. In 2002, citizens of the 12 euro-area countries began using the euro banknotes and coins. Ten new countries joined the EU in 2004 - Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia - and in 2007 Bulgaria and Romania joined, bringing the current membership to 27. In order to ensure that the EU can continue to function efficiently with an expanded membership, the Treaty of Nice (in force as of 1 February 2003) set forth rules streamlining the size and procedures of EU institutions. An EU Constitutional Treaty, signed in Rome on 29 October 2004, gave member states two years to ratify the document before it was scheduled to take effect on 1 November 2006. Referenda held in France and the Netherlands in May-June 2005 rejected the proposed constitution. This development set back the ratification effort and left the longer-term political integration of the EU in limbo.

### 3 Basic information on Europe - geography, people, government, economy

Main source of the following information is the last update of CIA World Factbook (2007 edition, last update 8 March, 2007).

For more information see:

[http://europa.eu/index\\_en.htm](http://europa.eu/index_en.htm): This website can be used as a gateway to the European Union informing about what the European Union does (by subject) and how it works.

Under the heading "Europe - a never-ending journey" the European Commission delivers valuable information on European countries - not only for tourists [[http://www.visiteurope.com/ccm/portal/?nav\\_cat=128&lang=en\\_GL](http://www.visiteurope.com/ccm/portal/?nav_cat=128&lang=en_GL)]

[http://europa.eu/scadplus/glossary/index\\_en.htm](http://europa.eu/scadplus/glossary/index_en.htm) is a glossary containing 233 terms relating to European integration and the institutions and activities of the EU. It is updated regularly and includes all the changes brought about by the Treaty of Nice as well as the changes provided for in the European Constitution currently being ratified.

#### ***Geographic information***

The European Union is located between the North Atlantic Ocean in the west and Russia, Belarus, and Ukraine to the east.

Total area is 4 324 782 sq km

Land boundaries Albania 282 km, Andorra 120,3 km, Belarus 1 050 km, Croatia 999 km, Liechtenstein 34,9 km, Macedonia 394 km, Moldova 450 km, Monaco 4,4 km, Norway 2 348 km, Russia 2 257 km, San Marino 39 km, Serbia 945 km, Switzerland 1 811 km, Turkey 446 km, Ukraine 1 257 km

Natural resources: iron ore, natural gas, petroleum, coal, copper, lead, zinc, bauxite, uranium, potash, salt, hydropower, arable land, timber, fish.

Environment agreements: *participate in*: Air Pollution, Air Pollution-Nitrogen Oxides, Air Pollution-Persistent Organic Pollutants, Air Pollution-Sulphur 94, Antarctic-Marine Living Resources, Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Desertification, Hazardous Wastes, Law of the Sea, Ozone Layer Protection, Tropical Timber 82, Tropical Timber 94

*signed but not ratified*: Air Pollution-Volatile Organic Compounds

## **People**

Total: 486 642 177 (July 2006 est.)

Age structure:

*0-14 years:* 16 % (male 37 608 010 / female 35 632 351)

*15-64 years:* 67, 2% (male 154 439 536 / female 152 479 619)

*65 years and over:* 16, 8% (male 31 515 921 / female 45 277 821)  
(2006 est.)

Population growth rate: 0, 15% (2006 est.)

Birth rate: 10 births / 1 000 population (2006 est.)

Death rate: 10, 1 deaths / 1 000 population (2006 est.)

Net migration rate: 1, 5 migrant(s) / 1 000 population (2006 est.)

Life expectancy at birth:

*total population:* 78, 3 years

*male:* 75, 1 years

*female:* 81, 6 years (2006 est.)

Total fertility rate: 1, 47 children born / woman (2006 est.)

Religions: Roman Catholic, Protestant, Orthodox, Muslim, Jewish

Language: Bulgarian, Czech, Danish, Dutch, English, Estonian, Finnish, French, Gaelic, German, Greek, Hungarian, Italian, Latvian, Lithuanian, Maltese, Polish, Portuguese, Romanian, Slovak, Slovene, Spanish, Swedish

## **Government**

Union name:

*Conventional long form:* European Union

*Abbreviation:* EU

Political structure: a hybrid intergovernmental and supranational organization

The capital is Brussels (Belgium). The Council of the European Union meets in Brussels, the European Parliament meets in Brussels and Strasbourg (France) and the Court of Justice of the European Communities meets in Luxembourg.

Member states:

27 countries: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, UK; note - Canary Islands (Spain), Azores and Madeira (Portugal), French Guyana, Guadeloupe, Martinique, and Reunion (France) are sometimes listed separately even though they are legally a part of Spain, Portugal, and France; candidate countries: Croatia, Macedonia, Turkey

Independence: 7 February 1992 (Maastricht Treaty signed establishing the EU); 1 November 1993 (Maastricht Treaty entered into force)

Constitution: based on a series of treaties: the Treaty of Paris, which set up the European Coal and Steel Community (ECSC) in 1951; the Treaties of Rome, which set up the European Economic Community (EEC) and the European Atomic Energy Community (Euratom) in 1957; the Single European Act in 1986; the Treaty on European Union (Maastricht) in 1992; the Treaty of Amsterdam in 1997; and the Treaty of Nice in 2003; note - a new draft Constitutional Treaty, signed on 29 October 2004 in Rome, gave member states two years for ratification either by parliamentary vote or national referendum before it was scheduled to take effect on 1 November 2006; defeat in French and Dutch referenda in May-June 2005 dealt a severe setback to the ratification process, though it has continued more slowly with Finland ratifying in December 2006; as of January 2007, 18 countries have ratified the Constitutional Treaty; Germany has made revival of the EU Constitution a goal of its EU Presidency in 2007

Executive branch:

*chief of union:* President of the European Commission Jose Manuel DURAO BARROSO (since 22 November 2004)

*cabinet:* European Commission (composed of 27 members, one from each member country; each commissioner responsible for one or more policy areas)

*elections:* the president of the European Commission is designated by member governments and is confirmed by the European Parliament; working from member state recommendations, the Commission president then assembles a "college" of Commission members; the European Parliament confirms the entire Commission for a five-year term; the last confirmation process was held 18 November 2004 (next to be held in 2009)

*election results:* European Parliament approved the European Commission by an approval vote of 449 to 149 with 82 abstentions.

### Legislative branch:

Council of the European Union (27 member-state ministers having 345 votes; the number of votes is roughly proportional to member-states' population); note - the Council is the main decision-making body of the EU; European Parliament (785 seats (as of 1 January 2007); seats allocated among member states by proportion to population); members elected by direct universal suffrage for a five-year term.

*Elections:* last held 10-13 June 2004 (next to be held June 2009)

### Judicial branch:

Court of Justice of the European Communities (ensures that the treaties are interpreted and applied uniformly throughout the EU; resolve constitutional issues among the EU institutions) - 27 justices (one from each member state) appointed for a six-year term; note - for the sake of efficiency, the court can sit with 13 justices known as the "Grand Chamber"; Court of First Instance - 27 justices appointed for a six-year term.

## ***Economy***

Economic overview: Internally, the European Union attempts to lower trade barriers, adopt a common currency, and move toward convergence of living standards. Internationally, the EU aims to bolster Europe's trade position and its political and economic power. Because of the great differences in per capita income among member states (from € 6 000 to € 45 000) and historic national animosities, the European Union faces difficulties in devising and enforcing common policies. For example, since 2003 Germany and France have flouted the member states' treaty obligation to prevent their national budgets from running more than a 3% deficit. In 2004 and 2007, the EU admitted 10 and two countries, respectively, that are, in general, less advanced technologically and economically than the other 15. Twelve established EU member states introduced the euro as their common currency on 1 January 1999, but the UK, Sweden, and Denmark chose not to participate. Of the 12 most recent member states, only Slovenia has adopted the euro (1 January 2007); the remaining eleven are legally required to adopt the currency upon meeting EU's fiscal and monetary convergence criteria.

GDP (purchasing power parity): € 9 542 billion (2006 est.)

GDP (official exchange rate): € 10 227 billion (2006 est.)

GDP (real growth rate): 2, 8% (2006 est.)

GDP (per capita, PPP): € 21 888 (2006 est.)

GDP (composition by sector):

*agriculture:* 2,1% - *industry:* 27, 3% - *services:* 70,5% (2006 est.)

Labour force: 222, 7 million (2005 est.)

Labour force (by occupation):

*agriculture: 4,3% - industry: 27,2% - services: 67,1% (2002 est.)*

Unemployment rate: 8, 5% (2006 est.)

Household income or consumption by percentage share:

*lowest 10%: 2, 9% - highest 10%: 25, 4% (1995 est.)*

Inflation rate (consumer prices): 1, 8% (2006 est.)

Investment (gross fixed): 20,4% of GDP (2006 est.)

Industries: among the world's largest and most technologically advanced, the European Union industrial base includes: ferrous and non-ferrous metal production and processing, metal products, petroleum, coal, cement, chemicals, pharmaceuticals, aerospace, rail transportation equipment, passenger and commercial vehicles, construction equipment, industrial equipment, shipbuilding, electrical power equipment, machine tools and automated manufacturing systems, electronics and telecommunications equipment, fishing, food and beverage processing, furniture, paper, textiles, tourism

Industrial production growth rate: 2, 6% (2006 est.)

Exports: € 1000 billion (2006 est.)

Exports - commodities: machinery, motor vehicles, aircraft, plastics, pharmaceuticals and other chemicals, fuels, iron and steel, nonferrous metals, wood pulp and paper products, textiles, meat, dairy products, fish, alcoholic beverages.

Export - partners: US 23, 3%; Switzerland 7, 6%; Russia 5, 2%;China 4, 8%

Imports: € 1 090 billion (2006 est.)

Imports - commodities machinery, vehicles, aircraft, plastics, crude oil, chemicals, textiles, metals, foodstuffs, clothing

Imports - partners: US 13, 8%; China 13,4%; Russia 8,2%; Japan 6,2% (2005)

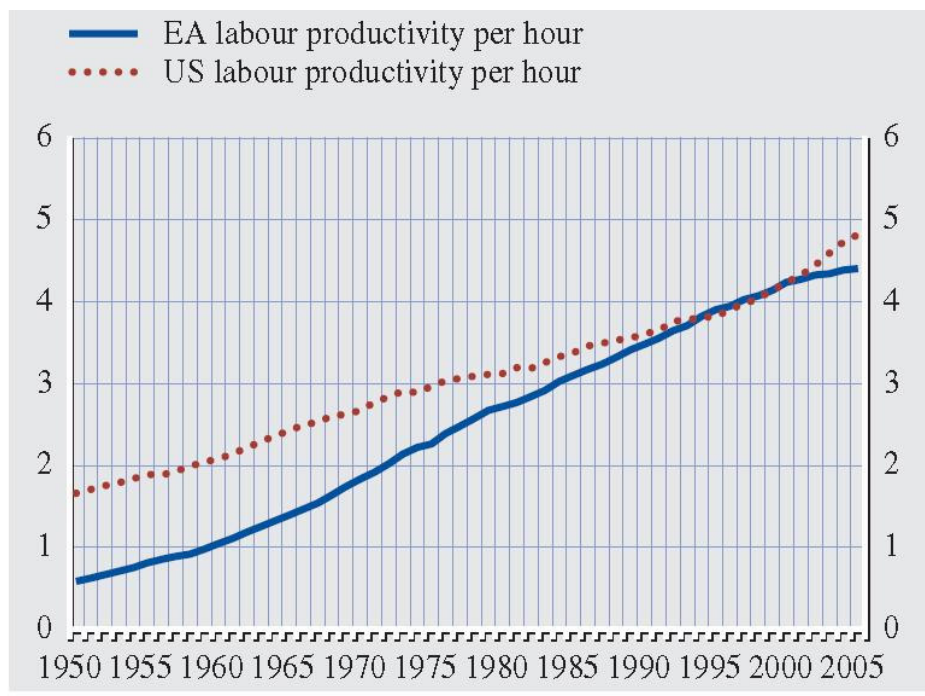
## 4 Productivity developments in the European Union

Productivity gains are a key factor driving long-term economic growth and increases in living standards. In the short to medium term, productivity also affects business cycle developments, inflation, exchange rates and other key macroeconomic variables, such as consumption, investment and employment. In this respect, the productivity growth performance of the euro area raises questions regarding the sources of economic growth in the euro area and directly impacts the environment for monetary policy.

### Productivity in relation to the United States

Developments in euro area productivity growth since the second half of the 1990s have been disappointing. Euro area labour productivity growth (as measured by real GDP per hour worked) declined from an average of 2.1% in the period 1990-1995 to only 1.2% in the period 1996-2005. At the same time, productivity growth in the United States increased strongly, from 1.3% in 1990-1995 to 2.1% in 1996-2005. As a result, following decades of stronger gains in the euro area than in the US, productivity growth in the euro area has fallen behind that in the US in recent years. More recently, in the first half of 2006, productivity growth in the euro area has gained some momentum. However, these more recent positive signs may be to a large extent a cyclical phenomenon and only developments over the course of the next few years will allow for a proper assessment of whether these recent improvements are sustainable. (ECB 2006:5)

**Figure 1: Labour productivity growth**



*Source: Gomez-Salvador et al. 2006, p.12*

## **Reasons for decreased productivity growth and prospects for future growth rates in European countries**

First, the overall assessment that there has been a decline in euro area labour productivity growth is independent of whether labour productivity is measured per person employed or per hour worked. Furthermore, the decline was experienced by most euro area countries. Second, the decline in labour productivity growth resulted from both lower capital deepening and lower total factor productivity (TFP) growth. The former can partly be associated with the robust pace of job creation since the mid-1990s, while the latter might be partly explained by higher utilisation of lowskilled workers. The slowdown in both capital deepening and TFP (Total Factor Productivity) growth appears to be widespread across euro area countries. Third, from a sectoral perspective, industries not producing or using intensively information and communication technology (ICT) would appear mostly responsible for the decline in average labour productivity growth in the euro area since the mid-1990s.

Moreover, the comparison of recent euro area developments with those of the US shows that, while the slowdown in labour productivity growth would appear to be related to strong employment growth, particularly in low-skilled jobs, there has been a lack of productivity enhancing use of new technologies in the euro area. The acceleration of US productivity in recent years is generally associated for a significant part with the production and use of ICT, which spurred output per hour worked through significant capital deepening and higher TFP growth. The euro area economy seems to have benefited much less from these factors, reflecting both lower investment in ICT compared with the US and barriers to the diffusion or appropriate use of new technologies, in particular in the services sector. Diverging trends in labour productivity growth between the euro area and the US in recent years mainly reflect developments in a number of specific ICT-using services such as retail, wholesale and some financial services where strong gains were registered in the US. (ECB 2006:5)

Timmer, Ypma and van Ark (2003, p. 1) found that “differences in the direct effects of IT almost fully explain the US lead in labour productivity growth over the EU aggregate over the period 1995-2001. However differences in the direct effects of IT are by no means the sole determinants of the widening of the “Atlantic Divide”, neither the main cause of divergent labour productivity growth patterns within Europe. Non-IT capital deepening and non-IT TFP growth were major contributors to continued or even accelerating growth in small economies such as Austria, Finland, Greece, Ireland, Portugal and Sweden. In Finland, Sweden and especially Ireland this was augmented by high contributions from IT, which were even higher than in the US. At the same time, decelerating labour productivity growth in major European countries such as France, Germany, Italy and the UK was mainly due to declining contributions of non-IT capital deepening and non-IT TFP growth compared to the period 1980-1995.”

On the other hand a strong average productivity increase can be observed since data of first and second quarter 2006 have been available:

The European Commission's recent interim economic forecast (see press release 16 February 2007) states, that economic growth in the European Union "is set to stay at a brisk pace in 2007 with growth seen at 2.7% in the EU and 2.4% in the euro area in the European Commission's interim forecast. This is +0.3 percentage point above the autumn forecast for both areas. 2006 was a remarkable year, with growth driven by domestic demand thanks to an improved labour market situation (3 million jobs created of which 2 million in the euro area). This allowed the EU economy to weather energy prices that reached record levels in the summer, tighter monetary conditions and a slowdown in the United States. Such developments bode well for 2007. On the inflation front, while higher energy costs pushed up consumer prices to 2.2% last year in both the EU and the euro area, inflation is expected to decline to 1.8% in 2007 in the euro area (2.0% in the EU) on the back of lower oil prices and a relatively limited impact of the German VAT hike." (European Commission 2007) In addition, the European Commission expects increasing average labour productivity.

According to Eric Chaney, Morgan Stanley's chief economist for Europe, "productivity per worker in the business sector, which grew on average by 0.7% from 1999 to 2005 on OECD estimates, reached 2.0% (annualised rate) in the first half of this year [2006], peaking at 2.4% in the second quarter." (Chaney 2006) Even if there are cyclical and therefore temporary dimensions of these productivity gains in the European Monetary Union another and more fundamental reason for the acceleration of productivity can be identified: a "combination of accelerating corporate restructuring due to globalisation and consistent investment in information technology by European companies" (Chaney 2006).

Seemingly the EU - US productivity gap is not a constant but a varying factor which strongly depends on the level of using ICT as many observers state (cf. Eicher&Roehn 2007: Gomez-Salvador et al. 2006). Slow US productivity values in the 1990 years have been caused by a so called productivity paradox: Despite high level production and utilization of ICT (high ICT investment rates) productivity did not develop appropriately. Main reason seems to have been the lack of experience with intensive ICT application at company level (causing technological, organisational and skill related problems) with resulting slow productivity growth rates. Since the second half of the 1990 years this mode of productivity development has changed. Regarding ICT-using industries in the United States Sibert (2006) claims they "did not become more productive by simply investing in ICT technology. Instead, these investments were combined with significant changes in the way that these industries did business". Why should European countries not follow this development path thus catching-up with US productivity [cf. Chaney 2006]?

## 5 EUROPEAN UNION: Selected basic macro-economic data

While productivity growth was broadly unchanged between the 1980s and the first half of the 1990s, both in the euro area and the US, a substantial change can be observed in the second half of the 1990s.

**Table 1: Labour productivity growth in the euro area and the US**

Table 1 Labour productivity growth in the euro area and the US								
(whole economy, annual average percentage changes)								
	GDP per employed person				GDP per hour worked			
	1981-90	1991-95	1996-00	2001-05	1981-90	1991-95	1996-00	2001-05
US	1.4	1.3	2.3	1.9	1.5	1.1	2.1	2.6
<b>Euro area</b>	<b>1.8</b>	<b>1.9</b>	<b>1.3</b>	<b>0.5</b>	<b>2.5</b>	<b>2.3</b>	<b>1.7</b>	<b>0.7</b>
BE	1.7	1.6	1.4	1.0	1.9	2.3	1.6	1.3
DE	1.8	2.6	1.8	0.9	2.7	2.9	2.5	1.2
GR	0.6	0.7	2.0	2.8	1.1	0.6	2.1	2.9
ES	2.3	2.2	-0.2	-0.8	3.3	2.3	-0.2	-0.6
FR	2.1	1.5	1.5	1.1	2.9	1.7	2.1	1.9
IE	3.6	2.6	3.9	2.5	3.8	3.5	5.6	3.0
IT	1.7	1.8	0.9	-0.6	2.0	2.3	0.9	-0.2
LU	2.7	1.2	2.8	0.0	3.3	2.1	2.9	1.1
NL	0.9	0.6	0.4	0.6	2.0	1.4	0.4	0.8
AT	1.9	1.1	2.9	1.5	2.4	2.7	3.3	1.9
PT	1.5	2.2	2.1	0.3	1.8	2.8	3.4	0.2
FI	2.6	2.9	2.3	1.4	3.1	2.8	2.6	1.5

Sources: ECB calculations based on data from the Groningen Growth and Development Centre and the Conference Board (Total Economy Database, May 2006, <http://www.ggdcc.net>).

Source: Gomez- Salvador et al. 2006, p. 10

In the euro area, average productivity growth (per hour worked) declined to 1.7% in the period 1996-2000 and further to 0.7% on average in the period 2001- 2005.

This is clearly lower than the 2.5% and 2.3% recorded respectively in the 1980s and in the first half of the 1990s. By contrast, in the US, growth in productivity per hour worked rose to an average of 2.1% in the period 1996- 2000 and to 2.6% over the period 2001-2005, a level of growth clearly above that experienced in the past. This rise in the US may partly reflect cyclical factors, but the apparent resilience of productivity growth during the past downturn and the significant further pick-up over the last two years tends to support the widespread view that the mid-1990s marked a structural improvement in US productivity growth. As a consequence, euro area labour productivity growth per hour worked fell in recent years clearly behind that in the US – for the first time in several decades. Clearly the assessment that productivity growth in the euro area has fallen behind that in the US since the mid-1990s is independent of the way labour productivity growth is measured.

The impressive productivity performance of the US economy since the second half of the 1990s and the view that the introduction and diffusion of ICT may have led to sustained higher productivity growth there.

The euro area economy seems to have benefited much less from this factor. Instead, euro area productivity growth slowed down and fell behind that in the US over this time period. (ECB 2006:9)

**Table 2: Annual labour productivity growth, EU-15 and US**

	<b>EU-15</b>			<b>US</b>		
	1979-90	1990-95	1995-01	1979-90	1990-95	1995-01
<b>Total Economy</b>	<b>2.2</b>	<b>2.3</b>	<b>1.7</b>	<b>1.4</b>	<b>1.1</b>	<b>2.3</b>
<b>Agriculture, Forestry and Fishing</b>	5.2	4.8	3.3	6.4	1.7	9.1
<b>Mining and quarrying</b>	2.9	13.1	3.5	4.4	5.1	-0.2
<b>Manufacturing</b>	3.4	3.5	2.3	3.4	3.6	3.8
<b>Electricity, gas and water supply</b>	2.7	3.6	5.7	1.1	1.8	0.1
<b>Construction</b>	1.6	0.8	0.7	-0.8	0.4	-0.3
<b>Distributive trades</b>	1.3	1.9	1.0	1.8	1.5	5.1
<b>Transport</b>	2.8	3.8	2.3	3.9	2.2	2.6
<b>Communications</b>	5.2	6.2	8.9	1.4	2.4	6.9
<b>Financial Services</b>	2.2	1.0	2.8	-0.7	1.7	5.2
<b>Business Services*</b>	0.7	0.7	0.3	0.1	0.0	0.0
<b>Other community, Social and Personal Services</b>	-0.3	0.4	0.3	1.2	0.9	-0.4
<b>Public Administration, Education and Health</b>	0.6	1.1	0.8	-0.4	-0.8	-0.6

\* Includes real estate

*Source: O' Mahony & van Ark 2003, p. 29*

It is also interesting to examine the contributions of various member states to the overall EU growth by multiplying each country's respective growth rates by its share in EU employment. It can be seen that the major contributors to EU labour productivity growth in the 1980s are Germany, France, the UK and Italy. By the end of the 1990s, the slowdown can be seen to be chiefly the result of the decline in all of these large nations, excepting the UK. Many of the smaller EU-15 nations have seen modest reductions over this period, and a number of the Southern European nations have seen slight increases. But the fortunes of Germany and Italy in particular have had a large impact on the EU growth slowdown.

**Table 3: Contribution of member states to EU- 15 annual labour productivity growth 1979 - 2001**

	1979-1990	1990-1995	1995-2001
<b>Total economy</b>			
<b>Belgium</b>	0.08	0.09	0.03
<b>Denmark</b>	0.04	0.05	0.02
<b>Germany</b>	0.59	0.68	0.22
<b>Greece</b>	0.01	0.02	0.05
<b>Spain</b>	0.18	0.15	0.22
<b>France</b>	0.40	0.27	0.22
<b>Ireland</b>	0.02	0.04	0.10
<b>Italy</b>	0.27	0.36	0.18
<b>Luxembourg</b>	0.01	0.01	0.01
<b>Netherlands</b>	0.14	0.13	0.11
<b>Austria</b>	0.07	0.09	0.04
<b>Portugal</b>	0.02	0.02	0.04
<b>Finland</b>	0.05	-0.01	0.04
<b>Sweden</b>	0.06	0.03	0.06
<b>UK</b>	0.31	0.38	0.39
<b>EU-15</b>	2.26	2.31	1.72

*Source: O' Mahony & van Ark 2003, p. 30*

## 6 Productivity differences among European Union member countries

European Union's productivity growth rates are the sum of weighted productivity growth rates achieved in the member states' economies. Much more space would be needed to investigate the details lying behind the national productivity differences. We confine this part of the report to the remarkably high productivity growth rates of the Nordic States in contrast to France, Germany, Italy and Spain.

### New vs. old member states

But first we would like to pinpoint a general requirement of productivity comparisons - taking into account the growth rate differences between "mature" and "catching-up" economies. As can be seen in table 4 of van Ark (2005, p. 7) some of the new EU member states outperform all other economies and also the US economy; this is true especially for the Baltic member states, but also for Poland, the Czech Republic and Slovakia. This is a quite "natural" process with decreasing productivity growth rates to be expected if the catching-up economies will have achieved a "mature" economic status with a high productivity base line

**Table 4: Growth Rates of Per Capita Income and Labour Productivity Growth, 1980 - 2003**

	<i>GDP per capita</i>				<i>GDP per hour worked</i>			
	1980-1995	1990-1995	1995-2003	of which 2000-2003	1980-1995	1990-1995	1995-2003	of which 2000-2003
<b>European Union (EU-15, present)(a)</b>	1.7	1.0	1.9	1.0	2.3	2.3	1.5	1.0
Austria	1.8	1.2	1.8	0.8	1.7	1.8	2.5	1.4
Belgium	1.6	1.3	1.8	0.6	2.0	2.3	1.7	0.0
Denmark	1.8	1.6	1.7	0.7	2.6	2.4	1.7	1.2
Finland	1.3	-1.4	3.4	1.5	2.7	2.6	2.8	2.4
France	1.4	0.6	1.7	0.8	2.4	1.4	2.1	1.5
Germany	1.6	1.0	1.1	0.2	2.6	2.7	1.9	1.2
Greece	0.9	0.6	3.5	3.9	0.9	0.6	2.6	2.9
Ireland	3.6	4.1	6.9	4.0	3.7	3.6	5.4	4.6
Italy	1.8	1.1	1.3	0.6	2.1	2.3	0.6	-0.4
Luxembourg	3.5	2.5	3.8	1.0	2.9	2.3	1.2	-1.1
Netherlands	1.8	1.1	1.3	0.6	2.1	2.3	0.6	-0.4
Portugal	2.5	1.6	2.1	-0.2	2.5	3.6	1.6	0.3
Spain	2.3	1.3	3.2	2.3	3.0	2.3	-0.2	-0.1
Sweden	1.2	0.1	2.4	1.3	1.4	2.0	2.3	2.2
U.K.	2.1	1.3	2.3	1.7	2.4	2.9	2.0	1.9
<b>European Union (EU-10, new)(b)</b>	--	--	3.8	3.1	--	--	4.3	4.8
Cyprus	--	--	2.7	2.1	--	--	1.9	0.9
Czech Republic	--	--	1.8	2.7	--	--	2.9	4.5
Estonia	--	--	6.6	7.0	--	--	7.3	7.1
Hungary	--	--	4.1	3.7	--	--	2.7	3.2
Latvia	--	--	7.0	8.1	--	--	6.1	7.5
Lithuania	--	--	5.6	7.7	--	--	7.7	13.0
Malta	--	--	2.0	-1.0	--	--	1.9	-0.7
Poland	--	--	3.9	2.1	--	--	4.9	4.4
Slovakia	--	--	3.7	3.9	--	--	4.9	6.7
Slovenia	--	--	3.6	2.8	--	--	3.1	2.7
<b>European Union (EU-25, enlarged)(c)</b>	--	--	2.1	1.2	--	--	1.9	1.5
<b>United States</b>	1.9	1.2	2.2	0.9	1.3	1.1	2.4	2.9
<b>Japan</b>	2.7	1.2	1.0	0.8	2.6	1.9	2.2	2.0
<b>Other OECD members</b>	1.8	1.5	2.3	1.4	1.2	0.9	2.2	2.0
<b>China<sup>d</sup></b>	6.3	7.4	6.6	7.7	4.9	6.5	6.3	7.1

a) referring to membership of the European Union until 30 April 2004; b) referring to new membership of the European Union as of 1 May 2004

c) referring to all members of the European Union as of 1 May 2004 (see Table 2); d) productivity in China is in terms of GDP per person employed

Source: TCB/GGDC Total Economy Database ([www.ggdc.net/dseries](http://www.ggdc.net/dseries)), based on OECD National Accounts and Labour Force Statistics

## The northern European countries

This chapter analyses the differences in hourly labour productivity growth rates and levels between the Nordic EU countries (Denmark, Finland and Sweden) and four larger euro area countries (Germany, France, Italy and Spain).

Since the mid-1990s, the Nordic EU countries, particularly Sweden and Finland, have experienced stronger hourly labour productivity growth than the larger euro area countries. Combined with a high level of labour utilisation, this has resulted in a “structural” labour productivity level that is relatively high compared with some of those larger euro area countries. As has also been the case in the United States, innovation and technological changes have played a major role in raising labour productivity growth in the Nordic EU countries.

**Table 5: Labour productivity growth per hour worked**

(average annual % change)				
	1980-1989	1990-1995	1996-2000	2001-2004
Germany	2.4	2.9	2.3	1.3
Spain	3.7	2.2	-0.3	0.3
France	2.9	1.5	1.7	1.9
Italy	2.0	2.0	0.9	-0.2
Finland	2.9	2.5	2.8	2.2
Euro area	2.4	2.1	1.5	0.9
Denmark	2.2	2.2	1.6	1.9
Sweden	1.1	1.9	2.4	2.4
United Kingdom	2.2	2.5	2.1	2.0
United States	1.3	1.2	2.1	2.9

Source: GGDC.  
Note: Prior to 1990, data for Germany (and the euro area) refer to West Germany.

**Source: Annenkov & Madaschi 2005, p. 7**

In Denmark ICT and non-ICT capital deepening have been the main contributors to hourly labour productivity growth. While TFP growth has played a smaller role than in the two other Nordic EU countries, the contributions of both ICT and non-ICT capital deepening to labour productivity growth have been much higher than in the larger euro area countries.

In Sweden hourly labour productivity growth has been mainly driven by the contribution of TFP and, to a lesser extent, ICT capital deepening. The stronger labour productivity growth patterns compared with the larger euro area countries have mainly been driven by the relatively high TFP and ICT capital deepening contributions to aggregate labour productivity growth, with a high contribution of the ICT-using service sectors. The ICT-producing manufacturing sector has also contributed to widening the labour productivity gap with the larger euro area countries.

In Finland the relatively high hourly labour productivity growth compared with the larger euro area countries is mainly a result of the high contribution of TFP growth and, at the sectoral level, the high contribution of the ICT-producing manufacturing sectors. The hourly labour productivity growth observed in the ICT-using service sectors has also contributed to raising labour productivity growth relative to the larger euro area countries.

Looking ahead, and given the need to further increase the level of labour resource utilisation in the larger euro area countries, the gap in labour productivity growth between the larger euro area countries and the Nordic EU countries may widen further, unless appropriate structural reforms take place in the euro area. In this respect, the experience of the Nordic EU countries provides some useful insights and lessons. (Annenkov & Madaschi 2005:6)

## **7 Some methodological and empirical problems of measuring [EU] productivity**

The measuring problems connected with productivity are paramount and have a long history. In his introduction to Kendrick (1961) Solomon Fabricant, the then Director of Research at US National Bureau of Economic Research, starts by saying productivity is a subject "surrounded by considerable confusion". Up to now the problems of definition and measurement / measurability of input and output factors are basically the same: The most widely used productivity index is physical output per hour worked which is a useful index in case of labour being by far the most important type of input. But "the bias in output per man-hour results not only from the omission of capital input. The usual index of output per man-hour fails also to take into account change in the composition or quality of labour" (Fabricant 1961, p.XL) - a problem that is today subject of intensive research (cf. EU funded KLEMS project). On the output side there is the same problem: "A general deficiency of all measures of output - and thus of productivity - is their failure to take adequate account of change in the quality of output." (Fabricant 1961, p. XLII) In general, the problem of partial productivities which are used to approximate "real" productivity is not at all solved sufficiently.

One of the many measurement and interpretation problems occurs if one takes GDP per capita (or per hour worked) as productivity measure (see table "Growth rates per capita income and labour productivity growth, 1980-2003" on p. 19 of this report). MIT professor Olivier Blanchard (EurActiv 2004) argues that productivity in Europe was about 30% lower than in the US in 1970. Today "the productivity gap has nearly entirely been made up." But how "can GDP still be lower per person although productivity has nearly caught up with US levels? The answer is simple: what has declined are the hours worked per person." Rather than getting the benefits of increased productivity in the form of higher income many Europeans have chosen more free time. "We cannot have everything at the same time. If we opt for more leisure, then we have to be aware that the standard of living will be lower." But the conclusion is in a certain sense misleading as reduced working times [unemployment and early retirement are only a smaller part of the phenomenon] may be an accepted

form of high standards of living [for a more critical position see Richter 2003]. In this context the historical development of working time, productivity and GDP in Germany confirms the trade-off between working time and income which has been made possible by high and steady productivity growth rates:

***Working time, productivity per hour worked and GDP in Germany (1870-1992)***

working time	- 47 %
productivity per hour worked	+ 1735 %
GDP per capita	+ 998 %

**Source: A. Maddison, *L'Economie Mondiale 1820-1992*. Paris: OECD, 1995**

(cited in G. Bosch, Das Ende von Arbeitszeitverkürzungen? In: WSI Mitteilungen Nr. 6, 1998)

The OECD manual (2001, p. 12-13) presents theoretical foundations to productivity measurement at countries level, covers implementation and measurement issues, gives empirical examples and discusses interpretation and use of productivity measures. It is a readable, comprehensive work which can be used as basis literature on productivity issues. It differentiates

- single factor productivity measures vs. multifactor productivity measures
- output measures (gross output vs. value-added)
- input measures (labour, capital, and intermediate input)

We present only the main types of productivity measures as proposed by OECD:

**Table 6: Overview of main productivity measures**

<i>Type of output measure</i>	<i>Type of input measure</i>			
	<i>Labour</i>	<i>Capital</i>	<i>Capital and labour</i>	<i>Capital, labour and intermediate inputs (energy, materials, services)</i>
<i>Gross output</i>	Labour productivity (based on gross output)	Capital productivity (based on gross output)	Capital-labour MFP (based on gross output)	KLEMS multifactor productivity
<i>Value added</i>	Labour productivity (based on value added)	Capital productivity (based on value added)	Capital-labour MFP (based on value added)	-
	<i>Single factor productivity measures</i>		<i>Multifactor productivity (MFP) measures</i>	

**Source: OECD 2001, p. 12-13**

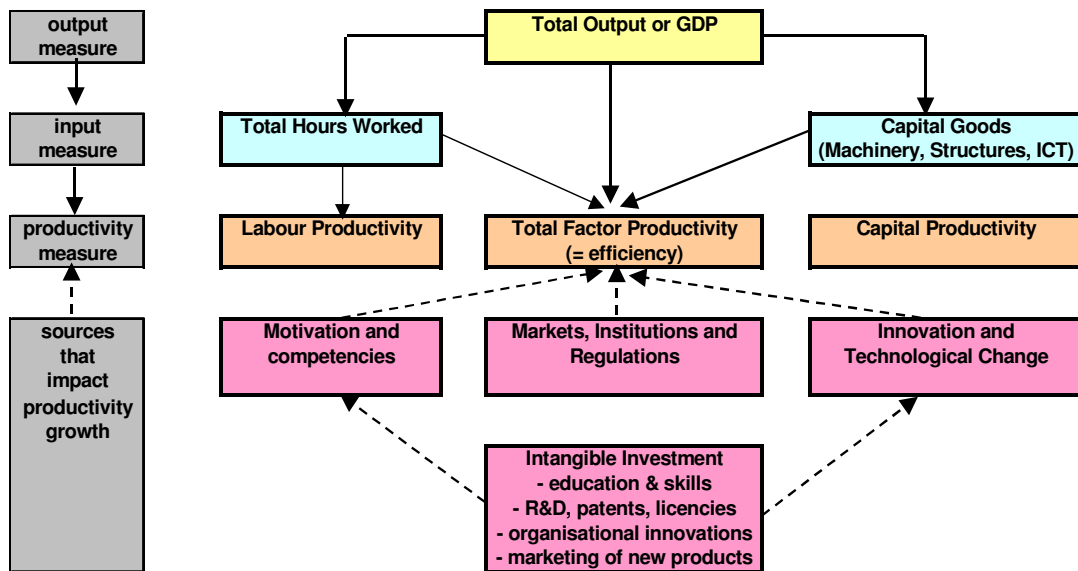
This table is restricted to the most frequent used productivity measures. [KLEMS stands for capital, labour, energy, materials.] Thus a further problem of productivity measurement has to be mentioned - the use of measurement methods depending on data availability and not so much on theoretically and conceptually based considerations.

This problem marks one of the starting points of EU funded KLEMS research project (2004-2007). Its purpose is to create a database on productivity by industry for EU member states with a breakdown into contributions from capital (K), labour (L), energy (E), materials (M) and service inputs (S). [<http://www.euklems.net/>]



## Productivity is the Key Variable of Economic Performance

*Measures of Productivity, Input Variables and Sources of Growth*



## 8 Important European Organisations dealing with productivity

### European Commission, Eurostat

Eurostat is a service unit of the European Commission. Its mission is to provide the European Union with a high-quality statistical information service.

[[http://epp.eurostat.ec.europa.eu/portal/page?\\_pageid=1090\\_30070682\\_1090\\_33076576&\\_dad=portal&\\_schema=PORTAL](http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1090_30070682_1090_33076576&_dad=portal&_schema=PORTAL)]

Eurostat has developed a shortlist of 14 structural indicators. Under “General Economic Background” two measures are of interest: **GDP per capita** (in PPP) and **Labour productivity** covering defined countries and data categories:

GEOGRAPHICAL AREA	EU-Member States, Euro-zone, EU-25, EU-15, US, Japan, Norway, Iceland; in part also for Candidate Countries
DATA CATEGORY	Key indicators on EU policy - Structural indicators -General Economic Background: <ul style="list-style-type: none"><li>- GDP per capita in Purchasing Power Standards (PPS)</li><li>- Real GDP growth rate</li><li>- Labour productivity per person employed</li><li>- Labour productivity per hour worked</li><li>- Unit labour cost growth</li></ul>

Source: Eurostat Structural Indicators -General Economic background (ecobac) -Eurostat Metadata in SDDS format: Base Page [ [http://europa.eu.int/estatref/info/sdds/en/strind/ecobac\\_gdp\\_base.htm](http://europa.eu.int/estatref/info/sdds/en/strind/ecobac_gdp_base.htm) ]

Chaney (2006) claims that productivity is measured poorly in Europe due to the poor performance of the European statistical system: “very few countries produce timely and reliable data on productivity per worker, not to mention productivity per hour. Don’t blame Eurostat for this woeful situation: this small EU Directorate cannot invent data that do not even exist at the national level of several large European economies.”

### ECB - European Central Bank

The European Central Bank (ECB) in Frankfurt am Main, Germany, is the central bank of the euro zone, in charge of monetary policy for the 12 countries that use the new euro currency. Regarding its economic research tasks ECB is to provide a strong conceptual and empirical basis for policy-making and to better communicate policy to the markets and the public. High-quality research is essential to ensure that the ECB is well equipped to cope with the unprecedented challenges associated with conducting a single monetary policy for a group of sovereign countries. The most important task of economic research within the Eurosystem is to increase knowledge of the functioning of the euro area economy and, more specifically, to provide models, tools and analyses relevant to the conduct of monetary policy and the fulfillment of other tasks of the Eurosystem.

[<http://www.ecb.de/home/html/index.en.html>]

Of specific interest are ECB publication - available as PDF files – like *ECB Working Papers* and *Occasional Paper Series*.

[\[http://www.ecb.de/pub/html/index.en.html\]](http://www.ecb.de/pub/html/index.en.html)

### **EANPC**

The European Association of National Productivity Centres was established in 1966 as a successor body to the European Productivity Agency. Its purpose is "to facilitate and increase exchanges of information and experiences, and arrange co-operation among participating bodies". Its seat is in Brussels. It works by individual members' contributions.

[\[www.eanpc.org\]](http://www.eanpc.org)

### **DIW Berlin - German Institute for Economic Research**

The German Institute for Economic Research is one of the leading research institutes in Germany. It is an independent, non-profit academic institution which is involved in basic research and policy advice. DIW Berlin was originally founded in 1925 as Institute for Business Cycle Research and was later renamed in German Institute for Economic Research. DIW Berlin presents its research results in science journals, within the scope of national and international scientific events as well as at workshops, symposia and colloquia. The research results provide a basis for the exchange of ideas among experts and other relevant groups. Current economic and structural data, forecasts and advices as well as services in the area of quantitative economics are provided to decision makers in economics and policy and the broad public.

[\[www.diw.de\]](http://www.diw.de)

### **OECD**

OECD Statistical Portal covers a productivity section which presents data (and data sources) regarding labour productivity and labour productivity growth: GDP, annual hours worked, total employment, total hours worked, GDP per hour worked. A second pillar is multi-factor productivity data. A specific strength of OECD productivity statistics are the publication of manuals and the presentation of sources and (measurement) methods.

[\[http://www.oecd.org/topicstatsportal/0,2647,en\\_2825\\_30453906\\_1\\_1\\_1\\_1\\_1,00.html\]](http://www.oecd.org/topicstatsportal/0,2647,en_2825_30453906_1_1_1_1_1,00.html)

## National Statistical Offices

Productivity related sources are to be found in many national statistical offices' print publications and websites (because of the important US – EU comparisons the US Bureau of Labour Statistics has been included).

Institution	Publication or link
Statistical Office of the Czech Republic	Gross-output based labour productivity by activity for mining, manufacturing and utility industries <i>Statistical Yearbook of the Czech Republic</i>
Statistics Finland	Value-added based labour productivity: <i>National Accounts of Finland</i> Labour productivity, capital productivity and MFP: <i>Annual publication [Productivity Report - Finnish language only]</i>
Statistisches Bundesamt (Germany)	Value-added based labour productivity (per employed person and per hours worked) by detailed mining and manufacturing industry Value-added based labour productivity (per employed person and per hour worked) by major activity <a href="http://statistik-bund.de/zeitreih/def.htm">http://statistik-bund.de/zeitreih/def.htm</a>
Hungarian Central Statistical Office	Gross-output based labour productivity Published in <i>Monthly Report of Industry; Monthly Bulletin of Statistics; Statistical Yearbook; Yearbook of Industry and Construction Statistics</i>
Central Statistical Office of Poland	Gross-output based labour productivity in selected primary industries <i>Statistical Yearbook</i>
Office of National Statistics (United Kingdom)	Value-added based labour productivity for total economy, "production" industries, and manufacturing industry <i>Economic Trends</i>
United States Bureau of Labour Statistics	Gross-output based labour productivity Value-added based labour productivity Gross-output based MFP Capital productivity International comparisons of manufacturing productivity <a href="http://stats.bls.gov/iprdata1.htm">http://stats.bls.gov/iprdata1.htm</a>

Source: OECD 2001, pp. 126-127

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