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Preliminary version

Innovation and Human Resources as a Key Factor in Strengthening Productivity in the European Union.

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Abstract

During the last ten years the EU experienced a rough slowdown of its own productivity. Such a decline has been mainly driven by the combined effect of three elements:

- a) an excessive focus on low and medium-low technologies industries;*
- b) an inability to seriously challenge the US' dominance in the domain of the high tech manufacturing sectors;*
- c) and finally its apparent slowness to exploit the productivity enhancing benefits of high tech sectors in a range of other sectors.*

The target of being the most competitive economy of the world (Lisbon strategy) and to close the economic gap with the US can be probably achieved with the help of two key factors, a stronger investment a) in the hi-tech innovation and, b) in the human capital.

At the moment, the average level of development of hi-technology and in the field of the life long learning, within the European Union, cannot be considered sufficient. According to the last Community Innovation Survey (CIS3), referred to the period 1998-2000, just 44% of the European enterprises had invested in some form of innovation activity. The range of the innovator enterprises swing between 28% of Greece and 61% of Germany. In 1999 the proportion of employees in enterprises providing CVT activities was around 87% of the total employment. Nevertheless, if we consider the percentage of employees who concretely took part in CVT courses, as a percentage of employees in training enterprises, the percentage falls down at 47%; 39% if compared with the overall employment. In fact, only 4 person over 10 are in the possibility to adapt their knowledge to the economic, technological and organization change.

We've to wonder whether in a continent that wants to be the first economy based on knowledge (like the Lisbon Agreement said) rates like these are acceptable.

One first question is: who must bear the costs of changing this situation and give a wider system of knowledge, capable of insuring that the flexicurity can operate in its own full effectiveness?

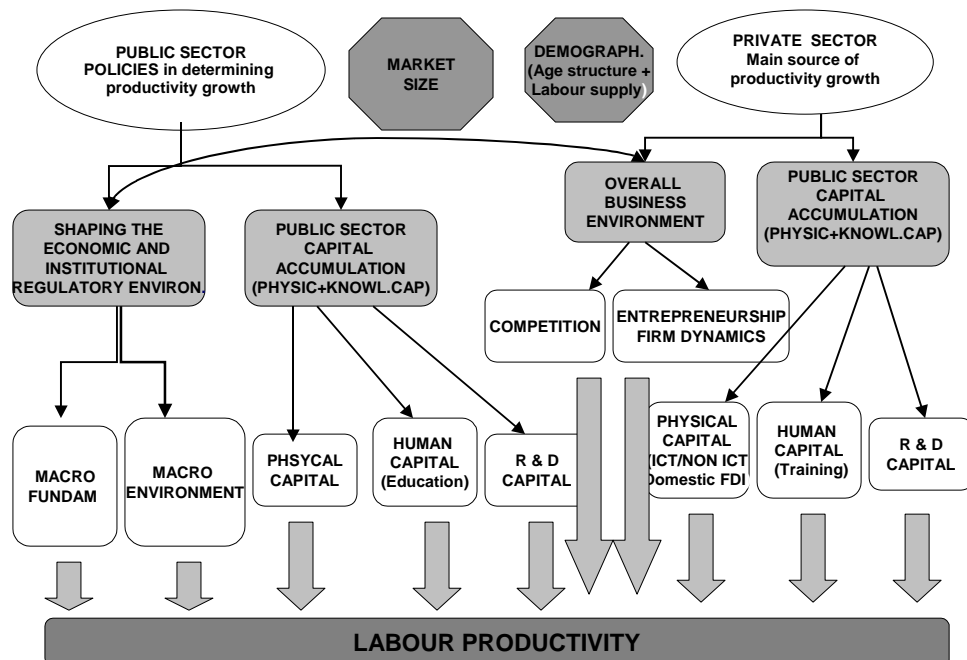
Secondly, can the Lisbon strategy process be considered sufficient in order to fill up the European shortage in productivity, innovation, human capital, etc?

For both questions, I'm afraid, the answer is: no. Also the ongoing review process, for instance, emphasizes the supply side only, without any adequate concern about the issues of the social cohesion and the ecological sustainability. In this framework it is rather difficult to found as strategic key factors of the Lisbon strategy the innovation and the human capital.

Productivity: The European Union gap

Before to analyse the productivity gap between the European Union and the United States let me stress some prominent factors which influence the labour productivity within an economic system: either the public and the private sector. Following the wide description used by Denis (Denis, C., et al. 2005) we can sketch the articulated scheme of the whole process (table 1).

Diagram 1. Main factors that influenced the labour productivity growth.



Source: Denis, C., Mc Morrow, K., Roger W., Veugelers, R., 2005

The Public sector has a crucial direct and indirect role to play:

- indirectly in terms of shaping the macroeconomic fundamentals (monetary stability; fiscal policy; trade openness) and providing adequate framework conditions (via regulatory regimes for the private sector to enhance productivity via well functioning product, labour and capital market);
- directly, in the form of financial support for the human capital development and for the public innovation system.

The other actor inside the economic system is – obviously - the **private sector**, the main source of the productivity growth. This actor with the public sector shapes the economic environment, the environment where the private sector operates. In such environment important factors are: a) the level of competition in the markets; b) the level of entrepreneurship and the dynamic of firms (entry and exit rules). Like the public sector, also the private sector plays a direct role financing the human capital development (training courses), and for the private innovation system, private R&D expenditure and introduction and diffusion of innovation technologies (Denis, C., et al. 2005).

In the last decade the European Union experienced a wide gap in the labour productivity if compared to United States. It could be interesting to analyse how this gap was realized comparing the EU and US data¹.

We can take three indexes of the productivity:

- Gross Domestic Product (GDP) per capita: the ratio between the GDP and the population;
- GDP per person: the ratio between the GDP and the employed people (*labour productivity*);
- And the latest index the ratio between the GDP and the total of hours in the production (*hour productivity*).

We can analyze these indexes under two main points of view:

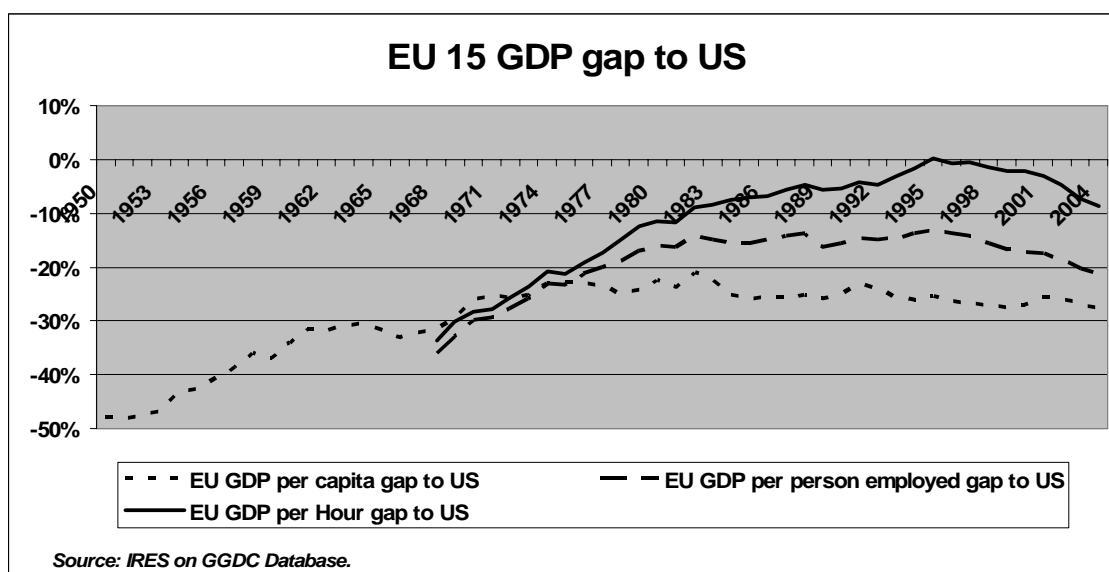
- ⇒ the productivity level;

¹ Before to illustrate the point about the EU productivity gap, I would like to thank the Groningen Growth Development Centre a research institute of the Groningen University that offers free of charge the availability to make statistical elaboration around the GDP and the labour productivity for many OECD countries. Unfortunately at this stage there are some gaps for the new comers countries in the EU like Hungary, Czech Republic, Poland, and so on. For this reason a great part of the elaboration that you will see in this paper are for the EU with 15 member states.

⇒ and the trend of the productivity (in other terms: the growth rate).

In the graph 1 we can compare the gap between the European Union and the United States during the period 1950-2004, for three index: GDP per capita, GDP per person and GDP per hour.

Graph 1. The gap between European Union and United States: 1950-2004.



The first line (blue line or continuing line) shows the EU gap in the GDP per capita to the US. We can see that at the start of the period (1950) the GDP per capita in the EU was less than 48% than the level of the US. During the time examined we see that European Union reduced this gap but, at the end of the period, it's remained quite huge around the level of 28%.

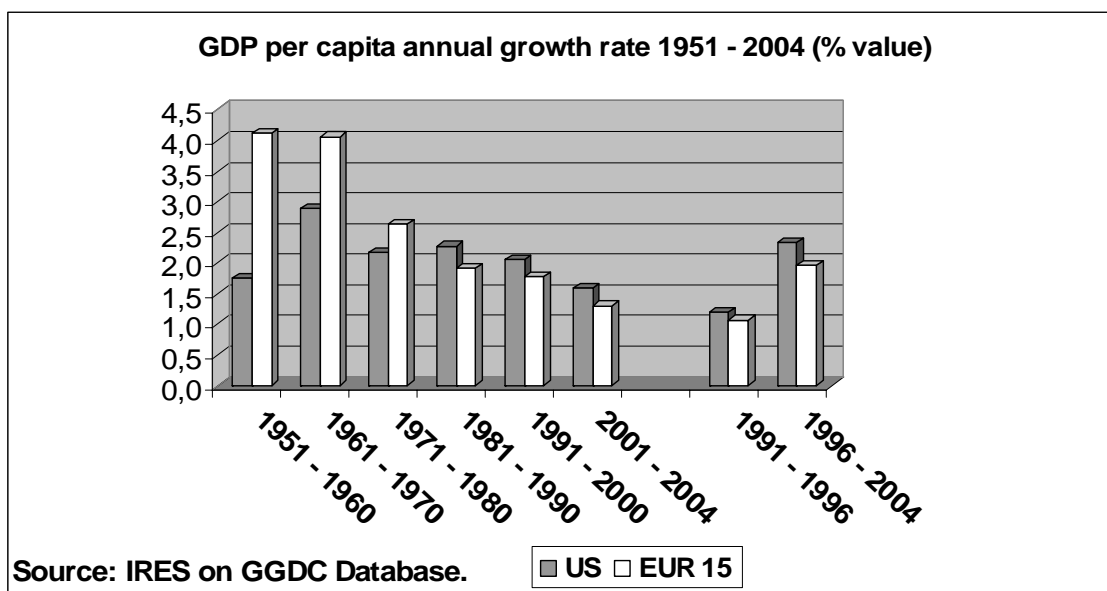
The second line (the red line or dot and line) shows the EU gap of the GDP per person employed (for this and for the next index we start to analyze the performance from the 1969, this is due to the availability of the data). For this index the EU gap starts – in the 1969 - around the 36%, followed by a period of net improvement (from 1969 to 1982), then a phase of stabilization around the level of 15%, followed by a phase of negative trend where the gap increases in the last ten years (we can see the negative turnaround the 1995 year). In the 2004 the index shows a gap around the level of 22%.

The last index (the yellow line or dotted line) shows the EU gap of hour productivity: in this case at the bottom of the period the gap is around 34%, but in the next 27 years there was a huge improvement. So strong that in the 1995 for this index the gap disappeared at all. Unfortunately after the 1997 there was a worsening and, in the 2004, the gap was around 10 percentage point.

After having analysed the productivity level for the two Regions, we now move to see the trend of the productivity, and with this kind of analysis we can see some interesting things.

The graph 2 shows the annual growth rate of the GDP per capita for the EU and the US for the last five decade. In the period from 1951-1980 is evident the European superiority for this index, with an annual rate around 4 per cent in the period 1951-'60 and 1961-'70 and around 2.5 per cent in the period 1971-'80. From the 1981 starts the superiority of the United States growth rate for this index.

Graph 2. GDP per capita annual growth rate: EU15 – US (1951-2004)



If for the same index (GDP per capita annual growth) we go in depth with the single European Member States performance (Table 1), we can find some interesting effects:

⇒ first of all, in the last thirty years some European countries had a performance better than the US for this kind of index;

⇒ if we divide the different countries, following the division around the welfare model (continental – scandinavian – latin and anglosaxon), in the last thirty years for each model there is one country at least with a good performance.

In other words if we consider the single Member States the difference with the United States are not so wide like could be appeared at first sight.

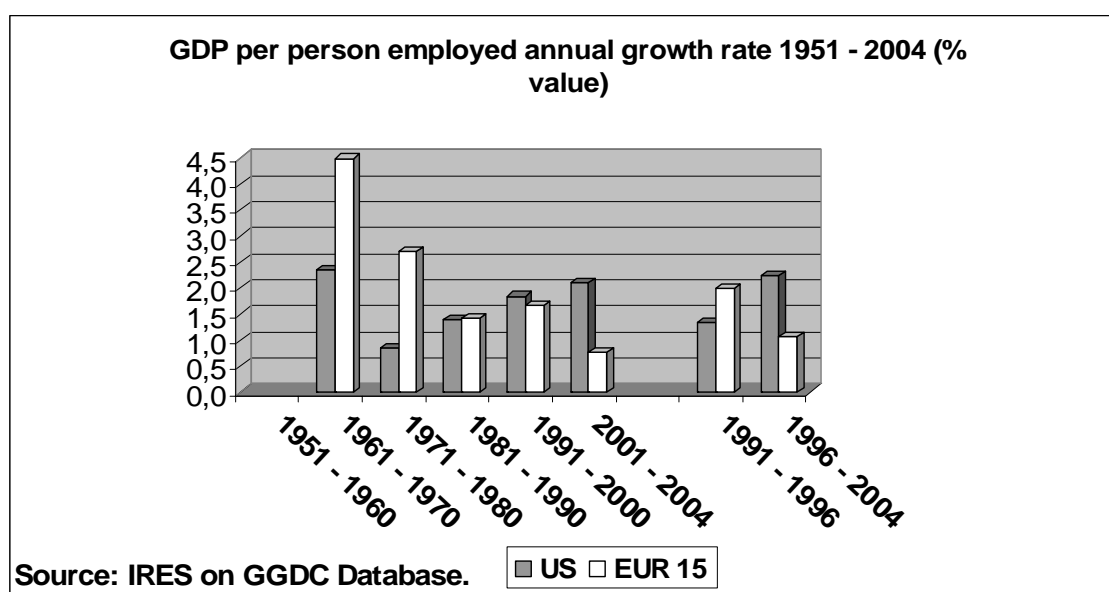
Table 1. GDP per capita annual growth rate (% value).

	GDP per capita annual growth rate (% value)												
	AUS	GER	FRA	NL	DK	FIN	SWE	SPA	ITA	IRL	UK	US	EUR 15
1951 - 1960	5,9	7,1	3,7	3,3	2,4	3,9	2,6	3,5	5,4	2,2	2,2	1,8	4,1
1961 - 1970	4,1	3,5	4,5	3,8	3,7	4,4	3,9	7,5	5,1	3,8	2,2	2,9	4,1
1971 - 1980	3,5	2,6	2,6	2,1	1,9	3,1	1,6	3,9	3,1	3,3	1,9	2,2	2,6
1981 - 1990	2,1	0,9	1,8	1,6	2,0	2,7	1,7	2,8	2,2	3,3	2,4	2,3	1,9
1991 - 2000	2,0	1,4	1,4	2,3	2,0	1,6	1,6	2,5	1,4	6,4	2,1	2,1	1,8
2001 - 2004	1,0	0,5	1,2	0,0	1,1	2,1	1,8	2,6	0,8	4,0	2,0	1,6	1,3
1991 - 1996	1,3	1,0	0,6	1,4	1,6	-1,3	0,2	1,3	1,1	4,1	1,4	1,2	1,1
1996 - 2004	2,0	1,2	1,8	1,7	1,7	3,4	2,5	3,2	1,3	6,6	2,5	2,3	2,0

Source: IRES on GGDC database.

In the graph 3 we analyze the GDP per person employed growth rate. Also for this index the superiority of US economic system comes in the last fifteen years. I would recall your attention on the fact that the US superiority of the ninety years depend in particular for the huge superiority showed during the period 1996-2004 with an annual growth rate around 2.2% for the US against 1.1% for the EU.

Graph 3. GDP per person employed annual growth rate: EU15 – US (1961-2004)



Also for this index we can see in the table 2 that some European countries show their superiority if compared with the EU performance in the different periods analyzed. During the 1991-'96 the US shows a GDP per person employed annual growth rate around 1.5% meanwhile some countries show an higher rate like Ireland 2.9%, Sweden 2.8%, Finland 2.7%, Denmark 2.4%, United Kingdom 2.4%, Germany 2.2%, Italy 1.6%. During the period 1996-2005, the United States show a growth rate at 2.2% meanwhile the only European countries with an highest rate are: Ireland 3.5% and Finland 2.3%.

Table 2. GDP per person employed annual growth rate (% value)

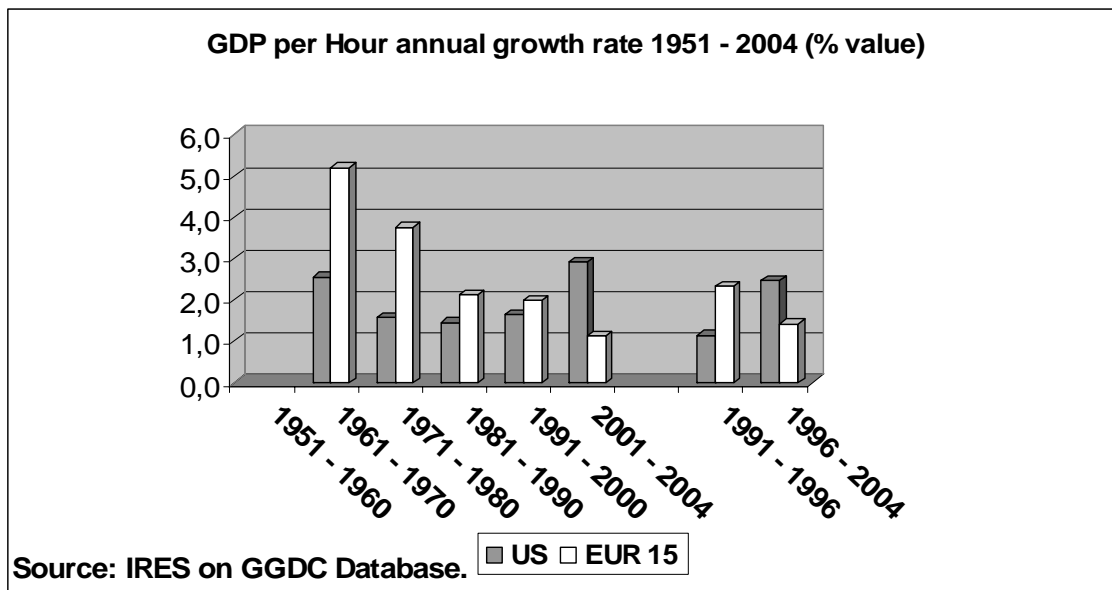
	GDP per person employed annual growth rate (% value)												
	AUS	GER	FRA	NL	DK	FIN	SWE	SPA	ITA	IRL	UK	US	EUR 15
1951 - 1960	nd	5,7	nd	3,4	nd	nd	nd	nd	nd	nd	nd	nd	0,0
1961 - 1970	nd	4,2	4,5	3,1	nd	4,7	4,0	7,8	6,3	4,2	2,5	2,3	4,5
1971 - 1980	3,3	2,6	2,7	2,0	1,6	2,5	1,0	5,5	2,9	3,8	1,7	0,9	2,7
1981 - 1990	1,2	1,7	2,1	0,9	1,3	2,4	1,3	2,3	1,7	3,6	1,9	1,4	1,4
1991 - 2000	1,6	2,0	1,1	0,5	2,1	2,6	2,7	0,9	1,4	3,3	2,2	1,8	1,7
2001 - 2004	0,8	0,9	1,0	0,2	1,6	2,0	1,7	0,0	-0,7	2,8	1,5	2,1	0,8
1991 - 1996	1,0	2,2	1,1	0,7	2,4	2,7	2,8	1,8	1,6	2,9	2,4	1,5	2,0
1996 - 2004	2,0	1,3	1,1	0,3	1,7	2,3	2,1	-0,1	0,2	3,5	1,7	2,2	1,1

Source: IRES on GGDC database.

For the last index (GDP per hour growth rate) we can see in the graph 4 that the American superiority is very recent – only in the last five years (at the start of new

millennium). The strong reduction of the European gap that you saw in the graph 1 was possible just for these huge rates of growth. Also for this index the last years (2001-2004) show a different situation, more favourable for the United States than for the Europe (2.9% against 1.1%).

Graph 4. GDP per Hour annual growth rate: EU15 – US (1961-2004)



In the table 3 we can see the superiority of some European countries compared to US. In the period 2001-2004 only Ireland shows a growth rate (3.5%) higher than the United States (2.9%). In the period 1991-2000 the European countries that showed a growth rate higher than US (1.6%) were: Ireland 4.6%; Finland 2.7%; Austria 2.6%; Germany 2.5%; UK 2.5%; Sweden 2.2%; Denmark 2.2%.

Table 3. GDP per hour annual growth rate (% value)

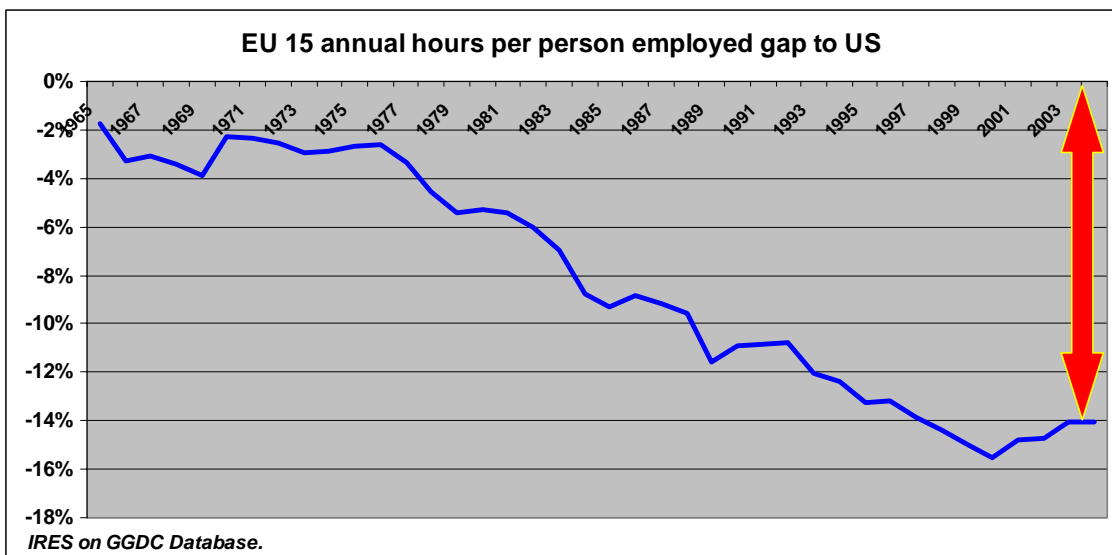
	GDP per hour annual growth rate (% value)												
	AUS	GER	FRA	NL	DK	FIN	SWE	SPA	ITA	IRL	UK	US	EUR 15
1951 - 1960	nd	6,7	nd	4,2	nd	nd	nd	nd	nd	nd	nd	nd	nd
1961 - 1970	nd	5,3	5,1	4,3	nd	5,1	4,9	7,3	7,0	5,0	3,4	2,5	5,2
1971 - 1980	4,3	3,8	3,9	3,2	3,1	3,3	2,4	6,1	3,7	4,8	2,9	1,6	3,8
1981 - 1990	1,7	2,8	2,9	2,0	2,4	2,8	1,1	3,3	2,0	3,7	2,3	1,5	2,1
1991 - 2000	2,6	2,5	1,6	0,9	2,0	2,7	2,2	1,0	1,6	4,6	2,5	1,6	2,0
2001 - 2004	1,3	1,3	1,9	0,4	1,9	2,2	2,4	0,3	-0,2	3,5	2,0	2,9	1,1
1991 - 1996	1,8	2,7	1,2	1,1	2,2	2,4	2,0	1,9	2,0	3,7	2,8	1,4	2,3
1996 - 2004	2,4	1,9	1,8	0,4	1,7	2,5	2,4	0,0	0,4	4,7	2,0	2,5	1,4

Source: IRES on GGDC database.

As we have seen up to now the productivity gap between US and the European Union is not nearly as large as the data on income per capita suggest. The most important difference between US and the European Union is not efficiency (yet) but: the numbers of hours worked and the employment rate.

As we can see in the graph 5, at the start of the 70s the European Union annual hours per person employed gap to US was around 2% and after forty years passed around 14%. The analyzed period closed in the 2004 with an amount of 1,819 annaul hours per person employed in the US against 1,563 in the EU.

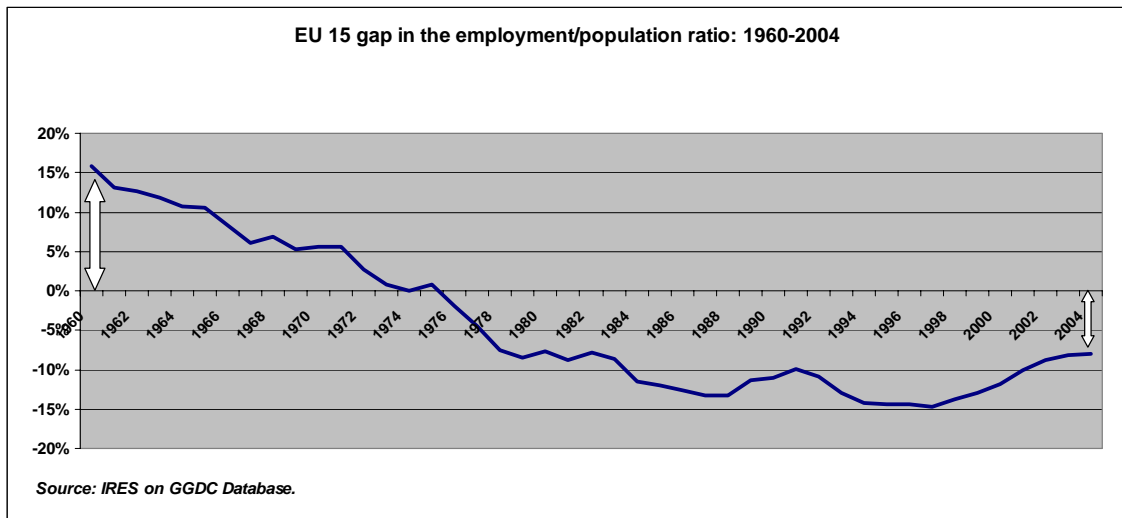
Graph 5. EU-15 Annual hours per person employed gap to US: 1966-2004.



Another important factor is the gap in the employment population. As you can see in the graph 6 until the mid-seventys the European Union showed an employment rate

(employment/population) greater than US. After this point starts a reverse situation, the US gains a ratio greater than European Union and at the end of the period analysed the gap was around the 8 point percent.

Graph 5. EU-15 Employment/Population rate gap to US: 1966-2004.



Until now we have analysed the productivity for the overall economy in the two economic system: EU and US, without regarding the difference between the different economic sectors. Now we try to analyse the different sectorial productivity in the EU and US. We have divided the manufacturing sectors and the services sectors on the basis of their technological content following the OECD and Eurostat classification (OECD, 1997; Eurostat, 2005).

Table 4. Manufacturing sectors on the basis of their technological content.

HIGH TECH MANUFACTURING	Office machinery Electronic valves and tubes Telecommunication equipment Radio and television receivers Scientific instruments Other instruments Aircraft and spacecraft
MEDIUM-HIGH TECH MANUFACTURING	Chemicals Insulated wire Other electrical machinery and apparatus nec Motor vehicles Railroad equipment and transport equipment nec
MEDIUM-LOW TECH MANUFACTURING	Mineral oil refining, coke & nuclear fuel Rubber & plastics Non-metallic mineral products Basic metals Fabricated metal products Building and repairing of ships and boats
LOW TECH MANUFACTURING	Food, drink & tobacco Textiles Clothing Leather and footwear Wood & products of wood and cork Pulp, paper & paper products Printing & publishing Furniture, miscellaneous manufacturing; recycling
ALL OTHERS MANUFACT.	Agriculture Forestry Fishing Mining and quarrying Electricity, gas and water supply Construction

Source: OECD, 1997; Eurostat, 2005.

As you can see in the table 4 the manufacturing sector is divided in five main sector: *High Tech, Medium High Tech, Medium Low Tech, Low Tech and Other manufacturing sector*. In the table 5 there are the other six sectors of the Services sector: *High Tech Services, Knowledge Intensive Market Services, Knowledge Intensive Financial Services, Knowledge Intensive Basis Services, All Other Services and the Public Administration Sector*.

Table 5. Services sectors on the basis of their technological content.

HIGH TECH SERVICES	Communications Computer and related activities Research and development
KNOWLEDGE-INTENSIVE MARKET SERVICES	Water transport Air transport Real estate activities Renting of machinery and equipment Legal, technical and advertising Other business activities, nec
KNOWLEDGE-INTENSIVE FINANCIAL SERVICES	Financial intermediation, except insurance and pension funding Insurance and pension funding, except compulsory social security Activities auxiliary to financial intermediation
KNOWLEDGE-INTENSIVE BASIS SERVICES	Education Health and social work Other community, social and personal services
ALL OTHER SERVICES	Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel Wholesale trade and commission trade, except of motor vehicles and motorcycles Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods Hotels & catering Inland transport Supporting and auxiliary transport activities; activities of travel agencies Private households with employed persons Extra-territorial organizations and bodies
PUBLIC ADMIN. & DEFENCE	Public administration and defence; compulsory social security

Source: OECD, 1997; Eurostat, 2005.

In the table 6 we can see how the value added is shared in these 11 sectors in the EU and the US in two different periods: 1980 and 2002.

The *High Tech Manufacturing sector* both in the EU and US shows from 1980 to 2002 a strong growth, even if the growth that interested the US was so huge. In the EU the share passed from 1.1 in 1980 to 7.7 per cent in 2002, meanwhile in the US the share passed from 2.1 to 15.2 per cent in 2002. Another important increase in the US was in the share of value added in *other services* from 15.0% to 18.7%.

From 1980 to 2002 inside the two economic system many things changed in the composition of the value added for the different sectors. In both system there was a

general reduction in the share of the value added in the *manufacturing system* but, the reduction that interested the US – in these twenty years - was stronger than the EU.

Table 6. Distribution of value added in the different sectors

		Distribution of Value Added			
		EU15		US	
		1980	2002	1980	2002
HIGH TECH MANUFACTURING	TECH	1,1%	7,7%	2,1%	15,2%
MEDIUM-HIGH MANUFACTURING	TECH	6,9%	6,3%	6,0%	4,5%
MEDIUM-LOW MANUFACTURING	TECH	6,5%	4,6%	4,0%	2,7%
LOW MANUFACTURING	TECH	8,7%	5,8%	7,0%	3,4%
HIGH TECH SERVICES		2,7%	6,1%	3,7%	5,4%
KNOWLEDGE-INTENSIVE MARKET SERVICES		15,4%	17,7%	16,8%	16,3%
KNOWLEDGE-INTENSIVE FINANCIAL SERVICES		5,0%	5,4%	7,2%	7,9%
KNOWLEDGE-INTENSIVE BASIS SERVICES		14,8%	13,6%	16,4%	11,6%
ALL OTHERS MANUFACT.		13,5%	10,1%	10,5%	7,6%
ALL OTHER SERVICES		17,8%	16,8%	14,9%	18,7%
PUBLIC ADMIN. & DEFENCE		7,4%	5,9%	11,4%	6,8%
TOTAL		100,0%	100,0%	100,0%	100,0%

Source: IRES on GGDC database.

In the table 7 we can analyze for the 11 sectors the labour productivity trends (the annual growth rate) for the EU and US in three period; 1980-'90; 1990-'95; and 1995-2002. As we can see in the table, it seems that something happened in the productivity performance of the two economic system after the 1995. There was a great increase of productivity in the *high tech manufacturing* sector in both system, but in the US the growth was greater than EU (37% against 31%). In the US there was a great increase also in *the knowledge intensive financial system* (5.4%) and in *the other services* (5.4%).

Table 7. Labour productivity trend EU 15 – US: 1980-'90; 1990-'95; 1995-'02 (annual growth rate % value).

	EUROPEAN UNION 15			US		
	1980-1990	1990-1995	1995-2002	1980-1990	1990-1995	1995-2002
HIGH TECH MANUFACTURING	4,5%	8,9%	31,3%	5,0%	9,7%	36,8%
MEDIUM-HIGH TECH MANUFACTURING	3,2%	4,3%	2,2%	3,2%	3,0%	2,8%
MEDIUM-LOW TECH MANUFACTURING	2,1%	3,5%	1,2%	2,6%	3,3%	2,3%
LOW TECH MANUFACTURING	2,3%	2,6%	1,4%	1,9%	0,8%	-0,1%
HIGH TECH SERVICES	3,6%	3,8%	5,3%	1,2%	3,3%	3,1%
KNOWLEDGE-INTENSIVE MARKET SERVICES	-0,8%	0,0%	-1,7%	-1,6%	-0,5%	0,9%
KNOWLEDGE-INTENSIVE FINANCIAL SERVICES	1,6%	0,9%	2,0%	-0,2%	2,4%	5,4%
KNOWLEDGE-INTENSIVE BASIS SERVICES	-0,2%	0,6%	0,1%	-0,3%	-0,9%	-0,6%
ALL OTHERS MANUFACT.	3,2%	3,3%	1,9%	1,9%	0,6%	0,3%
ALL OTHER SERVICES	1,0%	1,1%	0,7%	2,1%	1,7%	5,4%
PUBLIC ADMIN. & DEFENCE	0,7%	1,1%	0,8%	0,4%	0,0%	0,4%
TOTAL	1,7%	1,9%	2,1%	1,0%	0,9%	4,1%

Source: IRES on GGDC database.

In the table 8 we can see the employment distribution for each sector and the relative labour productivity growth rate for the period 1995-2002. The amount of employed people in *the High Tech manufacturing sectors* in the two economic system is around 1.3% (around 2,2 million in the EU and 2,0 million in the US).

There are two sectors that alone employed around an half of the total employment in both system. The two sector are: *knowledge intensive basis services* (20.6% in the EU and 25.2% in the US) and *Other services*.

In the *knowledge intensive basis services* the growth rate is around nil in the EU, whereas in the US the rate is negative (-0.6%).

But in the *other services* the growth rate of US was around 5.4% whereas the growth rate of EU was only 0.7%.

In general in the US during the period 1995-2002 there was a remarkable increase in the labour productivity in the *High Tech manufacturing sector*, in the *High Tech Services*, in the *Knowledge intensive financial services*, and in the *other services*.

**Table 8. Employment distribution and labour productivity growth rate: EU 15
– US**

	EUROPEAN UNION 15		US	
	Empl.distr.	Lab.prod.	Empl.distr.	Lab.prod.
	2002	1995-2002	2002	1995-2002
HIGH TECH MANUFACTURING	1,3%	31,3%	1,4%	36,8%
MEDIUM-HIGH TECH MANUFACTURING	4,9%	2,2%	3,0%	2,8%
MEDIUM-LOW TECH MANUFACTURING	4,3%	1,2%	2,5%	2,3%
LOW TECH MANUFACTURING	6,8%	1,4%	4,4%	-0,1%
HIGH TECH SERVICES	3,3%	5,3%	3,6%	3,1%
KNOWLEDGE-INTENSIVE MARKET SERVICES	10,5%	-1,7%	11,5%	0,9%
KNOWLEDGE-INTENSIVE FINANCIAL SERVICES	3,2%	2,0%	4,4%	5,4%
KNOWLEDGE-INTENSIVE BASIS SERVICES	20,6%	0,1%	25,2%	-0,6%
ALL OTHERS MANUFACT.	11,9%	1,9%	9,1%	0,3%
ALL OTHER SERVICES	26,2%	0,7%	27,6%	5,4%
PUBLIC ADMIN. & DEFENCE	7,0%	0,8%	7,3%	0,4%
TOTAL	100,0%	2,1%	100,0%	4,1%

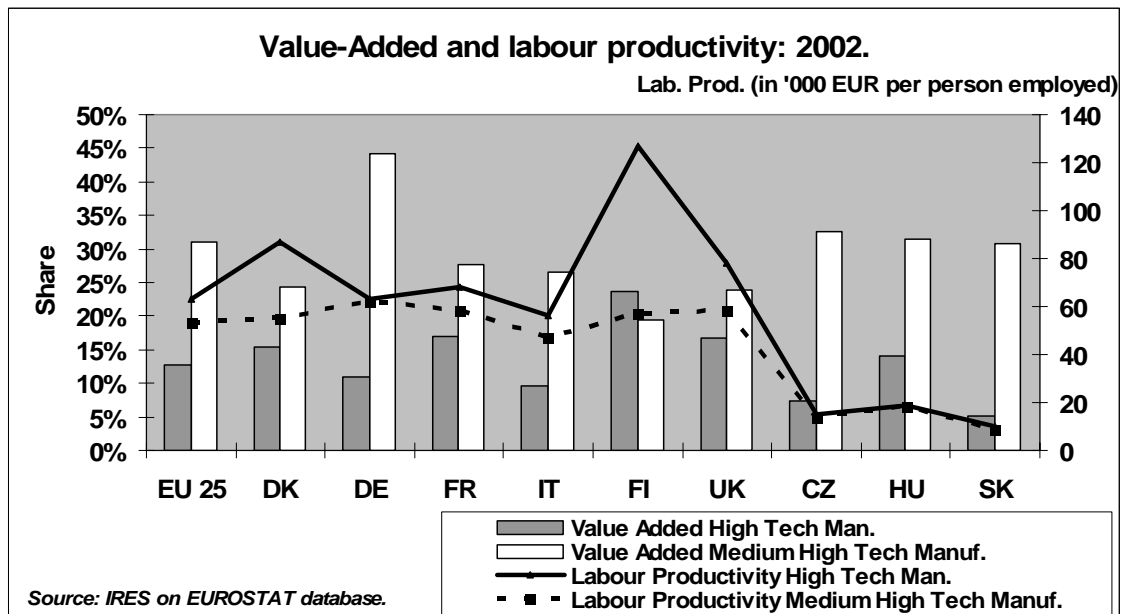
Source: IRES on GGDC database.

With the help of the graphs and the tables until now analysed we can underline the main characteristic of the EU productivity gap developed in the latest years. The EU productivity gap are driven by the combined effect:

- ⇒ of an excessive focus on low and medium-low technologies industries (sectors with declining productivity growth rates and a globalisation-induced contraction in the investment levels);
- ⇒ an inability to seriously challenge the US's dominance in large areas of the High tech manufacturing sectors, as reflected in the relatively small size of its high tech production sector;
- ⇒ and finally its apparent slowness in reaping the productivity enhancing benefits of high tech sectors in a range of other sectors (like ICT using sectors in the manufacturing and in services too) (de Groot, H.L.F., et al., 2004).

It's appear so strategic the importance of *Medium High Tech* and *High Tech manufacturing sectors* to the new throw of the European productivity. With the help of data showed in the graph 6 we analyse the status of *Medium High* and *High manufacturing sectors* in the European Economy. In the graph 6 for some European countries are reported the relative percentage share of the overall value added (on the left vertical axis) and labour productivity (expressed in thousands of Euros per person employed on the right vertical axis) for the year 2002.

Graph 6. Value Added and labour productivity: EU25 (2002).



As we can see in 2002 inside the EU at 25 Member States the share of value added was around the 13% for the *High Tech Manufacturing Sectors* (you can see the red bar in the graph). The share of Value Added for the *Medium High Sectors* was around the 30% (the blue bar in the graph).

Inside the 25 member states one of the countries with the highest value added for the *high tech sector* was the Finland with a share around 24% (in other words 24% of the value added in this country comes from the *high tech* sector), meanwhile for the *medium high tech* sector the Germany has the main share with 45%. Another interesting data came from a group of countries comprising Czech Republic, Hungary and Slovenia where the share of value added for *the medium high tech sector* exceed

the thirty per cent level (Slovenia 30.8%; Hungary 31.4% and Czech Republic 32.5%). Hungary show another interesting data in the *high tech sector* with a share of value added around 14.2% and a share of high tech export reach 24.6% (a very impressive result if compared with the share showed by other countries at the highest position in the gradulatory of the main high tech exporters: Malta 55.9%; Ireland and Luxembourg both at 29.1%; United States 27.0%; EU-25 18.2%).

The red line and the blue line in the graph show the labour productivity per person employed in the two main sectors (high tech and medium high tech). For this index we can see the huge difference in the performance between the old member states of the EU and the new member states like Czech Republic, Hungary and Slovenia².

As we have saw until now the US economy shows a quite good performance compared to the European Union. We try to reassume some factors that have contributed to the US's global dominance in High Tech sectors. These factors included:

- ⇒ world class research and teaching institutions (in particular in the University);
- ⇒ defence procurement contracts which nurtured the High Tech industry in its incubation phase like in other phases of their lives. The US spend more than the EU on publicly funded Research and Development as compared to their GDP: 1.14% US against 0.76% EU). However, over half of the US's Government Budget appropriations or outlays for R&D is directed towards defence purpose, a higher share than for the EU (around 15%).
- ⇒ the unique combination of financing and a highly competitive domestic marketplace which brought the high tech sector industry from the knowledge creation phase to the critical diffusion/mass market phase.

The EU has the ambition to be the most competitive economy in the world and to close the income gap with the US. How can it achieve this ambition? The academic and political discussion suggest these main ways (de Groot, H.L.F., Nahuis, R., Tang, J.C., 2004,):

² For an analysis about the role of ICT and innovation to strengthening the productivity in the CEE-10 see: van Ark, b., Piatkowski, M. (2004).

1) *Increase the number of hours worked*, in special for the richest member of the EU, this is the main way but, increasing this number has serious drawbacks and does not unequivocally improve welfare. One drawback is that increase in hours worked might partly be paid for with decreases in productivity per hours. A second, more important drawback is that more labour time means less leisure time, and the value of leisure time does not appear in income and production statistics, but this does not make this value less real. In the same way, official statistics ignore the value of household production.

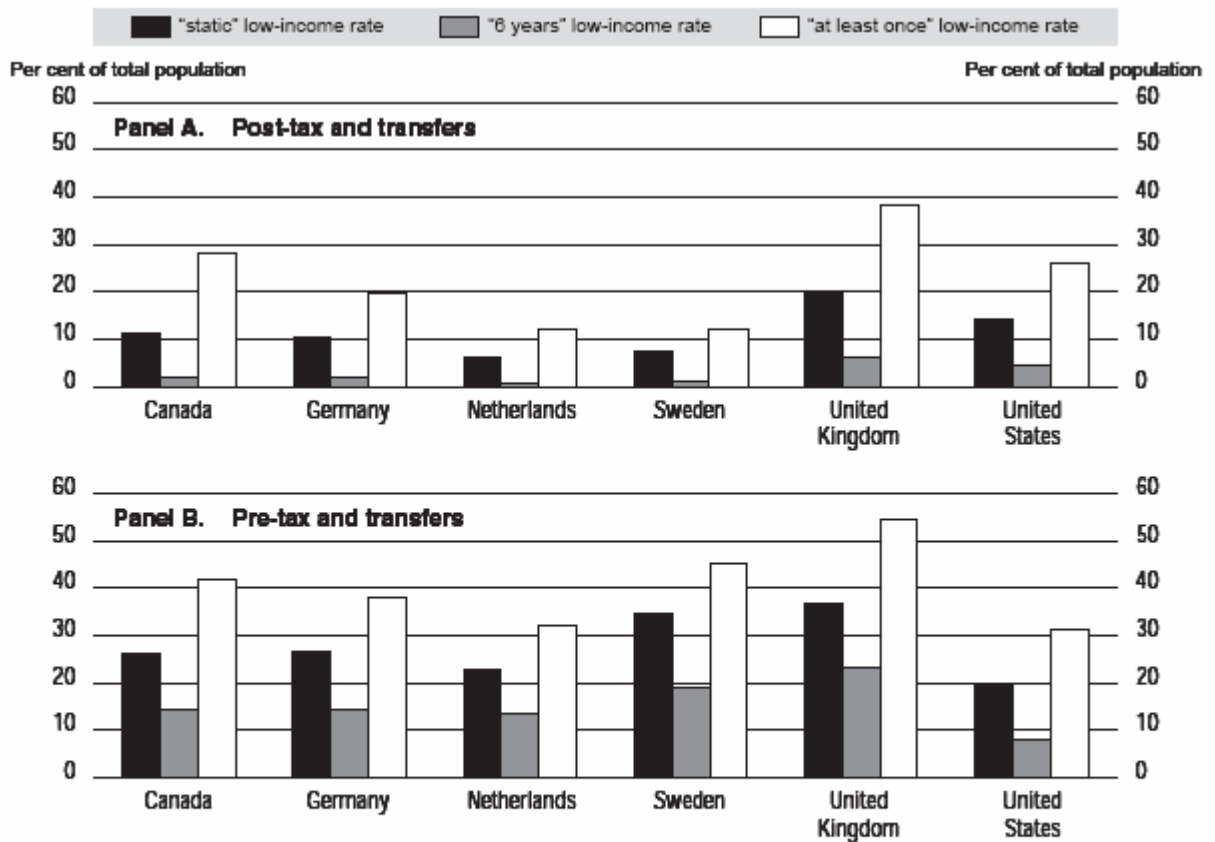
2) *Increase employment*, in many European countries, the unemployment rate is relatively high and the employment rate of the labour force is relatively low. In this specific field there is the potentiality for a real improvement

3) Another way to reduce the gap is *to raise the productivity per hour*, as we saw in Graph 1, Graph 4 and Table 3 many European countries are not (far) behind the US in terms of productivity per hour. Heavily investment in education, training, in new and better production methods and products can allow to operate at the technological frontier.

4) Reducing the gap seems to require *institutional reform*. In this context, a much expressed concern is that - in order to transform the EU into the most competitive economy in the world – a transformation towards an American style society is required which might go at the expense of the relatively equal distribution of income that characterises the EU social model.

At this point of our analysis we can wonder whether the American model is the winning model or are possible better alternatives? The next two graphs can probably help us to answer to the question.

Graph 7. Three dimensions of low income: “static” low income rates and rates for “those always on low income” and “having experienced low income”.



Note: The "static" low-income rate is the share of those below the low-income threshold in the total population in each year averaged over the period. The "6 years" low-income rate is the share of individuals who are on low income for the all 6 years as a share of the total population. The rate of persons having experienced low income is the share of those who have experienced at least one year of poverty over the six year period as share of the total population.

Source: OECD.

In the Graph 7 presented in a OECD Economic Studies (Oxley, H., Dang, T.T., Antolin, P., 2000) we can see the different effect of tax and social transfers on three different kind of poverty rates. In the upper graph we have the poverty rates for six OECD countries pre-tax and transfers (Canada, Germany, Netherlands, Sweden, United Kingdom and United States). In the down side we can see how the poverty rates changes for the effect of tax and transfers system. In the OECD study the poverty rates are calculated in six different years for the same sample (through a longitudinal analysis). We have three kind of poverty:

- ⇒ the black bar is the share of poor people in the total population averaged over the period;
- ⇒ the grey bar is the rate of longer term poverty (the share of individuals who were poor in every year through the six-year period)

⇒ and the white bar is the rate of those poor at least once in the six years.

As you can see: tax and transfer system has a substantial impact on:

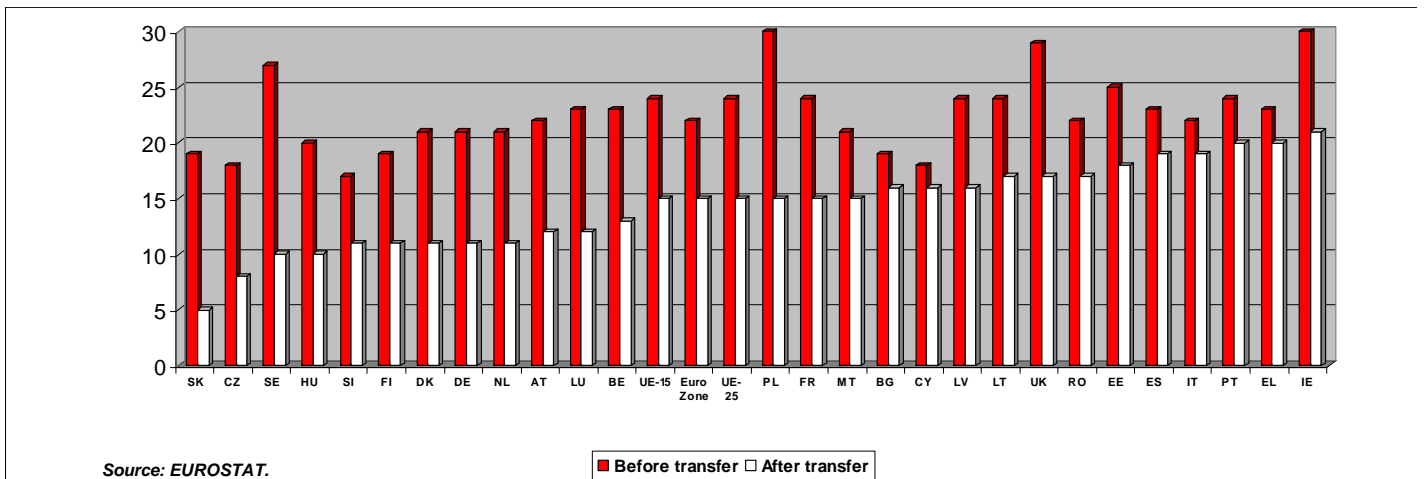
⇒ The level of poverty (black bar)

⇒ the time spent in poverty (grey bar)

⇒ And the rate of exit from poverty (white bar)

But the impact is smallest in the US while in Germany, the Netherlands and Sweden, the difference between poverty rates before and after taxes and transfers is more than three times as large (Oxley, H., et al., 2000).

Graph 8. At risk of poverty before and after social transfers: 2001 (% value).



In the Graph 8 we can see the share of people in every European countries at risk of poverty before and after social transfers. In the European Union around 24% of population is at risk of poverty before the social transfers (as you know the percentage of citizens that had an equivalised income that was less than 60% of their respective national median income in 2001).

Social transfers (pensions and other transfers) reduce the proportion of people at risk of poverty at the level of 15% in the mean of the EU, countries, so the effect of social transfers is to reduce the population at risk of poverty in all the European countries but to very differing degrees: the reduction ranging from 50% or less in Greece, Spain,

Ireland, Portugal, Cyprus and Malta to more than 75% in Sweden, Czech Republic, Hungary and Slovakia.

After these latest graphs the answer at the question if to improve the productivity and the competitiveness of the European Unions we should to follow the American model is absolutely no. As we have saw until now there are other economic model better than the American. The European Union put in the Lisbon Agenda (as we will see in the next paragraph) that increased competitiveness should not harm social cohesion, which includes limited income differentials in society.

The target of being the most competitive economy in the world and to close the income gap with the US can be achieved with the help of two key factors: the innovation and the human capital. Before to analyse the Lisbon agenda and its reform process we should to consider how these key factors are widespread in the European countries.

The key factors to improve the productivity and competitiveness of European Union: Innovation and human capital.

As we will see in the next paragraph the Lisbon process launched by the European Council in March 2000 have put in its first draft the innovation technology and the human capital in the middle of its strategic approach.

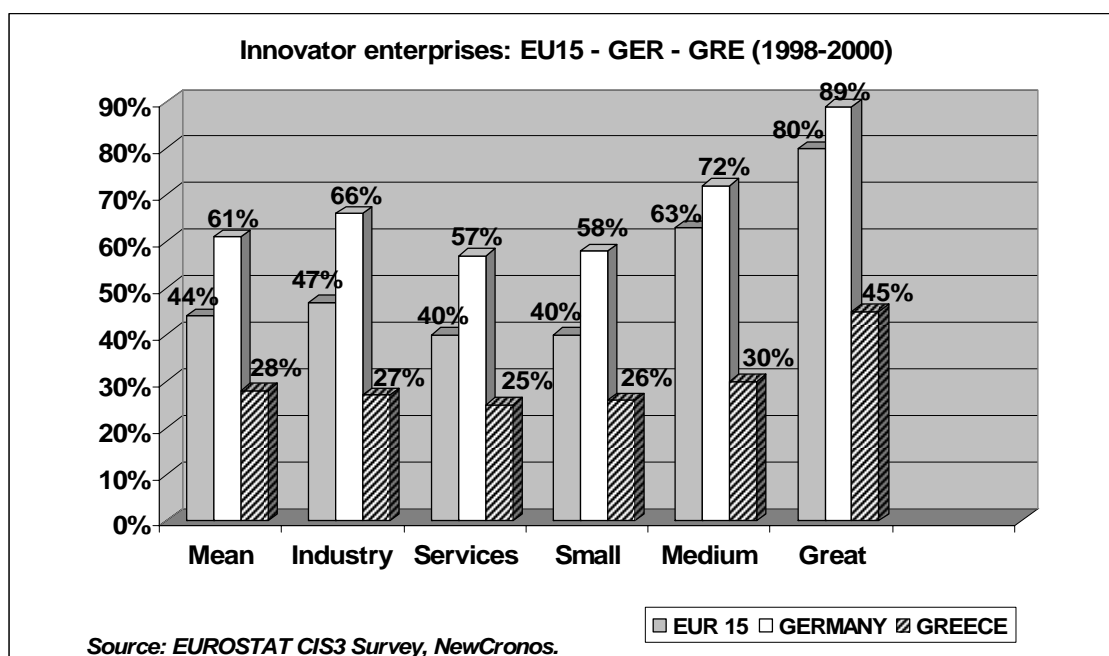
Innovation technology improves the physical capital of economic system (via product and production process innovation). In this phase the diffusion of IT needs a reorganization of the process production and a readapt ability of human capital via education and long life learning. So the economic system takes the path for more productivity and competitiveness.

In the Graph 9 we can see the average proportion of the innovator enterprises in the EU 15 compared with two member countries that we found at the two extreme of the classification: Germany with the higher proportion of innovator enterprises and Greece with the lowest proportion.

According to the third Community Innovation Survey (CIS3) in the EU during the period 1998-2000 the 44% of the enterprises had some form of innovation activity. In the industry sector the proportion of innovator enterprises is higher than the services sector: 47% against 40%.

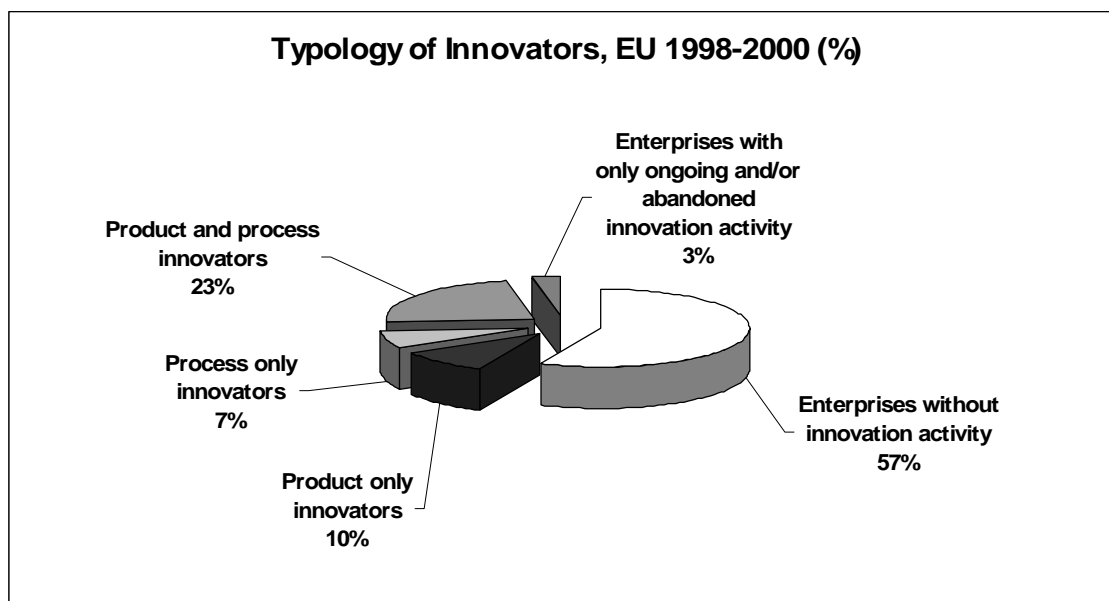
The range of the enterprises with some form of activity comes from the 28% of the Greece and the 61% of Germany. The countries with the lowest share of innovator enterprises are: Greece 28%; Spain 33%, Italy and UK with 36%.

Graph 9. Innovator enterprises: EU 15 (1998-2000)



A closer look at the different types of enterprises with innovations activity (Graph 10) shows that within the EU during the period 1998-2000 some 23% of all enterprises were both product and process innovators, 10% were product only innovators 7% process only innovators and 3% were enterprises with only on-going and/or abandoned innovation activity.

Graph 10. Typology of innovators.



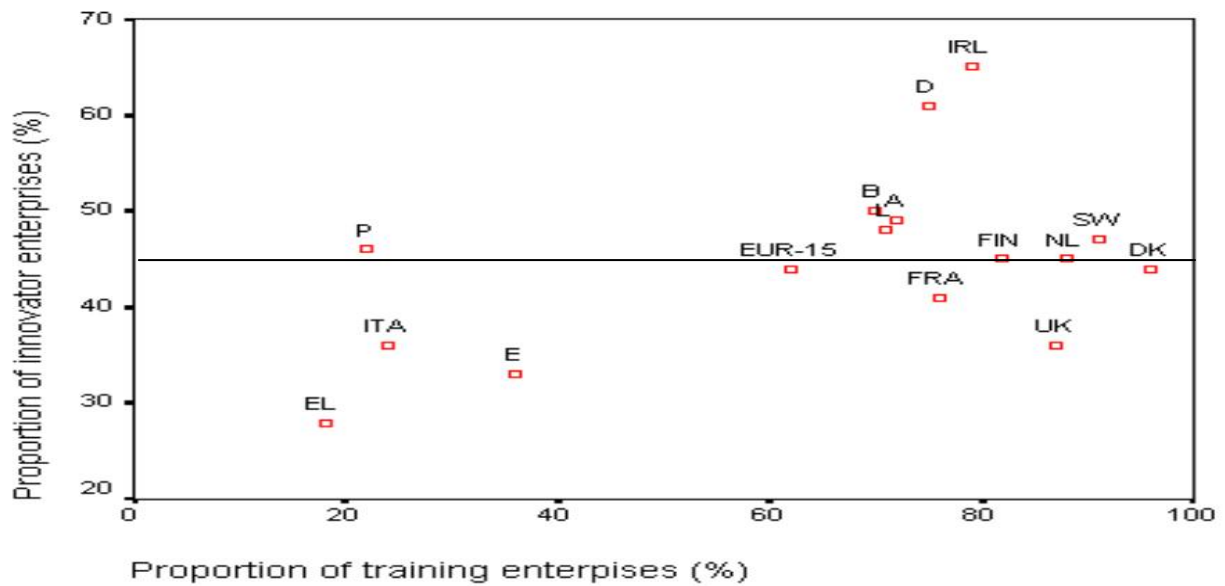
Source: EUROSTAT.

Inside the enterprise the capacity for a better use of a competitiveness potentiality through the diffusion of the innovation technology depends on other important strategic factor: the capacity to adapt the workers skills of workers via continuing vocational training courses. The two factors: innovation technology and life long learning are complementary to strengthen the productivity and competitiveness of enterprises.

In the Graph 11 we can see for each of the 15 member states of the EU the proportion of enterprises innovators (on the vertical axis) and the proportion of enterprises that give training courses at his employees (that we named training enterprises on the horizontal axis).

In the European Union we have 44% of innovators enterprises and around 62% of training enterprises. How we can see there is a correspondence between the two factors for the majority of the member state. Country with an higher proportion of innovator enterprises show also an higher proportion of training enterprises.

Graph 11. Proportion of innovator and training enterprises (% val.): 1999-2000



The Table 9 show the nexus between Innovation and the need to adapt the labour force a the change of the innovation by the tool of the long life learning.

In this table you can see the employees participating rate in continuing vocational training (CVT) courses in 1999 inside innovators enterprises and inside no innovators enterprises.

We can see that in the EU the participating rate in innovators enterprises was at 45% meanwhile in no innovators enterprises fall down at 30%.

In the innovators enterprises the range was from 67% in Sweden to 16% in Lithuania.

In no innovators enterprises the range was from 54% in Sweden to 4% in Lithuania.

For both classification the Hungary show a position in the low side of the classification.

Table 9. The employees participating rate in continuing vocational training courses in the EU in innovators and no innovators enterprises: 1999.

	Innovators enterprises	No innovators enterprises
E U 25	45	30
E U 15	45	32
B	53	29
C Z	49	32
D K	53	53
D E	36	23
E E	27	12
G R	22	4
E S	32	14
F R	54	43
I E	47	23
I T	37	15
L V	19	6
L T	16	4
L U	41	28
H U	19	8
N L	47	35
A T	38	26
P L	25	9
P T	29	7
S I	47	14
F I	55	35
S E	67	54
U K	53	46
B G	28	6
R O	11	3

Source: EUROSTAT.

In the Graph 10 we can see the link between the employees participating rate in CVT courses and the presence of joint agreement between the social parties to guarantee at employees CVT courses.

In the EU the rate of participating in CVT courses was at 52% in presence of joint agreement, meanwhile without CVT joint agreement the rate was at 34%.

The range in the EU countries in presence of joint agreement came from 68% of Sweden to 22% of Lithuania and Hungary.

The range in the EU countries without joint agreement came from 54% of Sweden to 7% of Lithuania.

Table 10. The employees participating rate in continuing vocational training courses in enterprises with and without CVT courses joint agreements: 1999.

	Joint agreement between employer and employees or their representatives	Without CVT joint agreement
EU 25	52	34
EU 15	53	35
B	57	37
CZ	56	33
DK	56	51
DE	48	28
EE	31	17
GR	29	12
ES	47	16
FR	63	40
IE	55	38
IT	52	20
LV	26	9
LT	22	7
LU	54	30
HU	22	10
NL	47	34
AT	44	33
PL	25	16
PT	50	14
SI	55	29
FI	64	45
SE	68	54
UK	52	48
BG	31	7
RO	18	4

Source: EUROSTAT.

In the last graph of this paragraph (Graph 11) we can see three different information about the level of continuing vocational training course inside the European enterprises.

Well in the first column we have a data of the proportion of employees in enterprises that providing CVT courses as a percentage of total employment. For the EU the average is quite good: 53% and the range for the different countries show a

discrepancy from 99% of the Denmark and the 52% of the Portugal. But if we analyse this situation more in deep we can found some important informations.

Table 11. Continuing Vocational Training courses in the EU-25 (1999)

	Employees in enterprises providing CVT as a % of total employment	Employees participating in CVT courses as a % of employees in training enterprises	Employees participating in CVT courses as a % of total employment
EU 25	87	47	39
EU 15	88	47	40
B	88	54	41
CZ	88	49	42
DK	99	55	53
DE	92	36	32
EE	79	28	19
GR	56	34	15
ES	64	44	25
FR	93	51	46
IE	92	52	41
IT	56	47	26
LV	74	25	12
LT	67	20	10
LU	87	48	36
HU	60	26	12
NL	96	44	41
AT	90	35	31
PL	57	33	16
PT	52	45	17
SI	81	46	32
FI	95	54	50
SE	98	63	61
UK	97	51	49
BG	57	28	13
RO	44	20	8

Source: EUROSTAT.

First of all the proportion of employees that in the reality participating at CVT courses as a percentage of employees in training enterprises tumble down. In the European Union the proportion of employees participating in CVT courses fall at 47%, for this indicator the range for the 25 member states fluctuate from the 63% of Sweden to the 29% of Lithuania.

The rate of employees who participate in training courses is very low if we used in the construction of this rate at the denominator not only the total of employees in training

enterprises but the overall employees. For the European Union this proportion is only 39% and the range, for the 25 European countries, show a discrepancy from 61% of Sweden to 10% of Lithuania. In the EU only 4 person to 10 are in the possibility to adapt their knowledge to the economic, technological and organization change.

From the analysis of the study conducted by EUROSTAT, there emerges the substantial incapacity of the companies to adopt continuous training for their own employees as a resource-opportunity capable of ensuring competitive performance for the company. What Trentin defines as: "*The only relatively stable wealth (or less mobile) that can still define the competitive potential of a company, territory, nation is intelligent and informed labour capable of 'resolving problems' and innovating; and equipped for this very reason with new spaces of decision-making discretion. Enhancing this resource, investing in the human factor constitutes the real challenge that an economic policy targeted at full employment must face. The separation, common in the past, of employment policies from labour policies, technological and organisational research and innovation policies, from initial training policies and continuous upgrading of professional skills founded on the construction of new relations between school and companies would lead to the failure of every attempt to construct in Italy and especially in Europe a social policy to sustain the challenge of unbridled competition.*" (Trentin, B.,1997, page 239). The possibility to provide valid solutions to the change, forecasting the consequences through a pro-active role of all the economic and social players, lies essentially in the human capital possessed and its adequate use. In this context, training represents a lever through which the adequate valuation of human capital is ensured allowing challenges induced by the change to be better dealt with.

After this analysis We have to wonder

- ⇒ whether in a continent that want to be the first economy based on knowledge (like the Lisbon Agreement said) rates like this are acceptable?
- ⇒ and who must bear the cost to changing this situation and give a wider system of knowledge able to make sure that the flexicurity can operate in its own effectiveness.

When the flexibility recall is unilateral (from enterprises to employees) and it is disconnected from security, then it represents the attempt to transfer the enterprise risk from the capital to the labour and for this way to reduce the overall competitiveness and productivity of the economic system. In order to erase this problem we need:

- a welfare system efficient and effective;
- and a strong human capital. The powerful of the human capital is giving by the investment on own capacity, on own professionalism, and on the opportunity to have the chance to participate at long life learning courses.

Can the Lisbon strategy process review be considered sufficient in order to fill up the European shortage in productivity, innovation, human capital, etc.?

The Lisbon strategy process review.

The Lisbon Agenda was launched by the European Council of March 2000 and was the elaboration of a European comprehensive strategy for the economic and social development in face of the new challenges (globalisation, ageing, faster technological change) with the explicit strategic goal of turning the EU economy until the year 2010 into "*the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion*". It is important to recall this quotation because the Lisbon strategic goal is to achieve a particular *combination* of strong competitiveness with the other features no less important (dynamic knowledge-based economy, sustainable economic growth, more and better jobs, greater social cohesion) (Rodrigues, M.J., 2004). To realize this goal requires an overall strategies designed to:

⇒ "*preparing the transition to a knowledge-based economy and society by better policies for the information society and R&D, as well as by stepping up the process of structural reform for competitiveness and innovation and by completing the internal market*;

⇒ *modernising the European social model, investing in people and combating social exclusion;*

⇒ *sustaining the healthy economic outlook and favourable growth prospects by applying an appropriate macro-economic policy mix."*

Later on, in the Spring 2001 the Council of the European Union in Stockholm emphasized the concern around the sustainable development.

The central idea of the Lisbon strategy is to recognize that, in order to sustain the European Social Model, the European Union need to renew its economic basis by focusing on knowledge and innovation. This objective should be reached on the basis of an average growth rate of 3% for the decade 2001-'10, at the end of which full employment should be achieved.

Over the last five years this strategy was translated into an agenda of common objectives and concrete measures, using not only the traditional instruments (such as directives and community programmes) but also a new open of coordination method (ocm), which had already been tested in the European Employment Strategy.

It's by now almost universally accepted that this agenda has failed to realise its ambitious objectives³. Two different report (*An Agenda for a Growing Europe – The*

³ As Rodrigues M.J. write some interesting goal were achieved:

- ⇒ 6 millions jobs created;
 - ⇒ Dissemination of information and communication technologies;
 - ⇒ European research networks;
 - ⇒ One stop shops for SMEs;
 - ⇒ Single market for telecommunications and for energy;
 - ⇒ Galileo;
 - ⇒ Integration of the national financial markets;
 - ⇒ Launch of the EUROPASS for European mobility in training and employment;
 - ⇒ Modernization of the active labour market policies;
 - ⇒ Action plan for social inclusion;
 - ⇒ National strategies for sustainable development;
- there were many other unresolved knots:
- ⇒ 22 million jobs still missing;
 - ⇒ Networks for innovation;
 - ⇒ Community patent;
 - ⇒ Red tape for business;
 - ⇒ Lifelong-learning;
 - ⇒ Single market for services;
 - ⇒ Social protection reforms;

Sapir Report; Facing the Challenge – The Lisbon strategy for growth and employment – The Kok Report) during the mid-term review identified and tried to answer at the main shortcoming: unclear strategic objectives; the existence of trade offs for many objectives; inflation of priorities and measures; lack of implementation, coordination and participation mechanism; lack of financial incentives; communication gap.

In view of this disappointing results the spring summit 2005 decided to launch a new, less ambitious and much more focussed version of the Lisbon Agenda, a "*New partnership for jobs and growth*", requiring greater commitment from the member states.

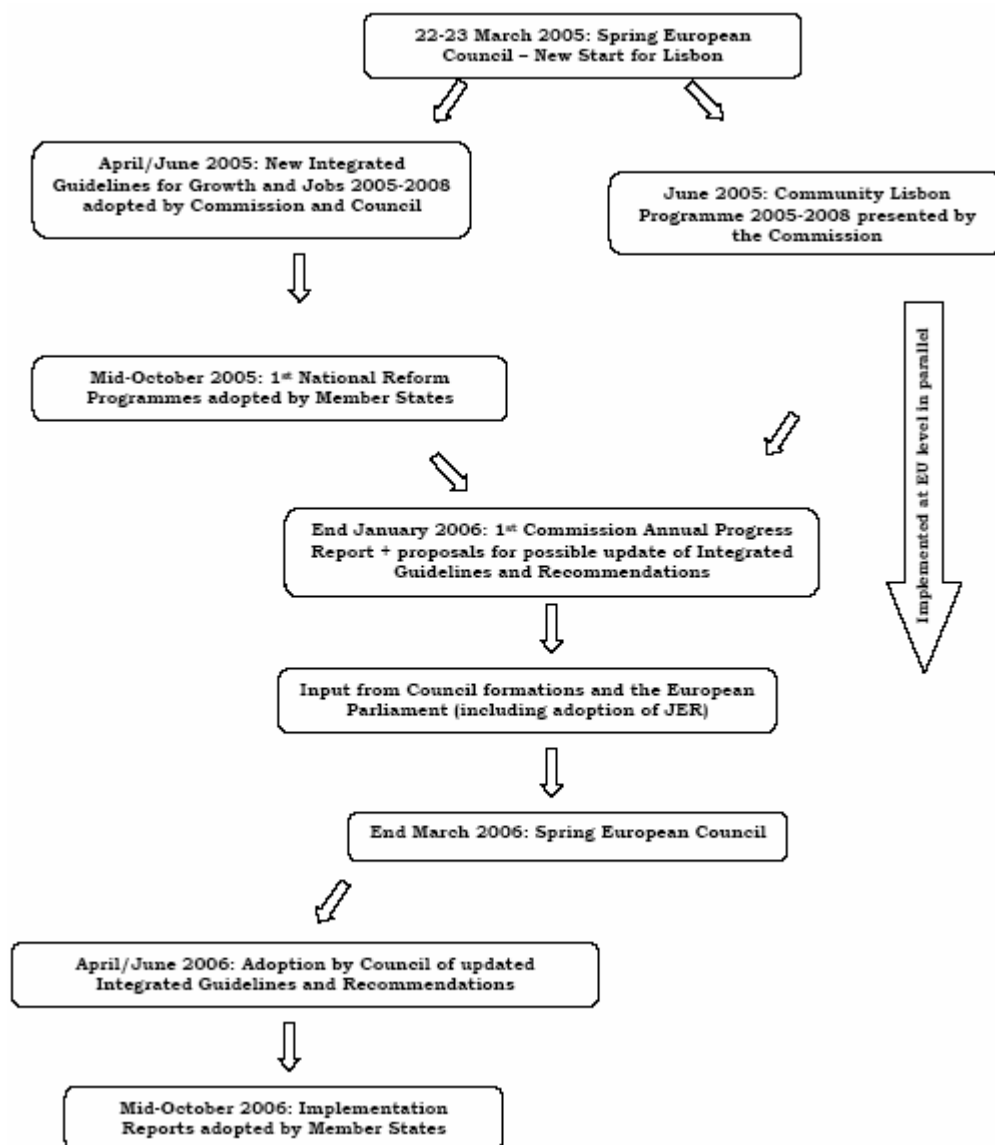
The European Council in June 2005 endorsed the Integrated Guidelines for Growth and Jobs, which constitute a basis for Member States' national programmes for growth and jobs. The European Council also invited the Commission to present, as a counterpart to the national programmes a "**Community Lisbon Programme**" covering all actions at Community level. This programme will follow the structure of the integrated guidelines for growth and jobs. Policy measures proposed under this programme fall under three main areas:

- ⇒ *knowledge and innovation for growth*, with an ambitious programme of policies for research, innovation, education and training;
- ⇒ *making Europe a more attractive place to invest and work*, by deepening the single market, improving the business environment and expanding the European infrastructure
- ⇒ *creating more and better jobs*, investing in people, modernising the European social model and combating social exclusion.

⇒ Dissemination of eco-technologies.

Diagram 2. Roadmap of the new Lisbon strategy for 2005/2006.

Source: Commission of the European Communities (2005).



Progress at both national and Community level will be reviewed in a single EU Annual Progress Report. As far as the Community level is concerned, the report will be based on regular monitoring of the actions listed in this Community Lisbon Programme. The EU Annual Progress Report will also evaluate the implementation of Member States' national programmes. On the basis of this annual assessment the Commission will identify, if necessary, further actions needed at the Community level and will revise the Community Lisbon Programme accordingly (Diagram 2).

The Community contributes to the overall economic and employment policy agenda by completing the internal market and by implementing common policies and activities that support and complement national policies. It will in particular **concentrate on a number of key actions** judged by the Commission at high value-added:

- ⇒ *the support of knowledge and innovation in Europe;*
- ⇒ *the reform of the state aid policy;*
- ⇒ *the improvement and simplification of the regulatory framework in which business operates;*
- ⇒ *the completion of the Internal Market for services;*
- ⇒ *the completion of an ambitious agreement in the Doha round;*
- ⇒ *the removal of obstacles to physical, labour and academic mobility;*
- ⇒ *the development of a common approach to economic migration;*
- ⇒ *the support of efforts to deal with the social consequences of economic restructuring.*

The review process of the Lisbon agenda involved a framework of European instruments comprising:

- ⇒ The Lisbon Community Programme
 - The 7th Framework Programme for RTD;
 - The Community Programme for Competitiveness and Innovation;
 - The Community Programme for Lifelong Learning.
- ⇒ New strategic guidelines for cohesion policy;
- ⇒ State Aid – New Regulations;
- ⇒ European Investment Bank and European Investment Fund;
- ⇒ Reform of the Stability and Growth Pact.

The process acts at four different levels: European, National, Sectorial-Regional and at Company level. It involves a group of different stakeholders: innovators, enterprises, universities, schools, young people, families, job seekers and people in social exclusion, local authorities, social partners.

Until now we have analysed the main characteristics of the review process of the Lisbon Agenda. Now also on the basis of the previous paragraphs we try to put some consideration about this review process.

With the review process the basic approach of the Lisbon Agenda remains the same: a rigorous policy of liberalisations of all markets and a strong discipline in budgetary policy, complemented by an increase in the technological base of the economy. With an approach exclusively concentrated on the supply side and complete neglect of the demand side of the economy, the outcome will be unchanged: persistently slow growth, high unemployment and rising inequality. Under the review process social inclusion and ecological sustainability disappear from the horizon of the Community Lisbon Programme and the attention concentrate exclusively on the rates of growth and employment without any consideration on the qualities of the growth, the employment, the welfare and environment (Euro Memorandum Group, 2005). In other words the social and ecological aspects of the Lisbon strategy move from the core of the framework build on 2000 to the periphery of the review process. I wonder what remain in this approach of the principle, stated several times over the last years by the European Commission that '*social protection is seen as having the potential to play an important role as a productive factor, ensuring that efficient, dynamic, modern economies are built on solid foundations and on social justice*' (Commission of the European Communities: 1995; 1997; 2003).

In my personal opinion, the challenges of the globalization of the economy and the building of an European knowledge society, in the next years, need a better framework of social system, much more efficient and encompassing than in the past years. The future outcome, is not clear at the moment and it will depend on a series of factors, like:

1. the capacity of governments of the Member States to pursue a strong idea of Social Europe;

2. the institutional power of the European Commission, Parliament and European Council;
3. the tenacity of pursuing a renewal of the European social model with the same determination demonstrated in the 90s for monetary unification.

If these three factors will be pursued, the reform of welfare state model in the EU will be aimed to improve efficiency and effectiveness in the respect of the European social and cultural tradition.

It is quite worrying that the Lisbon strategy review and the reform of the Stability and Growth Pact has been followed by a string of events which have seriously undermined the European Union integration process, namely the "no" votes in the French and Dutch referendums on the European Constitution, the decision to suspend the referendum process in the other countries, and the embarrassing failure to agree on the EU budget for 2007-2013.

It is as if the slow but inexorable process of putting together the European puzzle has been interrupted because each of the Member States has decided to reshape the pieces to fit its own national interests. Now the pieces will no longer fit together and can only be placed side by side or even on top of one another, leaving the picture largely incomplete and liable to be destroyed the first time it is accidentally – or perhaps not so accidentally – nudged by one of the parties to its con(de)struction.

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