# EUROPEAN UNION TRIPLE HELIX MODEL OF "THE NEW INDUSTRY"

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## ABSTRACT

The last few decades have been marked by important political changes, extraordinary scientific and technological improvements, positive growth of global sales, development of international companies and supranational institutions. However, the uncertainty and instability on all levels of business activity are increasingly threatening the world economic growth. European Union, as well as the whole world economy, is nowadays in a phase of deep structural changes at the crossroads between the former dominant mass production and the new production model based on scientific-technological, information and communication activities, infrastructure and services. There is a "new economic scene" emerging on the horizon, where uniqueness, innovativeness, creativity and productivity play the key roles. As the response to these kinds of global changes, the aim of the European Union was to become the most competitive and most dynamic economy of the world to the year 2010 according to the guidelines of the document known as "Lisbon strategy". European Union is a community of countries different in their size, culture and economic strength; hence it was essential to strengthen the national programs in order to increase the total economic strength of the European Union – for the aim of the Lisbon strategy has not been accomplished yet. The current financial, and thereby general economic crisis, have just slowed down the progress of the European Union towards the Lisbon aims.

European Union industrial policy has been directed towards the strengthening of the market economy effect by steering of all capital to the segment of „new industry“ against deindustrialization. The new concept of EU economy development, according to the challenges of the Lisbon strategy, should be based on the so called “informational and innovational society”, as well as the society based on knowledge, in which it could try to face the new challenges of its economic role on a global economic scene by using innovation policy, policy of encouragement of small and medium entrepreneurship development, and the policy of research and development stimulation.

The aim of this paper is to analyze the state of the industry and the current industrial policy of the European Union in accordance with the guidelines set by the Lisbon strategy. In order to accomplish that, there is a need to explore those industrial branches which could be the generator of the future economic growth, as well as all possible institutional solutions (creation of triple helix model), and which will have a supporting role.

JEL clasiffication: L52, L98

***Key words:*** new industry, European Union industrial policy, Lisbon strategy, Triple Helix

## 1. INTRODUCTION

EU industry is facing a great challenge. Financial and economic crisis, as well as regional disproportion in development of all member states of the EU, is slowing down the accelerated economic revival and growth. Intensive development on “new industry” becomes a long-term sustainable base. The term „new industry“ marks the industry based on implementation of solutions and models of scientific and research projects in all spheres of business activity. In order to redirect the current state of industry towards the new, innovative solutions, there has to be an integrated „will“ of three key interest protagonists: business, public and university sector. For that purpose a “triple helix” model is made, whose main goal is integrative activity and directing the activity in order to increase competitive advantage and long-term sustainable economic growth.

## 2. ECONOMIC STRENGTH OF THE EU IN GLOBAL SURROUNDINGS

In 1980 the whole world exported goods and services for 2,032 billion American dollars in total, and yet only 27 years later that amount was increased by 68%. In 2000 EU exported goods and services of the total value of 2,367 billion American dollars, and already in 2007 that value almost doubled amounting to 5,115 billion American dollars in total (UNCTAD, 2008). However, the uncertainty and instability are increasingly threatening the world economic growth. The recession in the USA which spread to the whole world, as well as mostly unstable food, oil and metal prices are just some of those menaces. World GDP drop, EU not included, has slowed down to 4.4% in 2008 compared to 5.2% in 2007 (COM, 2008). The total world trade marked a significant fall – from 9.5% average in 2006 to 6.8% in 2007. The biggest contribution in making of EU GDP was made by Germany with 3,297.23 billion American dollars, Great Britain with 2,727.81 billion American dollars and France with 2,562.29 billion American dollars in 2007, which makes not less than 16% of the world GDP. Euro surroundings make about 25% of the world GDP (Table 1). EU makes a powerful economy which side by side with the USA and Japan builds 56% of the world GDP.

The older member states of the European Union like Germany, Great Britain and France have made good results in global product and service exchange. In 2006 Great Britain exported 34% of high technology products in the total world export, whereas for example China and the USA by about 30% each. Among newer member states of the European Union Hungary stands out with 24% in the export of high technology products in the total export (Table 1). If we observe the indicator of probability for easy setting up of company, the USA occupies the leading position with only 6 days needed for company registration in 2007. EU does not fall behind all too much – in France you need only 7 days for company registration, in Great Britain 13 days, and in Germany 18 days. Among newer member states Rumania stands out with 14, Hungary with 16 and Czech Republic with 17 days (Table 1). Total tax rate as the profit percentage in EU-27 was on the level of average 48% (in Luxemburg 21% or France 65%), whereas Japan has a very high rate of 55%, and the USA the lowest of 42% (authors according to: Doing Business, 2010). It is possible to conclude that EU has potential towards the further economic growth acceleration through export of VAT goods as the result of application of high technology and connecting the research potential with industry.

However, in order to accomplish the above mentioned, it is necessary to observe the innovative activities of the EU. EU, compared to the USA and Japan, invests the least means into research and development. Between 1982 and 1995 in the USA the share of industries based on knowledge increased from 21 to 27% of GDP. It was accompanied by corresponding growth of intellectual ownership rights. EU lagging behind is proved through the research intensity which in 2004 was 1.9%, while for example in the USA it was 2.59%, and in Japan not less than 3.15%. The biggest enterprises in the world which invest the most into research and development are undoubtedly Japanese, American and European in almost all most important sectors of industry (Table 2). In 2008 EU-27 was investing about 1.9% of GDP into R&D (Scandinavian countries of an average of 2.7% and Germany 2.6%), whereas the USA invested 2.6%, and Japan even 3.4%. The enterprises with more than 250 employees take up about 1% of all EU enterprises and make 78% of the total expenditures for research and development (R&D). The biggest percentage of investment into research and development of the EU in 2004 realized the automotive industry (vehicles and equipment) with 23.8% of all investments into research and development, then follows pharmacy and biotechnology with 17% and IT hardware with 12.4% (Maincent and Navarro, 2006).

**Table 1.** Development indicators of selected countries

| Selected countries | GDP Billion $ 2007 | GDP per capita $ 2007 | Annual GDP growth rate 2007 | Industry - % of GDP 2005 | Export - % of GDP 2005 | Export of high technology - % of processing industry export 2006 | Import - % of GDP 2005 | Days needed for company registration 2007 |
|---|---|---|---|---|---|---|---|---|
| World | 54,347.04 | 8,219 | 3.8 | 28 | 27 | 20 | 27 | 44 |
| USA | 13,811.20 | 45,790 | 2.2 | 23 | 11 | 30 | 16 | 6 |
| Japan | 4,376.70 | 34,254 | 2.1 | 30 | 14 | 22 | 13 | 23 |
| China | 3,280.05 | 2,484 | 5.2 | 48 | 37 | 30 | 32 | 35 |
| Russia | 1,291.01 | 9,115 | 8.1 | 39 | 35 | 9 | 21 | 29 |
| EURO surroundings | 12,179.25 | 38,215 | 2.6 | 26 | 38 | 16 | 36 | 22 |
| Great Britain | 2,727.81 | 44,696 | 3.0 | 24 | 27 | 34 | 30 | 13 |
| Germany | 3,297.23 | 40,078 | 2.5 | 29 | 41 | 17 | 36 | 18 |
| France | 2,562.29 | 41,521 | 2.2 | 21 | 26 | 21 | 27 | 7 |
| Some EU member states | | | | | | | | |
| Hungary | 138.18 | 13,735 | 1.3 | 30 | 66 | 24 | 67 | 16 |
| Czech Republic | 168.14 | 16,276 | 5.6 | 38 | 72 | 14 | 69 | 17 |
| Slovakia | 74.93 | 13,876 | 10.4 | 32 | 77 | 6 | 82 | 25 |
| Poland | 420.32 | 11,044 | 6.5 | 31 | 37 | 4 | 37 | 31 |
| Rumania | 165.98 | 7,702 | 6.2 | 35 | 33 | 4 | 43 | 14 |
| Bulgaria | 39.55 | 5,176 | 6.2 | 29 | 60 | 6 | 76 | 32 |
| Slovenia | 45.45 | 22,500 | 6.1 | 33 | 63 | 5 | 64 | 60 |
| Croatia | 51.28 | 11,549 | 5.6 | 32 | 47 | 10 | 56 | 40 |

Source: the authors have adapted the data according to: World Development Indicators database, 2009

In 2005 the number of patents in European Patent Office (EPO) has grown from 65.42 to 112.17 per million inhabitants. In the number of patents EU-27 is lagging behind Japan which is the leading country according to registered patents in EPO with 163.69 applications per million inhabitants. The USA is close to EU with 114.68 applications per million inhabitants (authors according to: Eurostat, 2010). EU-27 investments into human resources have grown from 4.86% of GDP in 1999 to 5.04% in 2006. Belgium, Denmark, Finland, Sweden and Norway together invest on an average of 6.7% of GDP into human potentials. Despite of a slight increase of those investments, the USA is with 5.51% still the leading force.

Japan is lagging behind with 3.47 % of investments made into human potentials. The high technology product share[1] in the total EU-27 export was in 2006 only 16.6% (in Ireland 29%, Luxemburg 41%, Hungary 20%, Malta 53%, United Kingdom 27% and Switzerland 26%), while in the USA it was 26% and Japan 20% (Eurostat, 2010a).

**Table 2.** Top 5 EU enterprises and enterprises outside EU according to the 4 biggest sectors of R&D

| Rank | Enterprise | R&D investments (billion €) | Rank | Enterprise | R&D investments (billion €) |
|---|---|---|---|---|---|
| Automotive industry (vehicles, parts) | | | Electronic devices and equipment | | |
| 1 | Ford Motor<br>Daimler Chrysler | 5.9<br>5.6 | 1 | Matsushita Electric<br>Siemens | 4.3<br>5.5 |
| 2 | Toyota Motor<br>Volkswagen | 4.9<br>4.1 | 2 | Sony<br>Philips Electronics | 3.3<br>2.6 |
| 3 | General Motors<br>Robert Bosh | 4,5<br>2.7 | 3 | Samsung<br>Schneider | 2.4<br>0.5 |
| 4 | Honda Motor<br>BMW | 3.2<br>2.6 | 4 | Canon<br>Alsthom | 1.9<br>0.5 |
| 5 | Nissan Motor<br>Peugeot | 2.2<br>2.1 | 5 | Sharp<br>Thomson | 1.1<br>0.3 |
| Pharmacy and biotechnology | | | IT hardware | | |
| 1 | Pfizer<br>GlaxoSmithKline | 5.7<br>4.0 | 1 | Intel<br>Nokia | 3.5<br>4.0 |
| 2 | Johnson&Johnson<br>Aventis | 3.7<br>2.7 | 2 | Motorola<br>Ericsson | 3.0<br>3.2 |
| 3 | Roche<br>AstraZeneca | 3.1<br>2.7 | 3 | Hewlett-Packard<br>Alcatel | 2.9<br>1.6 |
| 4 | Novartis<br>Sanofi-Synthelabo | 3.0<br>1.3 | 4 | Hitachi<br>Infineon Tehnolog. | 2.8<br>1.1 |
| 5 | Merck Boehringer<br>Ingelheim | 2.5<br>1.2 | 5 | Toshiba<br>ST Microelectr. | 2.5<br>0.9 |

Source: authors have adapted the data according to: Maincent, E., Navarro, L., 2006

On the global competitiveness scale Switzerland, Germany, Finland and Sweden are the most competitive, commercially sophisticated and innovative countries of

[1] aerospace, computers, office machinery, electronics, instruments, pharmaceuticals, electrical machinery and armament.

the EU (Table 3.). If we consider that those countries are individual rivals to the „huge" USA or Japan, then EU has a remarkable potential for long-term sustainable development based on „new industry".

**Table 3.** Global competitiveness rank of the selected countries according to the World Economic Forum for 2009/2010

| Overall Index | | Business sophistication | | Innovation | |
|---|---|---|---|---|---|
| Rank | Country | Rank | Country | Rank | Country |
| 1 | Switzerland | 1 | Japan | 1 | United States |
| 2 | United States | 2 | Germany | 2 | Switzerland |
| 3 | Singapore | 3 | Switzerland | 3 | Finland |
| 4 | Sweden | 4 | Sweden | 4 | Japan |
| 5 | Denmark | 5 | United States | 5 | Sweden |
| 6 | Finland | 6 | Netherlands | 6 | Taiwan, China |
| 7 | Germany | 7 | Austria | 7 | Germany |
| 8 | Japan | 8 | Denmark | 8 | Singapore |
| 9 | Canada | 9 | Finland | 9 | Israel |
| 10 | Netherlands | 10 | France | 10 | Denmark |

Source: authors have adapted the data according to: World Economic Forum, 2010

## 3. EUROPEAN UNION INDUSTRY ANALYSIS

The industry of the European Union is a relatively healthy and dynamic economic sector which constantly marks a growth, and accordingly, opens new workplaces. The industry represents one fifth of the European Union output (COM374, 2007). As the centre of innovations, by making 81% of investments into research and development (private sector) and making of workplaces for highly educated and professional personnel, the industry plays a key role in transformation of European Union into the economy of knowledge. By strengthening the effect of market economy and directing all means to the segment of „new industry" opposed to deindustrialization, the EU industrial policy has been oriented towards the development and encouragement of the following industries: textile industry, cars and trains, airplanes, production of new materials (new ceramics and fibres), chemical industry, biotechnology, ship building, telecommunication devices (GSM, 3G and alike), new technologies for the preservation of environment and alike. These areas

can also be introduced as the three key factors for improving the competitiveness of industry: knowledge, innovations and entrepreneurship (COM714, 2002).

One of the industrial problems of the EU is certainly a non-enviable position of the ICT production sector and belonging industries of the EU according to the innovative capacities of the USA and Japan, and cost-efficient industrial processes in China and Eastern Asia. The structure of accomplished values of ICT sector of the EU industry only deepens this issue. Namely 80% of the ICT sector value goes to services, and only 20% to the actual production. Annual growth of work productiveness in the USA industry was in the period from 1995-2001 3.8%, whereas in the EU15 it was 2.3% (O'Mahony i Van Ark, 2003). In 2006 the productivity of workforce per employed person is higher for not less than 44% in the USA than the average of EU-27. In 2007 the countries with the most productive workforce were Luxemburg (80%), Norway (50%), Belgium (27%), France (22%), the Netherlands (14%), Switzerland (10%) and Germany (8%) (Eurostat, 2010b).

The new orders for EU-27 industrial products are marked by a fall of 5.9% in December 2009 compared to the same period in 2005. Some of the members that have an increase in new orders are Latvia (129%), Poland (56%), Slovakia (36%), Rumania (31%) and Czech Republic (16%) (authors according to: Eurostat, 2010d). Compared to the decrease in new orders, the industrial production volume records a fall in 2009 compared to 2005 in most of the EU-27 countries. Denmark recorded a fall of 14%, France and Great Britain of about 12%, Finland of 8%, Germany and Norway of about 7% and the Netherlands of 3%. The newer members of the EU have recorded a growth of industrial production volume of, for example, Slovakia 18%, Rumania 17% and Czech Republic 2% (Eurostat, 2010c). Apart from that, in EU15 the enterprises which employed more than 250 employees made up 43.8% of the employment of processing industry in 2000, whereas in the USA 48.6%. The highest EU15 employment in processing industry is made in refinement of oil and nuclear energy, production of transport equipment and chemical industry. We find the similar situation also in the USA, but still there dominates the production of transport equipment, production of electrical and optical equipment, mechanical engineering, chemical and textile industry (O'Mahony i Van Ark, 2003).

According to the Eurostat data (2007), in 2006, 17.9% of the employed persons were employed in EU industry, whereas ten years earlier the number of employed persons in industry amounted to 21.2%. In 2004 there were 2,280 registered in-

dustrial enterprises or 12.1% of the total number of EU enterprises. The biggest part, namely 17.5% of the enterprises, form enterprises engaged in metal industry and products which employ 13.3% of the employed people in industry (Table 2.). EU makes the positive balance of payments in international exchange of chemical products, transport equipment, and machines and devices. However, it worries that the import of electrical machines and optical devices, which stand for high technology products, is bigger than the export.

**Table 4.** Selected indicators of EU-27 industry

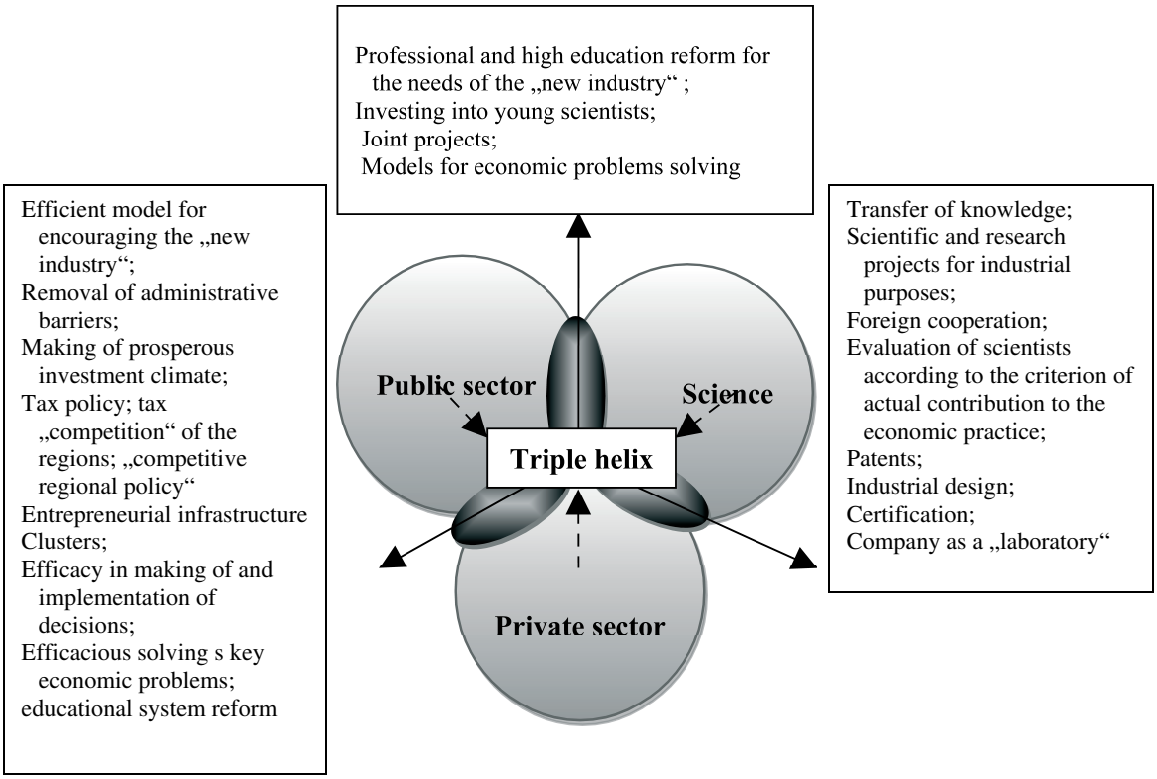
| Industrial areas | No. of industrial enterprises, (000), 2004 | No. of employed in industry (000), 2004 | Industry export (billion €), 2006 | Industry import (billion €), 2006 | Balance of payments (billion €), 2006 | % of the total EU export, 2006 |
|---|---|---|---|---|---|---|
| Production of food and beverages | 296 | 4,772 | 54,044 | 48,169 | 5,875 | 5 |
| Production of textile, clothes, leather and footwear | 266 | 3,410 | 45,765 | 97,493 | -51,728 | 4.2 |
| Wood and paper | 217 | 2,060 | 29,212 | 21,367 | 7,846 | 2.7 |
| Chemical products, rubber and plastic | 100 | 3,700 | 194,761 | 128,952 | 65,809 | 18 |
| Other nonmetal products | 102 | 1,600 | 17,595 | 10,382 | 7 213 | 2.7 |
| Metal and metal products | 399 | 4,991 | 90147 | 104 480 | -14 333 | 8.3 |
| Machines and devices | 164 | 3,661 | 171 147 | 74 717 | 96 430 | 15.8 |
| Electrical machines and optical devices | 196 | 3,600 | 197 586 | 267 029 | -69 443 | 18.3 |
| Transport equipment | 43 | 3,200 | 176 297 | 101 947 | 74 350 | 16.3 |
| Furniture and other products | 227 | 1,900 | 29 549 | 40 692 | -11 143 | 2.7 |
| Mining | 17 | 291 | 13 694 | 31 812 | -18 118 | 1.3 |
| Energy | 21 | 1,980 | 56 283 | 321 230 | -264 947 | 5.2 |

Source: authors have adjusted according to Eurostat, 2007

## 4. TRIPLE HELIX MODEL OF THE „NEW INDUSTRY“ AND FINAL THOUGHTS

Triple helix model of the „new industry“ is based on the integration of private, public and university sector with an aim of increasing the competitiveness advantage of the EU. Triple helix model, according to Etzkowitz (2003) represents a process in which the areas of university - business sector - government overlap with an aim of increasing benefits, bigger than national, regional and multinational systems. That is the new model of promoting the cooperation of business sector, university links and government organizations with an emphasis to commercialization (Asheim & Coenen, 2004; Leydesdorff, 2005; Leydesdorff & Etzkowitz, 2001; Shapira, 2002). Exactly from this form of cooperation results the balance between the knowledge, social benefit and profit (Asheim & Coenan, 2004; Leydesdorff, 2005). In triple helix model there must be an internal entrepreneur reorganization of each of the key factors (scientific sector, business sector and the state) as well as the mutual influence of each of the key factors to the making of new level of trilateral networks for the creation of new ideas and forms of high-tech and high-touch development (Picture 1.). By connecting and cooperation of the public and educational sector we will get an efficient system of knowledge transfer, and by connecting the educational and private sector entrepreneurship based on knowledge. The last decade started a process of making of private-public partnerships. Triple helix enables the best solution of long-term cooperation which permits short-term intensive experiences (Campbell, 2005; Etzkowitz, 2003). The possible problems of this kind of cooperation are difficulties related to coordination of responsibility, difficulties related to reports on project progress, conflicts of interest, as well as possible conflicts related to financial means. Shapira (2002) points to three key reasons of forming of this model: social benefit, economic efficiency and sustainability.

**Picture 1.** Triple helix of the" new industry "




Source: authors

EU definitely must redirect its efforts towards the new industries which make higher growth rates. The new concept of economy development of the European Union is based on the challenges of the Lisbon strategy, so there should be relied on the so called „information and innovation society", and the society based on knowledge in which it will try to face the new challenges of its economic role on the global economic scene by means of innovation policy, policy of encouraging the small and medium entrepreneurship development, and the policy of encouraging the research and development.

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