INNOVATION AS A KEY FACTOR IN THE INTERNATIONAL COMPETITIVENESS OF THE EUROPEAN UNION

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There is international scientific consensus that economic progress will be driven by innovation, namely the invention and application of new technologies. Research and Development (R&D) is one category of spending that develops and drives these new technologies. From the perspective of competitiveness, private sector firms are prone to focus their R&D on “applied” projects and many government-sponsored technological advances have been instrumental in driving economic growth and rising living standards. According to the published literature, it is expected that countries engaging in R&D activities have a comparative advantage in export of products, and countries with the “largest” R&D expenditure are in the forefront of the technology boundary when they invent new products or new production processes by gaining competitive advantages as compared to other countries producing competing goods.

It has been apparent for at least a century that future economic progress will be driven by the invention and application of new technologies. R&D is one category of spending that develops and drives these new technologies. However, private sector firms are prone to focus their R&D on “applied” projects, where the payoff to their bottom line is likely to accrue only to them. Their role is not to undertake broad R&D for the general benefit of our nation.

According to the literature, it is expected that countries engaging in R&D activities have a more comparative advantage in exporting their products. Furthermore, countries having “large” R&D expenditure may move to the forefront of the technology boundary when they invent new products or new production processes. They may then gain competitive advantages compared to other countries producing competing goods. It is, therefore, expected that the export performance of a country is positively related to its R&D behavior.

Keywords: R&D, patents, innovation, competitiveness, European Union.

Introduction

The Europe 2020 Agenda is a strategy proposed by the European Commission (EC) to stabilize the European economy after the global economic crisis and setting out a vision of Europe’s social market economy for the 21st century. The Europe 2020 agenda reinforce mutually three priorities (EC, 2010):

- Smart growth: developing an economy based on knowledge and innovation;
- Sustainable growth: promoting a more resource efficient, greener and more competitive economy;
- Inclusive growth: fostering a high-employment economy delivering social and territorial cohesion.

In order to define specific economic and social goals for the 21st Century, the European Commission has proposed a number of European Union (EU) headline targets which represent the three priorities of smart, sustainable and inclusive growth. In general the targets concern the increase of employment and investment in R&D, the reduction of greenhouse gas emissions, the share of early school leavers, and the number of European living below the poverty line.

EU, as a region, has declared a movement to the innovation driven economy. According to the Global Competitiveness Report (Schwab, 2012) competitiveness of the countries can be evaluated based on 12 pillars; and countries reach innovation driven economies if they have strong positions in the 11th (Business sophistication) and 12th (Innovation) pillars. Criteria to measure Innovation in this report are:

- Capacity for innovation
- Quality of scientific research institutions
- Company spending on R&D
- University-industry collaboration in R&D
- Government procurement of advanced technology products
- Availability of scientists and engineers
- PCT patent applications
- Intellectual property protection

The purpose of the present study is to examine the importance of R&D and its impact on the competitiveness of the EU countries.

Components of Economies Competitiveness

Competitiveness has increasingly gained currency across the globe. The international trade theories explain that different countries have different comparative advantages.
Thus, if a country is rich in natural resources or capital, it has a comparative advantage over the others (Porter, 1990). According to Pillania (2009), in the current knowledge economy, knowledge can be seen as a free resource with no natural home base, easily transferred to anywhere in comparison to natural resources. So, this has made the 21st century more and more competitive.

Competitiveness and country competitiveness rankings have increasingly become important, comparatively to microeconomics competitiveness, and various studies are carried out on the subject (Garelli, 2006). There are two internationally well recognized annual rankings on the competitiveness of countries, the Global Competitiveness Rankings and the World Competitiveness rankings.

The Global Competitiveness Rankings study is conducted by the World Economic Forum. Main coordinators and investigators of Global Competitiveness Report are Klaus Schwab, Michael Porter and Xavier Sala-i-Martín. Schwab (2012:4) define competitiveness “as the set of institutions, policies, and factors that determine the level of productivity of a country” and defends that the level of productivity is positively related with the sustainable level of prosperity and grow of an economy. So, more competitive economies tend to be able to produce higher levels of income for their citizens. The productivity level influences the rates of return obtained by investments in an economy, being this the fundamental drivers of the growth rates of the economy, taking to that more competitive is one economy more faster it tend to grows over the medium to long run.

The concept of competitiveness involves static and dynamic components. The productivity of a country is directly related to the level of income, being a central determinant of the returns to investment, and, in this way, a key factor to explain the potential of one economy’s growth (Schwab, 2012:4).

The determinants of competitiveness are many and complex. For competitiveness ranking of the countries, Global Competitiveness Report introduces the Global Competitiveness Index (GCI). The GCI captures the open-ended dimension by providing a weighted average of many different components, each of which reflects one aspect of the complex reality of competitiveness dimension. These components are grouped in 12 pillars of economic competitiveness (Figure 1).

The EU is continuously making efforts to improve its international competitiveness and to find new sources of growth based on intangible assets such as innovation, science and entrepreneurship (UNECE, 2012).

The development of the knowledge-based economy highlights the need to generate knowledge, to exploit, to transfer and to apply. Since nowadays information is widely accessible, the knowledge and skills are assets that can provide a real edge. Knowledge and innovation are hot topics because they are key drivers of economic development and along with other components they can turn into a strong competitive advantage of any nation. So far, regions were identified as important players in the knowledge-based economy. Because they fail to enhance their potential on their own, the triple helix model involving the public sector, the business community and the higher education institutions was developed. Its purpose is to create links and interactions between those three and in this manner to create a synergy. UE regions and countries differ from each other in terms of intangible assets and factors of competitiveness.

According to Raluca (2011), knowledge is a special type of economic resource and it’s a non-rival input in generation of new knowledge, what implies that knowledge is not based on the scarcity principle, and while most resources become depleted when used, knowledge can be shared and grow through application which further leads to innovation. So, knowledge and technology became the heart competitiveness determinants in the global economy. Raluca (2011:118) also refers that “evidence from a number of countries suggests a faster growth of investment in intangible assets than in tangibles hence the interest for them”.

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**Figure 1. The Global Competitiveness Index Framework** *(The Rebuilding Europe’s Competitiveness Report, 2013)*
At the time of global financial and economic crisis, with political and social pressures, innovations are increasingly seen as a vital boost to development, economic growth and job creation, and essentially, the key goal - competitiveness. This trend has been reflected in a shift in national policies and even supranational agendas like the EU’s Innovation Union and the OECD’s Innovation Strategy. It can be noted that increased concentration on the knowledge triangle – education, research, innovation – is in fact a common trait to all fast-growing and competitive economies (Vaidere, 2011).

It is important to perform an analysis on technological change and international trade in order to drive some conclusions on external competitiveness issues related to technological intensity of industrial manufacturing sectors and international trade. At this stage of the present study the focus will be only on an exploratory study among the variables related to technological change and exports of selected EU leading countries in foreign trade.

The EU underperforms competitiveness in several pillars. Based on the GCI methodology, Figure 2 shows that the US consistently outperforms the EU27 average across all pillars of the GCI (except macroeconomic environment).

Europe particularly lags behind in three areas: i) innovative capacity, related to the capacity to generate and use knowledge to create new products and processes to lead to more value added; ii) higher education and training systems, which are required to develop the skills needed to power a knowledge based economy; and iii) the creation of an efficient labor market (WEF, 2013).

In the e Global Competitiveness Index framework, innovation is the twelfth pillar, and it represents a key factor for competitiveness of enterprises, research facilities and regions within the EU to achieve goal of innovation – driven economies.

According to the Global Competitiveness Report (2012:7), the less-advanced countries “can improve their productivity by adopting existing technologies or making incremental improvements in some areas, while for those that have reached the innovation stage of development this is no longer sufficient for increasing productivity”. However, this requires an environment that provides innovative activity, and that should be supported by the public and the private sectors; and being relevant to this environment the follow contributors: the existence of investment in R&D; a high-quality scientific research institutions that could generate knowledge that supports new technologies; extensive collaboration in research and technological developments between universities and industry; and the protection of intellectual property, in addition to high levels of competition and access to venture capital and financing that are analyzed in other pillars of the Index.

**Innovation, Exports and International Competitiveness: evidence at firm level**

According to Belderbos, Duvivier and Wynen (2009), based in Becker and Egger (2007), some determinants of successful exports are investments in capital and technologies which contribute to higher labour productivity, and the introduction of product innovations. They also defend that R&D and innovation, involving the introduction of new products, contributing to sustain or improve the competitiveness. The relationship between innovation and R&D, is many times interpreted as an indicator of the non-price competitiveness of a nation’s products (Buxton, Mayes and Murfin, 1991), and export competitiveness success is used as one explanation for the nation’s differences in world trade performances.

Some empirical research shows evidence of a positive correlation between productivity and export performance (e.g. Aw and Batra, 1998; Bernard and Jensen, 1999; Chen and Tang, 1990). Moreover, according to Belderbos, Duvivier and Wynen (2009), a productivity advantage should be an important requirement to enter foreign markets successfully, suggested by empirical literature where productivity drives exporting, but the evidence of a ‘reverse’ effect is also true (e.g. Arnold and Hussinger 2005; Clerides et al., 1998; Bernard and Jensen, 1999; Delgado et al., 2002; Salomon and Shaver, 2005; Damijan et al, 2008).

The higher productivity of exporting is often related to firm-level technological advantages, due to R&D investments and the introduction of product and process innovations.

Since R&D and innovation is recognized as a driver for productivity, a large number of empirical studies have examined the relationship between exports and various input and output measures of innovation and technological capabilities. According to Belderbos, Duvivier and Wynen (2009), several works focusing on firms’ R&D expenditures or investments in new capital equipment related with technological change, confirmed a strongly positive relationship (Hirsch and Bijaoui, 1985; Belderbos and Sleuwaegen, 1998).

A number of recent studies have explicitly focused on the effect of the introduction of product and process innovations on exports. There are several reasons why innovation will influence the internationalization of firms. First of all, product and process innovations may make it possible for firms to target new markets (Autio et al., 2000), as innovation efforts result in improved, modified or new products and/or process that may give enterprises a competitive advantage in foreign markets. Furthermore, innovative firms in small economies can only produce sufficient returns on R&D investments if
they have a broad geographic market scope, which allows selling innovative products at a larger scale. In a study based on a sample of more than 1000 UK manufacturing firms, Wakelin (1997, 1998) confirmed that firms that introduced innovations were more export intensive and moreover less reliant on labor cost advantage to sustain exports. Using comparable plant-level surveys of UK and German firms, Roper and Love (2002) demonstrated a positive effect of product innovation on export in both countries. Becker and Egger (2007) using data on German firms, and Cassiman and Martinez-Ros (2007) using data on Spanish firms, conclude that product innovation is more important than process innovation for firms’ propensity to engage in export activities. While product innovations are important for foreign market entry, process innovation may help maintain export positions once these have been established. Product innovation process also increase quality competitiveness of certain industries and product groups (Priece, Skapars, 2011-2013). Overall, the existing literature indicates that innovation is to be considered a major underlying force of exporting and competitiveness in international and global markets.

Most competitive countries in the world and a place of EU countries

Although less-advanced countries can still improve their productivity by adopting new existing technologies or making incremental improvements, for those countries that have reached the innovation development this is no sufficient for increasing productivity (Global Competitiveness Report, 2012:7). So, firms in these countries must invest in the development of an environment conducive to innovative activity, based on R&D, that takes to the development of products and processes innovations to maintain a competitive edge and move toward higher value-added activities.

In light of the recent sluggish recovery and increasing fiscal pressures faced by advanced economies, it is important that the public and private sectors continue to invest in R&D, as this is critical for the world sustainable growth and international competitiveness.

From the GCI report we can see (Table 1) the top 30 most competitive countries in the world and also top 30 countries in the world based on the innovation ranking created by World Economic Forum.

In Table 1 we can see that most of the innovation leaders are also represented on the list of most competitive economies in the world.

Innovation ranking is created based on the following criteria (Schwab, 2012):

- Capacity for innovation
- Quality of scientific research institutions
- Company spending on R&D
- University-industry collaboration in R&D
- Government procurement of advanced technology products
- Availability of scientists and engineers
- PCT patent applications

We have to take a look into more theory and data to identify links between innovation and competitiveness.

<table>
<thead>
<tr>
<th>Competitiveness ranking</th>
<th>Innovation ranking</th>
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<tr>
<td>1. Switzerland</td>
<td>1. Switzerland</td>
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<tr>
<td>2. Singapore</td>
<td>2. Finland</td>
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<td>3. Finland</td>
<td>3. Israel</td>
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<td>4. Sweden</td>
<td>4. Sweden</td>
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<tr>
<td>5. Netherlands</td>
<td>5. Japan</td>
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<td>6. Germany</td>
<td>6. United States</td>
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<tr>
<td>7. United States</td>
<td>7. Germany</td>
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<tr>
<td>8. United Kingdom</td>
<td>8. Singapore</td>
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<tr>
<td>9. Hong Kong, SAR</td>
<td>9. Netherlands</td>
</tr>
<tr>
<td>10. Japan</td>
<td>10. United Kingdom</td>
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<tr>
<td>11. Qatar</td>
<td>11. Belgium</td>
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<tr>
<td>12. Denmark</td>
<td>12. Denmark</td>
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<tr>
<td>13. Taiwan, China</td>
<td>13. Austria</td>
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<tr>
<td>14. Canada</td>
<td>14. Taiwan, China</td>
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<tr>
<td>15. Norway</td>
<td>15. Norway</td>
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<tr>
<td>17. Belgium</td>
<td>17. France</td>
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<td>18. Saudi Arabia</td>
<td>18. Luxembourg</td>
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<tr>
<td>20. Australia</td>
<td>20. Iceland</td>
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<td>22. Luxembourg</td>
<td>22. Canada</td>
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<tr>
<td>23. New Zealand</td>
<td>23. Australia</td>
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<tr>
<td>24. United Arab Emirates</td>
<td>24. New Zealand</td>
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<td>25. Malaysia</td>
<td>25. Malaysia</td>
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<tr>
<td>26. Israel</td>
<td>26. Hong Kong, SAR</td>
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<tr>
<td>27. Ireland</td>
<td>27. Puerto Rico</td>
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<tr>
<td>28. Brunei Darussalam</td>
<td>28. United Arab Emirates</td>
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<tr>
<td>29. China</td>
<td>29. Saudi Arabia</td>
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<tr>
<td>30. Iceland</td>
<td>30. Estonia</td>
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Expenditures on R&D and their impact on export

One of the five headline targets of Europe 2020 Strategy is to achieve a R&D intensity (R&D expenditure as a percentage of GDP) of 3% in the EU. In 2011, R&D intensity in the EU-27 stood at 2.03% and largest EU-27 economy – Germany was with 2.84% in year 2011 (Figure 3).
Expenditures on R&D are very important since countries have great incentives to export higher added value. Despite some EU countries who are spending high share of GDP on R&D, EU-27 average was below the figures recorded in Japan (2009 – 3.36%), South Korea (2010 – 4%) and the United States (2009 – 2.87%), but higher than in China (2009 – 1.7%).

Among the EU member states, only Finland (3.78%), Sweden (3.37%) and Denmark (3.09%) exceeded the EU goal of devoting 3% of GDP to R&D, also outperforming the United States.

Another seven Member States, namely Germany (2.84%), Austria (2.75%), Slovenia (2.47%), Estonia (2.38%), France (2.25%), the Netherlands and Belgium (both 2.04%) were above the EU-27 average although below the target figure of 3%.

Between 2005 and 2011, R&D expenditure in the EU-27 increased by an average of 3% per year, reaching EUR 257 billion in 2011. Germany, France and the United Kingdom together accounted for more than half of all R&D expenditure in the EU-27.

In Figure 2 we can observe that South Korea and China are increasing expenditures on R&D rapidly in order to increase competitiveness in the world markets.

As a result from investment in R&D European Union 27 countries since year 2001 are making more than 50 thousand patent applications to the EPO annually and that is considerably more than USA and Japan (Figure 4).

We do have to take into account that countries with largest economies and investment in R&D are also a largest contributors to the amount of patents registered (Figure 5).

As we see in Figure 5, Germany with 40% from all patent applications is a leading country with greatest contribution followed by France (16%), United Kingdom (9%) and Italy (8%).

Patent applications overall shows a performance of the science and returns from investment in R&D. Authors in this paper decided to examine High-tech patent applications to the EPO. This analysis will give a better view on the industry performance.

Figure 6 shows information on High-tech patent applications to the EPO in total and Figure 7 shows High-tech patent applications to the EPO in industries like aviation, computer and automated business equipment, communication technology, lasers, micro-organism and genetic engineering and...
Figure 7. High-tech patent applications to the EPO in selected industries (Eurostat, Authors)
computer and automated business equipment and similar positions with Japan in field of semiconductors.

We can observe an interesting situation in world exports that shows shares of the biggest economies (Figure 8).

![Figure 8. Share of national exports in world exports (%)](image)

Figure 8 shows that shares of national exports in world exports from year 2003 are decreasing for EU-27 countries, United States and Japan, but China are increasing share rapidly – from 5.6% in year 2000 till 14.1% in year 2010. As we saw (Figure 3) China is increasing expenditures in R&D and rapidly increase competitiveness in the world markets.

Overall increase of exports share for China could be explained by strong positions in the machinery and transport equipment industry (Figure 9).

![Figure 9. Share of national exports in world exports (%) in machinery and transport equipment industry](image)

As we can see in Figure 9, China have managed to increase share of national exports in world exports in the machinery and transport equipment industry from 1.8% in year 2000 till 7% in year 2010.

### Attracting R&D-intensive FDI

The attraction of R&D-intensive FDI can be conceptualized as a horizontal policy which stands in the intersection between innovation policy and inward investment promotion. One of the roles of innovation policy is to improve the investment climate for R&D by identifying and acting upon the strengths and weaknesses of the national innovation system. By other side, the inward investment promotion as also the role to improve the image of the country as an R&D location and to provide targeted services to both potential and existing foreign investors in R&D (Guimon, 2008). Within each of those policy areas, Table 2 identifies a set of key policy instruments which are further discussed in the sub-sections that follow.

<table>
<thead>
<tr>
<th>Table 2. A policy framework to attract R&amp;D-intensive FDI (UNECE, 2007; Guimon, 2008:4)</th>
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<tbody>
<tr>
<td><strong>Innovation policy</strong></td>
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<tr>
<td>- Fiscal and financial incentives to corporate R&amp;D</td>
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<tr>
<td>- Human capital development and attraction of foreign talent</td>
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<tr>
<td>- Enhance the research infrastructure and promote collaboration and linkages</td>
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<tr>
<td>- Improve the intellectual property rights regime</td>
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<tr>
<td><strong>Inward investment promotion</strong></td>
</tr>
<tr>
<td>- Target R&amp;D-intensive FDI and build the image of the country as an R&amp;D location</td>
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<tr>
<td>- Provide R&amp;D-specific pre-investment and implementation services</td>
</tr>
<tr>
<td>- Emphasize after-care services</td>
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<tr>
<td>- Policy advocacy</td>
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</table>

The public intervention aimed at attracting R&D-intensive FDI is a horizontal policy that results from the intersection of (UNECE, 2009):

- Innovation policy: Improvement of the overall framework conditions for innovation; and
- Inward investment promotion: Building a positive image of the country or region as a location and providing specific support services for R&D-intensive foreign investors.

Most countries have locations or centre institutions with significant investment in science and technology (UNECE, 2009). Examples of these include:

- Military research facilities;
- Large corporate research centres; and
- Government sector-specific research facilities.

However, scientific research tends to be conducted on a smaller scale and at a higher level in more diverse locations such as universities.

Other aspect improving innovation is the R&D tax incentives as a policy instrument. In this case, the objective is to encourage business R&D providing financial incentives through the tax system. There are different types of R&D fiscal incentives that can be used. These can be classified as:

- General: They are granted to all companies under certain conditions.
- Specific: They depend on obtaining a certain status as a R&D company. This status is usually contingent on a certain threshold on the share of revenues from research and
development services over total income. Fiscal incentives may also be limited to small enterprises.

These incentives specify:

- The specific type of expenditures covered (all innovation expenses/only R&D, inhouse or external, including foreign; cost of patents);
- Any differentiation of rates. Typically, systems are more generous for basic research and less for development;
- The limits for any possible deduction (absolute or in relation to an identifiable benchmark);
- The modalities of certification of expenditures by the authorities (in advance or subject to review); and
- The time period for the application of the deduction.

Tax incentives can take the form of:

- Credits: Reducing the amount of taxes to be paid;
- Allowances: Reducing the tax base for the calculation of corporate earnings.

There are some generally accepted principles in designing R&D tax incentives (Table 3.).

Table 3. Principles of designing tax incentives for R&D in firms (UNECCE, 2007)

<table>
<thead>
<tr>
<th>General principles</th>
<th>Incentives should be transparent and easily accessible to a broad range of firms. The nature and basis of incentives should not change too frequently.</th>
</tr>
</thead>
<tbody>
<tr>
<td>General versus selective measures</td>
<td>General measures reach more firms, maximizing the potential increase in R&amp;D and minimizing market distortions. Targeted measures are best used to reinforce technological leadership or build critical mass, but must be carefully designed to avoid distortion of the market.</td>
</tr>
<tr>
<td>Types of regime</td>
<td>Where there is a relatively stable market demand for R&amp;D, volume-based incentives are best. Where there is a specific policy objective to support dynamic firms, incremental-based incentives are best. Both can be combined in one tax incentive.</td>
</tr>
<tr>
<td>Types of relief</td>
<td>To increase the number of employees engaged in R&amp;D or to support firms which are unlikely to make profits in the short term, tax incentives to reduce the cost of employing research personnel are particularly apt.</td>
</tr>
<tr>
<td>Level of generosity</td>
<td>The full cost of R&amp;D expenditure should be capitalized and depreciated over a period of time if it is decided not to allow the full cost of R&amp;D expenditure to be taken to the fiscal profit and loss account.</td>
</tr>
<tr>
<td>Eligible R&amp;D costs</td>
<td>A rate should be set which is both sufficiently attractive and sustainable in the long run.</td>
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</table>

Notwithstanding these principles, the experiences of different countries in applying R&D tax incentives may vary considerably.

For example in United Kingdom all companies with qualifying spending over £10,000 a year on R&D are entitled to a deduction when calculating their taxable profits of 150% of qualifying expenditure for SMEs or 125% of qualifying expenditure for larger companies, reducing the company’s UK corporation tax bill accordingly. The rate of relief under the large company scheme will increase to 130% for work undertaken on/after 1 January 2007, companies that sub-contract R&D work to unconnected parties will also qualify up to a maximum of 10% of the qualifying R&D expenditure in any one year.

The tax code in Israel allows firms to deduct qualifying R&D expenses (including outsourced R&D), from taxable income in the same year, after the claimed expenditure has been approved by the OCS.

The use of this clause is not widespread, although some firms are using it rather ‘creatively’, claiming all sorts if deductions, including sabbatical expenses of their employees abroad. There is no tax credit as such.

Russian legislation has established a number of tax privileges for firms’ R&D expenditures. Before 2007, R&D expenses up to 1.5% of the company’s turnover were to be considered as tax deductible. In 2007, this ceiling was abolished meaning that all R&D expenditures can be deducted when calculating taxable profits. Federal R&D Foundations are not subject to profit tax and VAT at all. In addition, company assets obtained from particular scientific and technology support funds are not considered as income. If a company’s fixed assets are used exclusively for R&D or technology support funds are not considered as income. If a company’s fixed assets are used exclusively for R&D expenditure. This shift is expected to be more advantageous for new companies.

The Spanish R&D tax incentives system has traditionally been one of the most generous among UNECE countries. Despite this, only around 30% of enterprises benefit from these incentives. Recent reforms have sought to reduce bureaucratic barriers to access R&D support. Since 2007, there has been a shift towards a reduction of the deduction percentages applied to R&D expenditures while allowing deductions of up to 40% of social security payments for research personnel employed for R&D and innovation expenditure. This shift is expected to be more advantageous for new companies.

The consideration of R&D for tax purposes is usually dependent on the significance of this activity for the overall advance of science and technology:

- It must have general relevance beyond the company that is incurring the expenditures.
- The use of science or technology does not imply necessarily that the process, material, device, product, service or source of knowledge is an advance in science and technology.
- It may include the adaptation of existing knowledge or capabilities, as far as it is considered as an advance.

Conclusions

EU needs to increase investment in R&D and innovation in a strategic way. The EU is slowly advancing towards its target of investing 3% of GDP in research and development (2.01% in 2009) but the gap with leading competitors is widening - Japan (2009 – 3.36%), South Korea (2010 – 4%) and the United States (2009 – 2.87%).
In times of economic crisis, accumulated investment in Innovation and R&D has a counter-cyclical effect, and countries that have increased their investments in R&D and Innovation can in a crisis framework. The European countries well positioned in Innovation ranking are also in the Global Competitiveness Index.

The investments in innovation and R&D have to be strategic. EU countries should provide a dynamic innovative creativity environment involving high-quality scientific research institutions, researches, resources, and companies and industry. These innovative activities concentrated on high-tech R&D will give the opportunity to increase the competitiveness of exports.

EU countries (27 countries), compared with US and Japan, and measured by high-tech patents, have strong positions in high-tech industries like aviation (the only industry with an increasing position in the last decade), and lasers. When compared the world exports shares of the biggest four world economies, EU countries (27 countries) have maintain the leadership in the last decade.

The attraction of R&D-intensive FDI EU countries can be conceptualized as a horizontal policy which stands in the intersection between innovation policy and inward investment promotion. There should be generally accepted principles used in designing R&D tax incentives to attract R&D-intensive FDI.

EU to maintain its strong position of international competitiveness has to invest in innovation and R&D in order to maintain a sustainable international competitive position and enable European countries to better prospects of getting out the economic crisis. So Innovation is a key factor for the international competitiveness of European Union’s companies and countries.

References
http://dx.doi.org/10.1016/0304-3878(94)00062-H
http://dx.doi.org/10.1016/S0022-1996(98)00027-0
http://dx.doi.org/10.1080/10438599100000005
http://dx.doi.org/10.1162/003355398555784


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