

E.U. strategy for competitiveness challenge. The aeronautics-aerospace case.

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Introduction.

In the current historical phase, E.U. is knowing a difficult situation in comparison not only with USA, but also others emerging economies as China, India and Japan (Alesina and Gavazzi, 2006).

The difficult is emerging in a evident way because the globalisation of knowledge, information and production processes, shows geo-economic areas one in competition without any protection. The UE at the beginning of the 21th century has had a growth ratio equal to 2,4% as annual average, versus the 3,5% in USA.

In the global competitiveness the most important results to consider are price and quality of products and services. It's just clear that EU have to gain competitiveness through quality rather than reduction of production cost, it is enough to consider that Europe must to respect obligations subscribed in several international summit about environment, job conditions and international security.

The best, and maybe the only one way that Europe can choose is the productivity growth through investments in new knowledge, technology transfer and human capital.

This assumption is the core of the Lisbon Strategy and it is the aim of EU policies that look at the long run perspectives.

Why to choose the way of innovation?

The necessity to invest in innovation, derives from the assumption that, the knowledge is the main source of competitive advantages as well as the instrument to win the challenge with old and new competitors is the knowledge in the present historical phase.

High technology has changed the economy and the society encouraging the develop of knowledge, so that we are going from the industrial society to the information one and from an industrial production model based on the mass production to a model focused on fragmentation and individual responsibility.

The US economy since the 60's started to invest in innovative activities and new technologies, in the same time the old continent began to lose its leadership in the global

economic context. In this moment started the decrease of competitive capacity related to USA, and Japan too. This European disadvantage increased as consequence of the different percentage of resources invested in R&D: it is enough to consider that in 2003 UE invested in these activities just the 1,93% of its GDP, versus the 2,5% in USA and 3,15% in Japan. In the same year the difference between USA and UE in terms of investments amounts to € 130 billions that comes for 80% from private sector.

Nowadays it is important to invest in new technologies because in Europe in 2000 the labour productivity is the 78% of the American one and the main reason of this gap seems to be linked with the low level of ICT embodied in labour processes and the not enough implementation of the innovation obtained in production processes.

In fact Europe has a leadership position in terms of scientific productions, considered one of the most important index of knowledge outputs, it covers the 38,3% of the publications in the world, the United States are at the second position with the 31,1% and Japan at the third one with only the 9,55%. In spite of these premises, EU has difficulties in implementation of these results. In fact in 2003 the Triadic Patents index, that refers to innovations protected in the 3 most important offices (EPO - European Patent Office -, USPTO - US Patent and Trade-mark Office -, and Japanese Patent Office) is equal to the 31,5% of the total amount of patents versus the 34,3% in USA. There are also disadvantages about the capability to transform innovations obtained in “goods” interesting for companies (COTEC 2006).

The aim of this study - conforming to the well-known positive effect that innovation technologies produce on TFP - is to light up the mechanism of transfer of knowledge, innovation and technology, choosing an industrial perspective and the aeronautics-aerospace sector as case study.

The reasons to choose aeronautics-aerospace sector.

Aeronautics-aerospace is a key asset for the future of Europe as economic power as well as political one. It is pioneering the knowledge society that the European Union is urgently seeking to achieve.

There are many reasons to look at the innovation challenge through the study of this sector. The first one is linked to the use of the traditional Pavitt's taxonomy, an instrument that classifies economic sectors in terms of technology embodied in their production processes. In this list the aeronautics-aerospace is defined like a knowledge-science-

based sector, the cluster that finds in science, technology and investments in R&D hits main forces. As users, developers and suppliers of advanced innovative technologies, these companies know the value and importance of continuously developing human skills. In fact the European sector in 2001 invested 15% of its turnover in R&D, equal to more than € 9 billions per year against an average of 9% in others sectors. Also the support from UE is relevant so that from 1990 to 2001 total public funding provided by UE has increased much more than the support of member States: it is a real perspective to reach a total amount of 100 billions before 2010. The justification of this programme is clear: in this field research and technologies have as target to protect the public interest in areas such as quality, safety and environment, considered as priorities in aeronautics program research.

The results maybe obtained in space research are relevant not just under the scientific point of view. For example the International Space Station (ISS) that will be finished in 2010, will be an important base for different experiments in physics of particles, chemistry of combustion, biology of virus, creation of new materials or new medicines; in addition thanks to the new station will be possible to understand how human body work in space conditions as well as to study climate changes (Giuri, 2007).

It is necessary to remind that space sector is strictly linked with national defence policy: there is a strong dependence from institutional budgets, the space requires expensive programs with high contents of risks, that's way governmental efforts are necessary. As consequence the competitive position of the State in this field is linked both to the dimension and the performance of companies and to the investments in national and international agency specialized in the research activities and spatial exploration, like NASA in USA and ESA in UE. In this field there is a significant gap between these two geo-economic areas, whose origin is clear if we consider that the resources coming from public sector amount to 74% in USA, 16% in UE and 5% in Japan.

If on one hand the aeronautics-aerospace sector is not particularly significant in terms of GDP and number of employed in the framework of a national economy, on the other hand is crucial in the production of innovation generated from workers that, in spite of their number, are highly skilled-knowledge-workers, experts in use and exploitation of advanced technologies, including the ICT, a sector where European losses in terms of competitiveness have been significant.

In addition aeronautics-aerospace sector is significantly pervasive. If we consider just the space field, we observe that it worth € 70 billions equal to the 0,2% of the GDP in the

world, but the entire production chain is six times bigger. That is why it may create cumulative effects on the reduction of unemployment

The fact that technological innovation improved in this sector contribute significantly at the displacement of the boundaries of knowledge is well-known; but it is fundamental to consider also that innovations created are often available for many applications, can be used in many others sectors sometimes apparently far to the first one, it's enough to think at the extraordinary applications that has had GPS.

The innovations generated in this sector conforming to the traditional mechanism of knowledge diffusion in formal and informal ways; this mechanism is also characterized by a rapid transfer in vertical as well as in horizontal sense. The first kind of flow is a consequence to the typical pyramidal structure of the sector that encourages the transfer of innovations embodied in technical instructions from the top to the base. On the top of the pyramid there is a limited number of big companies (system integrators) that coordinate the flow of materials and information; on the second level there are firms that produce motors, propellers and electronic equipment and finally, on the third level there are firms with a relevant know-how in production of specific component, these firms makes an activity of sub-supplying for companies on the second and first level of the pyramid (Niosi and Zhegu, 2005).

The horizontal diffusion of knowledge regards the use of innovative products created in the sector in many others, often far from the first one. The distribution of single parts of a research-project among universities and external companies, encourages the knowledge fertilization of the economic context and produces a positive effect especially on small and new firms that unexpectedly are able to create innovative outputs in spite of their negligible amount of R&D investments (Griliches, 1992)

An other relevant characteristic of this sector is the strong polarization on the regional level. This phenomenon is present in many EU countries that have a relevant position in this field. In Italy there are productive poles in 5 regions: Piemonte, Lazio, Lombardia, Campania and Puglia, in United Kingdom there are clusters in Welsh, in North West Region, in South West Region and in West Midlands. France distinguishes itself for aerospace pole of Île de France and of Midi-Pyrénées Region, Poland, among the new entry-States in EU, can rely on the Aviation Valley in the South East of country and finally Germany has an aerospace pole in Bavaria (Caroli, 2006).

Considering on one hand the well-known mechanism of knowledge diffusion in the spatial dimension and on the other hand, the positive effect that a carrying-company can produce

on a regional economy, it is possible to say that the aeronautics-aerospace sector can generate a significant knowledge and economic fertilization in many European regions conforming to the theory of “poles of development” formalized by Perroux.

The increasing attention in UE about the aeronautics-aerospace sector.

The aeronautics-aerospace is one of the field in which it is important to have an European strategy rather than a national one, this is the only way to contrast the USA leadership (Picerno and Brindisi, 2006).

New products development in this field is enormously expensive and, for many years the costs of developing and producing of a new products family have often beyond the reach of one company, and of the budgets of most single nations; in fact in aerospace sector the break-even-point is reached with 350-400 units sold in 10 years after the investment.

Looking at the total turnover of the main 7 States in the world in this sector, in 2003 it is evident the US leadership with less than € 100 billions, on the second position but with a significant difference to the first, there is UK with € 20 billions, lower there is France, Germany, Canada, Japan and Italy. In terms of employment at global level, USA have the 44% of the total of employed versus the 39% in Europe, 6% in Canada and 3% in Japan. Inside the UE in 2004 the 73% of workers are in France, the 27% in UK, 17% in Germany and 9% in Italy.

These classification shows the advantage that EU can obtain if will be encouraged an European strategy rather than a national perspective.

The creation of an European space policy started in '70s when has been recognized the crucial importance of the aerospace sector and has been broken the bipartition of market between USA and URSS. From this moment also Japan, China, UK and Europe encouraged own spatial programs. The European collaboration started in the 1974 with the creation of the ESA -European Spatial Agency- composed by 11 members.

In '80s also India and Israel created own space programs, and at the end of the decade was formalized the intercontinental cooperation program for the creation of the ISS (International Space Station) that will be finished in 2010.

In the defence industry, in '80 in Europe started a process of society concentration in the main States: in Germany the private company Daimler-Benz bought many others companies and generate the financial group DASA (Deutsche Aerospace AG), in UK born the British Aerospace, in France prevailed three groups: Aerospatiale, Snecma and

Dassault Aviation, in Italy the funding process started in 90's with the constitution of Alenia Spa born from Aeritalia and Selenia these are public companies, controlled by Finmeccanica.

But, if in 80's and 90's we have had an important process of funding in EU members State, the next goal is to create a common vision about aerospace, considering also that the sector is characterized by strong economies of scale, of diversification and economies of learning so that national companies can benefit by an European partnership.

In this sense a relevant result is the creation in 2001 of ACARE (Advisory Council for Aeronautics Research in Europe) a new entity designed to turn "*....the current patchwork into a research network...*" by defining the content of an European Strategic Research Agenda (reported in Vision 2020) and helping to make it a reality, a step that is considered crucial for transforming the European sector from a follower into a global leader over the period.

An important mark of the increasing attention in EU on aeronautics-aerospace sector is the presence of the issue "space" in the draft of the European Constitution. It is defined like a field in which there is a competence shared between EU and members States, In the section "Policies and European operation" in the article n. 254 in the III Part in draft, is written: "*.....to encourage the technological and scientific progress, the industrial competitiveness and the application of its policies, the EU elaborates an European spatial policy. For this objective encourages commons initiatives, supports the research and technical development and coordinates necessaries efforts for exploration and use of the space...the UE establishes all useful links with the European Space Agency....*"

In addition, in the planning of the SER (European Space for Research) are defined 7 sectors considered crucial for the European competitiveness, significant in enforcing relationship between science and society: gnomology and nanotechnologies for health, technologies for the information society, nanotechnologies new materials end new production processes, alimentary security and risks for health, sustainable development, citizens, governance in European society of knowledge, and aeronautics and space. Particularly attention is posed on research "dual use" like in aerospace sector, new materials and ICT. Finally it is important to stress that about resources of financing, the goal is to employ for these projects in the period 2007-2013 much more efforts than in the past, thanks to the budget of VII Framework Programme that is double compared to the budget of the VI one (Traballesi, 2006).

Conclusions.

The new challenges for EU in the current historical phase are connected to the ongoing globalisation and the low productivity. The European choice in the long-run perspective is to stake on productivity and competitiveness coming from the innovation technology.

In a global market in which many countries try to reduce production costs in spite of labour conditions and environment, the EU decided to invest in research, human capital and new technologies.

In this paper I have chosen to light the aeronautic-aerospace case, a top high-tech sector on which European and national policy makers focused their political attention and significant resources.

In my opinion aeronautic-aerospace industry, can play a relevant role in establishing an European knowledge society able to become from a follower in a leader in global economic context considering also that Europe has an economic space with a potential beyond comparison with USA and Asia.

Just the polarisation at regional level, that is a common characteristic in aeronautics-aerospace European clusters, shows that this sector can significantly contribute to the regional development thanks to processes of knowledge diffusion and economic push, well described in many economic studies.

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