INNOVATION AS A FACTOR OF RE-INDUSTRIALISATION: CONCRETE EXAMPLES

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Аннотация. Это было общее искушение принципов экономической и промышленных политики, чтобы настроить «современные» отрасли промышленности против «традиционных» или «старых» отраслей промышленности в современных российских условиях, когда требуются «модернизация» и «переиндустриализация». Теоретические подходы, а также анализ принципов экономической политики в различных странах показывают, что эти подходы не антагонистические, если каждый обращает внимание на последовательность производительной системы, определенной как комбинация различных отраслей промышленности в пределах данной экономики.

Ключевые слова: отрасль; индустриализация; экономика; возможности; политика; подход

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Annotation. It has been a common temptation of economic and industrial policies to pit «modern» industries against «traditional» or «old» industries, or in contemporary Russian terms, «modernization» and«re-industrialisation». Theoretical approaches as well as the analysis of economic policies in various countries show that these approaches are not antagonistic provided one pays attention to the coherence of the productive system, defined as the combination of the various industries within a given economy.

Keywords: industry; industrialization; economics; opportunities; policy; approach

As a whole, the productive systems of the 21st century can be viewed as a combination of material, immaterial, technical and financial links that are increasingly complex and pervasive. Most of all these links are characterized by the emergence of new hierarchies and new asymmetries [1]. For this reason, innovation cannot be separated from the rest of the productive system in its industrial dimension, all the more that innovation itself appears in more and more diversified forms.

INDUSTRIAL POLICIES AND INNOVATION POLICIES: THE EXAMPLES IN EUROPE

The European experience shows that innovation should not be opposed to the keeping of traditional industries.

In the case of France, in the 60's, 70's and 80's it appeared to be a natural trend to drop the traditional industrial base – represented for instance by coal, metallurgy and textile, in favour of new industries. France has very much focused on top-down innovation, initiated by public research programmes and implemented by large companies. This has led to great technical successes such as TGV (high speed train), nuclear power industry, aircrafts, space industry, telecommunications...Yet, in the 90's and 2000's, de-industrialisation accelerated, with the decline of non-ferrous metallurgy, light manufacturing, consumer goods, and even power-horses of modernisation in the previous decades, such as automotive and telecommunications. This reflected theimbalances of the prevailing model of industrial development.

Innovations that were not fitting into the scheme of very large projects were neglected. Top-down innovative projects allowed the development of large French companies in some high profile capital intensive areas. At the same time mid-size companies in less glamorous sectors fought for survival. This lack of a network of mid-size innovative companies is one of the major weaknesses of such policies.

On the contrary, in Germany, a balance has been kept between traditional industries and new innovative sectors. While it is less specialised that France on strictly high-tech industries, mostly because of aeronautics, the German economy is very competitive in medium to high technology industries: cars, chemistry, industrial machinery, and even telecoms and software [2]. Another feature of the German industry is the strength of what is called «Mittlestand»[1]. Not only has Germany been able to keep its industrial base, it remains a major export of industrial goods, on the basis of a very strong non-price competitiveness. A comparison between the two countries shows this major difference: **Germany is still a significant industrial economy while France has turned more into a service economy** (tab. 1).

Table 1

Key economic indicator, 2012

Countries	Share of manufacturing in GDP, %	Share of manufacturing in Working population, %	Share of services in GDP, %	Share of services in working population, %	Share of Export in GDP, %
France	20	24	78	72	22
Germany	30	30	69	68	43

Source: World Bank, UN, national statistical offices

Another way to look at this difference is to consider the major innovation indicators for each country (tab 2).

Table 2

Major innovation indicators. Relative performance to EU average (100)

Input indicators	**France**	**Germany**
Population with completed tertiary education	122	89
R&D expenditures in the public sector	104	128
R&D expenditures in the business sector	111	149
Non R&D innovation expenditures	45	156
Output indicators		
SMEs innovating in-house	94	142
SMEs with product/process innovation	85	148

Source: Innovation Union Scoreboard, 2014 [5].

[1] Mittlestand refers to the network of industrial mid-size companies (from 50 to more several thousand employees) that are strongly specialized and take their strength on non-price competitiveness.

France has a very goodperformance in input indicators related to higher education and science and is slightly above the EU average on public and private R and D spending. Yet it is weak on indicators related to applied innovation, especially in SME's.

The German case shows the importance of a continuous innovation process. Industrial competitiveness does not come only from disruptive technologies but also from incremental innovation at the level of products, processes, marketing… In–house innovation is also one of the key ingredients of industry competitiveness.

This approach of continuous integration of innovation in the industrial strategy – instead of relying on disruptive innovation– has become more popular, even in countries where the trend was more on large innovative projects that did not fully trickle down to the whole economy.

In the case of France, this new approach has led to the implementation of a systemic policy, shifting from mega-projects to a more decentralised approach. The major and most innovative component has been the setup of an ambitious programme of «pôles de compétitivité» (competitive clusters) from 2004 onwards. 71 clusters have beencreated all over France, on criteria of technical specialisation as well as of regional dimension.

The «poles» integrate a variety of stakeholders andorganise cooperation between larges companies, universities, public research centers and small and medium size companies, with the participation of public decision makers.

Compared with the previous top-down policies this strategy allowed a better dissemination of innovation in the overall economy. Small and medium-size companies as well as start-ups are among the major beneficiaries. Another important factor is the impulse it gave to the economy of some previously de-industrialised areas.

A more recent step is the programme of 34 industrial projects launched by the French Ministry of Economy in September 2013. Unlike the projects set up in the 60's, 70's and 80's this it defines broad areas of interest and gives the details of implementation to committees representing the State, public companies, private companies, research labs and universities. It covers new technologies such as ITC, biotechnologies, nanotechnologiesand renewable energies. The interesting aspect is that it also covers traditional industries that need modernisation: metallurgy, chemistry, building materials, transportation, textile, wood [3].Another aspect is that the time-frame is reduced: projects should emerge within two or three years after launch.

FOR RUSSIA, INNOVATION SHOULD BE A MAJOR FACTOR OF RE-INDUSTRIALISATION

Although each country has its specificities, the cases of France and Germany can give some useful hints in the current discussions in Russia.

It can be said that not unlike France several years ago, Russia suffer of a discrepancy between the country's high science and technology potential and the low level of innovative output[2].

The scientific and technological potential is high in quantitative terms: According to the «Global Innovation Index» [4] Russia is 15th out of 142 countries for tertiary enrolment–and 14th for the % of graduates in science and engineering in tertiary enrolment. Yet Russia is lagging in Rand D expenditures – 30th, behind most industrial countries. As far as output indicators are concerned, Russia is below European average in most areas: in medium and high technology exports, in international publications, etc. The worst situation is for international patents: in Russia the ratio of PCT patents to GDP is 7% of the EU average [5]. This is the legacy of decades during which these issues have not been tackled (tab. 5).

[2] By comparison, the US are 2nd and France38thfor % of tertiary enrolment, and respectively 74th and 20th for the % of graduates in science and engineering in tertiary enrolment.

Table 3

Major innovation indicators. Relative performance of Russia to EU average (100)

Input indicators	**France**
Population with completed tertiary education	187
R&D expenditures in the public sector	57
R&D expenditures in the business sector	51
Output indicators	
SMEs innovating in-house	7
SMEs with product/process innovation	74

Source: Innovation Union Scoreboard, 2014 [5].

Many efforts have been made to boost the Russian innovative capability. Financial support, creation of dedicated institutions, development of Innovation centers, with Skolkovo as a flagship… [6; 7]. Yet these numerous actions focused on innovative industries are sometimes opposed to a policy of «re-industrialisation» based on mega-projects of infrastructures and support of traditional industries.

This is misleading. Today, innovation is not only performed by high technology start-ups in the mobile internet industry or in nano-technologies. The major innovative companies – as assessed by the number of patents – are large companies deeply rooted in the industrial world.

There are numerous examples of industries in which Russia could use its innovation potential to gear up a new industrialisation. In agro-industrythe need for modernisation is huge. Is covers the use of more efficient machinery, but also innovation in genetics and animal husbandry, computer-aided fertilizing methods, management of storage facilities, etc. In metallurgy and chemistry, Russian research centres produce world level innovations for products and processes. Here the issue is the improvement of the link between research centers and industrial applications and the financing of required investments.

One example to illustrate the link between innovation and re-industrialization is the area of energy transition. It can be defined as the path to reduce the consumption of fossil energy in favour of a wide array of new solutions – which is a need at a worldwide level. Even for a major producer of fossil energy such as Russia, it is a major opportunity at many levels because it involves both innovation and modernisation of existing industries. New technologies. The search for energy efficiency requires advanced technologies in areas such as software, micro-electronics and sensors, smart grid technologies, new materials, energy storage…

New products. A full array of products can be developed especially in the area of batteries, building material, biofuel… Improvement of existing products. This is especially true for transportation equipment: cars, trains, planes, ships… Improvement of the efficiency of existing industries such as metal processing, chemistry…

Development of new infrastructures: energy networks, communication networks. In a given country, energy transition can create several hundreds of thousand direct jobs and improve the competitiveness of industries employing several million people[3].

[3] By comparison, the US are 2nd and France38thfor % of tertiary enrolment, and respectively 74th and 20th for the % of graduates in science and engineering in tertiary enrolment.

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