

## INNOVATIVE DEVELOPMENT AS A FACTOR OF EUROPEAN UNION ECONOMY DIGITALIZATION

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### Abstract

By now, the European Union has already accumulated quite a solid theoretical basis along with a range of applied measures for stimulation of innovations-based digital economic development on the supranational level. Studying this experience is relevant for other regional integrations in part of both economic development and innovations. Thus, this article considers the very notion of innovation-based economy along with the criteria of innovativeness of the economic systems and then evaluates the asynchronous nature of innovative progress across the EU. Afterwards, recommendations on innovation-based alignment of digital economy development rates are provided taking into account such important aspects as modernization of the industrial policy, innovations' transfer and generation of innovations at the regional level.

Key words: innovation-based economy; innovative potential; the European Union; innovation-based modernization, digital economy

### Introduction

At the current stage of world economies' development innovations and advanced technologies are not the most decisive factors for economic growth of separate countries but they are also the

indicators of countries' well-being and even of their sovereignty.

Economic development and innovations go hand in hand today due to three main reasons: a) knowledge and technical progress are the most solid factors of economic development, in any coun-

try; b) innovations can be truly useful only if they are adapted to the specific economic conditions of a particular country; c) today, the most important element of any national economy is availability of own postindustrial infrastructure.

For these very reasons, all economies worldwide, without any exceptions, are interested in the formation of own innovation-based engine for further economic growth. This should be the primary goal of any economic policy since only innovations can guarantee new competitive advantages at the world markets.

At the same time, in the last couple decades, due to the heavy influences of the world economy globalization, the very structure of innovation-based economic mechanisms started to change. Globalization has offered a wide range of brand new economic opportunities, but at the same time, it has also changed the very methodology of competitive fight. The largest economic players — transnational corporations — became the driving force of economic globalization. However, they are also subject to fierce competition: first of all, a new generation of rapidly developing Asian corporations is emerging these days; secondly, all corporations, old and new ones, are forced to participate in the ongoing fight for new knowledge, information and technologies. These are the key factors behind innovation-based mechanisms of economic development.

Therefore, studying economic development without innovation factors (or studying innovative development with-

out economic factors) would make very little sense in today's conditions.

Thus, the primary objective of our research study is to analyze the asynchronous processes of innovation-based modernization within the EU and then to offer own set of recommendations directed at alignment of innovation indicators across European economies.

In accordance with this primary objective above, the research tasks of this study are formulated as follows:

- to describe the nature and the most specific features of the innovative mechanism evolution in the context of the EU economy's development;
- to analyze the core of the innovative mechanism behind the EU development and to compare the innovation system of the separate EU countries-members with the aim to determine the level of differentiation among these systems;
- to evaluate critically the content and the key problems with institutionalization of innovative development of the EU economy, also revealing the role of national and supranational institutes in increasing the competitiveness of the EU overall at the global market of innovations;
- to formulate the top priorities in the post-crisis transformation of the EU economy basing on its innovation mechanism;
- to develop and present own methodology of innovation-based processes' implementation across the EU industries along with the opportunities to renovate the EU industrial sector using the most advanced innovations;
- to explain the role of external economic relations in increasing the EU

competitiveness at the world markets of innovative products.

As per these research tasks, the initial hypotheses have been formulated as follows:

1. The key reason behind the current imbalance in the EU economy concerns a group of external factors related to the development of the world economy overall; internal economic reasons of the EU itself are of secondary importance.
2. The major bottleneck in the currently functioning innovative mechanism in the EU is that the current level of European economies' integration does not allow them flexibly adapt to the constantly changing conditions of the global market. Thus, new methods and instruments are needed to rebalance the economic integration within the EU.
3. Under today's conditions of economic globalization, getting new competitive advantages in the field of innovations depends, first and foremost, on how well-tuned is cooperation between public authorities and the private sector in a particular EU state.

The key object of our research is the innovative mechanism behind the EU economic development.

### The Theoretical Background

International integrations are getting increasingly more importance in the world economic processes today. In the last several decades such integrations have gradually become autonomous economic units. The European Union takes a prominent place among such regional integrations; during the six decades of its development, this union of

countries has transformed into a truly global innovative community oriented on permanent economic growth.

Intensively technological revolution has gradually shifted the European Union on a totally new stage of transformations. The innovative mechanism behind European economic growth has also changed. The EU has done truly a lot for its own innovative development; the Union has tremendous practical experience in all major fields of technical research. This applied experience makes the EU one of the global leaders in what concerns innovations.

In the majority of the EU countries, innovations have become the key factor of competitive fight, at both internal and external markets. Today it is already quite obvious that the economic system of the EU as a whole is competitive thanks to its high degree of innovativeness; innovations have made Europe capable to respond to the major economic and social challenges of today's world.

The whole story of the EU economic development clearly demonstrates that even the most mature economy, with its well formed innovative space and its well developed institutions, can be still subject to numerous risks, mostly due to the unstable nature of the world economy development.

Moreover, at the current stage of the EU development, its traditional sources of economic competitiveness are becoming obsolete while competition at the international market is getting only stronger. Thus, the ideology of economic

development should be reoriented even more on innovations.

Summing up the key trends of the EU economic development based on innovations can be also helpful as it allows clarifying and adjusting some of the most traditional principles of innovative development, taking into account the most recent serious shifts within the EU economy, namely, liberalization of its external economic relations and gradual formation of the postindustrial society. Here we need to keep in mind, at all times, the serious impact of the most recent global financial and economic crisis as it has significantly altered the overall course of the EU economic development. Due to the global crisis manifestations within the EU, several gradually accumulating socioeconomic problems became especially acute. Here we also need to mention that the EU did its best to solve these problems and other socioeconomic consequences of the global crisis using methods and instruments based on innovations.

In the context of the world economy overall, evolution of the innovative development concept has passed several logical stages. All of these stages have been quite thoroughly described in literature. Obviously, J. Schumpeter was the founder of the innovative development theory, as he was the first to explain the meaningful and decisive role of innovations in the cyclical nature of economic development.

In our opinion, the contribution of N.D. Kondratieff (1984) has been unfairly overlooked in what concerns the innovative aspect of development. This

author has been also among the first to consider the key trends of economic development dynamics and in particular put emphasis on such aspect as technological development of a country.

The initial input message of our analysis is that the role of innovations at the contemporary stage of the world economy's development is steadily growing all the time. This is happening not only because of the global crisis but also due to the growing necessity to find new sources to increase competitiveness. The role of tech revolution for economic growth is beyond all questions (Edison et al., 2013; Kline, 1985).

Problems related to innovation-based development become even more complex today due to the international nature of scientific and technological progress. The circle of participants in international trade in innovations is getting only larger, while the world economic system becomes subject to systemic fluctuations with an increasing frequency (Franklin, 2009, Rogers, 1962).

In order to be adequate to the current trends of the world economy development, formation of an innovation mechanism within the economy of any country must stem from the following preconditions: peculiarities of its geo-economic positioning; development strategies of the largest corporations operating inside this country; institutional and infrastructural support for economic development; how well this particular economy fits into the general world trends of innovation-based development; inequalities and differentiation between

countries when it comes to the latest innovations (Adler, 2005; Strumsky et al., 2010).

National innovation systems, as they are already formed across the globe, are by default very different and highly specific. They are based on the radically different approaches to development, implementation and dissemination of innovations. Here, much depends on the clusterization trends inside a particular economy and also on how strong are its external economic relations with innovation-based sectors in other countries (Morisson & Doussineau, 2019).

## Key Research Results

We agree with (Tuomi, 2002) that the following are the key parameters of innovative inequality in the world: local modifications in generally known innovations due to the differences in the national innovation systems of the most developed economies; innovative transformation taking places in the countries only with the highest innovative potential; some of the countries might not have a strong national innovation system but they still have strong innovation potential; most of innovation gaps between the countries are observed due to the same-size gaps in the levels of their socioeconomic development (Gordon, 2012; Freeman, 1995); rapidly developing countries are prone to same rapid innovative adaptation.

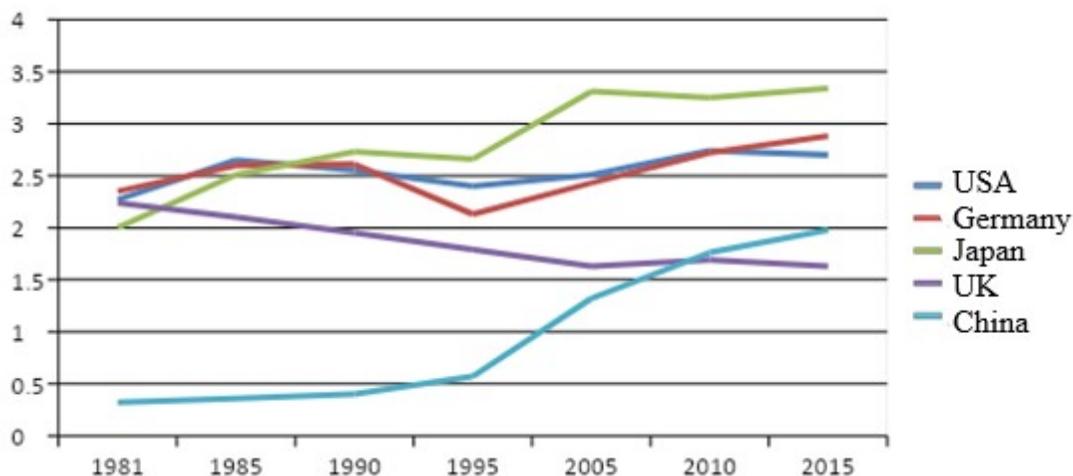


Figure 1. Dynamics of R&D spending in the selected countries, as % of GDP, 1981 to 2015 (data: R&D Intensity in OECD Countries and other Economies, 2016)

International experience overall proves that for most efficient integration of a national innovation system into the

global innovation space, the key parameters at the state level should be as follows: the emphasis must be on the indi-

rect instruments of the innovation sector support; public authorities should at all times keep in mind that today's truly innovative industries tend to concentrate geographically in the regions with good-quality information environment and high-capacity human resources; non-linear model of the innovative progress should be preferred as it guarantees closer interdependence between all the elements of the innovation system and stronger orientation on the actual market demand; the state must be motivated to support the most flexible forms of production; support for clusters' establishment must be always a top priority (Gordon, 2012).

Growing inequality in the innovative development rates is also confirmed by the fact that not all the countries have the growing dynamics of R&D spending: in some countries this indicator was going down during 1981-2015 (the UK, for example), while in some other countries (including Denmark, Sweden and Japan) it was seriously on a

rise; other countries have been demonstrating rather low and slow rates of growth (Canada and the USA, for example). Noteworthy, China has shown truly impressive growth rates in this regard (see Figure 1).

The key participants in all innovative processes taking place at the world economy level are transnational corporations, mostly due to their capacity to generate foreign direct investment inflows. Looking at the general trends of the international innovative space formation, we can state that it is very much heterogeneous and there is place for significant differentiation among the groups of countries.

For example, most of developed countries have innovative chains with serious added value, while developing countries usually play secondary roles in the world innovative process, they are mostly seen as the permanent sources of cheap natural resources (Lundvall, 1988).

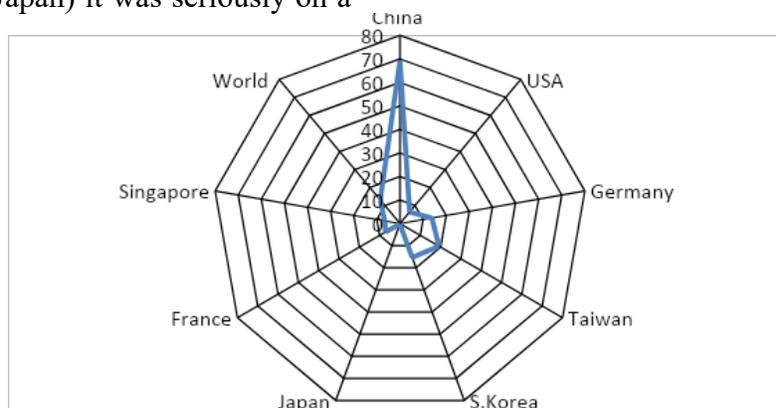


Figure 2. Average annual export of high-tech products in the selected countries, in %, 1997-2018

(Source: designed and calculated by the author on the basis of Science and Engineering Indicators 2019)

Corporations are also responsible for the following important processes: gradual internationalization of research; international outsourcing of innovations; implementation of innovations mostly at global markets.

We strongly support the idea of dividing national innovation systems into two types: traditional systems (as in the USA, Scandinavian countries, UK and Germany) and innovation systems of a new type (as in Australia, Israel, India, China and South Korea) (Unger, 2019). At the same time, efficiency of a particular national innovation system should be first of all evaluated looking at the national shares of scientific and innovative products in the world export and also at the shares of national income from such export. Here, traditional leaders are the USA, Japan and some of the EU countries; however, separate developing countries are also demonstrating some potential (India and China in the first place, see Figure 2).

Here we should also note that innovative development rate is not always directly correlated with competitiveness of a national economy. Our analysis clearly shows that some countries have very different indicators when it comes to measuring competitiveness index and then innovation index (The Global Competitiveness Report, 2017-2018).

In some countries this difference can be really manifold. Some of the EU members have been suffering from serious economic problems during the last decade, thus, their global competitiveness ranks went down, while their inno-

vation-based indicators remain on the more or less previous levels. For example, Italy is ranked 49th in the world by economic competitiveness, but it is also 29th by innovations. Another interesting example is Greece: this country is 81st by competitiveness but also 74th by innovations.

At the same time, developing countries usually perform better by competitiveness rather than by innovations: Vietnam is 68th and 98th accordingly; Georgia is 69th and 118th; Ukraine is 76th and 92nd.

Growing number of regional integrations also has its impact on innovation-based development and innovation policies. Economic growth within any regional integration can be possible only under the conditions of common access to the key production factors. This indirectly also influences the generation of innovations, and in the most positive way.

Generally speaking, the mechanism of economic integration impact on innovation-based development is roughly as follows: firstly, when two (or more) national economic systems come closer, businesses inside them are forced to engage in more intense competition, face new challenges and thus improve quality of their products/services as well as discover new segments of production (which often involves innovations); secondly, the institutional framework of economic integration assumes the establishment of new, specialized institutes responsible for research and technological cooperation - activities of these insti-

tutes also contributes to knowledge accumulation.

Availability of the EU common market opens up new opportunities, for all the countries involved, as to new technologies' acquisition and much faster mastering of the latest innovations overall.

Thirdly and finally, regional integration shapes a common market for the R&D results' commercialization. This, in its turn, means lower transactions costs for all participants engaged in high-tech trade and transfer.

In the EU, supranational integration programs together form a solid basis for innovation-based development as such. A range of framework agreements and projects assume mutual transfer of innovations between all the countries-members involved, including those countries that are not (yet) members of the EU but are working closely with the Union. We are convinced that availability and active use of such a cross-country transfer of technologies within the EU contributes greatly to economic alignment and thus pushes innovative development even further.

The latest financial & economic crisis has made complex economic relations within the EU even more tricky, most because national economic interests, under crisis conditions, tend to always prevail over higher, general European interests. Changes in competitiveness rankings also has its ambiguous impact on the course of innovative development. When it comes to competitiveness of national economies, in the last

several years differentiation inside the EU became even more drastic. For example, some of the relatively new members (Slovakia, Slovenia, Czech Republic and Cyprus) went seriously down in their global competitiveness ranks.

In 2010, the strategic document Europe-2020 was approved. In it, formation of an "innovation Union" is mentioned as one of the top priorities. Its establishment and functioning assumes a great deal of joint efforts aimed at joint application of innovations in various industries and the services sector. This is expected to provide a large amount of new workplaces and higher economic growth overall.

Despite some progress achieved in this direction, as of 2020, we can already state that this objective has not been fully reached and the very idea of having an "Innovation Union" is, sadly, premature. The major hindering reason is that the gap between the indicators of innovative development across the EU members remains to be rather large, much larger than the gap between their key macroeconomic indicators. 19 EU countries have the innovativeness indicator lower than the EU average; at the same time, the EU average indicator is significantly lower than that of the US, Japan and South Korea.

In such a context, it becomes quite obvious that a new innovative mechanism is needed to increase the competitiveness of the EU economy; and this new innovative mechanism needs to take into account all these economic and social contradictions which have been forming inside the EU for the last 50 years. Integrated socioeconomic devel-

opment has always been the core idea behind the EU as such, this idea made development of national economic systems of secondary importance. At the same time, overcoming economic inequalities between the EU countries requires significant efforts exactly at the national level. Thus, many related problems have not been solved to date. In such conditions, innovation-based instruments become the only means to increase economic competitiveness, considering the context of ongoing economic globalization.

### Conclusions and Recommendations

Despite a range of truly impressive achievements, the EU industries today are obviously suffering from serious structuring problems. Back in the 1990s even the smallest European economies used to be demonstrating tremendous growth in productivity, across different industries. Yet, even then already this productivity growth was generally lower than that in the US (3.2% vs 5.5% in the USA).

Moreover, the overall level of labor productivity in the EU is lower than in many industries across the globe. From 1996 to 2018 the expenditures on information and communication technologies across the EU industries grew from 5.4% to 9% of GDP (Information Economy Report, 2018), however, this growth had hardly any positive impact on productivity and/or enterprise performance.

Finally, overall low productivity of the EU industries as well as relatively low employment level are actually the

direct consequences of several structural problems observed in European economy. The recent global economic crisis has only emphasized that the real sector and industries are of vital importance for the EU economic survival. The role of industries is still much more important than many innovation-oriented optimists think: the industrial sector still covers over 80% of all European exports and same 80% - of the private European R&D.

The consequences of the Pandemic - 2020 will become an important modern factor of transformative processes of innovative modernization not only in Europe, but also in the whole world, which not only demonstrated the ability of countries to destroy transnational production and distribution chains that have already become traditional and customary in order to ensure the safety of their own population, but also the weakness of the supranational regulation infrastructure, including within the European Union.

In our opinion, the system of regional administration of digitalization and innovative modernization processes in Europe will undergo significant changes both in its resource content and in the procedurality of organization.

The economic systems reformatting in the EU countries, caused by the consequences of the pandemic, as well as by the threat of repeated waves of infection in the future, consisting in a radical change in the role of the transport, trade, entertainment, tourism, shifts in favor of online technologies in the field of infrastructural support for these industries functioning, also will largely determine

the dynamics of the digitalization processes in the region, the redistribution of investment flows, the employment of highly qualified personnel in the short and long term.

Anyway, optimization of the EU industrial policies should be ongoing, of course. Its further modernization, in our opinion, should include the following instruments and methods: fuller support for education, life-long education especially, as this is one of the key factors for competitiveness; further development of technological and informational infrastructure, with special emphasis on the innovations supporting entrepreneurship and its competitiveness; stronger deregulation. Governments and other public authorities should still be responsible for formulation of all economic policies, including the industrial one, however, participation of businesses should be more engaging; political influences of various parties on formulation of economic policies should be minimized. Any new economic policy must rest on solid theoretical and empirical basis, not on party visions and ideologies; the general framework and the key tasks of a national industrial policy must be strongly oriented on both current market needs and available forecasts of further economic development; there must be a place for gradual transition from the sector-based economy to the concept of adaptive competitiveness. Support must be provided not to specific sectors within an economy, but rather to the most important and truly breakthrough technologies. Understanding of what is competitiveness as such must be revised.

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