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# The financial instrument of the Innovation Union — Horizon 2020

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**Abstract:** In this research work, the author focuses on the analysis of the financial instrument of the Innovation Union — Horizon 2020. Horizon 2020 is the flagship initiative aimed at securing Europe's global competitiveness. It will combine all research and innovation funding currently provided through the Framework Programmes for Research and Technical Development, the innovation related activities of the Competitiveness and Innovation Framework Programme (CIP) and the European Institute of Innovation and Technology (EIT). Horizon 2020 will tackle societal challenges by helping to bridge the gap between research and the market, by helping innovative enterprise to develop their technological breakthroughs into viable products with real commercial potential. This market-driven approach will include creating partnerships with the private sector and Member States to bring together the needed resources. The main objective of the paper is to give a comprehensive analysis of the Horizon 2020 programme as the flagship initiative for the growth of the European Union global competitiveness, the challenges for Horizon 2020 to accelerate technology development, the objectives of the new EU programme for research and innovation, the comparison of options and assessment of cost — effectiveness of Horizon 2020.

**Keywords:** Innovation Union, Horizon 2020, financial instrument, global competitiveness, research and innovation, technology development, cost-effectiveness

## Instrument finansowy Unii Innowacyjnej — Horyzont 2020

**Abstrakt:** W podjętej pracy badawczej autor przedstawia analizę instrumentu finansowego Unii Innowacyjnej — Horyzont 2020. Horyzont 2020 jest sztandarową inicjatywą mającą na celu zabezpieczenie wzrostu konkurencyjności Unii Europejskiej. Obejmuje on ogół działań badawczych i innowacyjnych prowadzonych na bieżąco przez Ramowy Program Badań i Rozwoju Technicznego, działania innowacyjne wynikające z Ramowego Programu Konkurencyjności i Innowacji oraz Instytutu Europejskiego Innowacji i Technologii. Horyzont 2020, uwzględni wyzwania społeczne w celu pomocy w usuwaniu luki między badaniami naukowymi i rynkiem poprzez pomoc innowacyjną dla przedsiębiorstw aby pomóc w rozwoju technologicznym ich produktów, biorąc pod uwagę rzeczywisty potencjał handlowy. Te pobudzające działania rynkowe obejmują także kreatywność stosunków partnerskich sektora prywatnego z Państwami Członkowskimi, aby

wspólnie uzyskać wzajemne korzyści. Celem głównym artykułu jest kompleksowa analiza programu finansowego Horyzont 2020 jako sztandarowej inicjatywy dla wzrostu konkurencyjności globalnej Unii Europejskiej, wyzwań dla instrumentu finansowego Horyzont 2020 mających na celu przyspieszenie rozwoju technologicznego, głównych celów nowego programu UE dla badań naukowych i innowacji, porównanie przewidywanych kosztów i efektywności instrumentu finansowego Horyzont 2020.

**Słowa kluczowe:** Unia Innowacyjna, Horyzont 2020, instrument finansowy, konkurencyjność globalna, badania naukowe i innowacje, rozwój technologiczny, koszty-efektywność

## Introduction\*

The Innovation Union initiative has clearly signalled the EU's intention to rise to the challenge. It sets out measures to contribute to this aim, including increasing investment, refocusing R&D and innovation policy on major societal challenges, and strengthening the links from frontier research right through to commercialisation. A key challenge for the EU in implementing its strategy will be to build a next-generation expenditure programme which matches this level of ambition in both its budget and its aspirations.

The challenges facing the European Union economy continue to be daunting. In particular, several Member States' economies continue to face large deleveraging of the private and public sectors. This deleveraging reflects the unwinding of accumulated financial imbalances linked to previous unsustainable expenditure levels financed by credit, in some cases promoted by asset price bubbles in the private sector and in others by the lack of fiscal rigour in the public sector. This is now weighing on growth, as spending is reduced and income directed to debt repayment.

## Materials and methods

Methodologically inclusive account breaks the financial instrument of the Innovation Union — Horizon 2020. The main objective of the paper is to give a comprehensive analysis of the Horizon 2020 programme as the flagship initiative for the growth of the European Union global competitiveness, the challenges for Horizon 2020 to accelerate technology development, the objectives of the new EU programme for research and innovation, the comparison of options and assessment of costs — effectiveness of Horizon 2020. The general theoretical approach will be of broad interest to economists interested in international questions concerning especially the new tendency in the European Union development, like the Innovation Union as well as to political scientists. The main method applied in

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this research was a method of scientific study. The institutional method, the comparative method, the documentation method and statistical method were used. The methods of deductive and inductive forecasting were used as well.

## Discussion

### Horizon 2020 — the flagship initiative for the growth of the European Union global competitiveness

Science and innovation are key factors that will help Europe to move towards smart, sustainable, inclusive growth, and along the way to tackle its pressing societal challenges. But Europe suffers from a number of critical weaknesses in its science and innovation system which contribute to the above problem. The concept of the innovation system (Freeman 1987, 1988; Lundvall 1988, 1992; Nelson 1993) is a comprehensive look at the innovation process. Fumio Kodama points out that the existing categories of innovation and the measurements still do not cover all types of innovation. After Charles Freeman, he distinguishes, besides radical and improving innovations, other kinds of technological change (Huges and Irfan, 2008) like the change of the technological system and techno-economic paradigm. In the modern economy, the innovation can be realized by combining products and processes held by various companies from various sectors of the economy, as well as businesses and other entities, particularly from the field of research and development.

Companies and other innovation system actors can be linked in the innovation process in many ways. The basic traditional method are the transactional links based on the market. However, the increasingly frequent are non-market links, which are manifested in the cooperation agreements concerning joint research and development and innovation activity. The cooperation between the partners in the economic process and particularly the innovative one shows increasingly popular concepts of networks and clusters and innovation systems, among both researchers and politicians (Wójnicka 2008).

An efficient innovation system introducing innovation and competitiveness of companies must have the proper linkages between science and industry. The scientific and technical policies of the countries moving towards the knowledge-based economy favour the linkage between universities (science), industry (market) and governments. Those places with research universities witness a growing demand for knowledge transfer to industry and, through government, to society (Etzkowitz and Leydesdorff 1998; Etzkowitz and Leydesdorff 2000, Etzkowitz et al., 2000). At the same time, the science sector should fall within the network of links with local, regional, national and foreign partners. As a result of such activity the boundaries between institutions will disappear, and the entire system will

become more dynamic. The national policy can affect the science sector more than companies, so stronger links between science and industry can be inspired by the reform of the educational system. The EU's right to act is set out in the Treaty on the Functioning of the European Union and its objectives are cited under Article 179 and Article 180 (for research) and in Article 173 for the competitiveness of industry. The European Atomic Energy Community Programme (2014–2018) complementing Horizon 2020 has its legal basis in the Euratom Treaty (see in particular Article 7) (SEC 1428 final 2011).

Horizon 2020 is the financial instrument implementing the Innovation Union, the Europe 2020 flagship initiative aimed at securing Europe's global competitiveness (Wright 2008a; Wright 2008b). Running from 2014 to 2020 with a budget of just over €70 billion, the EU's new programme for research and innovation is part of the drive to create new growth and jobs in Europe.

Horizon 2020 provides major simplification through a single set of rules. It will combine all research and innovation funding currently provided through the Framework Programmes for Research and Technical Development, the innovation related activities of the Competitiveness and Innovation Framework Programme (CIP) and the European Institute of Innovation and Technology (EIT).

The proposed support for research and innovation under Horizon 2020 will:

- strengthen the EU's position in science with a dedicated budget of € 24 341 million. This will provide a boost to top-level research in Europe, including the very successful European Research Council (ERC);

- strengthen industrial leadership in innovation € 17 015 million. This includes major investment in key technologies, greater access to capital and support for SMEs;

- provide € 30 956 million to help address major concerns shared by all Europeans such as climate change, developing sustainable transport and mobility, making renewable energy more affordable, ensuring food safety and security, or coping with the challenge of an ageing population.

In the context of these problems the indication of a time line for Horizon 2020 is interesting. This time line includes:

- preparatory work in ITRE — Industry, Research & Energy Committee (EU Parliament): September/October 2013

- vote on the Multiannual Financial Framework (MFF) in the EP Plenary: September/ October 2013

- vote on Horizon 2020 in EP Plenary: October/November 2013

- adoption by the Council: November/December 2013

- adoption of work programme and publication of first calls for proposals: 11 December 2013

- Horizon 2020 national launch events: October 2013 to January 2014

Horizon 2020 is being adopted using the “ordinary legislative procedure” (formerly known as “co-decision”).

## The challenges for Horizon 2020 to accelerate technology development

It must be emphasized that Horizon 2020 will tackle societal challenges by helping to bridge the gap between research and the market by, for example, helping innovative enterprise (Schumpeter, 1911) to develop their technological breakthroughs into viable products with real commercial potential. This market-driven approach will include creating partnerships with the private sector and Member States to bring together the needed resources.

International cooperation will be an important cross-cutting priority of Horizon 2020. In addition to Horizon 2020 being fully open to international participation, targeted actions with key partner countries and regions will focus on the EU's strategic priorities. Through a new strategy, a strategic and coherent approach to international cooperation will be ensured across Horizon 2020. Horizon 2020 will be complemented by further measures to complete and further develop the European Research Area by 2014. These measures will aim at breaking down barriers to create a genuine single market for knowledge, research and innovation.

It must be emphasized that new growth strategy of the EU needs public intervention, subsidiarity and European Added Value. There is a clear case for public intervention to tackle the problems above. Markets alone will not deliver European leadership. Large-scale public intervention through both supply and demand measures will be needed to overcome the market failures associated with systemic shifts in basic technologies. However, Member States acting alone will not be able to make the required public intervention. Their investment in research and innovation is comparatively low and fragmented, and suffers from inefficiencies — a crucial obstacle when it comes to technological paradigm shifts. It is difficult for Member States on their own to accelerate technology development over a sufficiently broad portfolio of technologies, or to tackle the lack of transnational coordination.

As highlighted in the proposal for the next Multi-annual Financial Framework, the EU is well positioned to provide added value, through measures to coordinate national funding, which restructure more efficiently European research and innovation landscape, and through implementing collaborative research and mobility actions, which generated critical mass (SEC 1428 final 2011).

A next generation programme should be built on the experience from past Framework Programmes for Research and Technological Demonstration (FP), the Competitiveness and Innovation Programme (CIP), and the European Institute of Technology and Innovation (EIT). It is important to underline that over several decades, EU programmes have funded Europe's best researchers and institutes, and produced large-scale structuring effects, scientific, technological and innovation impacts, micro-economic benefits, and downstream macro-economic, social and environmental impacts for all EU Member States. However, important les-

sons can be learned from the past, including academic insights and stakeholder feedback. Research, innovation and education should be addressed in a more coordinated manner and research results better disseminated and valorised into new products, processes and services. Especially education and skills are key for increasing of innovation levels and creating new jobs (Table 1).

The intervention logic should be more focused, concrete, detailed and transparent. Programme access should be improved and participation increased from start-ups, SMEs, industry, less performing Member States and extra-EU countries (SEC 1428 final 2011).

Table 1. Unemployment rate and numbers of unemployed, overall and among young people (under 25) (December 2012)

|    | Unemployment rates in % (total population) | Number of persons unemployed (rounded) | Youth unemployment rates in % | Number of young unemployed (rounded) |
|----|--|--|-------------------------------|--------------------------------------|
| EU | 10.7                                       | 25 926 000                             | 23.4                          | 5 702 000                            |
| BE | 7.5  | 368 000                                | 20.0                          | 85 000                               |
| BG | 12.3                                       | 411 000                                | 27.5                          | 69 000                               |
| CZ | 7.5  | 394 000                                | 21.0                          | 78 000                               |
| DK | 8.0  | 233 000                                | 14.7                          | 65 000                               |
| DE | 5.3  | 2 236 000                              | 8.0                           | 362 000                              |
| EE | 9.9  | 68 000                                 | 19.5                          | 13 000                               |
| IE | 14.7                                       | 316 000                                | 30.2                          | 68 000                               |
| EL | 26.8                                       | 1 346 000                              | 57.6                          | 181 000                              |
| ES | 26.1                                       | 5 972 000                              | 55.6                          | 957 000                              |
| FR | 10.6                                       | 3 123 000                              | 27.0                          | 794 000                              |
| IT | 11.2                                       | 2 875 000                              | 36.6                          | 610 000                              |
| CY | 14.7                                       | 66 000                                 | 28.5                          | 12 000                               |
| LV | 14.1                                       | 146 000                                | 31.7                          | 32 000                               |
| LT | 12.3                                       | 187 000                                | 23.6                          | 31 000                               |
| LU | 5.3  | 13 000                                 | 18.8                          | 3000                                 |
| HU | 10.9                                       | 476 000                                | 27.9                          | 87 000                               |
| MT | 6.7  | 13 000                                 | 15.7                          | 5 000                                |
| NL | 5.8  | 520 000                                | 10.0                          | 144 000                              |
| AT | 4.3  | 188 000                                | 8.5                           | 51 000                               |
| PL | 10.6                                       | 1 845 000                              | 28.4                          | 436 000                              |
| PT | 16.5                                       | 897 000                                | 38.3                          | 174 000                              |
| RO | 6.5  | 661 000                                | 23.0                          | 194 000                              |
| SI | 10.0                                       | 102 000                                | 26.9                          | 22 000                               |

|    |      |           |      |         |
|----|------|-----------|------|---------|
| SK | 14.7 | 405 000   | 35.9 | 85 000  |
| FI | 7.7  | 206 000   | 18.9 | 63 000  |
| SE | 7.8  | 395 000   | 23.9 | 154 000 |
| UK | 7.8  | 2 474 000 | 20.5 | 938 000 |

Source: Growth, competitiveness and jobs priorities for the European, Semester 2013. Presentation of J.M. Barroso, President of the European Commission to the European Council of 14–15 March 2013, <http://ec.europa.eu/news/pdf/sg.2013-00286-01-04-eu.tra-00.pdf> (Access, 24.01.2014).

## The objectives of the new EU programme for research and innovation

Monitoring and evaluation need to be strengthened. In order to tackle the problems identified above, the following objectives have been set. The general objective of the next EU spending programme on research and innovation will be to contribute to the objectives of the Europe 2020 strategy and to the completion of the European Research Area.

In order to achieve this general objective, there are five specific objectives:

- strengthening Europe’s science base by improving its performance in frontier research, stimulating future and emerging technologies, encouraging cross-border training and career development, and supporting research infrastructures

- boosting Europe’s industrial leadership and competitiveness through stimulating leadership in enabling industrial technologies, improving access to risk finance, and stimulating innovation in SMEs

- increasing the contribution of research and innovation to the resolution of key societal challenges

- providing customer-driven scientific and technical support to Union policies

- helping to better integrate the knowledge triangle — research, researcher training and innovation.

Considered options were designed and evaluated in relation to stakeholders’ views, the problems and the objectives above. They take into account some key parameters set out in the EU budget review: the need to focus on instruments with proven European added value, to develop a more results-driven approach, to leverage other public and private funding, and to design EU instruments that work together in a single strategic framework.

This Impact Assessment considers four policy options:

- Business-as-usual (BAU): maintaining the current plurality of programmes for R&D and innovation: In this scenario, the three main existing EU sources of funding for research and innovation — FP7, the innovation-related part of the

CIP, and the EIT — are simply carried forward into the next multiannual financial framework as separate instruments, and in their current formats.

— Improved business-as-usual: loose integration and stand-alone simplification (BAU+): In this scenario, FP7, the innovation-related part of the CIP, and the EIT remain separate instruments and retain their current formats but are put together under a ‘common roof’; loose coordination mechanisms are established between them. The implementing modalities of each programme are simplified separately, but no single set of simplified rules, funding schemes, support services etc. applies across the three programmes.

— Horizon 2020: Establishing a single strategic framework for Research and Innovation: In this scenario, FP7, the innovation-related part of the CIP, and the EIT are fully integrated into a single unitary framework: Horizon 2020, The Framework Programme for Research and Innovation. The current separation between research and innovation activities is eliminated. Horizon 2020 sets out three strategic policy objectives: raising and spreading the levels of excellence in the research base; tackling major societal challenges; and maximising competitiveness impacts of research and innovation. Horizon 2020 is structured around three priorities which link directly to these aims. The selection of actions and instruments is driven by policy objectives and not by instruments. Horizon 2020 also integrates a major simplification and standardisation of funding schemes and implementing modalities across all areas.

— Bring to an end EU level R&D financing and re-nationalise R&D and innovation policies: The renationalisation option consists of discontinuing EU research and innovation programmes and of spending those funds at Member State level. A discontinuation option, which is assessed to a lesser extent, consists of discontinuing EU research and innovation programmes and not spending those funds at Member State level either (SEC 1428 final 2011).

Indication of how the options were compared is interesting. The four policy options were compared along a range of key parameters relevant to assessing public intervention in research and innovation:

- clarity of focus of the intervention
- quality of the intervention logic
- extent to which the intervention achieves critical mass at both programme and project level
- extent of flexibility associated with the intervention
- extent to which it promotes excellence
- accessibility and reach
- degree of stakeholder support
- impact on SMEs
- extent to which the intervention promotes knowledge triangle and broader horizontal policy coordination



- impacts of the intervention — structuring, leverage, innovation, economic and competitiveness, social, environmental, and EU policy impacts
- cost-effectiveness.

The comparison along these parameters was done using a range of evidence including: ex post evaluations; foresight studies; analyses of FP and Community Innovation Survey data; science, technology and innovation indicators; econometric modelling; reviews of academic literature; competitiveness studies; expert hearings etc.

## The comparison of options and assessment of cost-effectiveness of Horizon 2020

In the context of analysis we would like to present the comparison of options and assessment of cost-effectiveness. Horizon 2020 emerges as the preferred option. It was also endorsed as the preferred option in the 29 June 2011 Commission Communication on the next Multi-annual Financial Framework 2014–2020. This option has clarity of focus and a well-developed intervention logic. Like the BAU option, it achieves critical mass at programme and project level. It also enhances the promotion of scientific and technological excellence and allows for more flexibility. Levels of administrative burden would be reduced drastically, significantly improving accessibility and increasing stakeholder support. Knowledge triangle and broader policy coordination are enhanced through a single framework seamlessly integrating research, education and innovation aspects and explicitly defining links with other policies. SMEs would benefit in particular from administrative simplification and closer knowledge triangle coordination particularly concerning research and innovation finance. S&T and innovation impacts would be enhanced through the seamless support from idea to marketable product, stronger output orientation, better dissemination of results, clearer technological objectives, enhanced industrial and SME participation and thus better leverage, the funding of demonstration activities, and innovation financing and support. Enhanced scientific, technological and innovation impacts would translate into larger downstream of economic, competitiveness and social impacts as well as environmental and EU policy impacts.

Horizon 2020 also maximises cost-effectiveness. On the cost side, its far-reaching integration, simplification and harmonisation will reduce costs for the Commission and for applicants. At the same time, the Horizon 2020 option maximises the benefits through a close integration of research, innovation and training. This will provide the best approach for ensuring that investments made at the EU level in research projects are fully valorised into patents and new products, processes and services.

The enhanced scientific, technological and innovation impacts produced by Horizon 2020 should translate into larger downstream economic and competitiveness impacts. It is estimated that by 2030 it could generate the following impacts over and above the BAU option:

— Horizon 2020 will stimulate Europe's economic growth, generating 0.53 percent of extra GDP.

— It will also enhance Europe's competitiveness, increasing its exports by 0.79 percent, and reducing its imports by 0.1 percent.

— It will create jobs for Europe's citizens, increasing employment by 0.21 percent.

Under the renationalisation and discontinuation options, the effects would be weaker compared with the BAU option by 2030:

— Renationalisation would reduce GDP by 0.04 percent, cut 0.06 percent off exports, have no effect for imports, but would lead to a job loss of 0.01 percent;

— Discontinuation would shave 0.39 percent off GDP, decrease exports by 0.58 percent and raise imports by 0.05 percent, while producing job losses of 0.19 percent.

Comparing the positive effects of the Horizon 2020 option with the negative effects of the discontinuation option demonstrates its true added value:

— By 2030, it is expected to generate an extra 0.92 percent ( $0.53+0.39$ ) of GDP, 1.37 percent ( $0.79+0.58$ ) of exports, -0.15 percent ( $0.10+0.05$ ) of imports, and 0.40 ( $0.21+0.19$ ) percent of employment (SEC 1428 final 2011).

The BAU+ option would allow for some alignment of objectives and achieve a certain degree of simplification producing positive effects on administrative burden, accessibility, reach, structuring effects, leverage effects, innovation impacts and downstream of economic, social, environmental and EU policy impacts. In the case of the renationalisation option, it would be more difficult to orient Europe's research and innovation programmes on commonly agreed objectives while critical mass and excellence would be compromised. The quality of the intervention logic, the level of flexibility, accessibility and reach, and the extent of knowledge triangle and broader horizontal policy (Wright 2008b) coordination could in theory be enhanced more easily at national (Freeman 1987, 1988; Lundvall 1988, 1992; Nelson 1993) or regional level (Cooke 1992; Cooke et al. 2004) though this is not the case now and would involve important trade-offs. This would compromise the return on investment in research as scientific, technological and innovation impacts would be reduced, which would translate into smaller economic and competitiveness, social, environmental and EU policy impacts. A summary of the comparison of options is given in Table 2.

Under Horizon 2020, only those kinds of activities will be supported that have passed the European added value test. Under the proposal on the next MFF, the funding for Horizon 2020 amounts to €80 billion (constant 2011 prices), which

Table 2. Impacts of the BAU+, Horizon 2020, and renationalisation options compared to the BAU option

| Dimension                              | BAU+ | Horizon 2020 | Renationalisation |
|--|------|--------------|-------------------|
| <b>Effectiveness</b>                   |      |              |                   |
| Focus                                  | +    | ++           | +(1)              |
| Intervention logic                     | =    | +            | +/(2)             |
| Accessibility, reach                   | +    | ++           | ++(4)             |
| SMEs                                   | +    | ++           | ++(5)             |
| Excellence                             | =    | +            | -                 |
| Critical mass                          | =    | =            | -                 |
| Structuring effect                     | +    | ++           | -                 |
| Leverage effect                        | +    | ++           | -                 |
| Innovation impact                      | +    | ++           | -                 |
| Economic and competitiveness impact    | +    | ++           | -                 |
| Social impact                          | +    | ++           | -                 |
| Environmental impact                   | +    | ++           | -                 |
| Impact on EU policy                    | +    | ++           | -                 |
| <b>Efficiency</b>                      |      |              |                   |
| Reduction of administrative costs      | +    | ++           | ++(3)             |
| Reduction of participation costs       | +    | ++           | ++(3)             |
| <b>Coherence</b>                       |      |              |                   |
| Knowledge triangle coordination        | +    | ++           | +/(2)             |
| Broader horizontal policy coordination | =    | +            | +/(2)             |
| Flexibility                            | =    | +            | ++(3)             |

Source: (SEC 1428 final 2011).

represents 46 percent increase with respect to comparable funding under the MFF 2007–2013 (constant 2011 prices). The new system for the evaluation and monitoring of Horizon 2020 will be based on a comprehensive, well-timed and harmonised strategy, with a strong focus on throughput, output, results and impacts (SEC 1428 final 2011).

## Results

The Innovation Union is one of the seven flagship initiatives of the Europe 2020 strategy for a smart, sustainable and inclusive economy. An efficient innovation system introducing innovation and competitiveness of companies must have the proper linkages between science, industry and governance. Horizon 2020 is

the financial instrument implementing the Innovation Union as the Europe 2020 flagship initiative aimed at securing Europe's global competitiveness. Running from 2014 to 2020 with a budget of just over €70 billion, the EU's new programme for research and innovation is part of the drive to create new growth and jobs in Europe.

International cooperation is an important cross-cutting priority of Horizon 2020. In addition to Horizon 2020 being fully open to international participation, targeted actions with key partner countries and regions will focus on the EU's strategic priorities. Through a new strategy, a strategic and coherent approach to international cooperation is ensured across Horizon 2020.

Horizon 2020 maximises cost-effectiveness. On the cost side, its far-reaching integration, simplification and harmonisation reduce costs for the Commission and for applicants. At the same time, the Horizon 2020 option maximises the benefits through a close integration of research, innovation and training. This provides the best approach for ensuring that investments are made at EU level. Structural reforms, which improve competitiveness, wage responsiveness and price flexibility are key to improving adjustment capabilities and to stimulating the transfer of resources from declining to growing sectors.

## Conclusion

In the second decade of the 21st century and especially in the new budget perspective 2014–2020 on the backdrop of a changing world order, the European Union faces a series of crucial challenges: low growth, insufficient innovation, and a diverse set of environmental and social challenges. Europe 2020, the EU's comprehensive long-term strategy, recognizes these challenges and argues that Europe faces a moment of transformation. The solutions to all of these problems are linked. It is precisely by addressing its environmental and social challenges that European Union will be able to boost productivity, generate long-term growth and secure its place in the new world order.

It must be emphasized that structural reforms are necessary to facilitate adjustment and improve the framework conditions for the European Union growth. Structural reforms, which improve competitiveness, wage responsiveness and price flexibility are key to improving adjustment capabilities and to stimulating the transfer of resources from declining to growing sectors. Reforms promoting job creation, investment in innovation, skills and inclusive growth are necessary to tackle the risk of hysteresis and alleviate the negative impact of the crisis on social conditions. A fair distribution of the adjustment burden across society is an important aspect for sustained growth. Ultimately, however, a coherent policy mix encompassing both macro-financial and structural policies is indispensable for growth to resume. Hence a determined policy action on all these fronts is ne-

cessary to counter the negative dynamics and improve the economic situation in a sustainable manner.

The important aspect of the research is the conclusion that in the innovation process also in the European Union very important are the connection between science, market (industry) and government. There is positive dependence between innovation activity in innovation system and effectiveness of the innovation process. More interaction and cooperation can be observed on the regional level than on the state. The new programmes of the scientific and innovation research, Europe 2020 and Innovation Union, are very important factors of the European Union's entrepreneurship and global competitiveness especially against the USA and Japan and also BRICSAM<sup>1</sup> countries.

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<sup>1</sup> BRICSAM — Brazil, Russia, India, China, South Africa, Mexico

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