

**RESEARCH AND INNOVATION REDEFINED.
PERSPECTIVES ON THE EUROPEAN UNION INITIATIVES ON HORIZON 2020**

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<http://dx.doi.org/10.5755/j01.eis.0.6.1426>

The article describes the EU initiatives on Horizon 2020, the EU Framework Program based on Research and Innovation, which will be created to redefine cooperation in funding and scientific research of the EU countries. Horizon 2020 is one of the main pillars of the so-called Innovation Union – one of the Flagship Initiatives of Europe 2020, which aims to increase Europe's competitiveness in the world. The article defines types of strategic choices that strengthen support for technological innovation, investigate societal communication and foster excellence level in research through the support of scientists, coordination and development of an improved infrastructure of research resources and facilities in the EU. The article also discusses the main economic aspects in correlation with political approach of the program.

Horizon 2020 provides immediate stimulus to the economy and scientific and technology base and industrial competitiveness in the future, so that the UE society will function in a more intelligent and balanced way, and is also conducive to societal exclusion. The quantity based research will show, which out of 5 main strategic choices (business level, corporate level, internationalization, innovation & entrepreneurship, mergers & acquisitions) the companies in the EU will follow to provide best results of the program in the EU countries.

The funds of the Horizon 2020 will be used for three main purposes: support the EU leadership in science with a budget of €24.6 billion (comprising 77 percent increase resources to the European Research Council); provide European businesses at the forefront of industrial innovation (€17.9 billion) – this includes a significant investment of €13.7 billion in key technologies, as well as better access to capital and support for SMEs; €31.7 billion will be spent on important issues relating to all Europeans, which is divided into six main issues: (1) health, demographic changes, welfare, (2) food safety, sustainable agriculture, marine research and environmental management, (3) environmental safety and efficient energy, (4) intelligent, organic and integrated transport, (5) climate actions, effective management of resources and raw materials, (6) integration, innovative and safe society.

The main outcomes of the article show that most of the European companies consider Horizon 2020, the part of the Europe 2020, as one of the most important funding program of this century. This funding will also serve to promote international cooperation, which will enhance the attractiveness of the EU's research, and enable the joint addressing global issues and to promote the EU external policy. The analysis of possible synergy with funds awarded under the EU cohesion policy will be made in order to provide the greater number of participants across Europe. The weaker regions will identify potential centers of excellence, which will propose a strategic advisory and financial support under the program Horizon 2020, and the EU Structural Funds will be spent on upgrading infrastructure and equipment.

Keywords: *innovation, strategy, growth, research, European Union, Horizon 2020, development.*

Introduction

Most of the strategic choices taken by the companies can be simply identified. Especially in the European Union (EU) nowadays there is a specific change in terms of strategic directions connected with the EU financial support. 21st century has created very specific expectations for both the companies and the entrepreneurs in order to provide constant existence in the highly competitive markets. To provide strong knowledge and scientific based foundation for companies existence and firm's after-crisis recovery the EU sees the importance of supporting especially research and innovation. The article investigates the development in research and innovation in order to provide sufficient funds for European firms with worldwide science and experience based cooperation.

The object of the article is to provide an overview of the Horizon 2020 one of the EU Flagship Initiatives of Europe 2020 and the dimension of the Horizon 2020 pillars and

their impact on European research centers and firms' future performance. *The tasks* of the article are connected with providing theoretical basis of the concepts of the EU strategy for the few next years. The paper defines types of strategic choices that strengthen support for technological innovation and foster excellence in research. The article also discusses the main economic aspects in correlation with political approach of the Horizon 2020.

Horizon 2020 will be one of the biggest EU initiative, however there is a lack of scientific explanation of its importance and high influence in firms' strategies and the EU economy in general. *Research methods* used in the article include the analysis of literary sources, including theoretical literature and research materials related to the subject of the paper, as well as a comparative analysis of research on innovation presented in varied literary scientific sources.

The subject of the article is topical, as most companies need to take certain decision in order to achieve the highly competitive position in turbulent environment with the basis of the newest science and knowledge that come from all over the world.

Therefore, it is essential to provide an in-depth analysis of changes in the EU strategy of firms' financial support that provides sustainable growth and supports the EU leadership in science.

As the main results of conducted research, the decisions taken by most companies seem to follow the direction of the EU innovation roadmap, but still the percentage of scientific and knowledge based solutions seem to be inadequate, when implementing it into practice. Only coordinated and supported cooperation on the line: managers and scientists will allow the companies to grow and make those innovations differentiate from regular inventions that are never implemented into practice and real life.

European Innovation Strategy

With no doubt the EU in one of the main pillars of the globalized world. In terms of its main aspects of strategic choices taken by both companies and independent entrepreneurs, increasingly connected markets from all sides pull the EU. Innovation is understood as a main response to the global economic recession, and research institutions are assumed to be major factors in finding effective solutions to the crisis.

In the EU innovation agenda, knowledge is increasingly seen as the new strategic factor. The creation, transfer and application of innovative knowledge are assumed to have a prime importance for a process of economic re-orientation and continuous social and economic development. In the effect the EU has become more assertive in its efforts to influence the behavior of research and innovation. In Europe research and innovation are increasingly being challenged by the rapidly developing the EU innovation strategy.

In economic turnaround times the EU finds its time of changing, sometimes conflicting the priorities for the organization and support of research and innovation. Although scientific opportunities are increasing, in terms of societal challenges and entrepreneurship understood as taking the most appropriate strategic choices the main economic playground is especially now, not really stable. The prosperity relies on science, innovation and technology; many nations are turning to other countries in pursuit of mutually beneficial collaborations. The EU will soon explore different approaches to those collaborations that arise from changes in the cooperation landscape, beginning with the proposed new European Union Framework Program for Research and Innovation, Horizon 2020.

On November 31st 2011 in Brussels European Commission (EC) has issued legislation-based proposals for a decision of the European Parliament and Council of the EU connected with Horizon 2020, which is the next Framework Program (FP) for Research and Innovation (EC, 2011a). The official information was provided by research and innovation commissioner M. Geoghegan-Quinn, EC VP, A. Tajani and commissioner A. Vassiliou, with Geoghegan-Quinn describing the budget as *ambitious but realistic*, and very necessary as the Eurozone looks to innovate its way out of the crisis, so a

large increase on the current €56 billion Framework Program 7 (FP7) demonstrated a commitment to innovate as part of Europe's *exit strategy* from the sovereign debt crisis (Hatcher, 2011). The decision and adoption is an ongoing process from Dec. 2011 to Dec. 2013, with Horizon 2020 to guide and also support wide European research and innovation from 2014 to 2020. The program has strong correlation with strategic choices of Europe and its connections on the basis of new political contexts, challenges, and opportunities. The main sources of information include main legal documents connected with the program (EC, 2011b).

Framework Program 7 (FP7)

The EU FP start dated back to 1973 (EC, 2011c), is mostly seen as additional value compared with national activities by fostering cross-border and cross-sectorial cooperation, organizing competition towards excellence beyond national capacities, and combining complementary competences (Horvat, 2011). Archive data show that it attracts high-quality project ideas, top researchers, and excellent consortia involving researchers from Europe. Evaluations also identified some areas that need improvement, i.e. further sharpening of objectives, better alignment of instruments for participation, simplification of procedures, management and administration. The current FP7 is world's largest competitive transnational program, with a €50 billion budget for the 2007–2013 period (European Council, 2010).

Of course the creation of new policy frame in the EU is relevant for the Europe 2020 (EC, 2010a) strategy for jobs and growth. It defines three main priorities (listed below) supported by seven *Flagship Initiatives*.

The three priorities are:

- I. Smart, sustainable, and inclusive growth;
- II. Measurable headline targets, such as meeting the EU's climate change and energy objectives;
- III. Investment of 3% of the EU's GDP in R&D by 2020.

EC will transfer almost €7 billion for the research to stimulate the EU's innovation. It is the largest to date financial program under FP7 (KE, 2011). The EC hopes to rise funding on research and technological development under FP7 that will create approximately 174K of jobs in the short term and almost 450K of jobs and almost €80 billion in GDP over the next 15 years¹. There is a particular place for the Innovation Union, which is one of the Flagship Initiatives, that addresses – with around 30 commitments – issues such as higher investments in research, increasing the number of researchers, modernizing universities, and spending resources more efficiently (Europa, 2010). One of main tasks is the completion of ERA (EC, 2010c), understood as a common and strictly unified market for EU research and innovation that will allow the free movement of technology and knowledge (Geoghegan-Quinn, 2011).

The EU spending on research is a political priority, and is now also at the center of a coherent strategy on innovation – the *Innovation Union*. They are essential if we are to compete with large, rapidly developing countries such as USA and China (Science Progress, 2011). In such radically changing

¹ based on a model *NEMESIS* developed by Professor Paul Zagamé, *Ecole Centrale Paris Erasme*, within the European research program *DEMETER*

economic circumstances, we need a new concept of European research and innovation. Horizon 2020 provides immediate stimulus to the economy and scientific and technological base and industrial competitiveness in the future, so that our society will function in a more intelligent and balanced way is also conducive to societal exclusion (EC, 2010d).

The framework for ERA will be presented by EC in 2012, with its aims to strengthen position of European researchers, improve operations ability of research councils, facilitate cooperation among research infrastructures and join forces of the EU constant cooperation (EC, 2007a). Another element of Innovation Union is that by 2015, Member States and the Commission will complete or launch construction of 60 percent of the European priorities from ESFRI (European Strategy Forum for Research Infrastructures) (EC, 2010e).

Horizon 2020 – Funding Pillars

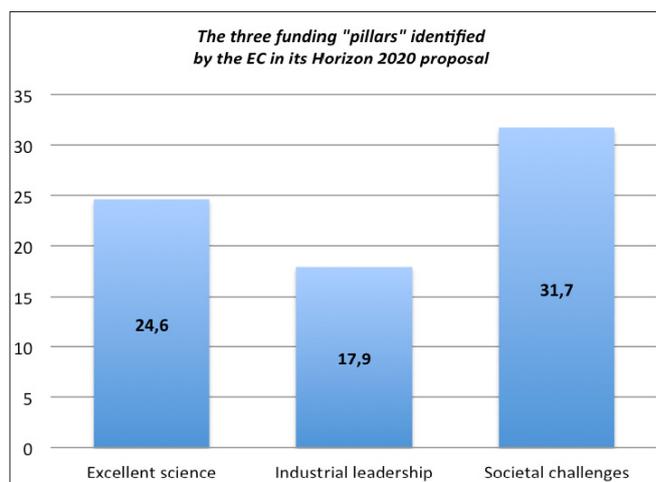
The main fundaments of Horizon 2020 in the EC proposition are based on the three key objectives that will cover the program of research and innovation funding in the EU that will be provided by FP7. In the Common Strategic Framework, the most relevant will be two parts – CIP (Competitive and Innovation FP) and EIT (European Institute of Innovation and Technology) (EC, 2010f). CIP's main role is to support SMEs by offering enterprise and innovation programs, ICT and also intelligent energy. The parts of the program that are strictly related with innovation of course require access to finance, so it will be mostly generated by Horizon 2020 and in the effect will provide both – loan guarantees and finance equity.

On the other hand, the only four-years-old EIT based on education of entrepreneurs is to integrate research results and create innovation (EC, 2011d), by the three Knowledge and Innovation Communities – Climate Change and Mitigation, Sustainable Energy and ICT (Gilbert, 2011). Although the EIT is still in a creation and development stage, especially now it requires constant control and monitoring in order to combine it with Horizon 2020 in a proper direction considering strong correlation with its three main pillars (Macilwain, 2011), which the EC has identified as *excellent science*; *industrial leadership*; and *societal challenges*. In the proposed budget, the science base receives €24.6 billion; industrial leadership receives €17.9 billion; and societal challenges €31.7 billion (figures are quoted in constant 2011 prices, and do not account for inflation).

The €80 billion budget for Horizon 2020 is almost 46 percent higher, comparing with the previous programs. The EC presents new approach for Horizon 2020 that includes both – top-down activities (that are also agenda-driven) and bottom-up approach that offers open fields for new ideas of innovation presented by the prospects. Under the science pillar, the ERC is set to receive €13.2 billion, equivalent to a huge 77 percent boost compared with its present funding level in recognition of its *spectacular* success.

The first pillar is problem-driven. It requires strict integration with key enabling technologies (KET) and sciences, so on the other hand it requires as well constant policy coordination. The second pillar in terms of KET is based on a close cooperation with the industries. The third one is fully bottom-up. The new FET (Future and Emerging Technologies) scheme in this case will be the ground for high-

risk initiatives such as new research collaborative projects that will consider also the role of social sciences, economics and humanities.



Source: <http://ec.europa.eu/research/horizon2020>

Figure 1. Three Pillars of Horizon 2020

Although the whole concept of Horizon 2020 is new, it is already the topic of many analysis and researches, i.e. Copenhagen Research Forum or many Polish universities, i.e. Wroclaw University of Environmental and Life Sciences. Both analysis show that the societal challenges can only be solved in a true multi- and cross-disciplinary research context. Future research solutions will be based on crosscutting research which means that Horizon 2020 will stimulate and encourage collaboration between the research communities associated with the six main program challenges (presented in Figure 2). On the other hand it will allow to see the challenges not only in a European, but also in a global perspective.



Source: Copenhagen Research Forum, *Visions for Horizon 2020*, 2012

Figure 2. The six challenges on Horizon 2020

The best solution for the research collaboration is connection of the best qualified research teams from all over the world, which will create solutions on an international basis

correlated with best-qualified researchers' knowledge. New challenges will arise before 2020, so a dynamic approach with new research solutions that also use risk-taking approaches is necessary and emerging challenges (presented on Figure 2) must be recognized early (Højgaard, 2012). An end-user, problem-solving approach will also strengthen the impact of the FP and the utilization of outcomes and results. Horizon 2020 provides open approach and simple administration, which in the effect gives user-friendliness, and because of that the money for Horizon 2020 will provide optimal innovation, create new jobs, solutions, knowledge and education – for a wealthy, healthy Europe as an inclusive, innovative and secure society.

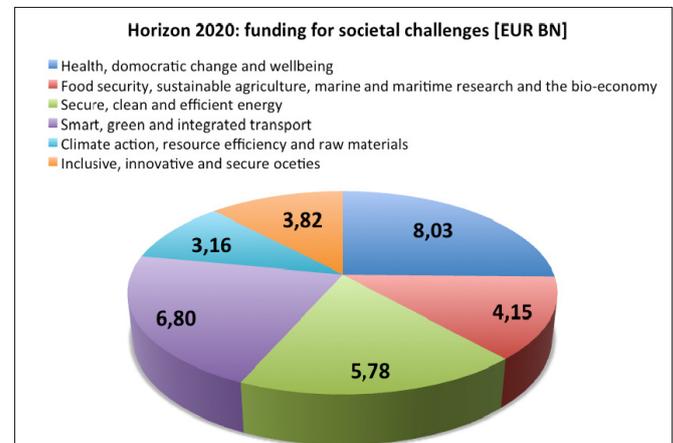
Key Enablers

Funding of closer-to-market projects will be made under the industrial leadership pillar, and this will include much of the photonics innovation activity, with photonics previously identified by the EC as one of a handful of KETs. KET effort is designed to attract active participation from Europe's largest private enterprises and SMEs alike, and it had fundamental importance for the future, because technologies will help to renew European economies. One of the important issues is the photonics industry that can retain the status of standalone KET (now is combined together with micro- and nano-electronics). EC tries to strengthen ties between the public and private sector through the installation of more public-private partnerships (PPPs) – especially with photonics and robotics – which are considered in Horizon 2020 (Hatcher, 2011b).

One important change in the approach of funding innovation will be the use of financial instruments, in the form of debt and equity finance. This is also budgeted under the *industrial leadership* pillar, with €3.5 billion earmarked for risk finance. EC says that approximately €1 billion of that will go towards implementing Strategic Energy Technology Plan projects, around one-third of the funding is expected to go to SMEs, in the form of loans and venture capital. Other measures will include the introduction of a new dedicated SME-funding instrument based on the small business innovation research (SBIR) model already used in the US, and widely viewed as an effective approach to funding innovation. EC states that *its simple rules and procedures, the new instrument will encourage SMEs to put forward their most innovative ideas with the EU dimension (...) and only SMEs will be able to apply for funding, (and) even single company support will be possible to ensure market relevance and to increase commercialization of project results*. SMEs are set to be allocated around 15 percent of the combined *societal challenges* and *industrial leadership* pillar funding, equivalent to some €6.8 billion over the course of the Horizon 2020. The proposed funding for societal challenges is presented in Figure 3.

Unfortunately most of the discussions on the FP program are full of criticism, mostly because of the overload of bureaucracy. One of the major changes that ought to benefit all participants in EC projects will be another attempt to cut bureaucracy. That's why in case of the Horizon 2020, the administrative works will be more harmonized and simplified and also based on a risk control, in the effect the EC will try

to slash the red tape so that researchers can spend more time in the laboratory or workshop than they spend filling in forms. Those simplifications were offered by EC and Parliament in 2010 (EC, 2010g). Because of new-implemented solutions, the whole program coordination is considered as more optimistic, it includes: personnel cost calculation flexibility, flat-rate payment salaries and consistent rules among departments and agencies based on excessive financial control.



Source: <http://ec.europa.eu/research/horizon2020>

Figure 3. Horizon 2020: Pillar – Societal Challenges

Crosscutting research issues impact

According to Copenhagen Research Forum Cross-disciplinary research is the prerequisite for success. Future European Research should be organized and performed in a context with a genuinely holistic approach with inter- and multi-disciplinary research groups in Europe with the rest of the world, but this requires structuring the Horizon 2020 to stimulate and encourage research cooperation between the research communities contributing to each of the individual societal challenges. One of the mechanisms for creating such cooperation is the establishment of element with the specific purpose of pursuing research on the interconnections between the challenges (CRF, 2012). The transition to a sustainable European society demands research between the identified challenges and bridging across the different areas. Horizon 2020 includes viewing the whole area on a holistic basis and is designed to meet these needs.

The analysis of funding shows that Horizon 2020 provides major simplification through a set of rules that will combine all research and innovation funding 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).

According to the CRF (2012), Horizon 2020 will tackle societal challenges through helping to *bridge the gap between research and the market* by, for example, helping innovative enterprises in order to develop their technologies into the products with commercial potential. Because of the market-driven approach it will include creating partnerships with the private sector and Member States and in the effect it will bring together required resources.

Horizon 2020 and the EU Cohesion Policy

The basis of competitive strength of the EU will be based on mainly collaborative research and this will also be the main part of the Horizon 2020 (EC, 2011e). Trying to put what is the main task of the Horizon 2020, the fundamental task is the excellence in research and innovation that are independent of geographical considerations. In this place it needs a different understanding, in comparison with the other EU policy funds, which were based on the regional needs (EC, 2011f). Horizon 2020 and the EU Cohesion Policy funds are distinct but complementary. According to F. Van Vught, between those two programs the *interoperability, mutual enforcement and synergies will be essential* (Van Vught, 2011). One thing that is definitely specific for the FP program is collaboration with countries from all over the world, although the amount of the countries outside the EU (including the EU candidates) did not cross the amount of 7 percent (Archibugi, 2008; EC, 2011g) and that is why one of the Horizon 2020 objectives is also to strengthen the international cooperation, especially outside the EU region. Of course mainly the legislation barriers cause the lack of this cooperation. M. Horvat and K.A. Harrap find that it also might be caused by the intellectual property (Horvat & Harrap, 2009).

The New Style of Partnerships

The previous programs had shown the EC that new partnership initiatives have to be developed to strengthen Horizon 2020 and also add necessary funds and that would help building ERA (EC, 2011h). The partnering initiatives could have both, public and private character, i.e. ERA-NETs (ERA-Networks) and JPIs (Joint Programming Initiatives), and they can combine regional research funding with national programs. Those two types of programs of course will be relevant for the whole ERA Framework. The policy by itself has been improved by EC and the Parliament mostly by more strict regulations in private partnerships. On the JTIs side it was also connected with flexibility, efficiency and effective management. That gave the JTIs the possibility of using *open innovation* business models (Vanhaverbeke & Cloudt, 2008).

The importance of KETs is essential, because prioritizing some of them will have strong influence on SME's increase and industry participation. The cooperation with EIT would be also an important element to foster entrepreneurship and innovation. Something definitely new in this process will be the usage of public procurement to stimulate innovation by defining innovative requirements and targets. The strategies considered by the EU take into account also the measures of High-Tech SMEs that have less R&D capacity even in the regional aspect. The importance of funding of SME's will be important in terms of synergies with Cohesion Policy.

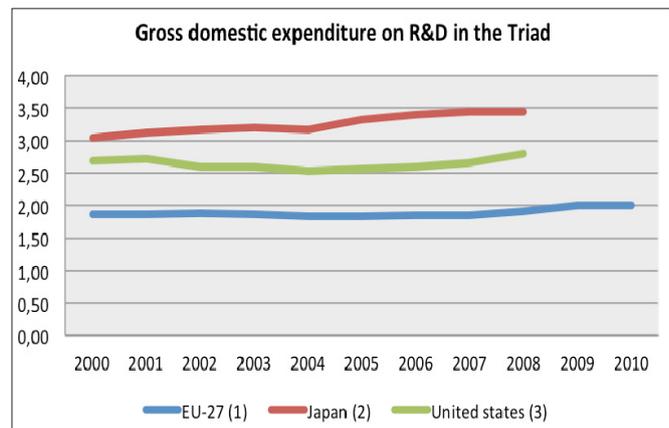
It's almost certain the main budget for ERC will be increased, mainly because it organizes competitions based on excellence without cross-border cooperation. The importance of ERC is already growing; some countries are using the ERC results data to make finding decisions at regional level. It also in return helps ERC to manage its budget at national level (Pain, 2011). Of course ERC needs to be strengthened in opinion of the EC and SE (Science Europe), the same situation affects the Maria Curie-Skłodowska Programs. The EC and SE stated the importance of those changes, mostly in

order to support mobility of the EU researchers to emerging knowledge powers (India and China). The two mentioned programs of course support the cooperation with the non-EU countries and also universities.

It will be important to achieve the goal (by 2015): research infrastructure and synergies between Horizon 2020 and the CPF (Cohesion Policy Funds). It will be almost necessary to redefine the feasibility studies and operational costs from Horizon 2020 and CPF contributing to the construction costs where national funding will also be essential. Trying to answer the question how to provide the way of proper functioning of Horizon 2020, it requires the strict cooperation with ERA initiatives, but before that happens ERA requires developing governance. ERA is planned to complete by 2014, but it can only happen when the ERA Framework will be accepted by the Member States. The implementation of Horizon 2020 will be a very important step for the EC that has a facilitating role, because it's committed by the EU Treaty to take initiatives to achieve ERA (Official Journal of the European Union, 2010).

Research & Development Expenditures

The global recession, world economic crisis and shifts in science and technology since FP7 may motivate Member States towards more coordination and cooperation and to aligning policies and strategies with the EC in building towards Europe 2020. A strong Horizon 2020 framework program prepared in close partnership with all members will be the key. The EU has still not reduced the gap to the U.S., Japan and South Korea in terms of innovation. Most countries spend on research and development approximately 2 percent of GDP. Poland is below the average in case of public spending 0.53 percent of GDP and 0.2 percent private (TVP Parliament, 2012; Statinfo 2012).



Source: Eurostat (tsc00001), OECD

Figure 4. GERD – Expenditure of R&D of GDP (%)

Polish result in terms of innovation beyond the research industry, i.e. innovative business processes, is approximately only 1.25 percent of GDP. Innovation must be seen as a key element in the strategy development and economic recovery from crisis. The goal is 3 percent of GDP on research and development. Unfortunately, only few countries have achieved this goal. Most countries are spending about 2 percent of GDP. There is also a risk that we see in other economies, such as China. Compared to the previous EC survey in 2010, the EU countries have improved results, but

the pace of this improvement is not closer to the three leading the EU economies (McDermott, 2009). The innovation survey in 2011 shows that although almost all Member States had increased their innovation, the rate of growth decreases and the EU is not able to compensate for delays to world leaders: the US, Japan and South Korea. The biggest delay in the EU notes in the private sector and the fall especially is noticed in SMEs. The U.S. has the same target for R&D expenditures (3 percent) as was stated by President Barack Obama in the National Academy of Sciences in 2009 (EC, 2011i).

Who is More Innovative?

The European Union Countries vs. Rest of the World

The EU has the distinct advantage of rapidly growing economies of China, Brazil, India, Russia and South Africa. China however is steadily increasing its innovation and is gradually records delays. Within the EU innovation leaders are Denmark (up 6 percent of GDP of public expenditure and 3.7 percent of private), Germany (6.4 percent of GDP) (German Federal Ministry of Education and Research, 2012; Pro Inno Europe, 2012), Finland and Sweden (3.4 percent). Leaders are catching up by: Belgium, United Kingdom, the Netherlands, Austria, Luxembourg, Ireland, France, Slovenia, Cyprus and Estonia, with results similar to the average for the entire EU (2 percent of GDP). Below average expenditure on research out of Polish persist Italy, Portugal, Czech Republic, Spain, Hungary, Greece, Malta, Slovakia. Significantly below are: Romania, Lithuania, Bulgaria and Latvia.

The collection of data for R&D Expenditures in period of 2000-2010 is presented in Table 1.

Table 1. 2000-2010 World's R&D Expenditures

	2005	2006	2007	2008	2009	2010
EU-27	1,83	1,85	1,85	1,92	2,01	2,00
Euro area (EA-17)	1,84	1,87	1,88	1,96	2,06	2,06
Belgium	1,83	1,86	1,89	1,97	2,03	1,99
Bulgaria	0,46	0,46	0,45	0,47	0,53	0,6
Czech Republic	1,35	1,49	1,48	1,41	1,48	1,56
Denmark	2,46	2,48	2,58	2,85	3,06	3,06
Germany	2,51	2,54	2,53	2,69	2,82	2,82
Estonia	0,93	1,13	1,08	1,28	1,43	1,62
Ireland	1,24	1,24	1,28	1,45	1,74	1,79
Greece	0,60	0,59	0,60	---	---	---
Spain	1,12	1,20	1,27	1,35	1,39	1,39
France	2,11	2,11	2,08	2,12	2,26	2,26
Italy	1,09	1,13	1,17	1,21	1,26	1,26
Cyprus	0,41	0,43	0,44	0,43	0,49	0,5
Latvia	0,56	0,70	0,60	0,62	0,46	0,6
Lithuania	0,75	0,79	0,81	0,79	0,83	0,79
Luxembourg	1,56	1,66	1,58	1,57	1,66	1,63
Hungary	0,94	1,01	0,98	1,00	1,17	1,16
Malta	0,57	0,62	0,58	0,56	0,54	0,63
Netherlands	1,90	1,88	1,81	1,77	1,82	1,83
Austria	2,46	2,44	2,51	2,67	2,72	2,76

Poland	0,57	0,56	0,57	0,60	0,68	0,74
Portugal	0,78	0,99	1,17	1,50	1,64	1,59
Romania	0,41	0,45	0,52	0,58	0,47	0,47
Slovenia	1,44	1,56	1,45	1,65	1,86	2,11
Slovakia	0,51	0,49	0,46	0,47	0,48	0,63
Finland	3,48	3,48	3,47	3,70	3,92	3,87
Sweden	3,56	3,68	3,40	3,70	3,61	3,42
United Kingdom	1,73	1,75	1,78	1,79	1,86	1,77
Iceland	2,77	2,99	2,68	2,64	3,11	---
Norway	1,52	1,49	1,62	1,61	1,80	1,71
Switzerland	---	---	---	2,99	---	---
Croatia	0,87	0,75	0,80	0,89	0,83	0,73
Turkey	0,58	0,57	0,71	0,73	0,85	---
Japan	3,32	3,40	3,44	3,45	---	---
United States	2,56	2,60	2,66	2,79	---	---

Source: http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsii_r020

Indeed the Horizon 2020 will not only increase investment in research, but also the efficiency of disbursement. Particular importance is linking Horizon 2020 with the Cohesion Policy (Rafalski, 2012). This will strengthen the scientific potential of the EU, especially the new Member States that have not sufficiently benefited from the EU funds for research (Ministerstwo Nauki i Szkolnictwa Wyższego, 2012).

High-Ed Innovation

The newest report based on world's best innovative companies recently presented by Fast Company Magazine, has awarded Southern New Hampshire University (SNHU) for relentlessly reinventing higher education, online and off (Kamenetz, 2012). In the report SNHU was ranked at 12th position in the world, for creating its Center for Online and Continuing Education (COCE), the largest online degree provider in New England. Its 10,600 students enrolled 120 programs and specialties. The SNHU's president (LeBlanc, 2012) says that by 2014 it will boast the country's biggest online not-for-profit education system. SNHU's success (revenue from \$10 million in 2007 to \$74 million in 2011) has attracted potential partners who could help to promote and spread this model. Some states are talking with SNHU about the possibly of offering free public higher education; local high schools, community colleges are exploring dual-enrollment programs; the I-Lab team has joined an international university partnership in New Zealand. It all adds up to a *brand-new kind of education, one that LeBlanc's parents would barely recognize* (Kamenetz, 2012). In simple words, the SNHU had a strategy to create the business model that *blows up* their current business model.

The EU initiatives will only strengthen similar initiatives. Horizon 2020 focuses more than ever on turning scientific breakthroughs into innovative products and services that provide business opportunities and change people's lives for the better. Running from 2014 to 2020 the EU's new program

for research and innovation is part of the drive to create new growth and jobs in Europe.

During the Polish Presidency, Member States discussed how to modernize Europe's universities. In September 2011, jointly adopted the EC conclusions, recognizing that the reform of universities can facilitate recovery from the economic crisis, and the most important challenges for European higher education is to improve the quality of education and the closest possible cooperation with the economic and business institutions and employers. It turned out that the Polish reform of science and higher education is ahead of this line of thinking and Polish changes have met with wide recognition in Europe. Today other countries are considering similar reforms. In addition, the Horizon 2020 as the priorities have considered those research projects that can bring answers to the most pressing social challenges and civilization. Even those regions that have developed dynamically, like the US or Asia, they are particularly desirable in the global industry (research in biotechnology, new information technologies and telecommunications).

The shift in the funding of research on the most rapidly developing scientific disciplines shows that Europe is trying to tackle the challenges posed by industrial development and new technologies and seek its own solutions in these areas of specialization, its own methods of production, design, programming, etc. In Poland, the biggest universities have set up technology parks, which are already successful in the implementation of research. And it is worth emphasizing that these are not just concepts worked out by faculty, but also by students. Poland – as the whole Europe and the world – well understands that at this time, institutions must be as close as possible to the economies, businesses and industries.

The European Union Strategic Choice

Worldwide recession and economic slowdown have created a higher level of market competition. Especially innovations during that time are good solution to become a leader within the industry. The recession is a specific time when there is a strong tendency to cost cutting for R&D and innovations, but companies, especially SMEs are trying to change their strategic choice. In the EU the amount of innovative companies in 2005 was approximately 42 percent (Uruski, 2011), in Germany 65 percent, in Austria 52 percent. Unfortunately Polish Central Statistical Office (GUS), admitted that in Poland that amount did not exceed 25 percent (Starczewska-Krzysztozek, 2008).

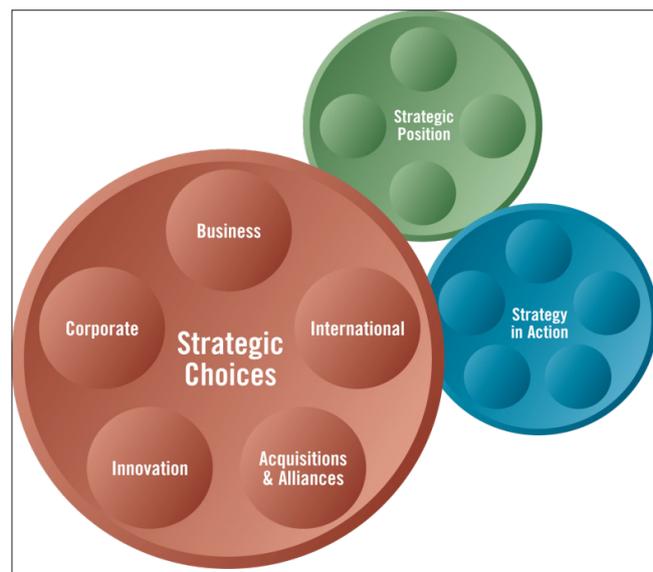
Competitive position in general depends on quality and innovation level, relatively less important has the price. One of the most important is the high-tech sector, usage of own technological solutions, patents and cooperation with R&D labs. It's almost certain that the price is not the correct destination for the companies' strategies. The EU's *transition plan* – Horizon 2020 seems to be the answer for higher customers' rapidly changing expectations, better perspective for human resources allocation and in the effect, the idea which with all its budget will pull the EU to the highest position in terms of the best strategic choice – innovation.

Before the Horizon 2020 idea, the governments have made similar decision in order to support long-term innovations, implementing the anti-crisis programs. In Poland we decided to: improve the EU funds allocation and usage; stimulate

innovation in telecom sector; invest in renewable energy; decrease the bureaucratic barriers for SMEs; support the R&D sector, especially highly innovative firms and VC investments (OECD, 2009). Altogether the expenses for support reached approx. 1 billion PLN (€250 million) (KPMG, 2011).

A lot of companies, not only in the high-tech sector, because of the skillful usage of innovation have a tendency of market driven approach. Because of the innovation they can create markets and have a high influence on societal aspects. New products, services and innovative solutions are creating new specific customers' needs (Krupski, 2009). This understanding of innovation often becomes a new category called *Value Innovation* (Kim, Mauborgne, 2005).

Polish ideas for innovation support have a strong correlation with Horizon 2020 proposals. In general strategic choices tell us how an organization at business level positions itself in relation to competitors, creates the specific strategic direction and methods by which to pursue strategies. Having a look at G. Johnson, R. Whittington and K. Scholes (2011) *Exploring Strategy Framework* presented on Figure 6 – *Part II: Strategic Choices*, it's almost certain that in case of Horizon 2020, all five types of the choices will be taken by the EU firms, although the innovation and entrepreneurship choice will be unquestionable leader.



Source: G. Johnson, R. Whittington and K. Scholes, *Exploring Strategy Text & Cases*, 9th Edition, Prentice Hall 2011, p. 193

Figure 6. Exploring Strategy Framework (the Choices)

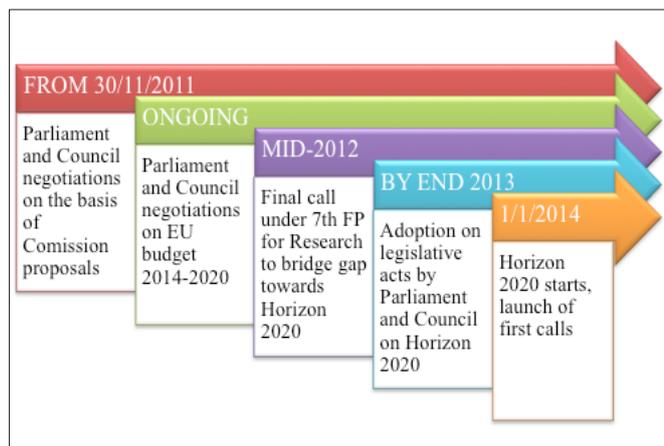
The survey based on questions regarding research and innovation and comparison of current business models and connections with the EU financial support shows that although there is a high interest in getting the EU grants, there are strong barriers in bureaucratic procedures. The research was conducted in Jan/Feb 2012 in Polish interactive television sector (both standard broadcasters and interactive TV companies). The form had 8 questions connected with EU funds, Horizon 2020 based challenges and research and innovation processes.

Out of 18 Polish SME's asked about the applications for EU funds and, 15 of them (83 percent) admitted that

they are not strong enough to prepare necessary forms and applications, due to bureaucracy difficulties. So there is a high probability that although there is a huge amount of money for SME's support, many of them will not take into account even the application process. Unfortunately, although the analyzed sector seems to be highly innovative (all companies see their future direction and strategy connected with innovations, not competition – 100 percent), the overall knowledge about Horizon is relatively low. 44 percent (9 firms) could identify the program and specify at least its main significance for the future market in the EU. 15 percent (3 companies) have received the support for their businesses, and in all analysed set, 10 of them had applied in the past (55 percent) for the EU support, all of them in the same Operational Program in Poland – Creative Economy, based on innovations.

Although presented figures give some directions for general conclusions, it has few limitations. Out of 50 sent surveys, only 18 companies decided to give their feedback about their current business models and innovations based concepts. It is hard to generalize the whole television market in Poland having insufficient amount of information, which in the effect can cause uncertain conclusions and misunderstandings of current market situation. There is a clear proof that innovation and research have strong correlation with firms's strategies understood as their ideas for future long-term existence in highly changing market.

The analysis will be continued with a larger amount of companies, and repeated once the Horizon 2020 is launched (Horizon 2020 timeline is presented in Figure 7). It will certainly give a better understanding of business model based on the EU funds directions and new ideas for creating innovation value for both – researchers from all over the world and highly demanding consumers and markets.



Source: <http://ec.europa.eu/research/horizon2020>

Figure 7. Horizon 2020 Timeline

2012 Main Research Findings

Horizon 2020 provides the framework for solving some of the major societal challenges that are facing the EU. A global approach and mechanisms must be put into place to support an international approach for both research and innovative applications. This will allow to create transnational cooperation and synergies between national programmes. On the other hand Horizon 2020 create incentives furthering

cross-disciplinary research, including both natural and social sciences, including programs, systems and strong cooperation with universities and engaging stakeholders. It will create new generation of researchers focused on different aspects of research based on cross-disciplinary and international mobility causing scientific cooperation.

One of the most important findings is improvement of transfer of knowledge from research and science communities to commercial stakeholders, by research centres, institutions, governmental bodies and industries. Research needs to have the potential for surprise so the assessment criteria must reward novelty and accept that all the potential impacts will not be known *a priori* (CRF, 2012). The Horizon 2020 will allow patent policies to be reconsidered to motivate scientists to innovate, moreover the intellectual property will be addressed on a European scale.

More innovation and diffusion of research results can be achieved through better networking and stronger links between supply and demand. Of course in this case it creates a strong field of research for universities and education and training sector. These efforts can be integrated into an intense communication programme for researchers to present their results to the widest audience possible in all kinds of media.

This new composition of research consortia will provide higher priority to the quality of partners and focus less on political priorities, improving quality results. Innovations in this case are of course necessary along the whole value chain from fundamental science and new technologies to new services and policy tools.

The conclusions of the research presented in Copenhagen (2012) proves that Horizon 2020 should *strive towards less structure and bureaucracy, more facilitation of meetings between peak performing competences and entrepreneurs, as well as support without too much filtering*. There is a strong connection with the firms' strategies and Horizon 2020 simplifies also the rules of the long-term project periods (5-7 years instead of 3) and collaboration with the researchers will reduce the amount of time scientists spend on bureaucratic issues.

Conclusions

Horizon 2020 is a reflection of efforts to invest in massive accumulation of laboratories that can perform extremely sophisticated research. This program has scheduled over €80 billion (2014-2020) for research funding. There is a lot of information about research and innovation implementation in Europe in Horizon 2020, but this idea is a challenge in a time of the economic crisis. This does not mean that funds will be used solely for these disciplines and research. The budget of the ERC, which finances basic research, has been increased by 70 percent. This means tremendous support for the funding of theoretical and basic research, which is often determined by development of an implementation study. Although the budget seems to be extremely high, it's only one-third what China is planning to invest in R&D. New re-defined European research and innovation are basically the EU various investments which will become the foundation for the development of the region, which is now plunged into deep crisis. New dimension of R&D will become part of stimulation of the European market. This has a much better impact, comparing with *pumping* more funds in the failing

banks and public budgets. Horizon 2020 is not created for *patching holes*, but to increase development and stimulation of the region and it's designed to combine the cooperating organizations in order to improve the EU position in the highly competitive global market.

For every European is now evident that during the crisis in a particular way we must remember that scientific research should be a catalyst for growth and innovation. On the other hand we also need to think ahead and invest in research initiatives which results cannot be accurately foreseen today, but they can significantly increase our competitiveness in the distant future. The EU funding priorities are negotiated not only among scholars representing different fields of science, but also among governments, which have their own interests in the funding of certain research.

The current form of Horizon 2020 will accumulate funds and investments in very large scientific enterprises. An additional benefit is the scientific specialization of the various European regions. The creation of powerful research laboratories will make the regional-focus view on the most innovative research projects in specific fields. It is important not to duplicate the same infrastructure in every region, but adapt it to the research capacity, quality of academic staff and also the realistic possibilities of implementation. Both the EC and the EU are aware that studying in Europe can only be financed from public funds. Thus, the system support of the research programs will also require input from industries and what is particularly most important – from local SMEs.

Member States and companies need to resolve and long-term commitment to participate in the strategic partnerships. Shortening the time requires to place on sale innovative products and services that will combine European leadership and accelerate fast economic recovery and provide long-lasting growth in the EU. Horizon 2020 re-definition of research and innovation is to allow not only to counter the current situation, but also allow for dynamic growth in the EU and regain the global leader position in science and development of new technologies. In the current economic downturn, many research centers are seeking co-operation, and it promotes synergy by sharing the achievements already gained. However the ruling bureaucracy in the EU makes life, business and science more difficult and so called *redefined research and innovation* is a first challenge on a global scale, that will create the basis for radical changes in the EU.

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The article has been reviewed.

Received in April, 2012; accepted in June, 2012.