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GLOBAL ECONOMIC INSTABILITY AND INNOVATION POLICY

Summary

The study is addressing the global instability impact on economic development, competition and innovation policy. Global shocks and instability expose the differentiation of GDP growth, trade tensions and protectionism, supply chains disruptions, expanded competition. Euro area has slower growth rates comparing to the US and emerging countries of Asia. Such situation creates a need for acceleration of growth in Europe based on the innovation and high technology. Regulatory policy in Europe aimed on the innovation production and dissemination for the all areas of the economy and society. Innovation policy focusing on fostering a solution of complex problems such as energy, sustainability, productivity, quality of life. Cooperation and partnership are key systemic methods of innovation policy on the EU, regional and international directions. Countries economic differentiation is influencing on the research potential and innovation capacities gap. EU innovation policy, cooperation and partnership are directed to coordinate innovation production and boosting competitiveness. Innovation playing a significant role in addressing of the EU key economic problems ach as boosting competitiveness, transformation of the EU energy sector towards greater efficiency, stability, transition to the green energy.

Introduction

The global instability is driven by the multiplying global shock, risks and transformations.

Pandemic shocks have affected social life, lockdowns, work conditions, business depression, disrupted communication and economic divergence. Post pandemic recovery has been disrupted.

Global shock ignited by russian invasion to Ukraine in 2022 and continued war have generated triple crises – energy, food and financial. War and crises

have affected global economy imbalances, contradictions and instability. Prolonged inflation and central banks anti-inflation high interest rates have depressed world economy and put some European economies at the brink of recession.

At the beginning of 2024 the inflation has moderating in the leading industrialized economies and marking prospects for economic growth. Such trend is foreseeing by the IMF and put as a title of its April 2024 World Economic Outlook report as “Steady but Slow: Resilience amid Divergence”. Such title pointing on the key features of global and especially European economies:

– steady like between stable and moderate and needs to be more dynamic;
– slow but has to be accelerated to meet pre-crisis levels;
– resilient to keep response to crisis and to avoid depression;
– divergent as a divide between higher growth and slower growth economies, notably in Europe, to be addressed.

Along with shocks actual and prolonged implications, international and regional challenged influence on growth and competition in Europe. Such challenged are: energy import dependence and clean energy transition, de-carbonization, climate change, environmental sustainability, demographic problems, cyber risks and others.

Innovations outcomes are focusing on resolving key problems and challenged to foster economic growth in Europe – launch new technologies to increase productivity and save resources, strengthen resilience, improve work and life environment, make accessible communication, promote inclusion.

Innovations are key driver to enhance the European countries international competitiveness: internal within the joint market between countries and against aggressive external rivals for EU markets (like foreign EV) as well as glob on the global competition son markets, innovations, new products and services.

Complexity of factors and components of the innovation process lead to differentiation and divide between countries, regions and sectors. Gaps elimination is one of the tasks of the EU policies, based on promoting harmonization, cooperation, adaptation and dissemination.

Such tasks require to conduct a permanent improvement and adaptation of the innovation policy in the EU and member states, support of balanced development of innovation capacities and implementation, overcoming an innovation gap between countries and regions.

Cooperation and partnership are key systemic methods of innovation policy on the EU, regional and international directions.

Countries economic differentiation is influencing on the innovation capacities.

EU innovation policy, cooperation and partnership are directed to mitigate innovation gap between countries and regions.

Innovation are playing a growing role in the transformation of the EU energy sector towards greater resilience, stability, transition to the green energy.

Chapter 1. Global shocks and economic instability

The current trends of the counties' and international economies are unstable and unpredictable. Growth rates are fluctuating, markets are volatile and reversible, supply chains unstable, globalization is accompanying with protectionism and re-shoring, prices and exchange rates moves against forecasts, It means that market conditions are changing under pressure of economic and political factors, market prices and exchange rates movements are contradictory against forecasts, trade and capital flows have volatility, government policies should react on the unforeseen changes and spend more resources for stabilization.

Instability currently has emerged under the pressure of global shocks and changing global environment. Global shocks and crises became more frequent and widespread during the last decades. Global financial crisis of 2008 have raises vulnerabilities in energy, manufacturing and international trade, cased imbalances and financial distress.

Pandemic shock of 2020–2022 has been unexpected hit on public health, economic and social life. Lockdowns affected business decline, large number of illnesses caused high budget spending and public debt, high cost of pandemic affected contraction of the economies, downturn of travel and services, disruption of supply chains, GDP slowdown or recession.

Global shock ignited by the russian invasion to Ukraine since 2022 have initiated the emergence of crises cluster in the world economy – an energy, food and financial volatility and disruptions. The energy shock most severe was in Europe, markets became volatile with high prices, supply chains rebalanced and sanction led to heavy reduction of russian oil and gas supply in 2022–2023.

Global shocks may demonstrate short-term effect with prices volatility and supply rebalancing. But they also may generate a secondary shock such as demand and supply shocks causing markets volatility, technology shocks, international debt burden, international inflation shock since 2022, central banks high interest rates shock and others.

Due to global shocks and instability, the world economic growth nowadays is slowing and differentiating, few countries are keeping relatively stable rates, but some countries are having low results less then 1 % and have been facing with depression risk, The main differences are between US and other advanced economies, between slow moving advanced European economies and other countries, between emerging Asian economies, notably China and India, and the rest of the world. Besides of economic differences, innovation and technology developments are becoming most important for international competition.

Table 1

Growth rates in the world economy, % per year

	2023	2024 projections	2024 projections to 2023
World	3,2	3,2	0
Advanced economies	1,6	1,7	+0,1
US	2,5	2,7	+0,2
Euro area	0,4	0,8	+0,4
Advanced Europe	1,6	1,7	+0,1
Germany	-0,3	0,2	+0,5
France	0,9	0,7	-0,2
Italy	0,7	0,7	0
Spain	2,5	1,9	-0,6
United Kingdom	0,1	0,5	+0,4
Emerging and Developing Economies	4,3	4,2	-0,1
World trade	0,3	3,0	2,7

Source: compiled and calculated based on the IMF [8, p. 10]

The instability causing slower global growth comparing with pre-pandemic period accompanying with a differentiation among countries:

– advanced economies have as twice as lower growth rate comparing with global and 2,5 times slower rates then emerging and developing economies. Such difference may require to emphasize on resilience and acceleration measures of economic policies;

– US has better growth rates then advanced economies and especially then Euro area;

– it would widening gap between US and Euro area in most important economic respects and put Europe into position of loosing competitiveness;

– advanced European countries have below 1% or even some (Germany) negative rates in 2023 and the same or worsening projections for 2024. For them it means that traditional models could not improve their competitiveness and mobilize sources of growth, this enforces a need for innovations and high technologies capable to improve productivity and efficiency;

– China and India keeping growth rates above global and progressing in the area of problems which may affect their prospects and influence on the global pace.

For Europe a difference in the economic development with the US has an importance in context of global competitiveness. For example, Euro area have been equal 30 years ago with US in labor productivity, but during last two decades gradually have Europe became comparably lower productivity [8].

Comparison of the Euro area economic development level with US using GDP per capita shows a gap since 2019 between Europe and the US on the level of 68 % with a negative forecast [9].

Countries differentiation is influencing global, regional and internal competition, especially in energy, high technologies, digitalization, innovations. At the same time innovations pay critical role in overcoming economic problems and differentiation negative impact, sourcing productivity growth and new market opportunities.

European economy instability has been affected by the global shocks, structural problems and international competition. As result the EU and few member countries remains at the low GDP rates and at the risk of depression. These also influence on the internal differentiation in Euro area of leading economic indicators: GDP, inflation, income, energy. The range of differentiation of key indicators could be considered as a gap between countries in respective area. For example, the annual rate of GDP growth in the EU in the first quarter of 2024 is 0,4%.

Table 2

Euro area GDP in 2 quarter of 2024 comparing with the same quarter of the previous year, selected countries, %

Country	GDP change, %
Euro area	0,6
EU	0,8
Chechia	0,4
Germany	-0,1
Estonia	-1,7
Ireland	-1,4
Italy	0,9
Latvia	-0,1
Netherlands	0,8
Romania	0,8
Slovenia	0,8
Finland	-0,7

Source: compiled based on the Eurostat [4]

EU moderate economic growth in 2 quarter of 2024 is weaker then the USA economy growth in 3,1% the same period [4]. Therefore, US economy continues to lead industrialized countries and EU not overcoming the divide. At the same time five EU countries have negative growth rates in second quarter 2024, including Germany the largest European economy. Such countries are on the edge of risk of technical recession. Seven more countries have less then1% growth in the same period [4].

Such results indicate the prolonged outcomes of high inflation following shocks and crises since 2022, nor easy to overcome the noted instability. Such situation affects intra-EU trade and incomes, have a structural and competitiveness implications.

The impact of inflation was most serious in 2023, when inflation rates in the EU was on peak of 10,3% and in Baltic states have exceeded 20%. Data shows that inflation in the EU recently keeping close to the target of 2%. But still gap exist between individual countries which affects macroeconomic stability, prices and incomes, trade, competitiveness [3].

European Central Bank (ECB) as first among developed countries to initiate the rates cuts on the third time in 2024. The ECB Governing Council decision on 17 October 2024 states "The Governing Council today decided to lower the three key ECB interest rates by 25 basis points. Accordingly, the interest rates on the deposit facility, the main refinancing operations and the marginal lending facility will be decreased to 3.25%, 3.40% and 3.65% respectively, with effect from 23 October 2024" [2]. Such monetary measure is aimed to continue disinflation, but at the same time effective investment and innovation policies are needed for turn a weak economy in order to stabilize and push growth.

Global instability, economic differentiation, gaps and challenges are pushing efforts for growth, quality and efficiency, creating the demand for innovations.

Addressing economic instability challenges influence a competitiveness and requires to encourage more targeted innovations:

– slow rate of growth requires frontier innovation to boost productivity, digitalization, quality and resource saving to accelerate growth;

– instability of global trade requires innovations to promote new high technology products and digital trade services;

– rapid technological changes enforce disruptive innovations and their international dissemination;

– climate change and EU Green Deal push for innovations for sustainability, clean energy and energy saving.

Innovation are creating and applying in different forms and areas such as:

– material – products, technology, materials;

– non-material in services;

– organizational – new types of organization of production, service and business, for example like digital commerce or gig-work;

– social – social networks, social media and others;

– educational – digital teaching, corporate university and other.Diversity of innovations requires to coordinate their governmental support and regulation.

Innovations are complex phenomenon and could be considered as a process covering several stages and forms with specific functions:

– research targeted on innovations – research and technology activities focused in producing innovative solutions, technologies, products; to be conducted at the universities, research entities, private companies, individuals;

– inventions – product or technological innovations which has no existing analogues, sometime as outcome of research discoveries; produced individually or by some group of inventors;

– innovation development – a process of developing of the innovation blueprint and prototype into model ready for mass production, commercialization and dissemination; in many cases carried by the special types of companies such as startups or venture companies;

– innovation commercialization – production of innovation with new functions and advantages for the competitive market, build up market share and revenues to achieve break-even point;

– innovations diffusion or dissemination – commercialization and promotion for different markets and customers.

Major areas of application and utilization of innovations are also complex: government, industry, agriculture, services, municipalities, transport, education, public health, households, some break through innovation, for example in energy, could be applicable in several of many areas. Process of production and dissemination innovations by combination of several entities (university, research lab, individual inventor, startup, small business, corporation) for the interests of different customers is a natural base for different forms of cooperation as a key way of coordination and management of the innovation.

Chapter 2. European innovations policy in the time of instability

Global shocks and unstable global environment, crises and market volatility influence on the international and national regulatory policies. Global shocks have provoked secondary shocks such as: energy demand and supply shocks causing markets volatility, international debt burden, international inflation shock since 2022, central banks rates increase shock, supply chains shocks and others. Economic growth in the world slowing and differentiating, some countries have been facing with depression risk, uncertainty affects financial markets and investments, Combination of shocks, crises, volatilities and their consequences have generated the international economy instability. Energy shock and European energy crisis of 2022 was most severe in last decades with high prices peak due to supply destructions and reduction of Russian oil and gas by sanctions in 2022–2023.

European economy instability has been affected by the global shocks, structural problems and international competition. As result the EU and few member countries remains at the low GDP rates and at the continuous low or negative GDP rates.

Instability influence on the European economy in different ways – keeps uncertainty of business and demand, markets fragility, consumption and industrial production depression, instable confidence of consumers and business, limited investment motivation.

Instability and global competition requires to employ a resources and factors which enable systemic complex solutions for the dynamic economic growth and global competitiveness, sustainability and social progress. Innovation development and dissemination will be essential for move to resilient and dynamic model of the European economy.

Europe's place on the global innovation market appears as co-existence of leading position in certain technology areas and catching-up the world leaders. Its clear when to compare the indicators of the innovation rope in the economy The EU spends a lower part of GDP (2.3 % in 2020) research and development than the United States (3.45 % in 2020) and Japan (3.26 % in 2020) [7].

Therefore, the EU innovation policy should address a complex of interconnected tasks:

– to improve university education and research, their cooperation with business and local communities;

– to put focus of research and development on disruptive innovation and dissemination;

– to develop partnership between government, research, innovators, business, communities to promote and disseminate innovation;

– to create conditions for international cooperation in research and innovation.

European innovation policy is a system of programs, actions, instruments and institutions, the prime purpose and activities of which are aiming to improve conditions, promote, coordinate, support and financing the productions and dissemination of innovation.

Innovation are sourcing and applying in all areas of the economy and society, world environment. Therefore, innovation policy is interrelated with other policies such as scientific, educational macroeconomic, industrial, technology, agricultural, digital, regional, environmental, international, social and regional policies.

Due to complexity of innovation and many parties involved, European innovation policy employs a systemic method of coordination and management such as:

– cooperation between institutions and countries;
– partnership for innovation programs and projects;
– innovation partnerships in regions and intra-regional;
– implementation and dissemination networks.

Innovation policy and programs are conduction the levels of economy:

– EU wide innovation policy;
– national or macroeconomic innovation policy;
– regional and sector innovation policy;
– micro level innovation policy – business, research institutions.

Coordination between different levels of innovation policy primarily based on the partnership principle, involve also regulatory instruments, financing, investments, social and ecological standards.

Innovation policy address the actual problems and issues of the EU, its capacity to improve international competitiveness. At the beginning of the century, the EU market remains fragmented and is not sufficiently innovation friendly. To reverse these trends, the EU developed the concept of an 'Innovation Union', which aimed to:

– Make the EU a world-class science performer;

– Remove obstacles to innovation – like expensive patenting, market fragmentation, slow standard-setting and skills shortages – which prevent ideas getting to market quickly;

– Revolutionize the way the public and private sectors work together, notably through the implementation of European innovation partnerships between the EU institutions, national and regional authorities and business [7].

Innovation regulation and innovation outcome both are complex issues covering educated manpower, creativity, inventions, access to resources, financing, inventions implementation. Therefore, innovation policy should be complex, aiming on a set of targets, coordinated institutional framework, a package of instruments, timely schedule and verifiable outcomes, cooperation and partnerships.

European Union undertakes some complex innovation policies and programs aimed on the fostering innovations and their implementation, increase economic and social outcomes, narrowing the gap in such area between countries. One of such advancing policies is Innovation Union. It has been established in 2010 and aimed to improve conditions and access to finance for research and implementation of innovations into new products and services with impact on the growth, jobs and productivity. The Innovation Union aimed to create a single European market for innovation, attract innovative businesses. To achieve this, various measures were outlined in patent protection, standardization, procurement and regulation. Several instruments have been introduced to measure and monitor the innovation situation in the EU countries in order to improve regulations [7].

The systemic approach became a basis for European Innovation Scorecard is a complex indicator of innovation management systems in the EU and member countries [6].

European Innovation Scoreboard 2023 measurement framework to oversee a complex nature of innovation process. Scoreboard set up a standardized set

of indicators for innovation conditions and countries The EIS 2023 distinguishes between four main types of activities:

– Framework conditions, Investments, Innovation activities, and Impacts – with 12 innovation dimensions, capturing in total 32 indicators. Each main group includes an equal number of indicators and has anequal weight in the average performance score, or the Summary Innovation Index (SII).

– Framework conditions captures the main drivers of innovation performance external to the firm and differentiates between three innovation dimensions:

- Human resources dimension includes three indicators and measures the availability of a high-skilled and educated workforce.
- Attractive research systems dimension includes three indicators and measures the international competitiveness of the science base.
- Digitalisation dimension measures the level of digital technologies and includes two indicators.
- Finance and support dimension includes three indicators including private funding:

1) venture capital investments;
2) R&D expenditures in universities and government research organizations;
3) direct government funding and government tax support for business R&D.

- The Firm investments dimension includes three indicators on R&D and Non-R&D investments that firms make to generate innovations.
- The Use of information technologies dimension captures the use of information technologies including two indicators [6, p. 8].

Based on scores system, EU countries have been designated into four performance groups: Innovation leaders, Strong innovators, Moderate innovators and Emerging innovators.

Innovation Leaders in the EU are mainly Northern European countries: Denmark, Sweden, Finland, the Netherlands and Belgium.

Strong innovators are key economic players: Austria, Germany, Luxembourg, Ireland, Cyprus, and France which are, performing above the EU average.

Moderate innovators: Estonia, Slovenia, Czechia, Italy, Spain, Malta, Portugal, Lithuania, Greece and Hungary.

Emerging Innovators include mainly CEE countries: Croatia, Slovakia, Poland, Latvia, Bulgaria and Romania [6].

The differentiated countries are representing innovation gap causing by country-specific and international factors, including global instability. The EU innovation policies are aimed to the overall development the national innovation systems and narrowing the gap between countries. During the period of 2016-2023, innovation systems gap between the countries have

narrowed, most strongly within the groups of Strong Innovators and Moderate Innovators. At the same time, the existing differences are larger then geographic concentration and economic divergences. Notably, the Innovation Leaders countries are concentrated in Northern and Western Europe, but Eastern Europe representing by Moderate and Emerging Innovators [6].

The EU countries innovation systems development helps to keep good international competitiveness position, but a need for its strengthening requires to design and apply advancing policy approaches aiming to support innovations and their practical implementation.

The New European Innovation Agenda, adopted in 2022, aims to position Europe at the new wave of deep tech innovation and start-ups. It will help Europe to develop partnerships in new technologies to address the social challenges, and to bring them on the market [10].

The New European Innovation Agenda focuses on five flagships:

Funding Scale-Ups:

– Activate institutional and private investors in Europe to invest in the scaling of European deep-tech start-ups.

– Facilitate innovation through improved conditions including experimental approaches to regulation (e.g. regulatory sandboxes, test beds, living labs and innovation procurement).

– Support the creation of regional innovation valleys and help Member States and regions direct at least €10 billion to interregional innovation projects, including in deep-tech innovation for key EU priorities. It will also support Member States to foster innovation in all regions through the integrated use of cohesion policy and Horizon Europe instruments [10].

Fostering, attracting and retaining talents

– Support the development of deep tech talents in and to the EU through a series of initiatives including an innovation intern scheme for startups and scale-ups, an EU talent pool to help startups and innovative businesses find non-EU talent, a women entrepreneurship and leadership scheme and a pioneering work on startup employees' stock options [10].

Improving policy making tools

– Development and use of comparable data sets and a shared definitions (startups, scale-up) that can inform policies at all levels across the EU and for policy coordination at the European level through the European Innovation Council Forum. the New European Innovation Agenda aims to accelerate the development and scaling up of innovation across the Union through a set of 25 actions [10].

Complex approach is a way of improvement of the countries innovation systems and enforce their input to socio-economic development and competitiveness. Such complex approach should be adapted for candidate and neighboring countries in order to facilitate further integration.

One of the key objectives of the European innovation policy is energy sector and energy transition. In 2022 EU was badly hip by strongest energy crisis of much greater extent then the rest of the world. The key reason for that was prevailing dependence on manipulative policies of russia energy supplies.

In response to energy instability risks, the EU is implementing regulatory measures to address energy resilience and overall sector stability. First of all, short-term measures include maintaining the solvency of energy consumers, stability and balance of supply, rationalization of energy consumption, reduction of energy losses etc.

One of the cluster manifestations of global shocks is the European energy crisis of 2022, the main features of which were a significant increase in energy prices, the negative consequences of dependence on the supply of oil and gas from Russia.

The main systemic factors and features of the European energy crisis can be considered the following:

– the volatility of energy prices as a result of market volatility and structural factors;

– demand shocks during the pandemic and, accordingly, the drop in energy prices, which was replaced by supply shocks due to the increase in energy demand in the conditions of the post-pandemic recovery of the economy and caused an increase in energy prices;

– supply shocks as a result of military aggression, reduction of natural gas supply from Russia and general destabilization of world markets;

– limited renewable energy and its dependence on natural conditions;

– the unevenness of global demand and increased competition for energy resources, the impact of Asian countries' demand for liquefied natural gas and oil;

– instability of global supply chains of energy resources;

– influence of global factors on natural gas and oil prices, market manipulation.

The European energy crisis had significant macroeconomic and structural consequences and became the main factor of uneven inflation in Europe. The crisis affected the decline of energy-intensive industries, transport, urban economy and private consumers, and caused financial stress at all levels of national economies. The price energy shock in Europe carries risks for private consumers and businesses: increase in costs and solvency of corporations, repayment of the financial condition of households, energy poverty, instability of energy supply.

The post-crisis adaptation of the European energy industry has a complex cross-sectoral content and is carried out on the basis of pan-European cooperation. Adaptation includes a set of coordinated technological, logistical, structural and regulatory changes designed to ensure sustainability and

flexibility of energy supply. Short-term adaptation measures included subsidies to maintain the solvency of energy consumers, maintain the supply balance, and reduce energy losses.

Medium- and long-term adaptation measures are intended to ensure stability and mobility of energy supply in conditions of instability of international markets. This includes logistical, structural and investment measures:

– diversification of energy supply sources on a long-term basis;

– development of Europe's energy infrastructure to ensure supply flexibility (liquefied gas terminals, gas pipelines, interregional power transmission network);

– joint gas purchases and maximum filling of storage facilities for guaranteed supply;

– investment in renewable energy;

– digitization of energy supply.

Adaptation of the European energy industry to international instability made it possible to overcome the pressure of the energy industry on inflation and reduce its indicators. So, if in October 2022 at the peak of energy prices, the inflation index in the Eurozone was 10.6% and energy inflation was 41.5%, then in October 2023 the inflation index fell to 2.9%, and energy prices had a deflationary negative value of 11,1% [3]. At the same time, global supply chains are changing, attracting global sources makes it possible to diversify energy sources and overcome the crisis. Global shocks, international instability and import dependence of the European energy industry stimulated the strengthening of the adaptability and stability of the European energy industry, its role in the economy due to a complex of measures of system regulation of energy supply, energy saving, and the development of alternative energy.

Advanced digital technologies could support energy system optimization and cost savings, system integration, enabling the data and operational design to balance supply and demand of energy locally and internationally. Digitalization could improve the utilization of the generating, reserve and grid capacity.

Digitalization of the energy system is carrying on the international, national and industry levels, maintaining cross-level coordination and integration, research and innovation cooperation, data and systems networking.

On the international level in response to current price volatility is expecting multiple effects from the digitalization development and implementation according to the decision of the European Commission of the Digitalization of Energy Action Plan [1, p. 3] started in 2022. The major outcomes in result of such digitalization plan implementation are expecting such as:

– creating the European data infrastructure to support a balanced and effective market for energy services;

– promoting of the best practices and innovations for servicing customers in energy;

– enhancing the application of digital technologies1 in the energy sector by research and innovation;

– enhancing the cybersecurity of the energy sector;

– supporting the development of climate neutral solutions for the Information and Communication Technologies sector, promote cooperation between the energy sector and the digital sector.

On the national level digitalization application is targeting on the data management of the country's energy systems, balancing supply and demand, capacities better utilization, energy saving and customers servicing.

On the industry level digitalization application including different technologies for energy management, data processing, integrated technological systems. In order to provide digitalization integration, the technology companies developing or partnering or acquiring the software development capacities and firms.

Digitalization of energy would apply the advanced technologies such as Big Data and Artificial Intelligence in order to improve the system stability and efficiency. Digitalization of energy is requiring of fostering international coordination and cooperation for development and scaling of advance technologies for energy sustainability.

Conclusion

World economy instability is resulting of the global shocks originated in pandemic, russian war in Ukraine, energy crisis and inflation. Now instability is a feature of the global economy and therefore put a stability, sustainability development on the international and countries' policies agenda, European economy is facing challenges and risks due to global shocks and international instability, has a weaker growth rates, productivity and competitiveness problems, economic differentiation with the US and between Union member countries.

Monetary measures of the central banks of developed countries results the inflation slowdown, but instability now requires to put focus on growth acceleration based on investments and innovation.

Innovation is a main factor of the European country's economic development and international competitiveness. Competition increases within the joint market between member countries and international with external rivals on the global markets of innovations, new products and services.

Complexity of factors and innovation resources differences are influencing on the gaps between countries, regions and sectors. Getting effective innovation is the tasks of the EU policies of harmonization, cooperation, partnership.

Global challenges require improvement of the innovation policy in the EU and member states, support development of innovation capacities, mitigating innovation gap between countries and regions. It also requires to manage the limitations and obstacles, to gat effective allocation and performance of public financing of research and innovation, their intensive dissemination, to enhance incentive of private sector for innovation production and utilization, to accelerate new technologies in the business, local communities and social area.

Innovation should be focusing on the key problems of the economy and society, especially sustainable development, circular economy. Energy stability and effectiveness are among priorities of the transformation of the EU energy sector towards decentralization, greater resilience, renewable – based transition to the green energy.

Innovation input into EU competitiveness and green energy transformation should be in agenda of economic, social, institutional, behavioral, environmental and technological studies.

EU innovation policy, cooperation and partnership are directed to enhance innovation competitiveness and its role in the economic and social stability, strengthening EU position on global markets.

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