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SYNERGIA PRIEMYSELNEJ POLITIKY A POLITIKY HOSPODÁRSKEJ SÚŤAŽE EÚ V RÁMCI KONCEPCIE INDUSTRY 4.0: PARALELY A VÝZVY

THE SYNERGY OF EU COMPETITION AND INDUSTRY POLICIES WITHIN THE INDUSTRY 4.0 CONCEPT: PARALLELS AND CHALLENGES

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Nadchádzajúca priemyselná revolúcia Industry 4.0, tiež nazývaná digitálna revolúcia, sa vyznačuje mixom technológií, ktoré stierajú hranice medzi fyzickou, digitálnou a biologickou sférou. Priemyselná politika je súbor činností a činností ovplyvňujúcich výrobné odvetvia, ako aj odvetvia služieb. Nový prístup Politiky hospodárskej súťaže EÚ sa zameriava najmä na normy, ako sú antitrustové pravidlá, kontrola fúzií a opatrenia na kontrolu štátnej pomoci. V rámci analýzy charakteristík Priemyselnej politiky EÚ a Politiky hospodárskej súťaže EÚ sa štúdia zaoberá mierou využitia ich súčasnej efektívnosti v súvislosti s koncepciou programu Industry 4.0. Táto synergia s cieľom ďalšieho možného zvýšenia vplyvu Priemyselnej politiky EÚ a agendy Politiky hospodárskej súťaže EÚ v rámci konceptu Industry 4.0 bude mať výrazný vplyv na sociálno-ekonomický rozvoj EÚ a situáciu na trhu práce EÚ.²

Kľúčové slová: zvyšovanie konkurencieschopnosti, automatizácia a robotika, svetová ekonomika, sociálny a ekonomický rozvoj, technologický pokrok a inovácie

The forthcoming Industry 4.0 Industrial Revolution, also called a digital revolution, is characterized by a blending of technologies that erase the boundaries between physical, digital and biological spheres. Industrial policy is a set of activities and actions affecting the manufacturing and service

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sectors. New approach of the EU Competition policy focuses mainly on its standards such as antitrust, merger control and state aid control measures. Within the analysis of the EU industrial policy characteristics and EU Competition policy issue the paper deals with the utilization rate of their current efficiency regarding the Industry 4.0 concept agenda. This synergy in the way of further possible increasing of EU industrial policy influence and EU Competitiveness agenda under the Industry 4.0 agenda will have a significant impact on EU socio-economic development and EU labor market situation.

Key words: competitiveness enhancement, automation and robotics, international economics, social and economic development, technology advance and innovation

JEL: F02, F59, O31

1 INTRODUCTION

The EU Industry policy is supposed to provide a platform bringing together regional, national and European actors, with the objective to define and implement a European industry policy agenda. The role of the Commission in this process is mainly to facilitate all forms of cooperation that could lead to more competitive states in Europe, by providing neutral economic analysis on existing and emerging clusters, identifying good practice, providing intelligence on opportunities for cooperation and facilitating net-working at practical and strategic levels. The EU Competition policy appears to be one of the most important current programs and activities at EU level which support clusters in the emerging industries in EU. European Union consists of 28 member states. Of course, cooperation, economic growth and creating a Single Market represent the main topics of political agenda of the Union. Competition policy is closely linked to the EU goal of creating a Single Market for goods, services, capital and labor. Industry 4.0 concept implemented into EU industry and competition policies can contribute to economic growth by stimulating productivity, investment and innovation. In our study, we deal with the theoretic determination of basic terms referring to competition, e.g. competition policy, as well as to development of European competition policy and setting up the basic competition rules and laws, emphasizing and focusing especially to EU Competition Law. Based on the comparative analysis of EU Competition and Industrial policies mutual interaction within the Industry 4.0 concept the object of the paper is to assess the impact of the EU Competition policy and the EU Industry policy effects on Industry 4.0 concept regarding the EU competitiveness enhancement in the international economics system. This paper will discuss how the competition agenda is implemented into EU Industry policy processes, how important role it plays within the current Industry 4.0 concept to assure sustainable economic growth and enhance the EU competitiveness within the international economics environment.

2 GOAL AND METHODOLOGY

The current status of the EU Industrial policy (IP) has been formed over a longer period and from the historical point of view is influenced by significant moments and factors such as oil shocks, world economy globalization and increasing integration of economic complexes. The microeconomic conditions importance highlighting for the competitiveness development is the driving motive of EU IP reorientation from the industry field support (e.g. by means of grants) to the area of creating a business environment that allows enterprises to quickly gain competitive advantage.

The paper's goal is by analyzing the synergy characteristics of EU Industrial policy and EU Competition policy to determine the utilization rate of their effectiveness within the context of Industry 4.0 concept, in succession to possible further impact increase of the competition issue on EU Innovation policy, followed by the overall socio-economic development of the EU. To achieve those objectives method of analysis, synthesis and logical deduction will be used. The issue is to figure out the extent to which technological advance and innovation policies along with the Industry 4.0 concept implemented in EU Industrial policy within the EU competition agenda can mitigate fluctuations in competitiveness of the EU economy, whose sluggish economic performance evokes a negative impact on the socio-economic development of the countries of European Communities. From this impact rate it will depend whether the EU economy is able to cope with competitive pressure within the world economy triad, or if there is rather a weakening trend on account of other centers in the world economy. Paper elaboration requires focusing on data from secondary literature sources processed by basic scientific learning methods with the primary use of methods such as synthesis, analysis, comparison and logical deduction.

3 INDUSTRY 4.0 CONCEPT AS DRIVING FORCE FOR INNOVATION

The world of Industry 4.0 (also called Fourth Industrial Revolution) is based on the fact that everything goes to the so-called networking, digitization. According to Schwab (2018) production is interconnected by intelligent logistics of goods and associated with marketing and intelligent services with a strong focus on needs, individual and specific capabilities of a customer. Tight linking of products, devices, people enhances the efficiency of production machines and equipment, and reduces costs and saves resources. Intelligent tracking, highly automated robotics, intelligent machines, technology will become a complement to human work. New business models and new collaboration across countries and continents are emerging. The Fourth Industrial Revolution has the potential to increase the world income levels and improve the quality of life of population around the world. Navrátilová, et al. (2019) state that with Industry 4.0, the possibilities are enhanced by emerging technical discoveries in areas such as artificial intelligence, robotics, the Internet of Things,

autonomous vehicles, 3-D printing, nanotechnology, biotechnology, materials science, energy storage and quantum computing, computerization of manufacturing and logistics within the machine - machine communication.

According to Simionescu, et al. (2019) Industry 4.0, the phenomenon of today, is the interconnection of the Internet of things, services and people, and the associated immense volume of data generated, whether the machine - machine, man - machine or man - man is already communicating. Industry 4.0 is not just a mere digitization of industrial production, it is a comprehensive system of changes gathered to a range of human activities, especially in the field of artificial intelligence, not only in industrial production. The Internet of Things (IoT) concept is being developed, enabling everyday items to be included within the communication network. There are new advanced steps in robotics, and even some autonomous vehicles are already being put into production by some companies (only new legislation is awaiting) along with 3D printers or augmented reality technologies becoming more and more creatively enforced in production.

4 EU INDUSTRIAL POLICY - ITS CURRENT STATUS AND FUTURE DEVELOPMENT

European Commission (2019) defines industrial policy as incentives for the supply side. More precisely, it comprises all government interventions aiming specifically to influence industrial change by affecting the incentives to produce industrial goods or incentives to enter/exit specific industrial goods markets. Industrial policy is a fairly wide-ranging concept. That is why a focus on government-driven incentives is a better guide than a catalogue of policy areas falling under it. Jancikova (2019) argues that industrial policy is largely a national responsibility of the member states. The Community's role is to ensure that the single market operates in accordance with the rules of an open and competitive system. The Community's industrial strategy consists of policies aimed at improving the business environment and the legal framework necessary for speeding up the structural adjustment and the competitiveness of European industry under free international trade conditions.

The EU has developed a treaty basis for industrial policies. Patonov and Zhegova (2019) state that the major thrust of the industrial policy since the late 1980s has been on negative policies linked to the creation of the Single European market and the development of a Common competition policy. The role of the EU in positive industrial policies has been significantly less influential. According to Křečková, Zdražilová, Řezanková (2016) industrial policy in the EU has moved away, in most sectors, from the type of interventionist policies that used to dominate in many of the member states in the 1960s and 1970s. However, the desire of some member states to protect some of their industries, and the favored status of what are regarded as key industries, mean that state aid and/or EU help continues to play an important role in many industries.

Moreover, the increased focus on developing competitiveness has led to the emergence of a new European champions movement. Policies to help companies in specific sectors such as ICT and biotechnology also enhance the vertical dimension of the EU's industrial policy. Nevertheless, there is still a strong focus on horizontal policies that are useful in promoting competitiveness. There are also areas, such as the policy towards SMEs (small and medium enterprises), that are largely based on gathering and disseminating information and preaching good practice. Belás, Vojtovič, Ključnikov (2016) underline that industrial policy in the EU, like many other EU policies, reflects a multitude of interests and is driven by a complex set of economic and political factors. As such it is not easily understood by a purely economic assessment of its rationale or its performance. Nevertheless, a movement towards a negative and internal market-driven policy framework that emerged in the 1990s seems to be evolving into a more strategically driven policy area connected to a desire to promote competitiveness among European companies. This policy appears to be developing elements of a European champions model and to have as an objective the creation of an institutional system of research and technological development that fosters greater European integration in this area.

The debate over the characteristics of EU industrial policy has become an important issue due to the growth of Union policies and programs that affect industry and because of the concept of subsidiarity. According to Miklošík, et al. (2016) four possible reasons for an EU industrial policy can be put forward - spill-over effects related to externalities, creating the conditions for 'free movement', promoting 'economic and social cohesion', and promoting the goal of political integration.

EU Industry policy can be defined as the policy of promoting businesses. This concept of policy emphasizes the application of appropriate legislation and also the importance of non-financial assistance to businesses nationwide by means of non-discriminatory services provision with high added value. Sadílek and Zdražilová (2016) highlight that one of the main conditions for successful IP is the functionality increasing that have fundamental importance for the clusters existence, but of which the public and private sector (entrepreneurs) are not aware enough or not at all. The commission of such information can help to the promising success of clusters formation. The role of government in this case appears to be the role of facilitator, which, moreover, bears direct responsibility for the project. On the contrary, desirable clusters that have not been formed, and whose potential will be proved over the time, may not always be successful. Therefore, it is better to support existing and emerging clusters, by means of equal access, without disrupting the market environment by selecting out the favorite ones.

The executive body for the EU business support policy is the Enterprise Directorate General under the EC. In evaluating the firms' competitiveness in EU the benchmarking method is mainly used. The relevant information and so called best

practices exchange is the priority how to strengthen the enterprises performance. Annually, Report on the EU competitiveness status assessing the progress made in the key thematic areas is issued. Other projects to promote entrepreneurship are so called business angels with a focus on education and training of entrepreneurs or ICT implementation monitoring and support for women in business and the fulfillment of framework conditions in the area of business, competitive and monetary policy. However, IP is not legally binding the EU Member States, thus an amendment is being worked out currently.

According to the European Commission (2019) the main objectives of the EU Industrial policy are defined by the three essential areas such as:

- 1) creation of a legislative framework that caters industry;
- 2) the use of synergies between different EU policies and their mutual reinforcement, and
- 3) encouraging a sectoral approach for industrial policy.

5 THE EU COMPETITION POLICY AGENDA AND TOOLS ANALYSIS

Competition policy is one of the oldest policy areas and has developed considerably over the years. It is also one of the policies with the most concrete, visible results. The core of the internal market is the maintenance of a level playing field throughout the EU for businesses to compete. Effective competition policy encourages economic efficiency and creates a favorable climate for growth, innovation and technological progress while pushing down prices (Dano, Lesakova 2018). Thus competition policy is the cornerstone of the internal European market. The European Commission has wide powers to make sure businesses and governments stick to European Union rules on fair play in trade in goods and services, while allowing governments to step in if markets are failing consumers or business, or to promote innovation, unified standards, or small business development.

Antitrust and cartels. Antitrust is an important tool to protect European firms from practices that adversely affect competition such as price fixing, patent abuses, capacity hoarding, or the prevention of cross-border activities. European Commission (2019) quotes that antitrust covers two prohibition rules set out in the EC Treaty: agreements which restrict competition are prohibited; and firms in a dominant position may not abuse their position.

Agreements between undertakings – examples include price fixing; limiting or controlling production, markets, technical development or investment; sharing markets or sources of supply; applying dissimilar conditions to equivalent transactions. The Commission is responsible for ensuring the application of these rules. A member state can apply for an investigation or the Commission can launch one by its own volition. If it finds antitrust infringements, it proposes measures to bring them to an end. Other types of agreement are considered by the Commission as harmful to competition and

thus prohibited without exception. They are usually presented in public black lists, and include: Among the horizontal agreements Price fixing, Joint sales offices, Production or delivery quotas, Sharing of markets or supply sources. Among the vertical agreements: fixing the resale price, and absolute territorial protection clause (Gärtner, Sadílek, and Zdražilová 2017).

Jiráňková (2012) argues that abuse of dominant position – the aim here is to prevent companies from abusing a position of dominance and thus distorting competition in intra-Community trade. Dominant positions, as such, are not prohibited, but rather the abuse of dominance when it is likely to affect trade between member states. Behavior which only affects a national market cannot be considered by the European authorities. This objective requires preventive Community intervention to investigate company mergers, since they may create illegal position of dominance. According to Mentlík and Helísek (2018) a “Cartel” is created by an illegal, secret agreement between competitors who fix or increase their prices, restrict supply by limiting their sales and/or their production capacities, and/or divide up their markets or consumers. Fines of up to 10% of their worldwide turnover may be imposed on the guilty parties. The amount of these fines is paid into the EU budget.

Merger Control. Merger control ensures European consumers and businesses are protected against price increases and other anti-competitive effects resulting from mergers, whilst simultaneously helping firms in restructuring and enhancing their global reach through mergers. The legislation states that a concentration - an operation to integrate previously separate companies - which would significantly impede effective competition in the common market, in particular by the creation of or strengthening of a dominant position, is incompatible with the common market (European Commission, 2019). When companies in any economic sector propose a concentration that is likely to affect the Single market, the Commission can undertake an investigation. Some authors such as Hnát, Zemanová and Machoň (2016) state that this Community dimension is determined on the basis of the companies' aggregate, worldwide turnover and the absence of national character. Companies that have no Community dimension are under the purview of national authorities. It does not matter where the companies are based, or if national authorities have no objection to concentration. If the companies' sales figures in EU markets are large enough, the Commission has jurisdiction, and can prevent potential mergers. Companies proposing mergers must notify the Commission, which will consider - within strict delays - whether the proposed merger creates or strengthens an illegal, dominant position in the relevant market (Sejkora and Sankot 2017). If yes, the merger is prohibited. If not, the Commission confirms that it is compatible with the common market and authorizes the merger with or without certain conditions.

State Aid Control. State aid control is essential to avoid distortions in the Single Market, whilst also ensuring that subsidies that promote the competitiveness of

sectors and companies are allowed. The EU's State aid regime - a system that is unique in the world - provides a framework that focuses aid on addressing market failures (European Commission, 2019). States that competition can be restricted by governments if they grant public subsidies to certain businesses. For this reason, the Treaty prohibits, in principle, any form of State aid that is likely to distort competition. As with mergers, the aid in question must be such that it affects trade between member states; aid with only domestic consequences is not under the purview of the Commission. An absolute ban on state aid, however, would be unthinkable: in certain cases, governments must be able to intervene or provide funding for select economic activities (Gress, Lipková and Harakaľová 2016). For this reason, the Treaty provides for a number of exceptions to the principle of State aid prohibition. Member states must notify the Commission in advance of any plans to grant or alter aid. Aid granted through plans without authorization is illegal and must be repaid. If the Commission considers that an aid plan is incompatible with the common market, it initiates infringement proceedings. This suspends application of proposed aid, pending a final decision. In practice, no aid is granted without the Commission's agreement (Lipkova, Hovorkova, 2018).

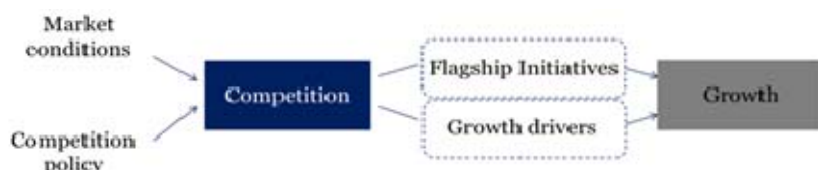
6 FINDINGS AND DISCUSSION

There are some important strategic collaborative linkages between the EU Competition policy and EU Industry policy necessary to be met. The definition of activities with high added value, which offer the best chance of strengthening the competitiveness of the state, needs strategic information. To resources for research and development and innovation have the greatest impact, must reach its critical value. They must be accompanied by measures to improve skills, increase education levels and knowledge infra-structure (Jiroudková, et al. 2015). The National and the regional governments should develop smart specialization strategies to increase the impact of industry policy agenda in combination with other the Union policies to the maximum. According to Machkova and Sato (2017) the Smart specialization strategies can ensure the efficient use of public resources and stimulate private investment. They can help regions that concentrated resources on a few key priorities. They can also be the key element in the creation of multilevel governance for integrated innovation policies. The strategy of smart specialization involves businesses, research centres and universities that cooperate to define the most promising areas of specialization of the region, but also the weaknesses that hamper innovation. It takes into account the different capacities of national economies, in terms of innovation (Krajňáková and Vojtovič 2017).

Generally speaking, the effect of competition policy on growth can be described in different ways. One way is to describe the link between competition policy and the Flagship Initiatives. This is a policy oriented description. Another way

is to describe the link between competition policy and drivers of economic growth. This description is in line with economic theory. However, the fundamental growth drivers are the same in both cases, so it is merely a matter of two different ways to describe the same relationships. Moreover, the first step in both descriptions is to describe how competition policy affects and strengthens competition. Relationship between competition policy and growth is shown in Figure 1.

Figure 1: Effects of competition policy to growth



Source: own processing by European Commission, 2019.

By discussing the issue, we can say that the innovation policy implemented into the EU industry policy plays very important role within the current financial framework 2014-2020 and Europe 2020 Strategy to assure sustainable economic growth in the EU and enhance its competitiveness within the environment of the world economy triad. Innovation and EU Industry policy and strategies implementations are one of the most important aspects of current international economics and business development issues. It is the key not only to creating more jobs and improving quality of life, but also to maintaining companies' competitiveness on the global market and states'/economies' competitiveness enhancement within the international economics system.

The synergy of EU Industry and Competition policies must show how technology within the Industry 4.0 concept refers to ideas and knowledge that business can exploit commercially and assure the world economy sustainable development. The sources of new ideas on which companies can call are many and varied, ranging from universities and research institutes to competitors, customers and suppliers, and to employees. The EU economies are following a long-established trend of restructuring away from the primary and secondary sectors and towards services and high value-added products. But manufacturing is still an important economic sector of the Community for production, trade and employment.

Following the sustainable development, the EU needs to develop a sustainable production policy, which should occur gradually fulfilling the commitments on sustainable production and consumption patterns. Next it will be important to evaluate proposals from all stakeholders, and not only the industry subjects being as so far the

leaders in designing the industrial policy. Authors such as Jeníček (2016) and Lipkova, Braga (2016) agree that applying the best available technologies, secondary raw materials recovery, production policy expanding over the products lifecycle (i.e. Integrated product policy), support of voluntary agreements in environmental field between the private and public sectors, development and diffusion of cleaner technologies, disseminating environmental management schemes within new features and support for small and medium-sized enterprises and their social and environmental responsibility are proposed steps to be taken in the EU to enable the implementation of the sustainable production.

In recent years the industry has operated against a background of slow growth of demand, rising unemployment, increasing international competition and rapid changes brought about by technological progress. Although these are problems which to some extent are shared by all members of the Community, industrial policy still remains largely a national responsibility. The Community has taken steps to ensure that, in accordance with a system of open and competitive markets, the conditions and the legal framework necessary for speeding up the structural adjustment and competitive-ness of European industry will develop. According to Cihelková, Platonova and Frolova (2019) the Community's industrial strategy in particular regions consists of policies aimed at improving the business environment, by working towards integrating the European market, promoting the necessary changes in industry's structure, and coordinating the activities of the member states. The single market has given a welcome boost to cross border mergers, acquisitions and joint ventures which are shaping a new structure of production and distribution.

De Castro and Hnat (2017) argue that the EU enlargement has brought new opportunities. For example, there is a regrouping of production and supply activities along the whole continent, which, thanks to EU enlargement have not moved massively to countries with the overall lowest labor costs. The economy structure reorganization towards the sectors with higher added value now takes place gradually in new Member States. Fojtikova and Stanickova (2017) highlight that even though the industry de-localization is a major challenge for the EU, which, moreover, does not apply only to labor-intensive sectors, but mostly the moderately and highly technically advanced sectors, which are crucial in the process of employment in the EU. This shift is related to the growth of capital-intensive industries in China and India along with the growth of their scientific and research potential. In addition to the EU is still unable to develop motivating environment for creation and implementation of innovation. Growing external and internal pressure on the industry performance is a major boost to the design the scientific re-search and innovation policies at the level of national states. EU will support the efforts of Member States in the field of science, research and innovation in the way to be placed in the heart of the EU common funding and the center of business activities.

Competitive advantage over the US, Japan, China, India and Russia are achievable only through increased spending on research and development and application of in-novation (something incomparable, unique literally) into the business cycle. EU innovation policy will focus not only on technology but also on non-technological innovation, design, business management, marketing and business culture. Finland, the EU leader in innovation, a cluster policy is carried out, which is a challenge not only for the EU states (Gorlevskaya, et al. 2018).

The Smart Factory approach appears to be the trend of Industry 4.0 in the USA, being characterized by flexibility and re-configurability, efficient resources deployment, ergonomics and direct connection with customers and subcontractors, hence the production productivity should increase by 30 to 40% (Abrahám and Lžičar, 2018). Industry 4.0 means the implementation of new software and technology in the US economy. The Smart factory approach development - called 4.0 Industry 4.0 – means that industrial companies are increasingly investing in software. And all this, along with the development of future technologies such as smart vehicles, artificial intelligence (AI), virtual reality and 3D printing, is a very promising background for long-term investment and changes within the industry production and foreign trade quality structure. In any case, technologies are a highly globalized sector - with the supply chains of companies often operating in many countries. The US economy is known for its technological innovations – that is why, it is home to some of the world's most important IT companies (Cepel, et al. 2019, Okręglicka et al. 2017).

According to Helisek (2019) and Svacina, Rýdlová, Boháček (2018) the entire Industry 4.0 in the US is based on the logic of cyber-physical systems (CPS). This means that you have autocratic, independently operating systems that are able to optimize production by themselves through self-optimization and mutual communication. Cyber-physical systems (CPS) are a central element of the new industry. They will enable efficient interconnection of individual machines, equipment, computers, logistics systems, vehicles, raw materials, products and entire operations in a cooperative supply-customer chain into one comprehensive network (Internet of Things - IoT). Individual items and sub processes in "smart factories" not only communicate with each other, but also control each other reliably.

The new Framework program for competitiveness and innovation evaluates the deficiency of innovation and creative solutions implementation at enterprise level, which is mainly the result of lack of access to appropriate forms of funding. This issue consists of three program components (European Commission 2019):

- 1) The Entrepreneurship and Innovation;
- 2) Program on information and communication technology (ICT) policy support;
- 3) Intelligent energy program.

The Framework Program furthermore is directly related to the new 7th Framework Pro-gram for research, technological development and demonstrative activities. The procedure should be initiated and form a common technology platform in important industrial sectors. The purpose of technology platforms is a national industry support, including the medium technically advanced sectors.

The EC report on industrial policy in an enlarged EU (COM (2004) 274) gives the following factors, which prevent the strengthening of science and research position com-pared to the USA (Obadi and Korček 2018):

- Difficult access to private funding to support research and development;
- Business culture downgrading the risk;
- Lack of cooperation between private and public sectors, which is reflected in the suppression of applied research;
- Significantly lower relative proportion of workers in science and research in EU.

High-tech clusters in Helsinki, Oulu and Turku can be an example. In Finland there are sample examples of incubators to promote innovation and emerging technology companies. In Helsinki, so called University for innovation will be established soon by linking the University of Music and Fine Arts, University of Technology and University of Economics (Navickas, Vojtovic, and Svazas 2017). Regarding the technological sophistication of production, it is customary to distinguish between low, medium and highly advanced industry. Particularly in highly advanced sectors (ICT, biotechnologies) Slovakia cannot stand aside from modern Europe. It is important also to be engaged in pre-orientation of industrial policy to innovation policy even in the more ideal case directly to Industry 4.0 concept.

7 CONCLUSION

The paper provides a comprehensive, coherent and systematic overview of the basic principles and objectives forming the backbone of the EU Industry policy and EU competition policy agenda within their synergy and operation mechanism along with the Industry 4.0 concept. The challenge is that Europe faces a moment of transformation regarding the 4th industry revolution being a challenge for the years of economic and social progress and exposed structural weaknesses in European economy. The world is changing rapidly and long-term challenges such as globalization, pressure on resources, aging populations, are becoming more acute. The EU must immediately take action.

In this paper we have shown how that EU has also launched several integrated pro-grams of research to help the EU to catch up with its rivals in the application of modern technology. In general, R&D expenditure and the rates of industrial production and productivity achieved by most EU member states are persistently below those of

its main competitors, such as the USA and Japan. An implication of these differences in performance is that in external markets the EU is rapidly losing ground in high-technology innovation and trade to face to Industry 4.0 concept implementation opportunities.

Finally, we can summarize that market integration and coordination of industrial policies and research along with the implemented Industry 4.0 concept are expected to have a favorable impact on the competitiveness and performance of EU industry with-out the need to resort to any form of aggressive and confrontational strategic trade policy. This will contribute to the efforts to reduce unemployment and increase growth and welfare and stabilize the EU labor market.

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