

## **CREATING A COMPETITIVE ADVANTAGE: NEW CHALLENGES AHEAD**

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**Abstract:** *Competitiveness is a central issue of a growing open, interconnected and integrated global economy, but it is not yet uniquely defined. There are many factors that determine competitiveness, and they change with the development of globalization, and even today, under the conditions of Industry 4.0. The coronavirus (COVID-19) pandemic has also provoked a situation in which both policies to foster competitiveness need to be adapted. In order to achieve competitiveness, countries must create factors and develop policies that will create the conditions for better positioning in the global market. In order to successfully integrate into new markets, but at the same time highlight and continue economic development, reevaluation of competitiveness determinants, as well as past positioning strategies, is necessary. The paper analyses the theoretical settings and determinants of competitiveness, as well as the challenges of today that economies should respond to. Understanding new features of the competitiveness can help policymakers develop approaches for enhancing their economic performance.*

**Keywords:** *competitiveness; determinants; Industry 4.0; COVID-19; policy.*

**JEL classification:** *F00, F6, L2.*

### **INTRODUCTION**

Competitiveness, although a rather vague term, represents a central objective of national policies (Liu, 2017). Globalisation has radically altered the nature of competition and it is generally recognized that, with the globalisation of the economy, competitiveness has become one of the prime concerns of governments and firms (Hatzichronoglou, 1996). As Gandotra (Gandotra, 2010) stated in an open economy, business performance depends upon the competence of creating and sustaining the competitive advantage, and it is the technological progress that has been

the engine of the development since the beginning of civilization (Sima, Gheorghe, Subić, & Nancu, 2020).

There are challenges in definition the term of competitiveness, due to the fact that there are different levels of competitiveness, many stakeholders, as well there are continuous changes on the market and technologies that are difficult to capture. Also, emerging of the technologies of the Fourth Industrial Revolution, as well as actual COVID-19 pandemic has posed new challenges for companies and countries to compete.

The aim of this paper is to discuss issues on competitiveness and gaining and maintaining competitive advantages today, in a globalise world, in terms of Fourth Industrial Revolution and COVID-19 pandemic.

The paper is organized in four sections. Section 2 summarizes the theoretical background and gives an overview of previous researches. Section 3 introduces issues of the Fourth industrial Revolution in the context of competitiveness. The final section presents conclusions.

## LITERATURE REVIEW

There is a lack of consensus on the definition of competitiveness (Ketels, 2016). Interestingly, Martin (Martin, 2003) states that term competitiveness is widely used, and often abused. Krugman (Krugman, *Competitiveness: A Dangerous Obsession*, 1994) is one of the theorists that claimed the concept of competitiveness to be meaningless. He stressed that it is much easier to define competitiveness at company level than at the country level because countries do not compete with each other in the same way as businesses. Moreover, in his later works, Krugman (Krugman, *Making sense of the competitiveness debate*, 1996) points out that debates on competitiveness are essentially differently the issues of the theory of international trade. As a complex, multidimensional and multilevel concept, competitiveness has become a central issue of a growing open, interconnected and integrated global economy (Ogrea & Herciu, 2010). The evolution of this debate has traditionally oscillated about four ideas: labour division and specialisation, market share, costs/prices and productivity (Siudek & Za-wojska, 2014).

While globalisation has strengthened the global economy and improved prosperity in general, the literature highlights the potential distribution of these benefits, which are unequal among many countries (Guinigundo, 2018).

Competitiveness can be discussed and evaluated at different levels, country level, industry level and a firm level. National competitive power is defined as the country's ability, under free market conditions, to increase the real income of its citizens and produce goods and services in accordance with conditions and standards on international markets (Akis, 2015). Momaya (Momaya, 1998) analysed international competitiveness on the industrial level, on the sample of construction industries in three countries: Japan, Canada and the United States, and confirmed the importance of the strategic management processes in reaching and maintaining competitiveness at the industry level. On the other side, Liu (Liu, 2017) points out the necessity for comprehensive approach to competitiveness, since competitiveness theories at all levels, including all microeconomic and macroeconomic determinants are closely related.

Sources of comparative advantages are broad and getting broader each day. Also, hierarchical order is changing too. Pietersen (Pietersen, 2010) on the other hand claims that competitive advantage is tangible and can be evaluated.

Aiginger et al. (Aiginger, Bärenthaler-Sieber, & Vogel, 2013) relate competitiveness with welfare, defining it as ability of country to perform beyond GDP. Having this point of view, they measure competitiveness through three different pillars: (1) income, (2) social and (3) ecological. In defining determinants of the competitiveness, they focus on price competitiveness (factor costs and productivity), as well as quality competitiveness (structure of production and exports and country capabilities which deal with innovation, education, institutions, ecology and social system).

Wen-Cheng et al. (Wen-Cheng, Chien-Hung, & Ying-Chien, 2011) consider technology innovation and organizational structure as main sources of competitive advantages. The key to successfully competing in the global market, facing many global challenges and achieving sustainable development, is certainly innovation (Bilas & Franc, *Inovacije i razvoj*, 2018). This is why innovation capacity, openness, diversification and specialisation are the most important tools for achieving competitiveness in complex and continuously changing globalisation conditions. Hchaichi and Ghodbane (Hchaichi & Ghodbane, 2014) consider also innovation a key factor of achieving and maintain competitiveness.

Stonehouse and Snowdon (Stonehouse & Snowdon, 2007) in interpreting Porter's work conclude that firm's value chain is necessary for generic strategy to be efficient and provide results. The role of successful value chain is in supporting this generic strategy to add value to firm's products and services, value which is higher than those of competitors.

Dwyer and Kim (Dwyer & Kim, 2003) differ three different directions of economic thoughts in defining and analysing competitiveness. In their opinion (1) economists put an accent on the price as a key determinant of competitiveness, (2) researchers from the area of management and strategy put an accent of firm-specific characteristics and (3) theorists from areas of sociology and political economy put accent on various social, political and cultural determinants of competitiveness. On the other hand, Delgado et al. (Delgado, Ketels, Porter, & Stern, 2012) found that competitiveness debate went around three factors: (1) market share, (2) costs and (3) productivity.

Most attempts to explain competitiveness in terms of prices are not considered to be enough (Hchaichi & Ghodbane, 2014). There are different non-price determinants that should be taken into consideration too.

Factors and policies that affect competitiveness are the business environment, economic and technological infrastructure, education, entrepreneurship, creativity and innovation (Duspara, Knežević, & Turuk, 2017). There are different sources of competitiveness in a wide range of industries, so called industry specific.

Delgado et al. (Delgado, Ketels, Porter, & Stern, 2012) defined foundational competitiveness as the "expected level of output per working-age individual that is supported by the overall quality of a country as a place to do business". In their definition they focus on broader national productivity, output per potential worker, and not usual measure of output per current worker. In their framework they differ microeconomic from macroeconomic competitiveness. According to their findings, microeconomic competitiveness is focused on specificities of the national business environment,

while macroeconomic competitiveness is focused on general preconditions that create opportunities for higher productivity, as they defined foundational competitiveness via productivity.

Ketels (Ketels, 2016) also puts accent on endowments that affect how the macro and microeconomic factors amendable to policy action translate into prosperity.

Porter (Porter, 1990) considers that differences in competitiveness levels between countries lie in the differences within and between the diamonds of national competitive advantages having four determinants: (1) factor conditions (e.g. availability of an educated workforce), (2) demand conditions (domestic demand for products and services), (3) related and supportive industries, and (4) the strategy, structure and rivalry of businesses. These determinants create a national environment in which companies create and learn to compete. Each point of diamond and diamond as a system affects the basic determinants of international success.

Ma (Ma, 2004) organizes competitive advantages in four main groups, and calls them a 4C model: (1) creation and innovation, (2) competition, (3) cooperation and (4) co-option. One of the framework models is consisted of three levels: (1) policy inputs which represent factors that policy can directly influence, (2) essential conditions which result from policy inputs and represent conditions under firm compete in a certain environment/country and (3) ultimate policy objective, which is sustainable growth (Ketels, 2016). This objective is not directly influenced by policymakers, but is influenced by the previous two levels.

Martin (Martin, 2003) summarised direct or indirect reflections on competitiveness by major schools of economic theory: classical theory; neoclassical theory; Keynesian economic theory; development economics; new economic growth theory and new trade theory. According to these theories, implications for competitiveness differ. Classical theory is based on theories of absolute and comparative advantages and the source of advantages is represented by differences in relative productivity among countries. If productivity is the same among countries, there is no basis for mutually beneficial trade. According to neoclassical theory, different proportions of factors of productions among countries represent a source of advantages. If factors proportions are same among countries, there is no basis for mutually beneficial trade. Interestingly, since the assumption of perfect competition, competitiveness is not considered to be relevant in the long run. According to Keynesian economic theory, capital intensity increases productivity and growth and assumption of imperfect markets allows differences among regions/countries. Also, governments can intervene successfully. According to development economics, regions with initial productive advantages are likely to maintain their lead and policies should promote convergence. On the other side, endogenous growth theory considers investments in research, development and innovations, as well as improving human capital as crucial for competitiveness. Finally, new trade theory put an accent on the size of the markets, specialisation, networks and economies of scale.

Similarly, Liu (Liu, 2017) theories of competitiveness on country level divides into four group of theories: (1) absolute and comparative advantages, (2) theories of international trade based on technology gap, (3) new trade theory and (4) diamond theory base on Porter's contributions. Theories which deal with competitiveness on the level of industries and firms, Liu (Liu, 2017) divides into resource-based theories

and new developments of these theories which include innovations and entrepreneurship.

Since competitiveness is a complex concept, a number of factors, the most appropriate way to assess the level of competitiveness is the use of multidimensional or composite competitiveness indicators (Siudek & Zawajska, 2014).

McGee (McGee, 2014) claimed that the sustainability of competitive advantage depends on the maintaining the levels of resources relative to customers, catching-up, and productivity of research and development activities, market dynamics and reinforcing of existing advantages.

Today, global trade and manufacturing are increasingly structured around global value chains (Bilas, Bošnjak, & Novak, *Međunarodna trgovina – quo vadis?*, 2020). International fragmentation of production is a powerful source of increasing efficiency and competitiveness of businesses (OECD, 2012). Competitive strategies are based on integrating activities in the value chain (Ensign, 2001).

One of the ways to achieve competitive advantages for companies is to innovate services which help them to adjust to market trends and customers' needs and improve their market performance (Noorani, 2014).

In 2018, a new Global Competitiveness Index 4.0 was introduced (Global Competitiveness Index 4.0 - GCI 4.0), which is based on a different methodology. The index integrates past aspects with newly identified catalysts for productivity and economic growth, focusing on the role of human resources, innovation, resilience and agility, as factors defining competitiveness characteristics in Industry 4.0 (World Economic Forum, *The Global Competitiveness Report 2018*, 2018). The GCI 4.0 methodology is based on 12 competitiveness pillars: (1) institutions, (2) infrastructure, (3) ICT adoption, (4) macroeconomic stability, (5) health, (6) skills, (7) product market, (8) labour market, (9) financial system, (10) market size, (11) business dynamism and (12) innovation capability. The pillars of competitiveness are grouped into four groups: the enabling environment, human capital, markets and the innovation eco-system. Thanks to the new concept, the new index reveals the latest identified sources of productivity and long-term economic growth during the current industrial revolution, Industry 4.0.

### **COMPETITIVENESS IN THE ERA OF INDUSTRY 4.0**

Term "Industry 4.0" was first used in 2011 to describe the government's high-tech strategy of the Republic of Germany, and today it refers to the Fourth Industrial Revolution - the emergence and diffusion of the spectrum of new digital industrial technologies. As Technology Industry 4.0, they are most commonly mentioned: The Internet of Things, Big Data and Analytics, Robotics, Artificial Intelligence and 3D Printing. Many of these digital technologies have been around for some time, but recent cost reductions and improvements in reliability allow for greater industrial application (Strange & Zucchella, 2017). The development and adoption of new technologies has accelerated dramatically in recent decades (UNCTAD, 2018).

The factors that determine competitive power have changed over time. Roughly, 15 to 20 years ago, quality and low production costs were important determinants of competing powers, but today the impact of these factors is diminishing. Today, competitive power is considered to be acquired by the ability to innovate and present improved products and/or services to the market before competitors (Akis, 2015).

Today, it is estimated that around 80% of world trade takes place within international production networks of multinational companies (World Trade Organization, 2018).

Industry 4.0 introduced a lot of changes, which affect competitiveness – structure of labor, innovation skills, health, institutions, financial system, education, macroeconomic variables (Bal & Erkan, 2019). Creative human capital is an accelerator in the process of developing and expanding Industry 4.0 (Kolesnichenko, Radyukova, & Pakhomov, 2019). A new set of technologies has already begun to penetrate global value chains and their impact will grow in the coming years (Lund, et al., 2019).

Deloitte (Deloitte, 2015) identified four main characteristics of the Industry 4.0: (1) vertical networking of smart production systems, (2) horizontal integration – new generation of global value chains, (3) through-engineering throughout the entire product life cycle and (4) acceleration through exponential technologies. The WEF (World Economic Forum, 2019) defines common success factors that can serve as the main principles of implementing the technologies of the Industry 4.0 in manufacturing to ensure competitiveness and sustainable growth: (1) systematic leadership, (2) collaborative innovation and (3) approach with the people at the centre.

Mainly, companies believe that digital transformation brought by Industry 4.0 will enable them to reach higher level of competitiveness (Deloitte, 2015). Also, Istomina et al. (Istomina, Vinogradova, Lukyanova, Dobrovolskaya, & Prodanova, 2020) confirmed in their research the key role for the digitalization in the modern economy and according to these results, creation of successful digital economy is considered to be a leading determinant for maintaining and developing international competitiveness.

Technologies are part of the solution to many of the complex global challenges of the 21st century. They are capable of taking society forward in an inclusive, sustainable and positive way, with an appropriate approach to their development (Philbeck, Davis, & Engtoft Larsen, 2018).

When discussing competitiveness in terms of challenges ahead, the impact of the COVID-19 pandemic cannot be neglected. According to the International Monetary Fund, global gross domestic product will contract by 3% in 2020, and some sectors experiences greater losses than others (International Trade Center, 2020). Lock-downs caused severe economic damage. This situation accelerated changes in business models and market trends.

International Trade Center (International Trade Center, 2020) defines four characteristics of the so called “new normal”: (1) resilience to change and unexpected shocks, (2) exploring all possibilities of digitalization, (3) prioritisation of inclusiveness and (4) focus on sustainable growth. A global supply chain breaks up the production process across countries (World Bank, 2020).

Firms specialize in a specific task and do not produce the whole product. The shutdown of factories due to the pandemic creates a chain reaction, affecting trade of other countries even if their manufacturing facilities are operational and borders are open to trade (World Bank, 2020) (International Trade Center, 2020).

It is a fact that Industry 4.0 change our understanding of the international competitiveness (Liu, 2017). Liu (Liu, 2017) provides a model of competitiveness in the area of Industry 4.0 using ecosystematic approach. The main logic of the model is that Industry 4.0 can impact competitiveness at all levels – nation, industry, firm through



both, microeconomic and macroeconomic drivers. According to the model, all relevant stakeholders should react in a systematically consistent way. There are five main points of the model according to which Industry 4.0 requires: (1) governments to provide innovation friendly institutions meaning promoting innovations, protection of the intellectual property rights, enabling business environment, adequate legal framework, etc., (2) strengthening factors of production through improvements in ICT, education and high skill workers, (3) development of the Internet of Things changes demand conditions, as well as, together with other technologies of the Industry 4.0 the way of functioning clusters and value chains, since customers are now closer to the production, (4) new strategies designed to take advantages of the Industry 4.0 and (5) understanding disadvantages of the Industry 4.0 like automation, disappearance of low-skill jobs, influence of blockchain and etc.

Manda and Dhaou (Manda & Dhaou, 2019) consider as drivers of the Industry 4.0: ICT and emerging technologies, education and training, innovation and responsive and context-specific strategies, while as most important challenges the following: potential job losses, skills challenges, infrastructure challenges, security and privacy.

According to UBS (UBS, 2016) there are significant implications of the industry 4.0 for the relative competitiveness of developed and emerging nations. Developed nations are considered to be relative winners, while emerging nations can experience negative effects from mainly low-skill jobs replaced by automation in combination with limited technology infrastructure which limits their potential benefits of connecting closely and entering different networks. Generally, according to UBS (UBS, 2016) flexible economies will have more benefits from Industry 4.0, flexible in terms of labor markets, education, infrastructure, etc. Bongomin et al. (Bongomin, Nganyi, Abswaidi, Hitiyise, & Tumusiime, 2020) found that most of the countries developed strategic initiatives and therefore positively responded to Industry 4.0 challenges. Before the Industry 4.0 it can be stated that competitive advantage depended upon primarily cheap and skilled labor force. Sima et al. (Sima, Gheorghe, Subić, & Nancu, 2020) concluded that in the era of Industry 4.0 these competitive advantages fell behind, because labor force need to be highly qualified and adaptive.

Turel and Akis (Turel & Akis, 2019) claim that Industry 4.0 will change global competition environment. From that point of view, they propose, if a country wants to stay competitive, it needs to analyse all potential advantages and disadvantages of the Industry 4.0, country specific, as well as to prepare digital innovations, new business models and promote close cooperation of all national stakeholders because it is the collaborative advantage one of the main sources of the competitive advantages today.

## CONCLUSION

Despite the fact there is no unified definition of the term competitiveness, as well as there are different levels at which competitiveness can be observed and different group of determinants influence competitiveness, achieving and maintain competitiveness is one of major policy concerns of most countries in the world. This paper examined and pointed out the implications of globalisation and Fourth industrial revolution/Industry 4.0 on competitiveness, mainly on the national level. It can be concluded that these implications require to be included in government's policy and strategy initiatives in order to ensure for countries to be competitive. The importance of these

changes is accented also by recently new approached and methodologies introduced to measure competitiveness in this new era, which include main features of globalisation and Industry 4.0 (i.e. Global Competitiveness Index 4.0). Another important factor is all changes on the market and business models determined by the coronavirus (COVID-19) pandemic. These all led to a conclusion that factors that determine the competitiveness have changed over time. There are new factors and determinants that should be taken into account in the contemporary competitiveness models. Acquiring competitive advantages today requires new business models, production processes and adaptation of education systems at all levels. Countries that are less prepared to adapt to these structural changes will underperform in their competitiveness. Further research may include more detailed countries case studies and empirical evidences from global companies and global value chains. It would be of great importance to provide theoretical models of competitiveness which will include the Fourth industrial revolution framework, as well as to provide empirical research on the impact of the Fourth industrial revolution on international competitiveness.

## LITERATURE

- Aiginger, K., Bärenthaler-Sieber, S., & Vogel, J. (2013). Competitiveness under New Perspectives. *WWWforEurope, Working Paper no 44*.
- Akis, E. (2015). Innovation and Competitive Power. *Procedia - Social and Behavioral Sciences, 195 (2015)*, pp. 1311-1320.
- Bal, H., & Erkan, C. (2019). Industry 4.0 and Competitiveness. *Procedia Computer Science, 158*, pp. 625–631.
- Bilas, V., & Franc, S. (2018). *Inovacije i razvoj*. Zagreb: Notitia d.o.o.
- Bilas, V., Bošnjak, M., & Novak, I. (2020). *Međunarodna trgovina – quo vadis?* Zagreb: Ekonomski fakultet Sveučilišta u Zagrebu.
- Bongomin, O., Nganyi, E., Abswaidi, M., Hitiyise, E., & Tumusiime, G. (2020). Sustainable and Dynamic Competitiveness towards Technological Leadership of Industry 4.0: Implications for East African Community. *Journal of Engineering*, pp. 1-20.
- Delgado, M., Ketels, C., Porter, M., & Stern, S. (2012). The determinants of national competitiveness. *NBER Working Paper Series, Working Paper 18249*.
- Deloitte. (2015). *Industry 4.0, Challenges and solutions for the digital transformation and use of exponential technologies*. Retrieved 10 13, 2020, from <https://www2.deloitte.com/content/dam/Deloitte/ch/Documents/manufacturing/ch-en-manufacturing-industry-4-0-24102014.pdf>
- Duspara, L., Knežević, S., & Turuk, M. (2017). Competitiveness and Innovation Challenge in Croatia. *Poslovna izvrsnost Zagreb, XI(2)*, pp. 41-58.
- Dwyer, L., & Kim, C. (2003). Destination Competitiveness: Determinants and Indicators. *Current Issues in Tourism, 6(5)*, pp. 369-414.
- Ensign, P. (2001). Value Chain Analysis and Competitive Advantage: Assessing Strategic Linkages and Interrelationships. *Journal of General Management, 27(1)*, pp. 18–42.
- Gandotra, N. (2010). Innovation culture for sustainable competitive advantage. *APJRBM, 1(2)*.
- Guinigundo, D. (2018). *The globalisation experience and its challenges for the Philippine economy*. Bank for International Settlements Papers No. 100.
- Hakkak, M., & Ghodsi, M. (2015). Development of a Sustainable Competitive Advantage Model Based on Balanced Scorecard. *International Journal of Asian Social Science, 5(5)*, pp. 298-308.



- Hatzichronoglou, T. (1996). Globalisation and Competitiveness: Relevant Indicators. *OECD Science, Technology and Industry Working Papers*, 1996/05.
- Hchaichi, R., & Ghodbane, S. (2014). Empirical Analysis of Determinants of International Competitiveness. *International Journal of Business and Social Science*, 5(5), pp. 203-209.
- International Trade Center. (2020). *COVID-19: The Great Lockdown and its Impact on Small Business*. SME Competitiveness Outlook.
- Istomina, A., Vinogradova, M., Lukyanova, A., Dobrovolskaya, O., & Prodanova, N. (2020). Leadership in the digital age: a new strategy for the competitiveness of countries and macro regions. *Revista Espacios*, 41(07), pp. 21-38.
- Ketels, C. (2016). *Review of Competitiveness Frameworks. An Analysis Conducted for the National Competitiveness Council*. National Competitiveness Council. Retrieved 10 12, 2020, from [https://www.hbs.edu/faculty/Publication%20Files/Review%20of%20Competitiveness%20Frameworks%20\\_3905ca5f-c5e6-419b-8915-5770a2494381.pdf](https://www.hbs.edu/faculty/Publication%20Files/Review%20of%20Competitiveness%20Frameworks%20_3905ca5f-c5e6-419b-8915-5770a2494381.pdf)
- Kolesnichenko, E., Radyukova, Y., & Pakhomov, N. (2019). The Role and Importance of Knowledge Economy as a Platform for Formation of Industry 4.0. (E. Popkova, Y. Ragulina, & A. Bogoviz, Eds.) *Industry 4.0: Industrial Revolution of the 21st Century. Studies in Systems, Decision and Control, Volume 169*, pp. 73-82.
- Krugman, P. (1994). Competitiveness: A Dangerous Obsession. *Foreign Affairs*, 73(28). Retrieved 10 13, 2020, from <https://pdfs.semanticscholar.org/4c16/a551a1761792f06ede31f2b6dbd2636566.pdf>
- Krugman, P. (1996). Making sense of the competitiveness debate. *Oxford Review of Economic Policy*, 12(3), pp. 17-25.
- Liu, C. (2017). International Competitiveness and the Fourth Industrial Revolution. *Entrepreneurial Business and Economics Review*, 5(4), pp. 111-133.
- Lund, S., Manyika, J., Woetzel, J., Bughin, J., Krishnan, M., Seong, J., & Muir, M. (2019). *Globalization in transition: the future of trade and value chains*. McKinsey Global Institute, McKinsey & Company.
- Ma, H. (2004). Toward global competitive advantage: Creation, competition, cooperation, and co-option. *Management Decision*, 42(7), pp. 907-924.
- Manda, M., & Dhaou, S. (2019). Responding to the challenges and opportunities in the 4th Industrial revolution in developing countries. *ICEGOV*, pp. 244-253.
- Martin, R. (2003). *A Study on the Factors of Regional Competitiveness. A draft final report for The European Commission Directorate-General Regional Policy*. The European Commission Directorate-General Regional Policy. Retrieved 10 12, 2020, from [https://ec.europa.eu/regional\\_policy/sources/docgener/studies/pdf/3cr/competitiveness.pdf](https://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/3cr/competitiveness.pdf)
- McGee, J. (2014). Competitive advantage. In C. Cooper (Ed.), *Wiley Encyclopaedia of Management*. John Wiley & Sons Ltd.
- Momaya, K. (1998). Evaluating International Competitiveness at the Industry Level. *Vikalpa*, 23(2), pp. 39-46.
- Noorani, I. (2014). Service innovation and competitive advantage. *European Journal of Business and Innovation Research*, 2(1), pp. 12-38.
- OECD. (2012). *Mapping Global Value Chains*. Paris: OECD.
- Ogrean, C., & Herciu, M. (2010). Globalization and the dynamics of competitiveness - a multilevel bibliographical study. *Studies in Business and Economics*, 5(1), pp. 126-138.
- Philbeck, T., Davis, N., & Engtoft Larsen, A. (2018). *Values, Ethics and Innovation, Rethinking Technological Development in the Fourth Industrial Revolution. White paper*. World Economic Forum.

- Pietersen, W. (2010). Defining Competitive Advantage: How much more value do you deliver than your competitors? *The European Business Review*, September - October 2010, pp. 34-39.
- Porter, M. (1990). The Competitive Advantage of Nations. *Harvard Business Review*. Retrieved 10 5, 2020, from <https://hbr.org/1990/03/the-competitive-advantage-of-nations>
- Sima, V., Gheorghe, I., Subić, J., & Nancu, D. (2020). Influences of the Industry 4.0 Revolution on the Human Capital Development and Consumer Behavior: A Systematic Review. *Sustainability*, 12, pp. 1-28.
- Siudek, T., & Zawojcka, A. (2014). Competitiveness in the Economic Concepts, Theories and Empirical Research. *Oeconomia*, 13(1), pp. 91–108.
- Stonehouse, G., & Snowdon, B. (2007). Competitive Advantage Revisited: Michael Porter on Strategy and Competitiveness. *Journal of Management Inquiry*, 16(3), pp. 256 – 273.
- Strange, R., & Zucchella, A. (2017). Industry 4.0, global value chains and international business. *Multinational Business Review*, 25(3), pp. 174-184.
- Turel, M., & Akis, E. (2019). Industry 4.0 and competitiveness. *Research Journal of Business and Management*, 6(3), pp. 204-212.
- UBS. (2016). *Extreme automation and connectivity: The global, regional, and investment implications of the Fourth Industrial Revolution*. UBS White Paper for the World Economic Forum Annual Meeting 2016. World Economic Forum. Retrieved 10 20, 2020, from <https://www.ip-watch.org/weblog/wp-content/uploads/2017/09/ubs-vierte-industrielle-revolution-2016-01-21.pdf>
- UNCTAD. (2018). *Technology and Innovation Report 2018, Harnessing Frontier technologies for Sustainable Development*. New York and Geneva: UN.
- Wen-Cheng, W., Chien-Hung, L., & Ying-Chien, C. (2011). Types of Competitive Advantage and Analysis. *International Journal of Business and Management*, 6(5), pp. 100-104.
- World Bank. (2020). *World Development Report 2020: Trading for Development in the Age of Global Value Chains*. World Bank.
- World Economic Forum. (2018). *The Global Competitiveness Report 2018*. Retrieved 10 20, 2020, from <http://www3.weforum.org/docs/GCR2018/05FullReport/TheGlobalCompetitivenessReport2018.pdf>
- World Economic Forum. (2019). *Shaping the Sustainability of Production Systems: Fourth Industrial Revolution technologies for competitiveness and sustainable growth*. White paper. World Economic Forum.
- World Trade Organization. (2018). *World Trade Report, The future of world trade: How digital technologies are transforming global commerce*. Geneva: WTO.

