

# WORLD INDUSTRY: THE GLOBAL TRENDS OF REGIONAL DEVELOPMENT

**Irina Rodionova<sup>1</sup>, Olga Shuvalova<sup>2</sup>**

<sup>1</sup> RUDN University

Faculty of economics, Department of regional economy and geography

Mikluho-Maklaya str, 6, 117198, Moscow, Russia

E-mail: iarodionova@mail.ru

<sup>2</sup> RUDN University

Faculty of economics, Department of regional economy and geography

Mikluho-Maklaya str, 6, 117198, Moscow, Russia

E-mail: dvigh@mail.ru

**Abstract:** *The research of changes illustrates us the idea of polycentric system of a modern spatial structure of a world industry. The main growth of industrial development through extractive industries is seen in developing countries. On the global and regional levels the shifts in manufacturing are also directed from West to East (from developed towards developing countries). At the moment Asia is the leader among the most "industrialized" regions of the world with China on top. There was a time not so long ago when some productions have not yet been located in Asia. Today they appeared there. At the beginning of the XXI century, Asian countries dominate the world market for steelmaking, car production, the production of mineral fertilizers, chemical fibers, etc. Given the high rates of industrialization in China, India, Brazil and others, it is worth noting that the level of industrialization of a huge group of developing countries (and especially from the group of least developed) is growing at a slower rate. The article also describes the topic on high level of concentration of industrial production in a small group of leading countries and the impact of reindustrialization and neo industrialization of the economically developed countries on a world industry. Asian countries are engaged in the production of high-tech products. But in fact, technology-intensive industries dominate in a global productive landscape of economically developed countries. It allows them to be more competitive in manufacturing*

**Key words:** *world industry, industrial sector, development trends, reindustrialization, neo industrialization*

**JEL codes:** *L00, L60, O25 F63*

## 1. Introduction

We can affirm that globalization and its core form a process of transnationalisation of economy while innovative development and growth of global interdependence has led to big changes in a world economy and its sectors, especially in a world industry. At the time being global value chains are the main element of a global trading and investments. It also emphasizes the need to include global value added chains into the strategy of a global industrial development (to create appropriate environment for trading and investments, to contribute to industrial capacity, to raise global labor qualification) (Gereffi et al., 2005; Draper, 2013; Safonov, 2016; Rodionova, 2017).

[1] Let us also emphasize the following. The definition “reindustrialization” has only recently appeared in a global scientific literature. Neo-industrialization is a broader term considered as a logical process of productive forces development that leads to a technotronic era in the development of society (with the transition to the knowledge-based, high-tech, more efficient and environmentally friendly industry). Here we mean a new paradigm of industrial development in developed countries called «Industrie 4.0» and a development of the «Internet of Things (IoT)» (Hermann et al., 2016).

[2] In other words, structural shifts of the spatial organization of a world industry on a regional and global level changed a share of countries in manufacturing and international trading. Industrial Development Reports of different years deeply analyze world industrial development trends. It also states that the key factor of a labor capacity growth of the industry is structural shifts in the industry (UNIDO, 2018).

[3] The studies characterizing structural shifts in economies of different countries and regions are dedicated to the features of industrial sector growth (Acs, 2013, Gierańczyk, 2010; Kholina & Mironova, 2012; Rachwał, 2011; UNIDO, 2018). It is highlighted that the need for informative and effective understanding of key concepts and models of a regional development and growth as an endogenous growth has increased in the last decade (Kourtiti et al., 2011).

[4] A report on a Global competitiveness index in manufacturing was published in 2016 (2016 Global Manufacturing...). The survey shows how manufacturing effect on trends of a world economy development. In other words, it says that a strong world industry (especially, strong manufacturing) is a direct way to the economic well-being even in a post-industrial economy.

[5] The purpose of this study is to analyze and to characterize changes in a world industry on the level of world countries and regions and to identify the main trends of a world industrial development which has led to a new balance of global industrial forces.

[6] Let us also emphasize the following. The definition “reindustrialization” has only recently appeared in a global scientific literature. Neo-industrialization is a broader term considered as a logical process of productive forces development that leads to a technotronic era in the development of society (with the transition to the knowledge-based, high-tech, more efficient and environmentally friendly industry). Here we mean a new paradigm of industrial development in developed countries called «Industrie 4.0» and a development of the «Internet of Things (IoT)» (Hermann et al., 2016).

In other words, structural shifts of the spatial organization of a world industry on a regional and global level changed a share of countries in manufacturing and international trading. Industrial Development Reports of different years deeply analyze world industrial development trends. It also states that the key factor of a labor capacity growth of the industry is structural shifts in the industry (UNIDO, 2018).

[7] The studies characterizing structural shifts in economies of different countries and regions are dedicated to the features of industrial sector growth (Gierańczyk, 2010; Kholina & Mironova, 2012; Rachwał, 2011; Innovation ...,2016; Dominiak & Rachwal, 2016). It is highlighted that the need for informative and effective understanding of key concepts and models of a regional development and growth as an endogenous growth has increased in the last decade (Kourtit et al., 2011; Crescenzi&Rodriguez-Pose, 2011).

[8] A report on a Global competitiveness index in manufacturing was published in 2016 (Giffi, 2016). The survey shows how manufacturing effect on trends of a world economy development. In other words, it says that a strong world industry (especially, strong manufacturing) is a direct way to the economic well-being even in a post-industrial economy.

[9] The purpose of this study is to analyze and to characterize changes in a world industry on the level of world countries and regions and to identify the main trends of a world industrial development which has led to a new balance of global industrial forces.

## **2. Methodology and Data**

The calculations were made on the author's methodology based on official sources of the World Bank, UNIDO, United States Science Foundation, etc. In order to show the features of a global industrialization and shifts taking place in a modern spatial structure of industry, it is necessary

to analyze a set of indicators. In our opinion, in the first group of indexes GDP per capita (PPP) reflects a common level of the economic development of the states and defines a level of industrialization or level of industrial development. One more index reflects a share of industry in GDP (percent). The next group of indexes characterizes the features of a world manufacturing include: share of MVA (Manufacturing Value Added) in GDP, MVA per capita, impact of a country on world MVA. Besides, an index of the relative "level of industrialization" or "the coefficient of industrialization" showed the level of industrial development and a role of each state in a global industry. This index was calculated by the authors and shows us an impact of a country on a world MVA (percent) to a share of a world population (percent). The third group of indicators characterizes the features of innovative development and a structure of manufactured exports in the states. These indicators include high-tech manufactured exports per capita and a share of high-tech manufactured exports in total manufactured exports.

[10] Industrial output of particular sectors of extractive industry and manufacturing were measured in a physical value (not economic) and after that a share of global regions (Europe, Asia, America, Africa) was calculated. The level of concentration of manufacturing was calculated by a share of leaders: first of three, five and ten countries. The data of the years 1950-2017 was also analyzed. The analysis of the obtained data made it possible to identify the main trends of a world industrial development.

### **3. Results and Discussion**

The rise of industry and manufacturing was seen in the second half of the twentieth and the beginning of the twenty first century in many countries of the world.

[11] The share of USA in manufacturing is still stable and high though with a small decline since 2000 (from 20% to 16%). But we see an increase of an industrial potential of China (24% increase in the total share in 2016) (www3). It is important to mention about a stable and significant share of Western Europe in a world industry. Though here we also see the changes – the share of particular countries of Western Europe is decreasing (for example, the share of Great Britain, France and even Germany). The decrease of share of Eastern Europe has begun since the beginning of 1970 after the dissolution of the Soviet Union and a fall of socialism in the 1990s. For example, the data given below shows the decreasing share of Russia in a world manufacturing (year/share): 1950 – 10,7% (share of the USSR – around 15%); 1960 – 14,9% (share of the USSR – around 20%); 1970 – 13,5% (share of the USSR – around 18%); 1990 – 10,3% (USSR – around 13%); 2007-2009 – around 3%; 2010-2015 – less than

3%. At the moment the share of Russia in manufacturing is around 1,5-2%, in high-tech manufacturing – less than 1%. (Rodionova, 2017).

[12] China is still considered as a developing country – though it is now successfully developing even after the socialism fall and in the circumstances of a planned economy. Industrialization allowed China to raise a share of developing countries in a world manufacturing and consumption of industrial goods.

[13] China has significantly increased its share in manufacturing and China is currently ranked first by its manufacturing output and by economic value of manufactured goods. The rise of manufacturing can not only be compared by its value. After having compared output by value or by volume it has become evident that China is a world leader in many sectors of manufacturing and certain sectors of industry (Sluka et al., 2018).

[14] The production of different types of goods has increased in new industrialized countries such as Singapore, Republic of Korea, Taiwan, Thailand, Malaysia, Indonesia and others. The importance of Mexico, Brazil, India and other countries in a world industry has significantly increased. But the level of industrialization of many developing countries (especially among more developed ones) is growing slowly. And their indicators are much lower than the indicators of economically developed countries.

[15] Nevertheless, the share of developing countries in a world economy and manufacturing is growing. On the global and regional levels the volume of manufacturing output has significantly changed and is directed from West to East (from developed towards developing countries) (Rodionova et al., 2017).

[16] Share of Asia in a world manufacturing value added has grown since 1999 to 2016 from 32 to 49% (share of North America and Europe is declining). (www2). For sure, such progress of Asia is related to the economic phenomenon of China (Rodionova, 2014, Rodionova et al., 2017). Chinese manufacturing output (24,4%, year 2016 - share in world MVA at constant 2010 prices) has surpassed outputs of such industrial giants like USA - 16%, Japan - 8.7%, Germany - 6.3%, Italy – 2.4%, France – 2,4% and made China first in the world. It is important to note that India (3.4%) and the Republic of Korea (3.1%) have already surpassed Italy and France. (www3).

[17] China is now ranked first by GDP at purchasing power parity (23.21 trillion dollars, 2017). China has surpassed USA, a former world leader which had kept this position for many decades before (19.49 trillion dollars). Then goes India (9.47 trillion dollars), Japan, Germany, Russia, Indonesia, Brazil, United Kingdom, France, Mexico, Italy, Turkey, the

Republic of Korea, the Kingdom of Saudi Arabia (www1). The group of leaders changed due to growing number of developing countries.

[18] The world industry is changing along with territorial structure of industrial sectors and world industry in general. One of the main indicators of industrial development is value added of all manufacturing industries per capita. According to UNIDO statistics there is a gap between average indicators of developed and developing countries, and it is persistent (Table 1).

**Tab. 2** Leading manufacturing economies share in world value added of all manufacturing industries (MVA)  
 (at constant 2010 prices)

Heading level	MVA share of countries in world value added of all manufacturing industries (%)			MVA per capita in \$ US	
	2005	2010	2016*	2005	2016*
<b>World</b>	100	100	100	1500,1	1660,8
<b>China</b>	11,66	18,51	24,36	1431,9	2170,2
<b>USA</b>	20,27	17,64	15,99	5905,6	6074,6
<b>Japan</b>	11,02	10,31	8,73	8404,0	8514,2
<b>Germany</b>	7,29	6,57	6,29	8478,9	9595,0
<b>India</b>	2,00	2,71	3,44	228,3	319,4
<b>The Republic of Korea</b>	2,51	2,93	3,10	6192,7	7556,8
<b>Italy</b>	3,67	2,91	2,36	5068,1	4854,5
<b>France</b>	3,10	2,58	2,30	4256,6	4380,5
<b>Brazil</b>	2,88	2,71	1,84	1414,8	1080,9
<b>United Kingdom</b>	2,66	2,15	1,84	3555,7	3475,2
<b>Indonesia</b>	1,55	1,60	1,83	687,1	866,0
<b>Mexico</b>	1,89	1,68	1,66	1466,9	1593,6
<b>Russia</b>	2,12	1,88	1,64	1362,1	1409,6

Source: (www3)

[19] Here we see a rapid growth of industry in China. Let us analyze the situation with the leading countries. Since 2005 to 2016 the share of economically developed countries (USA, Japan Germany, Italy, United Kingdom and France) was declining (Table 1). Among the top 10 we see India with its 5<sup>th</sup> place, the Republic of Korea ranked 6<sup>th</sup>, Brazil is on the 9<sup>th</sup> position. In 2016 Russia ranked 13<sup>th</sup>. Note that the share of the 15 leading manufacturing countries is 78% of total world manufacturing. The level of industrial concentration is still high in the world.

[20] We need to characterize the shifts in a spatial organization of a world manufacturing on the regional level. We see the dynamics of the share of regions in a world manufacturing of certain types of industrial goods

[21] According to Science and Engineering Indicators 2018, the share of North America in manufacturing has decreased from 32% to 22% (including the share of USA, with a decline from 28% to 19%). Though USA is still among the world leaders, China surely surpasses them. The share of the European countries has also declined from 30% till 23% (including the EU countries – from 28% to 18%). At the same time the share of Asian countries has increased from 32% to 49% through boosting output, first in China and new industrial Asian countries. For example, the share of China has increased from 6% to 29% of a global value, though the share of Japan has declined from 17% to 7% (www2). Among the top manufacturing countries (according to UNCTAD 2017) there are China, USA, Japan Germany India, the Republic of Korea, Italy, France, Brazil, United Kingdom, Indonesia, Mexico, Russia, Canada, Spain. These 15 top countries form 80% of a world manufacturing output, the first five countries combine around 60% (www3). According to the National Science Foundation data, the statistics is the same (about 80% and more than 60% accordingly) (www2).

[22] The statistics and previous calculations of the output of certain sectors of manufacturing (in physical value – in million tons, kg, billion cubic meters, units or other unit of measurement) show the extent to which a share of a region in a world manufacturing of certain sectors have changed. It is important to mention that almost all sectors of manufacturing were transferred to the Asian region (Rodionova, 2014; Rodionova at all, 2017).

[23] The share of electricity production also has increased in all world countries but the share of region in a global value has changed and the increase in share of Asia is notably seen (from 7% to 53%). Then, in the period from 1950 to 2017 the share of Asia in steel making increased from 4 to 72%, in motor vehicle manufacturing from zero to 75%, in mineral fertilizer production from 5% to 65%, in chemical fiber production from 8% to 83% and so on. And a share of Asia continues to grow (Rodionova at all, 2017).

[24] The obtained data proves the fact of transfer of production from major regions of the world to Asia. The comparative analysis helped us to understand the fact that a strong growth in Asia takes place first of all through industrial development of China, Japan, India and new industrial countries (NIC) of Asia.

[25] At the moment China is a leader or ranks among the three leading countries in manufacturing of many industrial goods. Besides and without any doubt, a period of cheap and

defective goods production is coming to an end. Modern policy orientation is aimed at production of high-tech goods and diversification of industry and manufactured export. And such processes are taking place now.

[26] At a global level, the differences of the industrialization between developing and developed countries still exist. Implementation of the latest technologies are changing a global "industrial landscape". Highly developed countries are forced to produce and deliver more and more sophisticated goods to the global market due to a high competition between the developing economies. The increasing population of developing countries stimulates production and consumption in these countries. We can see a growth of importance of developing countries and a growth of their share in a global manufacturing.

[27] To sum it up, we need to mention that comparison of shares of the leading manufacturing countries in a global rate and also shares of the leading 10 and 5, and 3 countries in the dynamics in the period from the middle of the last century (within more than 60 years) represents the shifts that took place within such a long-term period.

[28] In 1950 the industrial output of the top three (USA, USSR and Great Britain) slightly exceeded  $\frac{1}{2}$  of a share in a world manufacturing. The share of the leading 10 countries was more than 70% of a global industrial output. By the end of the 20<sup>th</sup> century a total share of the first three countries (USA, China and Japan) formed 40% in a global industrial output (21%, 11% and 8% accordingly). The share of the leading 10 countries declined till 67% (Rodionova, 2014).

[29] The situation began to change again at the beginning of 2000. And the level of concentration of world production in the leading group began to increase driven firstly by a rapid grow of China. Nowadays half of all world production is located only in these countries - USA, China and Japan. The production output of many categories of industrial goods (including high tech and knowledge-based) continues to grow rapidly in China. Domestic demand is growing along with export needs.

[30] The level of concentration in the leading group was declining for some time due industrialization. However this indicator is growing again through high indicator of industrial output in China, which has become a world leader.

[31] However, the changes in a modern world and in a group of economically developed countries are caused by reindustrialization and neo-industrialization, which are considered to be a natural process of improvement of productive forces that leads to a new technotronic era of the society. And this is a transition to the knowledge-based, high-tech, more



efficient and environmentally friendly industry which provides new, higher level of economy. Advanced technologies have become more important for achieving competitiveness of companies and countries. In fact, technology-intensive industries dominate in a global productive landscape of economically developed countries. It allows them to be more competitive in manufacturing (Rodionova at al., 2017).

[32] Scientists consider the development of the concept «Internet of things – IoT» is to be a driver of neo-industrialization. The development of “Internet of things” is stunning. The next step of the development of this concept will most likely become “Internet of Everything” – IoE that will allow everything that can be imagined to be connected to the global net. The planetary network will start to develop independently and to make decisions in accordance with the algorithm developed by programmers. Industrial internet of things is changing the whole economic model of interaction between “supplier – customer”. The Asia-Pacific region is a leader of the concept’s adoption (Gartner, 2015).

[33] On the way to this new paradigm of a global development – “Industry 4.0.” during the fourth industrial revolution - all sectors of economy will change along with a geography of a world industry.

#### **4. Conclusions**

The presented analysis shows that changes in a spatial organization of a world industry are taking place under the influence of economic development of the world countries and under different paces of their industrial development (including transfer of manufacturing of transnational corporations to their territories) and also under increase in demand for industrial goods. New global reality is changing - the balance of two different fields - international (with interaction between national economies of the world countries) and transnational (which corresponds to the links between TNCS and their affiliates in their global networks: industrial-technological, information, banking, trading, etc.).

Innovative development in a globalizing world economy will lead to serious changes in a sectoral and territorial structure of a global industry. While the historical structure of the international work market is also changing. Nowadays many developing countries along with developed countries specialize in the production of high-tech goods. First, labor-intensive, material- and energy-intensive (often environmentally "dirty") productions were transferred

there. At the same time the developed countries transferred new technologies and even the newest ones to Asian countries like Singapore, The Republic of Korea, and China.

The main trend and major shifts of a modern industrialization are seen in developing countries. The transfer of the production from developed countries, creation of new plants in the countries of Asia, South America and even Africa the increasing value of these regions shows the development of a process of industrialization of a global manufacturing and its modern trends. On the other side - the process of re-industrialization is going on in highly developed countries. And a modern industrial policy is based on the paradigm "Industry 4.0". That is why they still keep the leading positions in a modern global industry. But in developing countries (China, India, new industrial Asian countries and others) industrialization is taking place so rapidly that this process defined a spatial reorganization in a global manufacturing not only on a regional but also on the global level. Asia is becoming a leader in a world industrial development with China on top.

## Acknowledgments

The publication was prepared with the support of the "RUDN University" Program 5-100.

## References

- Acs, Z. J. (2013). Innovation and Regional Growth in the European Union, by Riccardo Crescenzi and Andrés Rodríguez-Pose. 2011. Series: *Advances in Spatial Science*. Berlin and Heidelberg: Springer. 215 x. ISBN 978-3-642-17760-6, €99.95, \$139. *Journal of Regional Science*, 53(3), 549-550. doi:10.1111/jors.12043.
- Dominiak, J., & Rachwał, T. (2016). Chief Development Tendencies, Structural Changes and Innovativeness of the Industrial and Service Sectors in Poland. *Quaestiones Geographicae*, 35(4), 49-69. doi:10.1515/quageo-2016-0034.
- Draper, P. (2013). The Shifting Geography of Global Value Chains: Implications for Developing Countries, Trade Policy, and the G20. *Global Summitry Journal*, 1(1). doi:10.7871/2291-4110.1005.
- Gartner. (2015). Gartner says 6.4 billion connected "things" will be in use in 2016, up 30 percent from 2015. Press Release, STAMFORD, Conn., November 10, 2015. Retrieved September 8, 2016, from <http://www.gartner.com/newsroom/id/3165317> [Google Scholar].
- Gereffi, G., Humphrey, J., & Sturgeon, T. (2005). The governance of global value chains. *Review of International Political Economy*, 12(1), 78-104. doi:10.1080/09692290500049805.
- Gierańczyk, W. (2010). Development of High Technologies as an Indicator of Modern Industry in the Eu. *Bulletin of Geography. Socio-economic Series*, 14(14), 23-35. doi:10.2478/v10089-010-0012-3.
- Giffi C. A. et al. (2016). Global Manufacturing Competitiveness Index. Deloitte Touche Tohmatsu Limited (DTTL) Global Consumer & Industrial Products Industry Group and the Council on Competitiveness;

- London. Available from: <http://avraska.com.tr/Dokumanlar/Global-Manufacturing-Competitiveness-2016.pdf>. [DoA: 10.09.2018].
- Hermann, M. et al. (2016). Design Principles for Industrie 4.0 Scenarios. 2016 *49th Hawaii International Conference on System Sciences (HICSS)*. doi:10.1109/hicss.2016.488.
- Kholina, V. N., & Mironova, M. N. (2012). The Russian economic space: Evolution during periods of reform, growth and crisis (1990–2010). *Miscellanea Geographica - Regional Studies on Development*, 16(1). doi:10.2478/v10288-012-0018-1.
- Kourtit, K, Nijkamp, P, Stough, R. (2011) Drivers of Innovation, Entrepreneurship and Regional Dynamics. *Advances in Spatial Science*. doi:10.1007/978-3-642-17940-2.
- Rachwał, T. (2011). Transformations of the Employment Structure as an Expression of the Transformation of Polish Industry Against the Background of the European Union. *Bulletin of Geography. Socio-economic Series*, 15(15), 5-25. doi:10.2478/v10089-011-0001-1.
- Rodionova, I. A. (2014). World industry in post-industrial society: Tendencies and regional shifts. *Miscellanea Geographica - Regional Studies on Development*, 18(1). doi:10.2478/v10288-012-0044-z.
- Rodionova, I., Shuvalova, O., Kokuytseva, T. (2017). The balance of power in the world manufacturing industry. *10th Annual Conference of the EuroMed Academy of Business «Global and national business theories and practice: bridging the past with the future»*. Rome, Italy.
- Safonov, S.A. (2016). Global value chains as a fact of shifts in the geography of world economy. *Moscow University Bulletin. Series 5. Geography*. (In Russ.).
- Sluka, N. (2018). On the way to Pax Sinica, Moscow. (In Russ).
- UNIDO (2018). Industrial Development Report 2018. Demand for Manufacturing: Driving Inclusive and Sustainable Industrial Development. Overview, Austria.

#### Online sources

(www1) <https://www.cia.gov/library/publications/resources/the-world-factbook/>

(www2) <http://nsf.gov>

(www3)

[https://www.unido.org/data1/IndStatBrief/World\\_Leading\\_MVA.cfm?print=no&ttype=W6&Country=&Group=oup=](https://www.unido.org/data1/IndStatBrief/World_Leading_MVA.cfm?print=no&ttype=W6&Country=&Group=oup=)