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## ON THE SUPRANATIONAL AND NATIONAL LEVEL OF GLOBAL VALUE CHAIN MANAGEMENT

Viktor Koval<sup>1</sup>, Ganna Duginets<sup>2</sup>, Oksana Plekhanova<sup>3</sup>, Andrii Antonov<sup>4</sup>, Mariana Petrova<sup>5</sup>

<sup>1</sup> *Odessa Institute of Trade and Economics of Kyiv National University of Trade and Economics, 6 Inglezi Str., Odessa 65070, Ukraine*

<sup>2</sup> *Kyiv National University of Trade and Economics, 19 Kyoto Str., Kyiv 02156, Ukraine*

<sup>3</sup> *Petro Mohyla Black Sea National University, 1068 Desantnykov Str., Mykolaiv 54000, Ukraine*

<sup>4</sup> *Zhytomyr State Technological University, 103 Chernyakhovsky Str., Zhytomyr 10005, Ukraine*

<sup>5</sup> *St. Cyril and St. Methodius University of Veliko Tarnovo, 5000 T. Tarnovski 2 Str., Veliko Tarnovo, Bulgaria*

E-mails: <sup>1</sup>[victor-koval@ukr.net](mailto:victor-koval@ukr.net), <sup>2</sup>[anna.duginets@gmail.com](mailto:anna.duginets@gmail.com), <sup>3</sup>[o\\_plekhanova@ukr.net](mailto:o_plekhanova@ukr.net), <sup>4</sup>[antonovav75@ukr.net](mailto:antonovav75@ukr.net), <sup>5</sup>[m.petrova@ts.uni-vt.bg](mailto:m.petrova@ts.uni-vt.bg) (corresponding author)

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**Abstract.** It has been proven that the functioning of global value chains (GVCs) takes place by the agreement of various interests of the participating subjects. In determining the direction of fragmentation of production processes of multinational corporations (MNCs), of particular importance are comparative advantages of countries, which explains the constant reconfiguration of GVCs, including the tendency of reconsolidation and repatriation of their links into developed countries occurring in the last decade. It is substantiated that superstate and state assistance to GVCs, in the conditions of the transformation of global production in the XXI century, is beginning to play a prominent role, without, however, decreasing the importance of corporate (or inter-corporate) regulation of these processes. The existing model of global production fragmentation, while active at the beginning of the XXI century, will not necessarily remain adequately effective in 10-15 years. Considering this, and the fact that the functioning of production chains participated in by MNCs is based on inter-country differences that are constantly changing under the influence of scientific and technological progress, it can be stated that global production will continue to evolve, as will GVCs and the conditions of their functioning, which makes further research in this direction relevant.

**Keywords:** business-government relations; regulation and internationalization; institutions; global value chains; fragmentation of production, innovation development

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### 1. Introduction

The acceleration of globalization processes at the end of the XX century and at the beginning of the XXI century has led to significant changes in the international business environment, which have manifested in the growth of economic and financial interdependence of countries, regions, markets and companies. Intensive development of scientific and technological progress, which has a significant impact on the processes of internationalization and

integration in the context of modern division of labour; a change in the public consciousness that forms a new relation to economic activity as such and contributes to the formation of new stereotypes, models, and forms of relationships in international business processes; the fragmentation of global production, which qualitatively changes the nature of the functioning of the economic systems themselves, giving them new opportunities and generating new risks in conditions of structural transformation of the economy - these are the main effects of these processes. Due to further transformation of traditional forms of international division of labour, the intensity of exchange and the increasing mobility of factors of production becomes very prominent, manifesting itself through the spread of global value chains (GVCs).

The effectiveness of the formation and development of GVCs depends on the conditions in which these economic relations are implemented. It is the awareness of the need to form a single economic, legal, and information space for effective business activity that contributes to the formation of such an environment, the features of which are the strengthening of the role of national and supranational institutions and mechanisms in the management of GVCs and creating an appropriate method for coordinating interests, with a fundamentally new regulatory and dispute resolution system.

World practice shows that, in the context of growing fragmentation of global production, national economies are increasingly drawn into internationalized production segments, becoming their constituent parts and exercising influence on the entire set of GVC segments. The high growth rates of developing countries, especially in Asia, stimulate explosive growth in demand and, accordingly, international trade. This, in turn, confirms in practice the thesis of Michael Porter that "the competitiveness of a country is created not on external, but on domestic markets" (1980, p. 218). As a result, trade in finished goods and services has been growing at almost the same rate as trade in intermediate products in the last quarter of the twentieth century. In these conditions, the structure of the world economy gains the features of multi-levelness and interdependence, which, in the conditions of the permanently weak dynamics of economic development of the last decade, makes relevant the issues of preserving jobs, increasing the level of localization of national production at all stages of creating value and protecting the domestic market. Therefore, the need to determine the specifics of the management of GVCs from the position of the subjects of these interactions (states, multinational corporations etc.) becomes urgent.

## **2. Literature review**

The rapid development of GVCs in the last third of the twentieth century is the result of the spread of cross-border fragmentation (the transfer of production elements across national borders) between developed and developing countries. Moreover, the theoretical substantiation of these processes is the model of two-dimensional fragmentation of production, proposed in (Kimura & Ando, 2005). Meanwhile, since the middle of the twentieth century, the interest in studying these processes has been reflected in the theory of placement of production, which uses neoclassical economy as the theoretical basis. The main contribution to its development was made by representatives of the German Geographical School, namely Lösch (1940). The subsequent growth of interest in the issues of placement of production and the formation of the theory of GVCs has been contributed to by the work of one of the founders of the theory of information society, Castells (1996). Further, since the 1990s, representatives of institutional and evolutionary theories became more actively involved in the analysis of network forms. And it is precisely O. Williamson (1981) who has identified networks (or, in his terminology, hybrids) as a separate subject of research within the institutional analysis of organizational forms of conducting business. Miles and C. Snow (1995) have focused on the study of mechanisms for the use of collective resources. Van Elstein (1997) made a synthesis of different approaches to the study of network systems with further detailed study of their distinctive properties within different schools of economic analysis. Powell's and Smith-Dora's (2010) joint research, conducted within the framework of an evolutionary scientific direction, helped to identify the factors influencing the spread of production chains, and these factors became the basis for the classification of modern forms of inter-organizational cooperation.

The theoretical and methodological foundations of studying the functioning of a GVC are considered in the works of Arndt and Kierzkowski (2001), De Backer and Miroudot (2014), Gereffi and Wyman (2014), Stöllinger (2018),

Johnson and Noguera (2012), Drăgulănescu and Androniceanu (2017), Kimura and Lee (2006), Mazaraki (2018). Special attention should be paid to the scientific studies of the impact of national and regional innovation systems on the economic development of developing countries (see, for example, Arocena, & Sutz, 2000; Lundvall, et al, 2011; Pukala, 2016; Labunska et al, 2017; Zeibote et al., 2019). Also worth mentioning is the sectoral system approach (Malerba, & Nelson, 2011), as it gives an opportunity to understand how national and sectoral characteristics are related to foreign trade relations and how they influence the development of innovation and, accordingly, the functioning of GVCs.

Recent research in this area, e.g. of Dias Mora, Carmen and Eraña García López shows that more than a third of exports of multinational corporations (MNCs) are of very high complexity in three main groups of countries. They believe that the higher the complexity of the product, the greater the volume of trade associated with GVCs and the impact on EU countries that have a wider set of opportunities for coordinating their activities (Díaz-Mora, & López, 2019).

Another example of this is the econometric evidence presented by Hermida et al (2018) that confirms the hypothesis that fragmentation and participation in GVCs provide higher growth rates for countries and also means that the country's position in these chains is important for the creation of a supportive business environment: growth in countries, which specialize in upstream activities in high technology and services sectors, tends to be faster than in countries located in primary sectors.

The formation and functioning of GVCs occurs through the agreement of various interests of actors within and outside of the corresponding organizational forms and economic connections, with the help of selected methods and incentives. So in the conditions of transformational changes in the global space in the 21st century, the formation of conditions for the development of GVCs at the state level deserves the most attention. This can be explained from two points: firstly, in modern economic literature, there is a considerable amount of research in this field, beginning with the eclectic paradigm of Dunning, which first developed the basic theoretical positions of the theory of international production and the causes of transnationalization, as well as attempted to determine the role of the state in this process (Dunning, 1990). Also, scientists Buckley and Hashai (2004) identified the theoretical aspects of the corporate strategy of controlling the production chain and the choice of localization (within a particular national economy) of individual segments of a GVC by identifying flows of information and production resources within the framework of global value chains. It should be noted that the theory of GVCs is based on a concept crucial for the fields of strategic management and international business, the value creation chain - or simply value chain - that also describes the creation of value in a chain of interrelated product or service operations.

The most important approach to identifying the value chain is the theory of competitiveness of Porter (1985, p. 33) and the concepts developed by Ghereffi (1996), which emphasize the magnitude of the term "value chain" and suggest its use for analyzing the activities of leading international companies on a global scale. The conducted preliminary analysis of the methodological basis of the formation of global value chains allows to propose an own, author's understanding of their content: a global value chain is the economic relationship between the parties to a single production process that concentrates certain elements of its production, promotion and distribution of newly created products and services in the global space, while taking into account its inhomogeneity in terms of available factors of production and the level of integration into network systems. So, in the context of this analysis, the definition of a GVC is reflected in the distribution across national borders of production processes that combine complete or taken partially elements of value chains located in different national territories.

Identifying the peculiarities of the development of GVCs based on MNCs also deserves particular attention. Since companies of this type are forced to look for new ways and strategies for developing and improving their positions at different levels of global value chains in the conditions of the transformation of the world production system taking place in the XXI century (Fleury, et al 2013; Pananond, 2015) it is of interest for the further development of the theoretical foundations of international business and strategic management in relation to the economic development of countries that are catching up, like Ukraine, because the earlier studies were based on analyzing companies from developed countries, thus not taking into account the peculiarities of companies from countries with developing markets (Narula, Dunning, 2010; Ramamurti, 2012).

The second standpoint, which focuses attention on the state level of coordinating the operations of GVCs, is based on the fact that, in determining the direction of fragmentation of MNCs' production processes, comparative advantages of countries (such as the relative cost of labor, level of infrastructure development, market capacities), that influence their competitiveness and the price of production factors, play a special role. This provides an implicit explanation of the processes where certain parts of MNCs' production chains relocate between countries in accordance with changes in the relevant comparative advantages. Rapid innovation against the background of technological changes prompts the constant reconfiguration of GVCs, including the reconsolidation and repatriation of their segments into developed countries. Thus, constant study of the global market becomes relevant from the perspective of MNCs' and MNCs', aimed at identifying the most effective locations for GVCs' production units.

Meanwhile, the growing importance of the state as a subject of specification and protection of property rights at the macroscopic level and the main bearer of national interests in the functioning of GVCs warrants a more thorough study. The state acts as an arbitration party, which guarantees compliance with relevant agreements; its dominant objective, in this context, is to create a property ownership structure that would maximize the economic impact of placing GVCs in its territory.

**3. Methods and information sources of research**

The study uses a complex of complementary methods of scientific identification of economic processes and phenomena: the system-structural, comparative and statistical analysis - for studying the current state and main trends in the development of global production (on the example of the automotive industry), and the territorial, resource, informational, process and institutional approaches for analyzing the formation and functioning of GVCs. The information base of the research is formed by statistical and analytical materials and informational and analytical collections, bulletins and reviews, made public by such sources as the Organization for Economic Cooperation and Development, World Bank Group, European Bureau of Statistics, Ukrainian and foreign research centres, factual information provided by state authorities, a wide range of domestic and foreign literary sources, and results of own research.

**4. Results and their discussion**

In the framework of further identifying the features of GVCs' control at the macroeconomic level, the subject-object relations that arise in the process of formation and development of these chains have been investigated. The objective component combines the interaction and effect of the principles governing the process of fragmentation of international production. It is determined by: the geographical location of the participant in the chain (current or future); the type of economic growth in the country where the chain segment is localized; the degree of technological development; the objective component that forms the foundations and limits of the distribution of production processes; specific motives and interests in participating in the GVC, the choice of objectives and means of regulating this process, and the assessment of their costs and effects. The subjective component contains a set of conscious interactions in the chains, including their corresponding forms, methods and incentives. In our opinion, any economic agent that directly or indirectly participates in the management of the processes of formation and functioning of GVCs in the world economy (Table 1) should be considered an economic agent of GVCs.

**Table 1.** Subjects participating in the management of formation and operation processes of GVCs

Level	GVC Subject	
Supranational and national	MNCs, MNBs	Direct participants
	Governments, integration groups, intergovernmental institutions, central banks, public organizations and non-state institutions	Mediated participants
National and regional	Territorial administrations, governments of autonomous districts	
	Firms, enterprises, including small and medium enterprises	Direct participants

*Source: developed by the authors*

In this context, these entities primarily seek to meet their most pressing needs, on the basis of which arise the relevant motives for interaction within the GVC or in its formation. In the context of this study, relations of the main direct and indirect participants - MNCs and governments - are the most important in the process of managing production chains.

The monopolarity of the world economy, in fact, causes not only the optimization of the costs of the production process, but also the implementation of the so-called "cosmopolitan rationality" for national economies, which renders national investments into sectors that are already represented on the world market by competitive producers inefficient. In the phase of globalization of the international business environment, the interests of business entities, primarily MNCs, which coincide with the national interests of the states in which the companies are registered, play a dominant role over the national interests of the recipient countries of the activities of these actors. Transnationalization in modern conditions is a qualitatively new stage in the internationalization of economic life, which is a process of strengthening foreign economic activity as a result of global operations of MNCs (Dzhusov & Pavlovich, 2015). Today, of the top 100 MNCs, 35 are based in the United States, 42 in Europe, 21 in Japan, and only 2 in other regions of the world (UNCTAD, 2017). However, this does not mean that the real production belonging to those MNCs is localized in the countries where the parent companies are based. It is the investment decisions of MNCs, which are connected to the involvement of independent contractors and offshore operators, act as the main factors behind the creation of GVCs worldwide.

Let us note that the goal of supra-state interactions in this area is to encourage the innovation processes, further reduce trade costs and overcome differences without raising tariff and non-tariff barriers, strengthen the international taxation system and mitigate the effects of and overcome climate change. Relations within production chains are based on stimulation rather than containment of the processes of developing and introducing technological innovations. But, new technologies serve as an instrument for maintaining control over production within the economies of developed countries, provided by two main methods:

- Keeping the more technological stages of given production processes in the developed countries;
- Providing control over the transfer of information needed to organize the production process on a global scale (Cantwell, 1998).

Moreover, newer technologies remain by the owner, whereas older ones are distributed downwards on the links of the chain in order to "pull" the participants of the interactions up to the desired level of development. Such a system is characterized by the presence of new types of control, which in general can be defined as "new protectionism", which functions at the higher level of ideas, developments, patents and brands. The system of "new protectionism" aims to reduce the benefits of using cheap labor, which is reflected in lively discussions on "social dumping".

In the first quarter of the twenty-first century, new economic centres (poles) are being formed, based on the possibilities for developing and introducing new technologies, in conditions of active competition between leading countries. The key actors in the fragmentation of global production are identified, with the fragmentation manifesting in the classification of four fundamentally different groups of countries:

1. Countries that develop fundamentally new technologies (first-level technologies);
2. Countries with the scientific and technical potential and investment resources sufficient to implement first level technologies and to create further modifications (technologies of the second level);
3. Countries that are likely to be able to implement separate components of new second level technologies or base their production processes on the developments of previous generations of technology.
4. Remaining countries that are unable to use components of new technologies in production processes.

It should be noted that this distribution is subjective, since within groups, subgroups of countries may be identified with a sufficient level of scientific and technological development but very little participation in the functioning of GVCs, or of countries which act as global competitors in the development of fundamentally new technologies (first level technologies).

In turn, MNCs are linked to the core of the global economic system through GVCs and today control more than half of the world's trade and finance turnover, including the most profitable manufacturing industries from different countries (mining and high technology industries, telecommunications and industrial infrastructure), which at the same time form the foundation of 5th and 6th waves of innovation.

For example, in 2012, more than half of the world's value added in low- and medium-technology industries was created in developing countries, and even the high-tech industries of developing countries contributed almost half of the total value added (Figure 1).

Thus, the main instrument of superstate regulation is the protection of intellectual property rights in global production, with the main stakeholders being MNCs. This is due to the exhaustion of opportunities for the growth of the previous technological structure, when corporations, faced with the decline in the growth rate and profitability of their financed industries, begin to search for fundamentally new opportunities for investment including taking into account the life cycle of TNCs and MNCs (Koval et al., 2017). In this case, it is about the advantage that global financial agents possess in providing for both technological development and the functioning of GVCs within the modern business environment. This conclusion is supported by data on dozens of major FDI recipient countries in 2015, which include the United States (384 billion USD), Hong Kong (163 billion USD), China (136 billion USD), the Netherlands (90 billion USD), United Kingdom (68 billion USD), Singapore (65 billion USD), India (59 billion USD), Brazil (56 billion USD), Canada (45 billion USD), and France (44 billion USD) (UNCTAD, 2017).

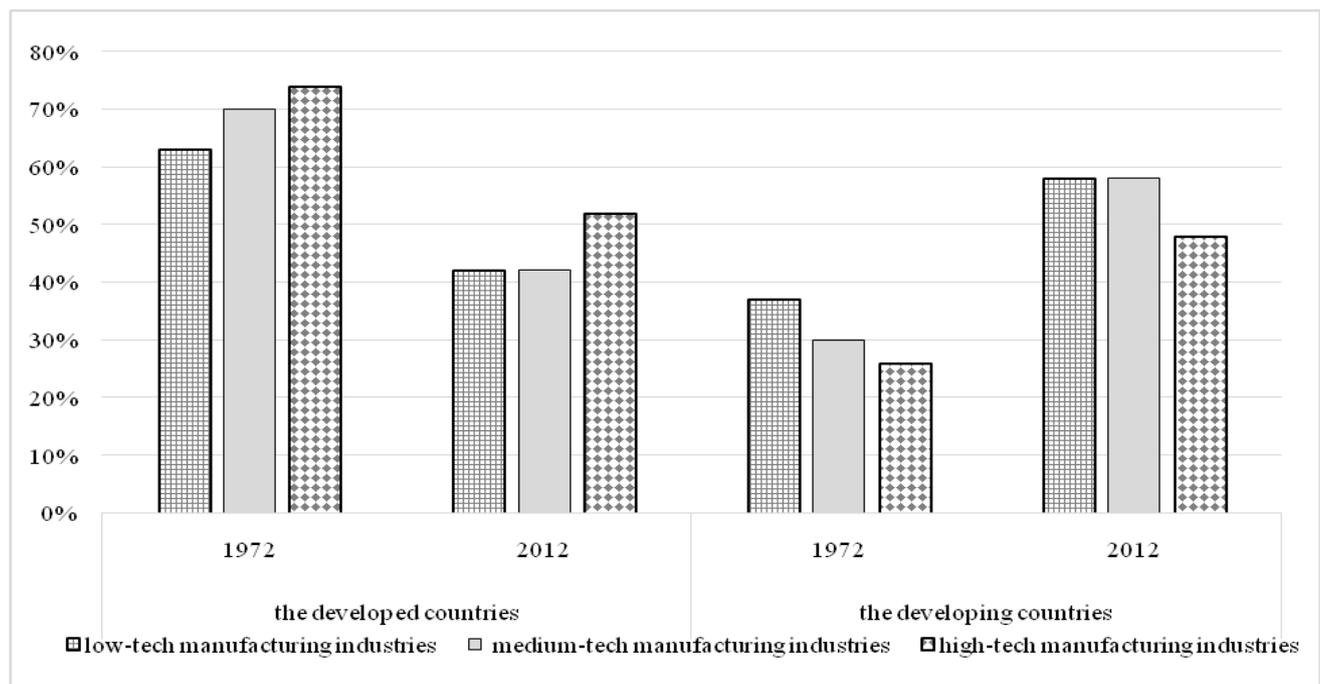


Fig. 1. The share of developing and developed regions in the creation of global added value in low-, medium- and high-tech manufacturing industries, 1972 and 2012, %

Source: compiled by UNIDO according to (Lavopa and Szirmai, 2015)

The implications of future technologies are unknown, but some of the possible problems associated with current technologies can already be foreseen. For example, due to the introduction of latest technologies, production and services would be transformed in the coming years in such a way that the question will arise as to how quickly can new jobs be created. That is, a knowledge-based post-industrial economy forms an ever-increasing demand for workers with higher education and qualification (Meshko & Tarabara, 2012; Mura et al., 2017). Also, according to a group of scholars, technical advances already create greater value for consumers than is currently reflected in national statistics (Boskin, et al., 1998; Brynjolfsson, et al., 2019); these issues need to be addressed quickly, which

is why the Inclusive Development Index (IDI) was presented by the World Economic Forum in 2017 (details in Schwab & Sala-i-Martin, 2016). This index presents the comparative analysis of the socio-economic development of countries in a way that provides a more comprehensive vision of integrated economic progress in the international business environment. It includes indicators that reflect growth and economic development (employment, life expectancy, GDP per capita), (Pukala, et al., 2014), "inclusive parameters" (Poverty and inequality levels), and sustainability (net savings, CO2 emissions per unit of GDP, public debt, the ratio of working-age population to incapacitated). So, in order to achieve successful inclusive growth, structural reforms and investment in human capital (including access to education and labor market flexibility) should be accelerated.

To achieve this, the state needs to take into account the existing and create the additionally necessary legal, regulatory, informational, financial, technical, personnel-related and other provisions for the functioning of GVCs, to apply appropriate methods, to form and employ appropriate incentives. The functions of such coordination should include:

- the legislative-normative function (formation of a single "legal field", the support and development of which ensures the economy of resources in the interaction of economic agents with each other, and since the rules of operating on the "economic field" are clearly defined, that is, the rights and responsibilities of each agent are understandable to all parties, the problems of cooperation in the GVCs would be most often resolved without intermediaries such as courts, arbitration, and state bodies);
- the informative function (timely provision of necessary information to economic entities);
- the social function (qualified and responsible economic subjects distantiate from the ideology of opportunistic behaviour, which inevitably contributes to the reduction of transaction costs associated with the GVCs' functioning).

The role of the state in coordinating the functioning of GVCs is to create institutions of communication between the economy and society, between economic and social development at the macro- and mega-levels of the economic system. Modern state institutions should provide manageability, which is a dynamic state, which implies the openness of public administration to reforms that are the implementation of the state's dynamic capacities in complex and uncertain conditions.

The trend of searching for a new model of management at the macro level began to emerge after the financial crisis of 2008-2009, as well as in the context of increasing complexity of the transformations taking place in the world economy. Scientific and technological advances transform the combination of factors of the production process in the world economy due to the spread of global value chains, which leads to an increase in interdependence of countries. Formation of GVCs occurs under the influence of a system of formal and informal requirements, rules, and norms that affect changes in the socio-economic environment. In the manifestation of this process, the role of the state is very important, which is to create an institutional environment for the promotion of the activity of GVCs in order to reconcile the various interests of network interactions' subjects.

The following characteristics of the state are important in its interaction with TNCs in the process of creating the conditions for the formation of GVCs:

- the ability of a state to use its strategic resources to improve its competitiveness in the world;
- the permanent coordination of the state's corresponding interests in the world;
- the ability of public authorities to cope with the challenges of the external and internal environments;
- the sustainability of coalitions for supporting the policies in various spheres of societal development, based on a high degree of social cohesion and the ability to politically compromise;
- the formation of cooperation in the relationship between the state, business and society, as well as the stimulation of these relationships through involvement in publicity.

In the context of this problem, it should be noted that, in the formation and functioning of these chains, there may be a conflict of interests between the participating state and MNCs. This is explained by the fact that foreign business entities and local authorities have different goals and count on different parameters of the partnership at the moment of laying the foundation for their interaction. The state, acting as the guarantor of the welfare of the nation, in cooperation with the MNCs seeks to stabilize macroeconomic indicators, modernize the basic infrastructure,

improve the living conditions and standards of life of the population, provide environmental safety etc. (Koval et al., 2019); MNCs, in turn, put in the first place the optimization of their own economic activity.

In the interaction of international business and the state, depending on the level of socio-economic development of the latter, as well as its priority directions of development, the state as the subject creating the conditions necessary for the functioning of GVCs has the right to take into account a number of elements that directly or indirectly affect the management of these interactions. Moreover, the state has the authority to use these strategic parameters, on the one hand, to stimulate the presence of foreign business, and on the other hand, as tools for regulating the presence of certain stages of the production process in its territory as a condition for the admission of MNCs to its market.

Table 2 shows the parameters that, in the authors' opinion, should be taken into account by the state in the interaction of the government and international business in managing the processes of GVCs' functioning. Moreover, the contribution of the listed parameters may be different depending on the country and in accordance with the peculiarities of the formation and development of GVCs.

**Table 2.** Parameters that are taken into account by the state when managing the operations of GVCs

No	Parameter	Main content and management indicators	Basic tools (regulators)	Management results
1	2	3	4	5
1	Ensuring employment	- the level and reason of unemployment in the country; - unemployment structure; - quantity and quality of created jobs;	- state support of both local and foreign investors (construction of new enterprises and / or establishment of joint ventures on the basis of existing ones)	reconfiguration of international production segments by means of achieving optimal inter-industry proportions of production between sectors of the economy
2	Security of local investors	- existing conditions in the country (infrastructure), stimulating national business; - fair competition; - effectiveness of anti-dumping measures active economy	- targeted support of industries that have lost their competitive position as a result of deindustrialization processes or pro-viding new goals for economic growth (ecology, stability, inclusiveness); - development of complex national legislation that deter-mine the optimal performance of international production networks in the country;	- strengthening the regional component, creation of innovative clusters on the basis of the principles of "reasonable specialization" and support of SMEs; - availability of innovative technologies for domestic producers; - development of domestic suppliers of 1st, 2nd and 3rd levels, of technological and service centres
3	National security	- branches into which foreign investments are directed; - strategic industries in the national economy		
4	Foreign trade	- geography and structure of the country's foreign trade; - availability of preferential agreements; - the state of trade and economic relations with the investor countries	- ensuring the harmony, sustainability and efficiency of international production and trade cooperation; - support of enterprises that create goods and services with high added value	the compatibility of implemented economic policies with those of the countries from which the investments flowing into the national economy originate
5	Fiscal policy	-taxes collected in the country; -main sources of budget replenishment; -customs regulation in the country	tax holidays and incentives for innovative enterprises and private investors	accumulating capacity for the development of new functions aimed at transitioning into more profitable segments of GVCs
6	Priority directions of development	- industries that require investment; - support of the national innovation system; - deficit branches of the national economy; - a list of intermediate goods for which there is demand from local producers	- creation of technology centres and business support centres; - programs of structural funds; - state support of innovations in science-intensive industries; - reforming the sphere of education (duality, inclusiveness, "education throughout life")	- development of the types of national economy's activity that are most promising in terms of effective participation in the GVCs; - technological development of all spheres of societal activity; - acceleration of the movement of foreign investment, which is catalysed by technological development.

7	Political stability	<ul style="list-style-type: none"> <li>- existing conflicting (threatening) situations in the country</li> <li>- the attitude of the society to local authorities;</li> <li>- political situation in neighboring states</li> </ul>	<ul style="list-style-type: none"> <li>- information support of national development programs;</li> <li>- promoting public-private partnership in various spheres of public life;</li> <li>- implementing the principles of a democratic society</li> </ul>	<ul style="list-style-type: none"> <li>- levelling social tensions in the process of transforming the production structure of the national economy</li> <li>- taking into account the fact that the entry competition in the most profitable GVC segments is constantly increasing, whereas the incomes of their participants are decreasing, in developing national development strategies</li> </ul>
8	Other benefits	<ul style="list-style-type: none"> <li>- the comparative advantages present in the country</li> </ul>		

Source: developed by the authors

In confirmation of the above, let us consider the experience of combining the national and supranational levels of the development of GVCs in the automotive industry of the countries of Central and Eastern Europe. European countries were chosen for analysis because the European practice of managing GVCs at the macro level employs a structured approach to implement on the opportunities provided, which, along with other measures, involves increasing the production potential of national producers. A good example is the significant increase in gross exports in absolute terms in recent years from France and Poland, as well as Hungary, Slovakia and the Czech Republic (Figure 2). In the construction of Figure 2, the data of the “Trade in Value Added (TiVA)” database (OECD, 2016) were used, which was created by the joint efforts of OECD and WTO. The database is open for general access since 2013, with the latest statistical observations dating back to 2011. Such a significant delay in the provision of information is associated with the high laboriousness of its processing, as well as the frequency with which individual countries calculate their “Input-Output” tables, since not all countries do it annually.

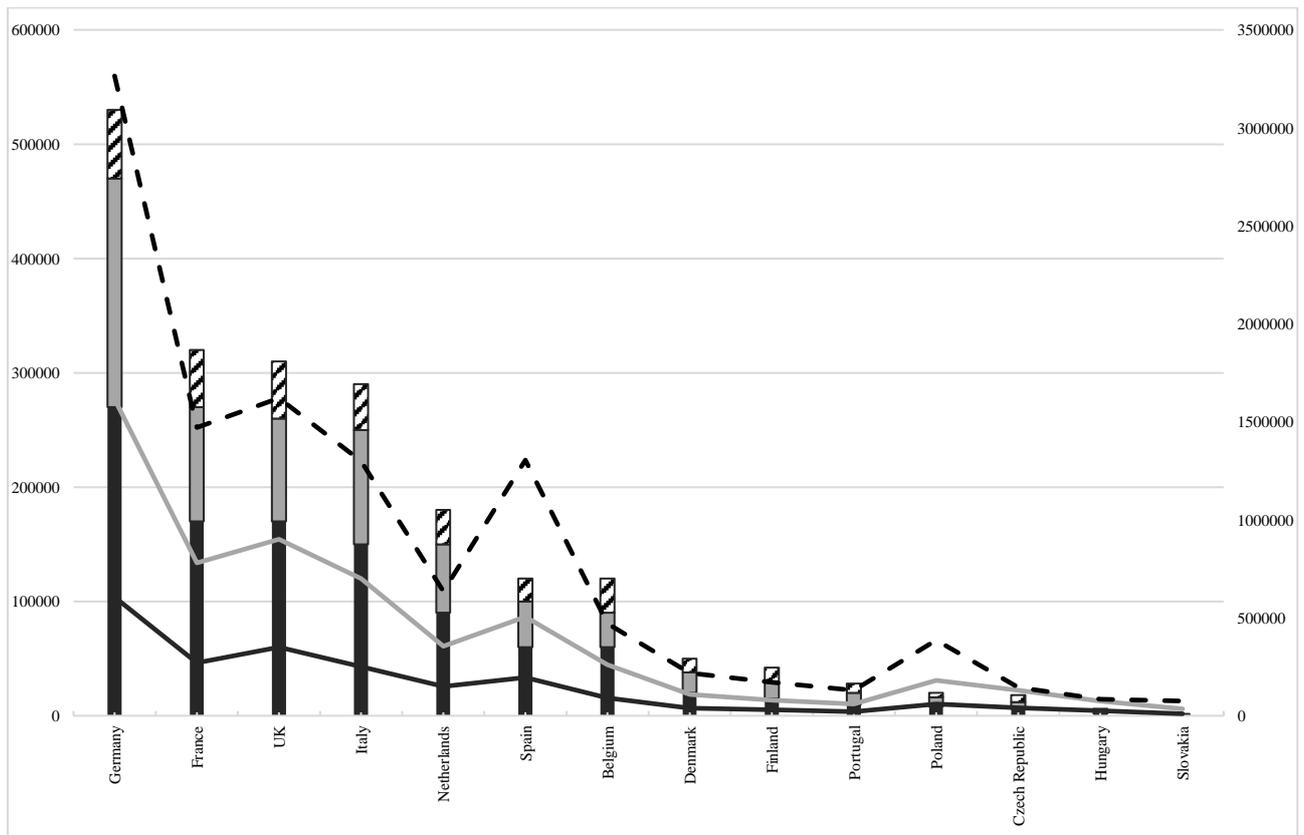


Fig. 2. Components of gross exports of some EU countries, 1995 and 2011, million USD

Legend: columns (accumulated total) – in 1995, lines (accumulated total) – in 2011; black dashed line – direct (that is, created directly by exporting industries) value added, created in the economy and exported abroad; gray – mediated (that is, created in industries, products or services of which were used in the production process as intermediate) added value created in the economy and exported abroad (Indirect domestic value added content of gross exports); black – foreign value added, created in the economy and exported abroad (gross exports); Also reimported value added created in the economy and exported abroad, and then returned to the economy (and again used for the production of export goods) is also taken into account (Re-imported domestic value added content of gross exports). Source: compiled by the authors on the basis of TiVA Database, OECD-WTO, October, 2015 (OECD, 2016)

In line with these transformation processes in the CEE region, the automotive industry began to develop rapidly. It should be noted that the automotive industry is of great importance for the economy, because it combines many of its sectors — from the metallurgical production to the latest technology development in the field of electronics. It is because of the fact that many industries are involved in the automotive industry - for example, the production of glass, rubber, plastics, metalworks, electronics, as well as technical and consumer services, finance and many others - that the creation of one job in the automotive industry provides for additional jobs in other industries.

The geographic location of these countries has played a strategic role for the growth of direct foreign investment flows (FDIs) of the world's largest automakers, since the factories located there can supply products to both the West and the East: the volume of accumulated FDI in the production of electrical equipment, automotive, electronic and optical equipment in Hungary amounted to 3.7 billion USD, in the Czech Republic – 1.5 billion USD; In the production of vehicles and accompanying equipment – 4.1 and 14.8 billion USD, respectively; In the production of machinery and other equipment – 1.7 billion USD in Hungary (OECD, 2016). The share of FDI in the region's automobile industry constituted 10–15% of the total volume of foreign investment in the CEE industry in 2000 (Radosevic, Rozeik, 2005, p. 25).

In general, the significant growth of the automotive market in CEE began in the 2000s. At that time, the share of Central and Eastern European countries in the world production of cars was only 2.5%, and 7.1% in the Europe-wide production. By 2014, the situation has changed: the share in world and European production has increased to 4.1% and 17.8%, respectively (OICA, 2016). The result of the rapid restoration of most of the CEE countries is the continuing operation of factories, which took an as flexible as possible approach to the production process in that period. CEE governments, in turn, provided certain benefits to producers during the crisis and supported them through various investment incentives. In particular, in Slovenia, value added tax was reduced from 20% to 8.5%, and special support was given to companies with high added value (Pavlinek, Zenka, 2010, p. 349–350).

Foreign economic activity data account for 56.1% of the total value of exports of Czech goods calculated on the principle of value added, 54.0% of Hungary's exports and 52.5% of Slovakia's exports. At the same time, foreign economic activity data accounts for 64.3% of all foreign value added in Czech exports, 67.6% in Hungary, and 57.9% in Slovakia (OECD, 2016).

In our opinion, such a large-scale inflow of foreign investments is explained not only by favorable economic factors prevailing in the region, but also by the active participation of the governments of the CEE countries in the development of the automotive industry. Some of them developed an effective industrial policy to support the industry, including domestic and foreign investors. Ways to stimulate investment include various measures, from "tax holidays" to financial rewards for the creation of new jobs. For example, in the Czech Republic, investor companies can have up to 25% of their costs reimbursed (CzechInvest, 2015, 16 p.).

In addition, the European Union provides the possibility of using the EU Structural Funds program, which stimulates the establishment of R&D centers, training centers, the implementation of energy conservation projects, the reconstruction of buildings, etc. For example, from 1998 to 2014, the volume of investment in the automotive industry that passed Through CzechInvest amounted to over 10 billion EUR; more than 300 projects had been implemented, in 62 of which state support bore more than 50% of the cost (CzechInvest, 2015). The largest project implemented through the investment incentive program was the construction of a Hyundai Motor plant in the Moravian-Silesian region, in which Korea invested about 1.2 billion EUR from 2006 to 2008, and the assistance of the Czech government amounted to 15%. The Hyundai production involves about 3,300 workers, and about 7 thousand jobs have been created by supplier companies of all levels that followed Hyundai to the Czech Republic (CzechInvest, 2015, p.10). Before that, in 2002–2004, Japan had invested approximately 740 million EUR in a joint venture Toyota Peugeot Citroen Automobile, and Germany invested about 500 million euros in Skoda Auto in 1998. Since then, Skoda has continued to invest in the development and expansion of its production, reaching a value of more than 830 million EUR, 30 of which were used in the construction of a technology center in 2006; the state's assistance in this case was 40% (CzechInvest, 2015).

In Slovakia, there is also an agency for investment and trade development, SARIO (Slovak Investment and Trade Development Agency), financed by the state and operating under the supervision of the Ministry of Economy. The goal of the agency is to improve the living standards of citizens by increasing employment and reducing disparities among regions. To do this, it promotes national and foreign investment projects, facilitates the provision of state support, creates databases on existing real estate and industrial parks, and contributes to the creation of Slovak and foreign joint ventures.

An important aspect of the CEE countries' ascension into global value chains is the government support not only for producers, but also for the development of domestic suppliers of the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> levels, of technological and service centers. For example, 56 of the top 100 global suppliers in the automotive industry are based in the Czech Republic (CzechInvest, 2015, p. 8). Certain forms of support for high-quality industrial projects are also used. One option is maximizing the profit from using investment incentive schemes provided directly by the government that can be used by both new companies and those already operating in the field of car manufacturing, technology centers and business support centers (software development, information, service centers, call centers, etc.).

Another important factor is the state support for innovations in high-tech industries. For example, the assembly production of leading automobile manufacturers in CEE countries are concentrated on a relatively small area covering Western Slovakia, the Eastern and Central Bohemia, Southern Poland and Northern Hungary (Table 3).

**Table 3.** Key automobile manufacturers in CEE countries, 2016

Automobile manufacturer	Brand	Country of production
1	2	3
VOLKSWAGEN GROUP	SKODA	Czech Republic, Slovakia
	VOLKSWAGEN	Poland, Slovakia
	AUDI	Slovakia, Hungary
HYUNDAI	HYUNDAI	Czech Republic
	KIA	Slovakia
RENAULT	RENAULT	Slovenia
	DACIA	Romania
TPCA	TOYOTA CITROEN PEUGEOT	Czech Republic
FIAT	FIAT	Hungary, Poland
PSA	CITROEN PEUGEOT	Slovakia
SUZUKI	SUZUKI	Hungary
Daimler AG	MERCEDES	Hungary, Slovenia
GM	OPEL CHEVROLET	Poland
Ford	Ford	Romania

*Source:* compiled by the author according to the data from (OICA, 2016)

In Slovakia, the number of those employed in the R&D has increased by 60% (to 14.7 thousand people) since 2002, although this amounts to only 0.7% in the employment structure of the population. Since the beginning of 2000, research and development spending has increased almost fivefold (to 670 million EUR), while continuing to remain less than 1% of the country's GDP (Eurostat, 2016). In the Czech Republic, between 2002 and 2014, the number of employed in the field of R&D increased by 2.3 times (from 15 thousand to 34.2 thousand), increasing the share in the total employed population from 0.3% to 0.7% (Eurostat, 2016). At the same time, the cost of research and development from 2000 to 2014 has increased more than fourfold. Another example is the number of large innovative firms that have emerged over the past decade in China, India, Brazil, and Israel; their share in the expenses of thousands of leading global innovation companies increased from 3% in 2005 to 14% in 2015. Ten years ago, 64 companies with corporate centers in China, India, Brazil, and Israel were represented in the Global Innovation rating; today, there are already 227 such companies (Jaruzelski, Schwartz & Volker, 2015).

Along with providing investment incentives, governments pay great attention to education and the labor market. In the Czech Republic, for example, technical universities are evenly distributed throughout the country. Since 2002, the number of students of technical fields has doubled and surpassed the mark of 94.5 thousand in the 2013/2014 academic year. The annual number of graduates in the last few years is at the level of 20 thousand, and the annual number of graduates of the graduate school has exceeded 8 thousand (CzechInvest, 2015, p. 12). In addition to universities, another source of skilled labor are the professional technical schools, where training lasts for 4 years and can be equated with a bachelor's degree. In Slovakia, in turn, there are 5 technical universities that train highly qualified specialists, including those in the field of R&D. In these universities, there are more than 43 thousand students of technical specialties enrolled and about 14 thousand graduates. More than 58 thousand students are enrolled in technical professional secondary schools. Since the beginning of 2000, a constant increase in the number of graduates of the faculties of mathematics and of technical specializations can be observed. In 2001, there were about 7 graduates per thousand population; by 2013, the indicator exceeded 18 graduates per thousand citizens (Eurostat, 2017). Slovakia is also reviving the tradition of double education: students receive theoretical education in schools and practical skills at enterprises; for implementing such a project, the Slovak government has been applying tax incentives since 2015 for companies implementing this model (SARIO, 2015, p. 12).

Thus, one can distinguish the following features of the formation of value chains in the industry, characteristic of most CEE countries:

- 1) a targeted government strategy for attracting foreign investment into the development of industries;
- 2) stimulation of national and foreign companies through cash grants and tax incentives;
- 3) step-by-step transition from a low-cost country (in terms of manufacturing) to a country specializing in technological and organizational innovations;
- 4) the generally positive effect on the economies of Slovakia and the Czech Republic that the development of high-tech industries has had.

Due to the development of the scientific basis and new technologies in the CEE countries, the growth of qualification of personnel and the increase in wages, the share of production of high value-added components will continue to increase, accompanied by the gradual relocation of activities with comparatively lower added value to other countries.

## **Conclusions**

As a result of the study of the specifics of GVC management at the macro level, it is determined that these processes occur primarily by the agreement of the various interests of the subjects of these interactions, primarily their direct (MNCs) and indirect (government governments) participants. In determining the direction of fragmentation of production processes of MNCs, comparative advantages of countries are of particular importance, which explains the constant reconfiguration of GVCs, including the tendency of consolidation and repatriation of their segments into developed countries becoming prominent in the last decade. From the point of view of host countries, there is an urgent need for substantiation and implementation of measures aimed at creating the conditions necessary for the improvement or preservation of the positions of national actors in GVCs (as well as the inclusion of new enterprises) in view of the diversity of the production cycle phases, structural constraints and the presence of opportunities for such policies. Thus, controlling GVCs at the macro level comes to the front in the conditions of the transforming global production in the XXI century, without diminishing the importance of corporate (or inter-corporative) management of production processes within GVCs.

States seeking to improve their position in the international business environment must introduce the institutional tools needed to improve the mechanism for reallocating income generated by exports of natural resources to the development of human capital, national innovation systems, institution and infrastructure creation, all necessary for attracting investments into production, with an emphasis on technological industrial business and the development of high-tech industries. The example of CEE countries proves that managing GVCs at the macro level through support for scientific and technological development, promoting FDI attraction and an appropriate human capital development strategy, which provides for the competitiveness of products and their distribution in foreign markets, is effective in the 21st century.

So, the institutional environment of the functioning of international production networks is formed by agreeing on the various interests of the subjects of network interactions. Public and state assistance to the activities of international production networks comes to the fore in identifying the main challenges of fragmentation: the growth of disproportionate distribution of income among the countries of the world economy, the depoliticisation of economic interaction through changes in the block thinking and the refusal of confrontation as a form of permanent state, the expansion of reconfiguration of international production networks, including the tendency of consolidation and repatriation of their links back to the developed countries. From the point of view of host countries, there is an urgent need to substantiate and implement measures to create conditions for the inclusion or preservation of the positions of national actors in international production networks in view of the diversity of phases of the cycle, structural constraints and the availability of opportunities for such policies. These topics will be investigated in the authors' further research.

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**Viktor KOVAL**, Dr. Sc. (Economics), Professor of the Department of Applied Economics, Odessa Institute of Trade and Economics of Kyiv National University of Trade and Economics. Research interests: economics of industry, production efficiency, environmental management, tourism.

ORCID ID: <https://orcid.org/0000-0003-2562-4373>



**Ganna DUGINETS**, PhD (in economics), Associate Professor of the International Economic Relations Department, Kyiv National University of Trade and Economics, Jean Monnet project coordinator. Research interests: global value chains; fragmentation of production, innovation development.

ORCID ID: <https://orcid.org/0000-0003-3708-3666>

**Oksana PLEKHANOVA**, Dr.Sc. (Public Administration), Associate Professor of Department of Constitutional and Administrative Law and Procedure of the Petro Mohyla Black Sea National University, Mykolaiv, Ukraine. Research interests: administrative reform and local government; economic relations and ensuring financial autonomy of local governments.

ORCID ID: <https://orcid.org/0000-0002-7943-5685>

**Andrii ANTONOV**, Dr. Sc. (Public Administration), Professor of Department of Economic Security, Public Administration and Management of the Zhytomyr State Technological University, Zhytomyr, Ukraine. Research interests: industry economics, public administration, national security.

ORCID ID: <https://orcid.org/0000-0003-0495-7056>

**Mariana PETROVA**, Professor, D.Sc in Physics and Mathematics, Assoc. Prof. St. Cyril and St. Methodius University of Veliko Tarnovo, Bulgaria; Professor Economics and Management in Department of Management, ISMA University, Riga, Latvia. Research interests: management of IT processes, project and services, business administration, modern information systems and innovations.

ORCID ID: <https://orcid.org/0000-0003-1531-4312>



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