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## CHANGES OF GLOBAL VALUE CHAINS IN THE INDUSTRIAL PRODUCTION SECTOR<sup>2</sup>

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### *Abstract*

*Economic globalisation causes increasing international fragmentation of value added chains, whereby companies outsource components of production to foreign markets. These conditions have changed the way of manufacturing organization and the method of measuring international trade. The aim of this paper is the conceptualization of terms such as dematerialisation, deindustrialisation, delocalisation and reindustrialisation of industrial production as well as the global value chain. Followed by analysis of participation of selected economies in global value chains.*

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### **Introduction**

The evolution of the modern global economy — triggered by the development of information and communication technologies, trade liberalisation, reduction of transport costs, automation of production — has changed the model of operation of manufacturing companies which by seeking to optimise their operations are increasingly implementing production processes as part of global value chains. Globalisation and regionalisation processes allow spatial coordination, improvement or restructuring of manufacturing activities through outsourcing and offshoring of operations.

A feature of globalisation is its dialectical nature which is demonstrated by, inter alia, simultaneous globalisation and fragmentation of industrial production. On one

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hand, in recent decades industrial production achieved a global level by overcoming the distinctiveness of national industries and using available technical, financial or organisational solutions. On the other hand, the increasing scope of free movement of goods, services and capital allows companies to take advantage of differences in technologies and prices of production factors between countries, which in turn leads to the fragmentation of production on a global scale. This means a breakdown of the previously integrated manufacturing process into various stages which may be located away from each other. In addition, the international specialisation in manufacturing is not limited only to finished goods but also applies to parts and components used for their production. Such a breakdown of a vertically integrated process of production of final goods into individual stages opens up further possibilities to achieve benefits offered by the specialisation (Cieřlik, 2008).

Due to the conditions of the operation of enterprises which are modified as a result of globalisation, systematic research in this area is required. For this reason it is advisable to supplement the existing analyses and to examine the changes of global value chains in the manufacturing sector. To achieve this objective, the structure of the article covers the conceptualisation of fundamental concepts, such as dematerialisation, deindustrialisation, delocalisation and reindustrialisation of industrial production as well as the global value chain. Then, based on the international statistical databases, the position of the traditional Triad countries (USA, Japan, EU) and China in global value chains in the area of manufacturing is analysed.

## **Globalisation and delocalisation of industrial production**

Although it is a widely used term, globalisation still does not have a uniform and universally accepted definition. The literature basically offers two definition approaches to this phenomenon. The first one defines globalisation statically as the next stage in the development of the global economy, characterised by a high degree of integration of the entities participating in it into one united body with new characteristics and patterns of functioning. The second one interprets globalisation dynamically and defines it as a process of further deepening of the international division of labour and its simultaneous transformation into a new global order where roles and responsibilities are shared not necessarily on an international level but also on a transnational or even supranational level (Oziewicz, 2012). The transformations taking place in the global economy determine the opportunities for the development of manufacturing companies whose priority is to build a competitive advantage. When identifying the effects of globalisation in the area of spatial and strategic behaviour of enterprises attention should be paid to the following aspects (Gierańczyk, 2008, p. 86):

- Political aspect demonstrated by the systematic reduction of barriers to the flow of production factors on a global scale.

- Economic aspect resulting in a search for further sources of business activity optimisation.
- Technological aspect which owing to reduced costs of transport and communication allows to conduct business activity in many countries.
- Organisational aspect which owing to the above mentioned factors is conducive to the development of new spatial relations and the fragmentation of production.

The interaction between the above factors results in changes in industrial production which have been observed in the current form since the 1970s. The consequence of these changes is the evolution from the traditional industries to innovative industries. The above changes result from the transition towards a knowledge-based economy whose features contrast with the features of an industrial economy. The existing Ford-style mass production and economies of scale give way to the production and distribution of knowledge and information. One of the key phenomena in this context is dematerialisation of production and a reduction of the degree of human involvement in many phases of the manufacturing process. The term dematerialisation refers to the decline over time in weight of the materials used in industry and products (Herman et al., 1989). In other words, the described process leads to the transformation of tangible assets into intangible assets which determine the enterprise value and become the source of its competitive advantage. Driving this transformation results in three key processes: digitisation (replacing physical goods and services with a digital version), atomisation (shifting manufacturing models toward additive assembly of very small, custom-designed components) and eco-systemisation (component materials are seen as part of a larger physical material ecosystem). These phenomena are accompanied by the reorganisation of manufacturing to happen at all scales, across a greatly distributed network of producers (Cascio, 2012). One option for dematerialisation is the transition from products to services. In this context, a consequence of the dematerialisation of production is servitization, i.e. a relative reduction of the importance of the industry and its lower direct share in the creation of national wealth in favour of services. When describing this trend the word deindustrialisation may be used. Deindustrialisation is an objective phenomenon and a feature of the economic development process. Deindustrialisation may be analysed empirically in two categories — measured by the decline of the share in the overall production and a decline of the share of industry in the overall employment.

An analysis of the data aggregated in figures 1 and 2 shows a decline in the importance of industry in the generation of gross value added in favour of services in the last two decades both globally and regionally. The employment data show in turn a systematic reduction of the level of employment in industry in the Triad countries. Different trends are observed in China where the proportion of the employed both in industry and in services increases at the expense of the employment in the agriculture. A long-term decline in the relative share of employment in industry is a natural consequence of industrial transformation and is attributable to the expansion of the

employment in the service sector. However, it raises a number of concerns regarding the creation of a sufficient number of new jobs in the service sector. When looking for the causes of the decline in the share of industrial production in the GDP creation and employment, the following reasons should be identified (Pilat et al., 2006):

- Saturated demand for manufacturing products.
- Relatively rapid productivity growth in the manufacturing sector, implying that despite growth in real manufacturing output, less employment is needed.

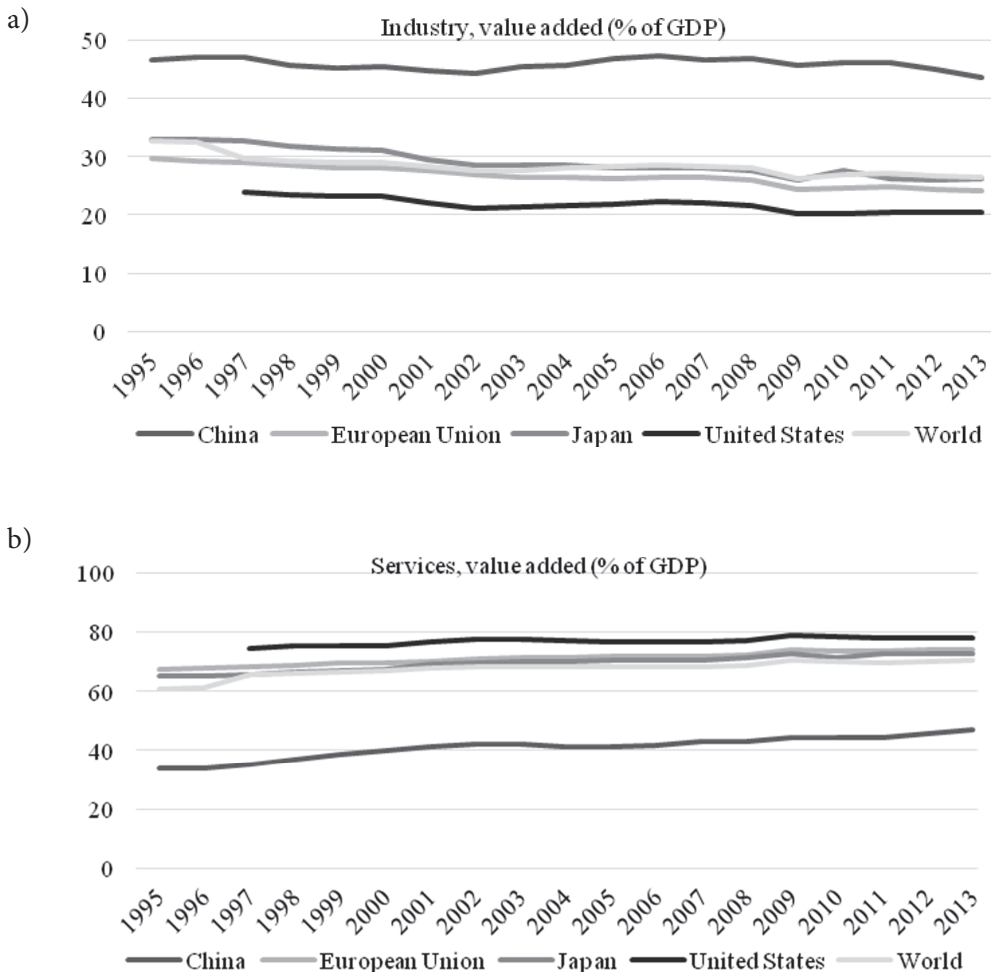


Figure 1. The share of industry and services in value added in selected economies, (% of GDP, 1995-2013)

Source: own study based on World Bank data: <http://data.worldbank.org/indicator/NV.IND.TOTL.ZS> (accessed on: 02.12.2015).

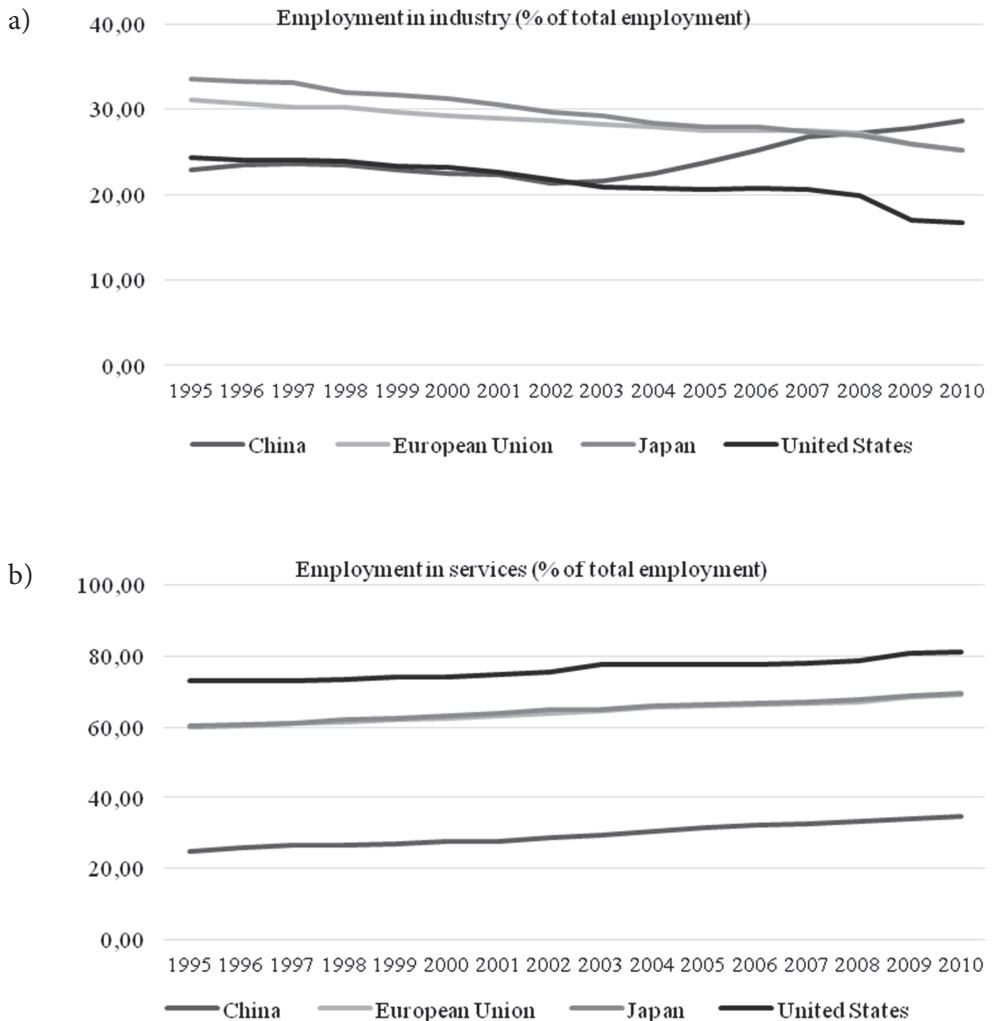


Figure 2. Employment in industry and services in selected economies, (% of total employment, 1995-2010)

Source: own study based on World Bank data: <http://data.worldbank.org/indicator/SL.IND.EMPL.ZS>, (accessed on: 02.12.2015).

- A blurring of manufacturing with services, where manufacturing firms increasingly capture value in the associated services they provide rather than manufacturing production.
- Manufacturing production has become more and more integrated at the global level. The last reason emphasizes a high degree of internationalisation of industrial production and the relationship between deindustrialisation and delocalisation.

A practical expression of globalisation is an increasing economic interdependence of economies and a changing nature of competition — from local to global — in numerous areas. A strategic position of companies competing on various markets depends on their position on a global scale and is improving as a result of the innovation introduced in any part of the business and subsequently incorporated in its global production system. For this reason, globalisation gives companies a choice to either compete in a coordinated manner all over the world or to lose their competitiveness (Wysokińska-Senkus, 2006). At the same time companies take advantage of the opportunities offered by globalisation and popularisation of the principles of market economy.

As a result, they have the freedom to choose the location of investments, thus creating their competitive advantage. A major motive is the desire to reduce manufacturing costs and to increase the operational flexibility of the company. In addition, qualifications of human capital, the availability of supply markets and demand as well as the infrastructure and the institutional environment are also important. Free movement of capital, migration and an uneven level of development of the individual economies intensify delocalisation processes. The term ‘delocalisation’ was popularised in the literature in the mid-1990s as another way of describing the fragmentation of production. Fragmentation is defined as a course of events whereby pieces of the production process are successively broken off, to be carried out in a different country, and then channelled back into the production process towards a final good (Kohler, 2003, p. 92). Similarly to other terms described above, the term ‘delocalisation’ (dislocation) does not have one universal definition yet. In the ongoing debate on delocalisation, the notion of relocation appears to dominate in the European Union, unlike for example the United States, where offshoring is the prime focus. The European Parliament defines relocation as the closing or scaling down of a firm’s activities in the home market following the shifting of parts of the production chain abroad (European Parliament, 2006, p. 3). Therefore, both delocalisation and deindustrialisation describe the process of migration and regression of industrial production, however the latter term additionally points to another phenomenon, i.e. the growth of the service sector.

Delocalisation may be also perceived as a spatial dimension of deindustrialisation. When analysing data on changes in world manufacturing value added (MVA) a decline in the importance of the Triad countries in favour of China and other emerging economies may be observed. A comparison of statistics for 1990 with the current figures shows a significant reduction in the share of EU countries (from 33.5% to 20.2%) and Japan (from 17.4% to 10.9%). The importance of the US economy in the creation of the world MVA is also lower, but only by 3 percentage points. An indisputable leader in the rate of growth of the analysed feature is China whose share increased from 2.6% to 18.4%. Table 1 presents fifteen leading manufacturing economies and their share in the world MVA in 2005, 2010 and 2014. Despite a systematic

increase in the importance of China, the first place in the ranking is still occupied by the USA. Germany, Italy, the United Kingdom, France and Spain are the major economies in the EU with their total share in the world MVA of 16.13% in 2014.

**Table 1.** Leading manufacturing economies share in world MVA in 2005, 2010 and 2014

Country/Economy	2005	2010	2014
United States of America	22.59	19.44	19.30
China	9.97	14.99	18.41
Japan	12.29	12.01	10.89
Germany	7.47	7.03	6.93
Republic of Korea	3.11	3.79	4.01
Italy	3.88	3.21	2.69
United Kingdom	3.38	2.80	2.54
France	3.29	2.79	2.46
India	1.60	2.26	2.31
Mexico	1.94	1.79	1.81
Brazil	1.86	1.82	1.59
Canada	2.22	1.66	1.58
Spain	2.10	1.69	1.51
Russian Federation	1.63	1.50	1.51
Turkey	1.12	1.20	1.30

Source: Unido, [http://www.unido.org/Data1/IndStatBrief/World\\_Leading\\_MVA.cfm](http://www.unido.org/Data1/IndStatBrief/World_Leading_MVA.cfm), (03.12.2015).

The increased involvement of the economies with various levels of socio-economic development in the international division of labour implies the development of global value chains. Companies intensify their activities focused on the creation of international networks which integrate manufacturing activities of enterprises located in different countries. Benefits for companies relocating their business are obvious and they include lower manufacturing costs, entry on new markets, opportunities for just-in-time delivery and acquisition of new employees. An analysis of this issue on a wider, global scale also implies positive effects resulting from the optimal allocation of production factors. However, from the point of view of developed economies from which industrial activities are usually relocated to developing countries, this process leads to divestment and job losses. The literature draws attention to the fact that in the medium and longer term positive effects of the relocation of business in the form of reforms and structural adaptation may outweigh short-term implications (European Parliament 2006a, p. 4-5). However, this problem is a subject of discussion which intensified primarily during the last global economic crisis that significantly interfered

with the development of industrial production in developed countries. The need to adapt to structural changes while counteracting trends leading to the decline of industry in production and employment is becoming an important challenge for most economies. This is because the crucial importance of industry for the growth of the economy is stressed more and more frequently. A new term, i.e. reindustrialisation, has been even developed to describe this trend. This term is popular especially in the EU where in 2012 *A Stronger European Industry for Growth and Economic Recovery* strategy was adopted. This document highlights the need for investments in innovation in order to reindustrialise Europe. Therefore, it seems reasonable to ask a question whether the industry is important since deindustrialisation is a common feature of advanced economies. A reply should point to several key properties of industrial production which, as a sector of the economy, is the main source of innovation, stimulates productivity growth, generates jobs and still has a dominant share in international trade. Following this line manufacturing is a key driver of productivity growth, due to improvements in the division of labour, technological change and economies of scale. Manufacturing also generates externalities in technology development, skill creation and learning that are crucial for competitiveness (UNIDO 2013, 4).

### **The concept of global value chain and its proliferation**

The concept of the global value chain is a key reference point for understanding and analysing the dynamics of the organisation of industrial production and international trade. The concept of the value chain was developed by M. E. Porter in the book entitled *Competitive Advantage: Creating and Sustaining Superior Performance*. The key assumption of the model is a division of business operations into strategically important activities. Therefore, the value chain is a sequential presentation of subsequent functions and links, each of which generates added value. Nowadays, owing to the liberalisation of the flow of production factors and the reduction of communications and transportation costs, companies optimise manufacturing processes by dividing the previously integrated activities into spatially dispersed manufacturing blocks. Global value chain (GVC) can be thus defined as a full range of activities that firms and workers do to bring a product from its conception to its end use and beyond. This includes activities such as design, production, marketing, distribution and support to final consumer (Gereffi and Fernandez-Stark, 2011, p. 4). These activities can be performed within the same company or can be divided among various companies. The fact that they are dispersed and implemented in several countries determines their global nature. The GVC concept was popularised at the beginning of the first decade of the 21st century, on one hand as a result of developments in the world economy and on the other hand as a method of analysis of these phenomena. Among the processes that affect directly international trade in the area of industrial production the following processes can be identified (Backer and Miroudot, 2012, p. 2):



- The increasing fragmentation of production across countries. GVCs link spatially dispersed activities in a single industry and help to understand shifting patterns of trade and production.
- The specialisation of countries in tasks and business functions rather than specific products. Most goods and increasing number of services are „made in the world” and that is why countries compete on economic roles within the value chain.
- The role of networks, global buyers and global suppliers.

GVCs are useful for understanding and describing the interdependence occurring between economies. However, this raises the need to take account of the opportunities and challenges related to the participation of the country in GVCs. There is no doubt that the fragmentation of manufacturing processes has a significant impact on the balance of foreign trade and the evolution of comparative advantage in international trade.

**Table 2.** Median GDP per capita growth rate by change in GVC participation and domestic value added provided, 1990-2010

GVC participation growth rate	Growth of the domestic value added share of exports		
	High	Low	High
			2.2%
Low		0.7%	1.2%

Source: (WTO, 2014, p. 102)

The literature on GVCs continues to grow which creates some restrictions on the explicit determination of their general impact on economic development. However, a positive correlation between the growing participation in GVCs and the rate of economic growth can be noted. Aggregated data in table 2 confirm this argument. This is because it turns out that during the analysed period the highest median GDP per capita growth rate was reported in the countries which simultaneously upgraded and integrated their economies as part of GVCs. Upgrading refers to broadening value added performance in a GVC in which integration has already been achieved.

Discussion of outcomes of participation in GVCs has been seen as the need to capture a growing share of domestic value added in exports or to target specific „sophisticated” products or production stages. However the point is that the volume of the activity may matter as much as the domestic value added share or sophistication, important benefit can be derived from specialising in less sophisticated assembly activities according to comparative advantages and performing them on a large scale (Kowalski et al., 2015, p.7). However, in view of the world economy dynamism and the changing determinants of competitiveness it seems that this strategy is well-

founded in the case of developing countries. Initial integration into GVCs often triggers beneficial structural transformation in economies at early stages of development. In this case GVC integration is typically associated with large productivity and welfare gains because labour is moved from agriculture into manufacturing or services. Although activities in the latter sectors also tend to be labour intensive and low skill in the early stages of development, their productivity is generally higher. Baldwin suggests however that because the learning process involved is less complex, industrialization is easier to achieve but it might also be less durable. Capabilities are now narrower and therefore easier for competitors to replicate. Simultaneously he argues that resisting GVC participation may be ineffective, because it hinders domestic firms in accessing inexpensive or more sophisticated inputs and potentially causing their products to be uncompetitive on world markets (WTO, 2014, p. 95-99). In result participation in GVCs may involve risks, competitive advantage can become more fleeting and followed by increasing vulnerabilities to relocation of firms.

International trade has been characterized by the growing interconnectedness of production processes across countries, with each country specializing in particular stages of production. Due to the spread of GVCs and a rapid growth of the trade in semi-finished products classic international trade measures based on the gross value are losing their relevance. Consequently, a number of institutions undertake works on new methods of calculating the value of trade which take into account the actual contribution of the domestic value added in exports. At this point the TIVA (trade in value added) database should be mentioned which results from the cooperation of the WTO and the OECD. Involvement in the production fragmentation processes is measured using two indices: forward participation and backward participation. Forward participation describes the part of the domestic value added comprising the exports of other economies (exported semi-finished products are a part of more complex products which are exported). Backward participation refers to the share of the value of foreign semi-finished products in domestic exports.

**Table 3.** GVC participation index<sup>3</sup>, 1995-2009

Countries	1995	2000	2005	2009
All	39,8	46,2	51,0	48,5
Developed	39,6	46,3	49,9	47,2
Developing	40,5	45,9	53,5	50,9

Source: (WTO, 2014, p. 84)

<sup>3</sup> GVC participation index captures the import content of exports (backward participation) and domestic value added embodied as intermediate inputs in third countries' gross exports (forward participation).

Looking at the changes across time, a majority of the economies (apart from Africa) increased their participation in GVCs. Table 3 shows that the global GVCs participation index has increased since the mid-1990s. It is worth to notice that the participation of developing countries in GVCs is slightly higher: 51 per cent of gross exports of developing countries in 2009 relates to their participation in international production networks.

### **Participation of selected economies in global value chains**

One may therefore agree that the integration of the economy in GVCs enables a rapid development of trade and allows to attract foreign direct investments and hence the flow of knowledge and technology spillovers. As a result, the economic development of the country is facilitated. However, not every economy is competitive enough to be able to benefit from the participation in GVCs. When examining the determinants of GVC participation several structural features may be basically distinguished (Smith et al., 2015, p. 7-8):

- **Market size:** a large size of the domestic market implies a lower level of the country's backward participation and a higher level of forward participation. Larger market sizes generate more opportunities for orders for semi-finished products.
- **Level of development:** the higher the level of income per capita, the greater the participation index — both forward and backward participation. Economically developed countries participate intensely both in import and export of intermediate and final products.
- **Industrial structure:** The higher the share of the manufacturing sector in GDP the higher the backward engagement and the lower the forward engagement.
- **Location:** GVC activity is organised around large manufacturing hubs, a premium can be noticed for being located close to large and developed economies.

Objective factors, such as the level of customs tariffs and participation in regional trade agreements, inward foreign direct investment openness, the level of infrastructure and the quality of institutions, are also important. They are all directly correlated with foreign trade and industrial policy pursued in a given country.

Specialisation and fragmentation processes are mainly driven by international corporations which in order to optimise costs and profits take advantage of differences in the affluence of the individual countries and regions. In this way, they seek to achieve the highest possible added value by cost reduction and the maximum use of the capabilities and attributes of a given location. In this situation, companies from the most developed countries, seeking opportunities to reduce costs and raise productivity, started to move their manufacturing activities, mainly those requiring a high labour input and low technical sophistication, to developing countries. This trend causes a strong increase in competition and forces companies to internation-

alise manufacturing processes. This results in two major phenomena. The first one is boosting international trade in semi-finished products and supply products which constitute a component in the production of final goods. The second phenomenon is an increase in the importance of international trade of developing countries. Taking into consideration the data contained in table 1, concerning the share of leading manufacturing economies in world MVA, a further analysis of changes in international trade in manufactures will focus on the following countries: China, Japan, the United States and major EU producers, i.e. France, Germany, Italy, Spain and the United Kingdom. The data used relate to 1995 and the most recent data cover 2011.

Statistics presented in table 4 emphasise the above described changes, pointing to a decreasing share of developed countries (Japan, the US and analysed EU) in the imports of intermediate products. While in 1995 the share of these economies in the imports of intermediate products of the entire group of the analysed economies was 95.12%, in 2011 it was only 76.39%. During that period the share of China increased from 4.88% to 23.61%. The development of the manufacturing base in China and other Southeast Asia countries allowed to prepare platforms for the export of semi-finished products. In this way the fragmentation of production is implemented through vertical specialisation where individual economies focus on manufacturing components or performing activities assigned to various chain links of a specific product.

**Table 4.** The selected countries' share of gross imports of final products and intermediate products in their common import, (1995, 2011)

Country	1995		2011	
	Final products	Intermediate products	Final products	Intermediate products
France	11.06	10.65	10.24	7.85
Germany	21.57	15.42	14.79	12.96
Italy	7.84	8.81	7.28	7.19
Japan	13.43	14.39	8.96	11.08
Spain	3.89	5.03	5.23	4.96
United Kingdom	10.88	10.34	10	7.71
United States	28.19	30.47	31.78	24.64
China	3.15	4.88	11.73	23.61
Sum (US dollar, millions)	1 239 614	1 696 243	3 206 973	5 952 670
Developed countries' share	96.85	95.12	88.27	76.39

Source: own study based on TIVA data: [http://stats.oecd.org/Index.aspx?DataSetCode=TIVA2015\\_C1](http://stats.oecd.org/Index.aspx?DataSetCode=TIVA2015_C1) (03.12.2015).

Figure 3 presents the position of the analysed economies in GVCs in the area of manufacturing. In all cases the scale of participation between 1995 and 2011 increased, with the largest increase recorded in Japan. In 2011 nearly 41% of Japanese exports was implemented as part of GVCs, of which 28.4% of gross exports was the forward participation, i.e. a share of the domestic value added forming a part of the exports of other economies. Backward participation, i.e. the share of the value of foreign semi-finished products in Japanese exports amounted to 12.5%. The rest of the exports are the domestic value added which are sold to foreign final markets. The share of the US increased by 5.2 percentage points from 25% in 1995 to 30.2% in 2011. This economy has built strong export competitiveness with a limited degree of integration in GVCs and it is dominated by the forward participation. The relatively low index of participation in GVCs in the area of manufacturing can be attributed to the size of the internal market (larger share of the value chain is domestic) and a significant share of the service sector in the economy. A characteristic feature of all analysed EU countries is a higher level of participation in GVCs than the average in the EU. This level was also higher in 2011 in comparison with 1995. If the abovementioned countries are to be sorted by the level of participation, they should be listed as follows in descending order: Germany, Italy, France, Spain and the United Kingdom. However, in all cases, except for the United Kingdom, the share of the foreign value added was greater than the share of domestic value added in gross exports. This demonstrates a relatively high imports input for the export of manufacturing of EU countries.

The country which is considerably involved in manufacturing fragmentation processes is obviously China which implements 43% of exports as part of GVCs. China remains the country with the highest level of GVC participation, reflecting its primacy as a very important region for export-oriented manufacturing. Despite the growing share of the forward participation, the involvement in GVCs is still dependent because the dominant part — 30% is the backward participation. However it should be mentioned that many studies have confirmed the importance of imported intermediates for exports specialisation in final products (Beltramello et al., 2012). With GVC-driven development, countries generate growth by moving to higher value added tasks by embedding technology.

The above analysis is obviously a certain generalisation because the participation in GVCs may significantly differ depending on the industry. Moreover, developed countries aim at concentration in those phases of the manufacturing process that have the highest value added. In this way the production requiring the most advanced technologies, highly skilled human capital or modern management methods is located in the home country. Therefore, it seems reasonable to determine the domestic value added in individual industries. An analysis of the data presented in table 5 shows however that the results of the EU countries in this area are worse than the results of their main competitors, i.e. the USA and Japan. In the most technologically advanced industries, i.e. „electrical and optical equipment” and „chemicals and

non-metallic mineral products” the average domestic value added of the European countries is 70.16% and 60,95% respectively. These values are lower than the corresponding values recorded in Japan and the USA by more than 10 percentage points.

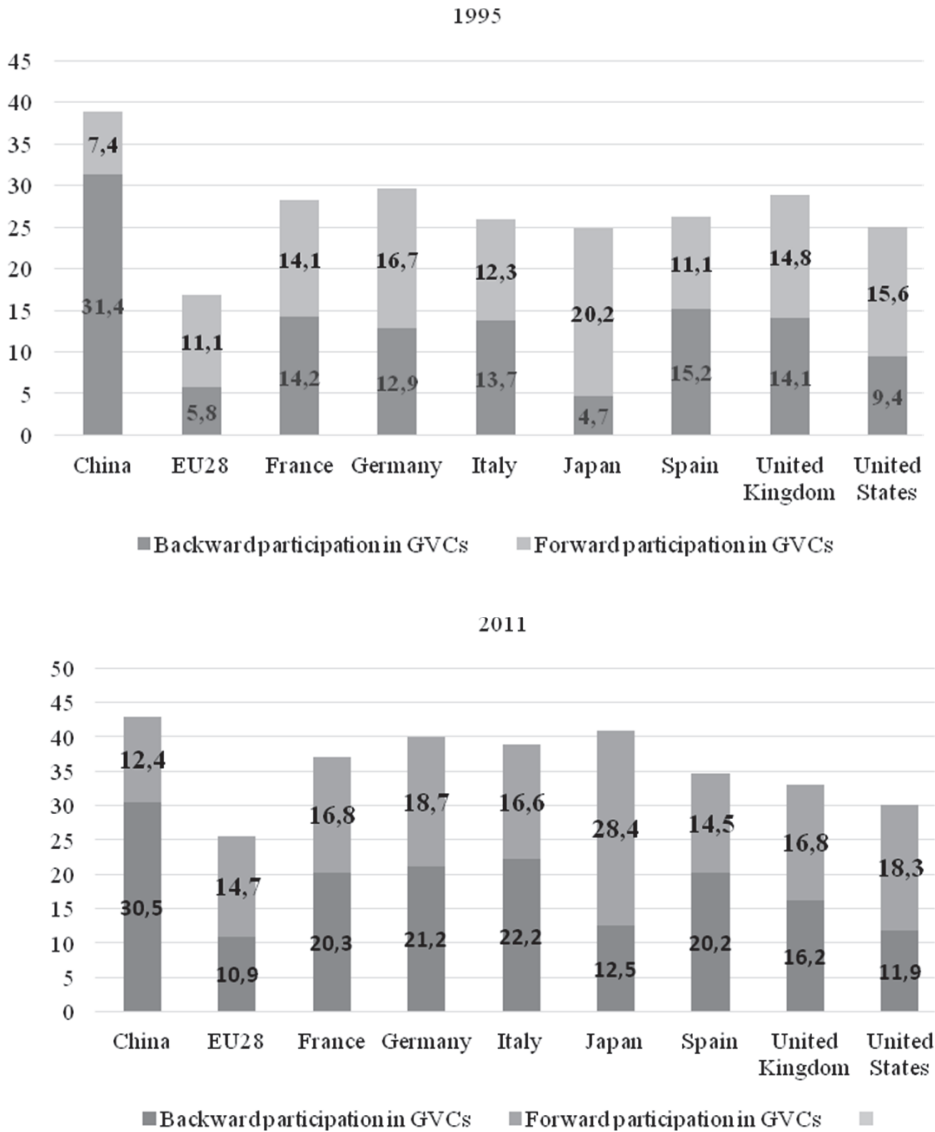


Figure 3. Forward and backward participation in GVCs in selected economies in 1995 and 2011 (as % of total gross exports of total manufactures)

Source: own study based on TIVA data: [http://stats.oecd.org/Index.aspx?DataSetCode=TIVA2015\\_C1](http://stats.oecd.org/Index.aspx?DataSetCode=TIVA2015_C1) (03.12.2015).

**Table 5.** Domestic value added share of gross exports by industries in 2011

	France	Germany	Italy	Japan	Spain	United Kingdom	United States	China
Total manufactures	66.62	69.74	68.01	81.97	62.55	64.26	78.47	59.88
Food products, beverages and tobacco	77.31	72.49	76.89	87.24	72.55	73.69	86.43	74.59
Textiles, textile products, leather and footwear	68.58	69.25	72.55	76.03	66.68	73.16	81.69	73.52
Wood, paper, paper products, printing and publishing	78.44	79.01	77.56	89.21	78.53	80.36	88.1	57.97
Chemicals and non-metallic mineral products	63.09	67.61	57.62	74.16	54.91	61.53	76.38	58.6
Basic metals and fabricated metal products	71.8	61.83	62.09	78.49	67.28	54.99	72.76	67.48
Machinery and equipment, nec	71.71	73.32	74.2	85.63	72.57	66.92	76.1	69.58
Electrical and optical equipment	69.64	74.9	71.86	83.09	66.44	67.96	85.22	46.19
Transport equipment	59.14	67.92	67.44	85.77	55.97	59.82	71.06	70.03
Manufacturing nec; recycling	71.06	73.72	75.84	81.37	72.27	71.91	85.05	77.68

Source: Own study based on TIVA data: [http://stats.oecd.org/Index.aspx?DataSetCode=TIVA2015\\_C1](http://stats.oecd.org/Index.aspx?DataSetCode=TIVA2015_C1) (03.12.2015)

Generally economies can be positioned upstream or downstream in GVCs depending on their specialisation and their position may change over time. Upstream economies export natural resources or knowledge assets at the beginning of the production process, while downstream economies assemble processed products (OECD, 2013, p.29).

## Conclusions

The contemporary internationalisation phase is subordinated to the development of an innovative economy and the dispersion of the value added chain. The international production, trade and investments are nowadays organised in global value chains where various stages of production are located in different countries. The liberal policy of countries, resulting in the opening of the domestic markets, contributed to the increasing relocation of links of the value added chain. The strategy of the dispersion of economic operations favours the optimal allocation of resources on a global scale and becomes a part of the global effectiveness of international companies. However, when analysing this process in the regional context its negative consequences may be pointed out in the form of relocation of industrial activities to the regions which guarantee lower production costs. A change of the location of the industrial production in the system of macroeconomic links gives rise to implica-



tions that are in particular severely experienced at the local level, for instance in the form of the reduction in employment.

Countries derive the greatest benefit by supporting the potential of the domestic economy and by strengthening its linkages with GVCs. All analysed economies (the USA, Japan, major producers in the EU, and China) have increased their participation in GVCs in the last decade. It should be noted however that the mere fact of the increased participation does not guarantee a long-term increase in benefits from participation. It seems important to achieve a comparative advantage in certain industries. The effectiveness of management is nowadays determined by the degree of technological advancement of the given country. In this context diminishing benefits of the analysed EU countries should be mentioned which result from a relatively lower domestic value added in the production of high technologies in comparison with Japan and the USA. This is a challenge for EU countries, because how countries engage with GVCs determines how much they benefit from them.

## References

- Backer K., Miroudot S. (2012), *Mapping global value chains*, Paper prepared for the final WIOD Conference: Causes and Consequences of Globalization, Groningen, The Netherlands, April 24-26, 2012, [http://www.wiod.org/conferences/groningen/Paper\\_DeBacker\\_Miroudot.pdf](http://www.wiod.org/conferences/groningen/Paper_DeBacker_Miroudot.pdf) (November 20, 2015)
- Beltramello A., De Backer K. and Moussié L. (2012), *The Export Performance of Countries within Global Value Chains (GVCs)*, OECD Science, Technology and Industry Working Papers, 2012/02, OECD Publishing.
- Cascio J. (2012), *Dematerialization. The growth of atomically precise manufacturing*, [http://www.iff.org/uploads/media/SR-1473\\_TYF12\\_DematerialForecast\\_sm.pdf](http://www.iff.org/uploads/media/SR-1473_TYF12_DematerialForecast_sm.pdf)
- Cieślak A. (2008), *Wpływ przedsiębiorstw międzynarodowych na fragmentaryzację produkcji i handel wewnątrzgałęziowy w Polsce z krajami OECD*, „Gospodarka Narodowa” 10(206), Rok XIX.
- European Commission, *A Stronger European Industry for Growth and Economic Recovery*, (COM(2012) 582 final).
- European Parliament (2006a), *Relocation of EU Industry. An Overview of Literature*, IP/A/ITRE/NT/2006-14.
- European Parliament (2006), *Delocalisation of EU Industry. Delocalisation and challenge of structural adjustment. A review of policy options*, IP/A/ITRE/FWC/2006-087/Lot1/C1/SC1.
- Gereffi G., Fernandez-Stark K. (2011), *Global Value Chain Analysis: A Primer*, Center on Globalization, Governance & Competitiveness, Duke University, North Carolina, USA.



- Gierańczyk W. (2008), *Problematyka definiowania zmian w tendencjach lokalizacyjnych przedsiębiorstw przemysłowych w dobie globalizacji*, Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego, Warszawa–Kraków, vol. 11.
- Herman R., Ardekni S. A., Ausubel J. H. (1989), *Dematerialization*, in: Ausubel J. H., Sladovich H. E. (eds.), *Technology and Environment*, Washington, D.C.: National Academy Press.
- Kohler W. (2003), *The Distribution Effects of International Fragmentation*, German Economic Review 4(1).
- Kowalski P. et al. (2015), *Participation of Developing Countries in Global Value Chains: Implications for Trade and Trade-Related Policies*, OECD Trade Policy Papers, No. 179, OECD Publishing, Paris.
- Leamer E. E. (1996), *The Effects of Trade in Services, Technology Transfer and Delocalisation on Local and Global Income Inequality*, Asia-Pacific Economic Review Volume 2, Number 1, p. 44-60.
- OECD (2013), *Interconnected Economies: Benefiting from Global Value Chains*, <http://dx.doi.org/101787/9789264185560-en>
- Oziewicz E. (2012), *Globalizacja gospodarki światowej*, in: Orłowska R., Żołądkiewicz K., *Globalizacja i regionalizacja w gospodarce światowej*, PWE, Warszawa.
- Pilat D., Cimper A., Olsen K. and Webb C. (2006), *The Changing Nature of Manufacturing in OECD Economies*, STI Working Paper 2006/9, OECD, Paris.
- Porter M. E. (1985), *Competitive Advantage: Creating and Sustaining Superior Performance*, NY: Free Press.
- UNIDO (2013), *Industrial development Report 2013. Sustaining Employment Growth: The Role of Manufacturing and Structural Change. Overview*, UNIDO ID/446.
- TIVA data: [http://stats.oecd.org/Index.aspx?DataSetCode=TIVA2015\\_C1](http://stats.oecd.org/Index.aspx?DataSetCode=TIVA2015_C1)
- Unido data, [http://www.unido.org/Data1/IndStatBrief/World\\_Leading\\_MVA.cfm](http://www.unido.org/Data1/IndStatBrief/World_Leading_MVA.cfm)
- World Bank data: <http://data.worldbank.org/indicator/SL.IND.EMPL.ZS>
- World Bank data: <http://data.worldbank.org/indicator/NV.IND.TOTL.ZS>
- WTO (2014), *World Trade Report 2014. Trade and Development: recent trends and the role of WTO*, [https://www.wto.org/english/res\\_e/booksp\\_e/world\\_trade\\_report14\\_e.pdf](https://www.wto.org/english/res_e/booksp_e/world_trade_report14_e.pdf)
- Wysokińska-Senkus (2006), *Ewolucja standaryzacji i zarządzana jakością w sektorze gospodarki żywnościowej na świecie a proces globalizacji*, Rocznik Akademii Rolniczej w Poznaniu – CCLXX.