REINDUSTRIALIZATION AND STRUCTURAL CHANGE IN FUNCTION OF THE ECONOMIC DEVELOPMENT OF THE REPUBLIC OF SERBIA

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This paper examines industrialization and structural change induced thereof, which are the main drivers and bearers of economic development. The author observes that the industry of the Republic of Serbia is devastated due to sudden and premature tertiarization as well as inadequate reforms. The current structures of both the economy and the industry do not have a sufficient capacity to ensure sustainable economic development; hence, the aim of the research presented in this paper is to emphasize the importance of reindustrialization and the implementation of structural changes in the Republic of Serbia. The paper starts from the premise that industry is the main driver and the bearer of economic growth and development. Therefore, it is necessary for the Republic of Serbia to turn to reindustrialization and implement structural changes in this sector given the fact that the levels of the development and competitiveness of the industry are correlated to the intensity of industrialization. The research findings indicate that developed industrial countries are characterized by more effective structural changes and more propulsive production that creates higher value-added products. This reflects not only at the level of the industrial development but also at the level of the competitiveness, volume and quality of exports.

Keywords: industrialization, structural change, the level of industry development and competitiveness, economic development

INTRODUCTION

The economic history of developed countries and the fast-growing BRICS economies (Brazil, Russia, India, China and South Africa) confirms that industry has a major role in the economic development of these countries by being its major driver and bearer.

Furthermore, thus far, the countries with a developed industrial sector have been less exposed to adverse effects of the global economic crisis. This crisis has also confirmed that there is no substantial economic progress without a developed industry where structural changes are implemented on a regular basis. The advantage of industrial development is that it requires constant changes in the industrial structure, which is particularly important for countries with a low production capacity, a low volume of exports and

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poor industrialization intensity. Structural change is a necessity in terms of the dynamic development of science, knowledge and technological innovation, while the results depend on the rate and efficiency of its implementation.

The industry of the Republic of Serbia (RS) has been locked in a deep crisis for a long time; the global economic crisis has intensified and brought to light all the weaknesses of the economic and industrial development. The deindustrialization of the economy and the devastation of the industry inevitably brought about by the transition have made the economic growth completely unsustainable. The past and present experiences and practices of developed countries, the fast-growing BRICS economies and advanced transition countries show that the stable economic development of RS can only be achieved through the country's industrialization and reindustrialization - industrialization is needed because certain activities have utterly been devastated and require that a start should be made from scratch, while reindustrialization is required in order to improve the intensity of production and increase the level of the competitiveness of the industry.

Therefore, the industrialization of RS and a structural change that should be in function of an efficient industrial development as well as the sustainable development of the economy as a whole are the subject matter of this study. Reindustrialization is a way out of the economic crisis and a path to the successful implementation of a number of socio-economic goals.

Based on the relevant information on the degree of the devastation of the Serbian industry and the low level of the GDP *per capita*, the objective of this paper is to underline the importance of the effective implementation of reindustrialization and structural changes for a sustainable economic and social development. The importance of reindustrialization is further supported by contrasting the results of the comparisons made between RS and the countries undergoing industrialization (Bulgaria, Croatia) as well as a group of industrialized countries (the Czech Republic, Slovakia, Hungary and Slovenia) in terms of economic and industrial development and implemented structural reforms. These are all small countries, which, with the exception of Bulgaria, are at

a significantly higher level of economic development compared to RS, as measured by the GDP *per capita*.

In accordance with the set objective and the purpose of the research, the paper starts from the following hypotheses:

H1: Given the fact that the industry is the driver and the bearer of the economic growth and development in RS, it is necessary that reindustrialization be carried out and structural changes in the industry be implemented.

H2: The level of the development and competitiveness of the industry is in a direct correlation with the intensity of industrialization.

In order to confirm the aforestated hypotheses, the following indicators related to development and structural changes have been used: the industrial production growth rates and indices, the share the industry has in the GDP, the GVA (Gross Value Added) and employment, the GVA of the processing industry per employee and the volume and structure of exports in terms of the technological intensity and the Standard International Trade Classification, Revision 4 (SITC, Rev. 4). A comparative method has been employed to analyze and compare the industrial performance and structural changes in Bulgaria, the Czech Republic, Croatia, Hungary, Slovakia, Slovenia and RS. The application of this methodology has been considered to be the most suitable for identifying the data and information that can contribute to initiating reindustrialization. The methodology of the United Nations Industrial Development Organization (the UNIDO methodology) is relevant for the assessment of the degree of industrialization and industrial competitiveness. A correlation analysis has been used to determine the nature and the type of the correlation among the achieved level of development, competitiveness and the intensity of industrialization.

The paper is organized into eight sections. Following the introduction, the second section provides an overview of the literature on industrialization and structural changes. The third section analyzes the pace of the industrial development and the economic crisis in RS in the period of transition. The fourth section discusses the experience of the premature

and rapid deindustrialization of the economy and the devastation of the industry in RS. In the fifth section, the assessment of the achieved level of the industrial development of RS and the observed countries is given, whereas in the sixth section, the research findings concerning the industries of the mentioned countries are presented. The seventh section analyzes the main production and export activities which call for structural changes in the Serban industry. The concluding remarks are presented in the eighth section of the paper.

LITERATURE REVIEW

The industrialization process, which has been lasting for some 250 years already (i.e. since the beginning of the Industrial Revolution), is usually seen as an economic development strategy. It has different priorities and modes of implementation in different countries, depending on the level of a country's development and the time when this process was introduced (Pack & Westphal, 1986). Industrialization is synonymous with economic development, wealth, technological leadership and innovation, economic and political power and international dominance (Szirmai, Naude & Alcorta, 2013). Industrial development is considered to be the key driver of the structural change and transformation of an economy, which is of particular importance for developing countries. Along with the changing structure of an economy, and changes in the share of an industry in the GDP and employment, the structure of an industry also changes, especially the manufacturing one. The intensity of changes is inversely related to a country's level of development - the higher the intensity of change, the lower the level of development.

Structural change refers to changes in the composition of an aggregate, which affects the relative significance of economic sectors or their parts, and is strongly interrelated with economic development (Syrquin, 2007). It involves a shift from traditional activities to newer, highly productive ones (Rodrik, 2008). Furthermore, industries have higher levels and dynamics of productivity than other sectors do (Szirmai, 2012). Industry induces productivity growth

in other sectors, which is essential for an increase in competitiveness.

Structural change introduced in an industry leads to changes in relationships and a transformation in the composition of the production factors, production output, employment, supply, demand, investment and trade (Doyle, 1997). The flexible manufacturing structure established in this way is an important element of productivity growth, which allows an efficient redistribution and reallocation of resources (Fagerberg, 2000; Jakopin, 2012).

The countries that failed to implement structural change in the industry are lagging behind and have hardly moved away from traditional production (Lin, 2012). In developing countries, the structural transformation from the traditional manufacturing industries to the technologically advanced ones - characterized by higher productivity rates, improved competitiveness and higher value-added products - is an essential condition for an increase in the intensity of industrialization. This is the basis for the creation of new jobs and the achievement of a sustainable economic development. The critical drivers of intensive industrial development and structural change in an industry are: knowledge, skills, innovation, technology, demand, resource efficiency, investment, the company size, value chain activities, agglomeration effects and the industrial policy (UNIDO, 2013a).

The industrial policy is an important factor in the process of industrialization and structural change. The fact is that industrialized economies have provided different kinds of development support to their industries (Lin & Chang, 2009). In addition to correcting market failures, the main task of the industrial policy is to initiate and accelerate structural change (Syrquin, 2007). The fast-growing BRICS economies owe their success to the industrial policy that affected the successful development of the industrial sector, technological capabilities and competitiveness (Naude, Szirmai & Lavopa, 2013). It is clear that the reason for considering the role of the state in development, as well as the active and sophisticated industrial policy (Rodrik, 2007), is prompted by the development of technologically competitive industries. In this case, the industrial policy is aimed at improving the business environment and the continuous transformation of

the industrial structure towards the activities that will ensure sustainable economic development and social well-being (Rodrik, 2009; Wade, 2012; Aiginger, 2014).

Today, many countries are faced with two major challenges - deindustrialization and reindustrialization (Kucera & Milberg, 2003; Palma, 2008; Tregenna, 2009). Industrialization remains an important goal for the majority of developing countries, particularly those that are undergoing economic transition. The global economic crisis has underlined reindustrialization as one of the critical present and future challenges related to the economic development of the mentioned countries. Reindustrialization also has a major role in developed countries, primarily due to competition among rapidly growing economies.

However, many advanced economies with a higher GDP *per capita* are actually deindustrialized due to a faster productivity growth in the manufacturing sector than in services, increased demand for services rather than manufactured goods and the expansion of trade linkages between developed and developing countries (Kollmeyer, 2009). Here, deindustrialization shows the maturity of the industrial sector and the economic structure, while the predominant share of high-tech industries leads to losing the identity of the classical industrial structure (Tregenna, 2011).

In this respect, deindustrialization can be both the positive and the negative process (Rowthorn & Coutts, 2004). In the positive context, productivity records a faster growth than that of the production output; therefore, the number of jobs in the manufacturing sector decreases in both absolute and relative terms. However, unemployment is not the consequence. Redundant workers are reallocated to the service industry, where new jobs are being created, which enables economic growth. Otherwise, deindustrialization leads to major problems in economic development, as is the case in the countries of Central and Eastern Europe (Mickiewicz & Zalewska, 2005). This type of deindustrialization occurs in a much earlier phase of industrialization and at the lower level of the GDP *per capita* than that in developed countries.

In developed countries, deindustrialization is accompanied by efficient reindustrialization. Surely,

reindustrialization is one of the challenges related to premature deindustrialization in developing countries. However, there are many other challenges (Tregenna, 2011).

In order to restore an increased share of the industrial sector in the GDP and employment, more efforts are needed than it would have been the case at the beginning of or during industrialization. One of the reasons for such a situation is also change in the development paradigm, where a successful development no longer exclusively depends on the availability of natural resources, cheap labor and capital. The efficient industrial sector also depends on the factors considered to be the basis of highly-sophisticated reindustrialization, the strengthened role of propulsive industries and the creation of new knowledge- and technology-based products as well as the emergence of the service industries. Such a shift from deindustrialization to reindustrialization points to the significance and importance of the industrial policy, which can be employed to enable continuous structural change.

THE PACE OF INDUSTRIAL DEVELOPMENT

In the aftermath of the WW II, the level of the development of the Serbian economy, as well as the economies of the other federal republics of the SFRY, spurred the economic development strategy based on general industrialization, i.e. it focused on the model of rapid industrialization as the essence of the industrial strategy. The aim was to achieve a rapid and dynamic economic development, where industrialization was a means for the realization of broader socio-economic objectives. The bearer of industrialization was the state, which rather employed the economic policy than an adequate industrial one in order to steer the very process of industrial development.

Although the pace of industrialization varied in the different periods of the industrial development, the overall effects of the industrial development achieved in RS (measured by the volume of production) were very significant at the end of the 1980s (Figure 1). With the GDP *per capita* of about 1,450 USD (at current
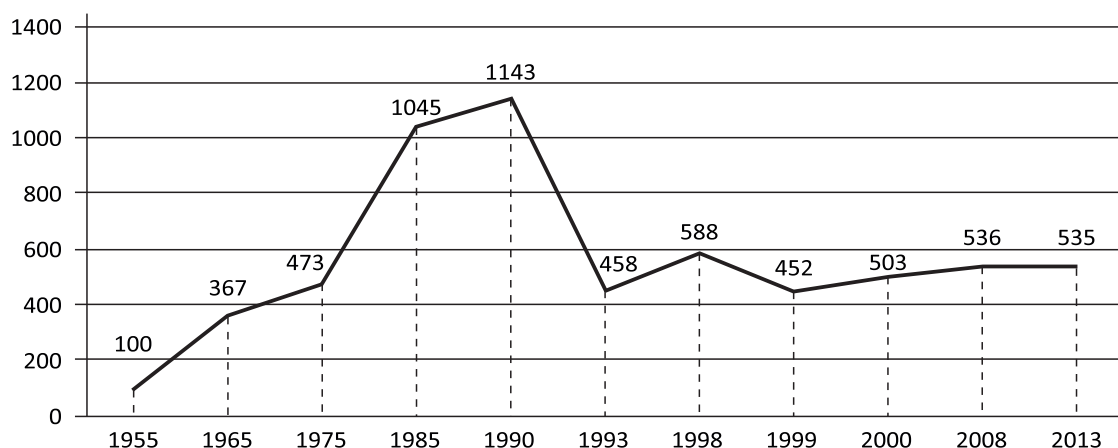
Figure 1 The index of the physical volume of industrial production in 1955-2013

Source: Author, based on: The Statistical Office of the Republic of Serbia (SOR), 2015.

prices in 2000) at the time of the breakup of the former Yugoslavia, the Serbian industry reached the central and most delicate phase of development balancing. The rapid pace of the industrial growth made the industry contribute most significantly to the economic growth, accounting for about 44% in the creation of the total product.

The initiated transition process of the economic system in the early 1990s also marked the beginning of the industrial development crisis. The slow pace of transition during the 1990s as well as its intensification after 2000 led to a sharp decline in industrial production. The decline was the result of the slow and inefficient transformation of the old economic system and the delayed and inadequate establishment of the new one as well as of other numerous internal and external non-economic factors. Industrial production recorded an average decrease of 7.5% (5.5% of the GDP) in the last decade of the twentieth century (Table 1). In contrast to RS, the other countries that are the subject matter of the analysis, showed a slight decline in production. The structural reforms implemented in the industrial sector, particularly in the countries of Central Europe, became an integral part of the transition process of these economies. Changes in the production structure are the result of the growth

of the domestic and foreign investment and the reallocation of production facilities from developed countries as well as access to the EU market. As early as in the initial stage of the transition, it became clear that the implementation of structural changes in the manufacturing sector was vital in order to ensure a successful recovery and industrial growth in these countries.

Table 1 Average industrial growth rates, 1991-2000

Country	1991-2000	2001-2008	2009-2013
Bulgaria	-5.7	7.0	-2.1
Czech Republic	-1.7	5.5	0.1
Croatia	5.9	4.0	-3.8
Hungary	3.8	5.7	-0.3
Slovakia	-0.8	9.5	2.2
Slovenia	-1.5	3.8	-2.1
The Republic of Serbia	-7.5	2.0	-1.1

Source: Author, based on: European Bank for Reconstruction and Development (EBRD), 2015

In the first decade of the 21st century, RS showed an extremely low pace of industrial growth, which - concerning the favorable market trends prior to 2008 - resulted in a much lower average annual growth rate (2%) compared to the other observed countries. The cause for such a situation can be found in the reforms brought about by the transition process and the numerous structural limitations that have led to the rapid tertiarization of the economy. The additional deceleration of production has also resulted from the contraction of the economic activity and a decline in export demand from 2008 onwards. The rate of production growth was negative and far below the achieved one prior to the crisis. The slowdown of the economic, structural and institutional changes has affected the pace of the economic recovery and production growth.

According to the official statistical data, the level of industrial production in 2013 amounted to only about 50% of the level achieved in 1990. To be more precise, the level of industrial production in 2013 did not exceed the physical volume of production in 1998 (SOR, 2015). The comparative analysis of the growth of the physical volume of industrial production showed that in 2013 this volume increased in Slovakia (by 86%), the Czech Republic (by 45%) and Hungary (by 45%) compared to 2000. The level of the physical volume of industrial production in RS increased by only 10% (Table 2) in the same period.

Table 2 The industrial production index, 2000=100

Countries	2001-2008	2001-2013
Bulgaria	155	145
Czech Republic	144	145
Croatia	132	113
Hungary	145	145
Slovakia	175	186
Slovenia	130	119
The Republic of Serbia	115	110

Source: Eurostat, 2015

The rate of industrial growth in RS confirms two facts. The first fact is that the Serbian industry has been in severe crisis for a long time and that this crisis is of a structural rather than cyclical nature, for which reason an implementation of significant structural changes is required. The second fact is that there were no significant structural changes in terms of achieving a more modern and propulsive industrial structure because such changes can only occur in a period that follows a more dynamic industrial growth.

THE DEINDUSTRIALIZATION OF THE ECONOMY AND THE DEVASTATION OF THE INDUSTRY

The growth in the share of the service sector joined with the reduction in the share of the real sector in production and employment represent the common features of the transition process. As such, they have influenced the onset of the deindustrialization of the Serbian economy and the economies of the observed countries. Unlike RS, more advanced transition countries started the process of reindustrialization concurrently with deindustrialization, which resulted in a more/less successful increase in industrial production early in 2008. This was also the reason why the intensity of structural changes, concerning manufacturing and services, was somewhat more moderate than the one in RS.

The sharp average decline in industrial production from 1990 to 2000 (-7.5%) as well as its development at an average rate that was 3.5 times lower than the GDP growth (about 3%) after 2001, led to a drastic decrease in the share of the industry in the GDP. In 2010, the share of the industry in the GDP was 21.4%, while in 2001, it was 30% and in 1991, even about 44% (Table 3). The other observed Central European countries show a significantly smaller and slower decline in the share of the industry in the GDP in the same period.

The analysis of the gross value added (GVA) based on the production sector shows a decline in the share of the manufacturing industry, whereas at the same time, the share of the service sector increases.

Table 3 The share of the industry in the GDP

Country	1991	1996	2001	2006	2010	Change 1991-2010
Bulgaria	39.8	29.0	25.2	26.1	22.6	-17.2
Czech Republic	37.9	33.8	37.5	41.9	37.7	-0.2
Croatia	21.5	20.2	19.0	17.7	19.5	-2.0
Hungary	21.0	23.5	26.4	26.1	26.8	5.8
Slovakia	35.2	29.5	25.8	28.3	25.3	-9.9
Slovenia	36.0	25.4	25.9	23.8	24.2	-11.8
The Republic of Serbia	44.4	26.0	30.0	21.8	21.4	-23.0

Source: Author, based on: EBRD, 2015; United Nations Economic Commission for Europe (UNECE), 2015

In 2013, the largest share of the manufacturing industry in the GVA was achieved in the Czech Republic (28.7%), while the largest decrease (since 2001) was recorded in Slovakia (-3.2%) and RS (-2.6%). Unlike RS, Bulgaria showed an increase in the share of the manufacturing industry in the GVA (Tables 4 and 5). It is evident that the share of the service sector in the GVA in RS is similar to that of the Czech Republic and Slovakia; however, the intensity of the growth of this sector is much greater in RS. Such a trend is due to the fact that the average growth rate of the industry's GVA is among the lowest ones (1.7%), while that of the service sector is among the highest ones (3.3%), concerning the surveyed countries. In contrast to the observed countries, the economy of RS recorded a decline in the share of agriculture and construction, i.e. the entire real sector, in the GVA.

Furthermore, in RS, the number of workers employed in the industry was reduced in both absolute and relative terms. The total number of employees was decreased from 674,000 persons in 2001 to 337,000 in 2013. At the same time, the number of employees in the manufacturing industry decreased by 317,000 persons (SOR, 2015).

Sectoral changes in the staffing structure are characterized by an increasing number of employees in the service sector, which is also the case in the other observed countries (Table 6). However, the service sector has not created enough jobs to compensate for the huge job loss in the manufacturing sector; therefore, a certain number of industrial workers were reallocated to the agricultural sector. The fact that the unemployment rate was about 23% in 2013 (SOR, 2015), while the involvement of employees in the manufacturing industry was lower than that in agriculture, best reflects the level of the economic development, the participation of the manufacturing industry in the development and its current state.

Compared to the other countries, the share of employees in the industrial sector is lower, while the

Table 4 The share in the GVA, by the sector

Country	Agriculture		Industry		Construction		Services	
Sector production activity	2001	2013	2001	2013	2001	2013	2001	2013
Bulgaria	10.5	4.7	18.9	19.9	4.5	4.1	66.1	71.3
Czech Republic	3.0	2.3	28.7	27.9	5.6	5.0	62.7	64.8
Croatia	5.3	3.6	19.4	17.9	4.6	4.5	70.7	74.0
Hungary	4.9	3.7	22.5	22.1	4.7	3.3	67.9	70.9
Slovakia	4.5	3.7	25.8	22.6	5.7	7.8	64.0	65.9
Slovenia	2.6	1.8	25.2	23.1	5.4	4.6	66.5	70.5
The Republic of Serbia	17.8	7.9	25.0	22.4	4.3	4.3	52.9	65.4

Source: Author, based on: The Eurostat data, 2015; UNECE, 2015; SOR, 2015

Table 5 GVA - The average growth rate and change in the share (+/-), 2001-2013, %

Sector production activity / Country	Agriculture		Industry		Construction		Services	
	Avg.	(+/-)	Avg.	(+/-)	Avg.	(+/-)	Avg.	(+/-)
Bulgaria	-1.4	-5.8	3.8	+1.0	3.7	-0.4	4.0	+5.2
Czech Republic	-0.3	-0.7	3.8	-0.8	0.7	-0.6	2.1	+2.1
Croatia	-0.8	-1.7	0.5	-1.5	2.3	-0.1	2.3	+3.3
Hungary	3.5	-1.2	1.4	-0.4	-0.1	-1.4	2.0	+3.0
Slovakia	6.8	-0.8	6.1	-3.2	4.6	+2.1	3.4	+1.9
Slovenia	0.3	-0.8	1.7	-2.1	-0.7	-0.8	2.3	+0.8
The Republic of Serbia	1.9	-9.9	1.7	-2.6	4.5	0.0	3.3	+12.5

Source: Author, based on: The Eurostat data, 2015; UNECE, 2015; SOR, 2015

share of the people involved in the agricultural sector is high. According to the given data, Bulgaria is in a situation similar to the situation in RS. However, in the Czech Republic and Slovakia, the share of the people employed in agriculture is 6.5 times smaller than that in RS, in Hungary 3 times, in Slovenia 2.5 times and in Croatia 2 times. The countries in the higher stages and in a more successful process of industrialization have a share of the people employed in agriculture significantly below 10%.

The rapid and intensive decline in the share of the industry in the GDP, the GVA and employment,

together with the sharp increase in the share of the service sector and a large number of people employed in agriculture, cannot be attributed to deindustrialization characteristic for developed countries. In addition, in this case, deindustrialization is by no means the result of the maturity of the industrial sector. In the case of RS, the premature deindustrialization can rather be observed as a negative process that led to the devastation of the industry.

The conclusion that the deindustrialization in RS is premature and not a common one is supported by the fact that, in developed countries, the maximum

Table 6 The share and change of employees per sector, 2001-2013, %

Sector production activity / Country	Agriculture			Industry			Construction			Services		
	2001	2013	(+/-)	2001	2013	(+/-)	2001	2013	(+/-)	2001	2013	(+/-)
Bulgaria	23.9	19.2	-4.7	23.2	19.9	-3.3	4.1	5.2	+1.1	48.8	55.7	+6.9
Czech Republic	4.6	3.3	-1.3	30.6	28.4	-2.2	8.3	8.4	+0.1	56.5	59.9	+3.4
Croatia	16.2	10.7	-5.5	23.6	20.4	-3.2	6.4	7.1	+0.7	53.8	61.8	+8.0
Hungary	11.5	7.1	-4.4	26.3	20.8	-5.5	6.0	6.4	+0.4	56.2	65.7	+9.5
Slovakia	5.9	3.4	-2.5	28.1	23.6	-4.5	5.9	7.6	+1.7	60.1	65.4	+5.3
Slovenia	11.1	8.4	-2.7	29.3	22.7	-6.6	7.3	6.8	-0.5	52.3	62.1	+9.8
The Republic of Serbia	19.5	21.3	+1.8	34.0	19.6	-14.4	5.4	4.8	-0.6	41.1	54.3	+13.2

Note: The data comparison was done according to the activity classification from 2010; agriculture includes Sector A

Source: Author, based on: The Eurostat data, 2015; UNECE, 2015; SOR, 2015

participation of the industry in the GDP is achieved at the level of the GDP *per capita* between 3,000 and 3,500 USD. In RS, the deindustrialization process began in 1990 at the GDP *per capita* of 1,450 USD (at the current prices in 2000). That this process was not the result of a mature industry and an advanced economy is evidenced by the achieved level of the GDP *per capita* of only 1,300 USD in 2011. The accent on extensive industrialization in the period before the transition was certainly one of the reasons for such a situation. Since the beginning of the transition - without neglecting the importance and impact of the socio-political environment and factors - the devastation of the industry has been the result of the inefficient and ill-conceived concept of transitional reforms and the inadequate economic development strategy implemented in the critical stage and at the critical level of industrial development. This produced deep systemic and structural imbalances in the economy, whose side-effect is the tertiarization of the economy, with the very slow pace of development shown by the GDP *per capita* growth rate as their major consequence.

The achieved level of industrialization

Structural changes in the industry, particularly the manufacturing one, affect the achieved level (degree) of the development of the entire industry. The latter directly affects the level of the productivity of the industry and its competitiveness, i.e. the volume, the structure and the quality of exports.

The level of the industrialization of RS and the observed countries can be expressed and comparatively analyzed by UNIDO's quantitative indicators, which present the results and the trends related to the manufacturing industry. According to UNIDO's classification and the level of the industrial development of RS in 2013, the country was classified into the group of the economies undergoing the process of industrialization and in the industrial sub-group of developing industrial economies (UNIDO, 2013b). Concerning the other countries that are the subject matter of the research, only Bulgaria and Croatia are classified into this group. The Czech Republic, Slovakia, Hungary and Slovenia are classified into the group of industrialized economies.

The production capacity and exports of the manufacturing industry are low (Table 7). The manufacturing value added *per capita* (MVApc) and manufactured exports *per capita* (MXpc) are particularly very low. Compared to the Czech Republic, which has the highest MVApc and MXpc of all the countries observed, RS has the 12 times lower production capacity of the manufacturing industry and 15.5 times lower exports. Bulgaria, which, according to the level of the development of the industry, belongs to the same group as RS, has a production capacity over 2 times higher than that of RS's and exports which are almost 3 times as high.

Table 7 The manufacturing industry production capacity and exports

Country	MVApc		Index 2013/06	MXpc		Index 2013/06
	2006	2013		2006	2013	
Bulgaria	560	712	127	1,471	2,639	179
Czech Republic	3,287	3,872	118	8,572	14,364	168
Croatia	1,555	1,363	88	2,063	2,738	133
Hungary	2,230	2,403	108	6,526	9,812	150
Slovakia	2,194	3,505	160	7,009	13,389	191
Slovenia	3,852	3,644	95	9,444	12,784	135
The Republic of Serbia	391	320	82	533	931	175

Source: UNIDO, 2013b; UNIDO, 2015

The fact that it will take RS 9.5 years to catch up with the Bulgarian MVApc - assuming that RS's MVApc grows at an average rate of 10% *per annum* - while at the same time Bulgaria's MVApc decreases, best speaks of the achieved level of the industrial development in RS measured by the production capacity. Although MXpc has increased by 75% since 2006, which is about 9.5% a year on average, the above-mentioned estimate concerning the level of MVApc, supports the even more pessimistic assessment regarding exports.

The intensity of industrialization and the export quality, i.e. the level of the industrial technological

development of RS, is at a low level. In addition to its very low level, the intensity of industrialization is also declining (Table 8). The contribution of the manufacturing sector to the manufacturing value added share in the total GDP (MVAsh) of the economy is a modest one. There were no significant qualitative changes in terms of the industrial structure, the increased technological complexity, knowledge transfer and technological modernization; therefore, there was no increase in the medium- and high-tech manufacturing value added share in the total manufacturing value added (MHVAsh), which is reflected in the volume and quality of exports.

Table 8 Industrialization intensity

Country	MVAsh, %		Change 2006-13	MHVAsh, %		Change 2006-13
	2006	2013		2006	2013	
Bulgaria	14.0	16.0	+2.0	24.2	25.6	+1.4
Czech Republic	24.2	28.5	+4.3	44.4	44.6	+0.2
Croatia	14.6	14.6	0.0	31.7	31.7	0.0
Hungary	19.6	22.2	+2.6	53.4	53.4	0.0
Slovakia	20.9	31.5	+10.6	39.8	43.2	+3.4
Slovenia	20.5	18.9	-1.6	42.6	45.2	+2.6
The Republic of Serbia	17.7	12.0	-5.7	20.7	20.0	-0.7

Source: Author, based on: UNIDO, 2013b; UNIDO, 2015

Furthermore, in terms of the export quality, RS significantly lags behind (Table 9). The changes in the structure of the manufacturing industry result in the very low medium- and high-tech manufactured exports share in the total manufactured exports (MHXsh). The manufactured exports share in the total exports (MXsh) was reduced by 1.6%, although regarding the structure of the exports, the share of medium and high technology-intensive products has increased by 7.7%. The global economic crisis reduced the export of natural resource- and labor-intensive products, which affected the quantity and quality of exports from RS.

Table 9 The export quality

Country	MXsh, %		Change 2006-13	MHXsh, %		Change 2006-13
	2006	2013		2006	2013	
Bulgaria	74.9	78.0	+3.1	27.7	35.9	+8.2
Czech Republic	92.4	93.2	+0.8	66.1	67.9	+1.8
Croatia	88.7	87.9	-0.8	44.6	47.8	+3.2
Hungary	88.2	90.1	+1.9	78.0	75.6	-2.4
Slovakia	91.2	94.4	+3.2	60.8	64.8	+4.0
Slovenia	90.3	89.8	-0.5	60.3	61.3	+1.0
The Republic of Serbia	81.5	79.9	-1.6	26.0	33.7	+7.7

Source: Author, based on: UNIDO, 2013b; UNIDO, 2015

RS's impact on the world manufacturing value added (ImWMVA) and the world manufactures trade (ImWMT) is very low. In comparison with RS, the more industrialized Czech Republic, Hungary and Slovakia, show much higher impacts of their manufacturing sectors on the world manufacturing value added and the world manufactures trade (Figure 2).

It can be noted that the basic indicators of the level of the manufacturing industry development in RS are at a low level (Tables 7, 8 and 9). More precisely, of the surveyed countries, RS has the lowest level of industrial development. The decreasing trend observed in the majority of the indicators in 2013 compared to 2006, indicates the consistency of the negative trends in the industry as well as the deindustrialization of the economy.

The achieved level of the industry's competitiveness

The competitiveness of the manufacturing industry, which produces the largest part of tradable goods, is one of the key factors for a sustainable economic development. Labor productivity in the manufacturing industry is the key indicator of competitiveness. It is also an important indicator of the structural changes in the surveyed countries, i.e. the capacity of their industries to grow, develop and export. Labor productivity can be expressed as the ratio of the value added per employee (Table 10).
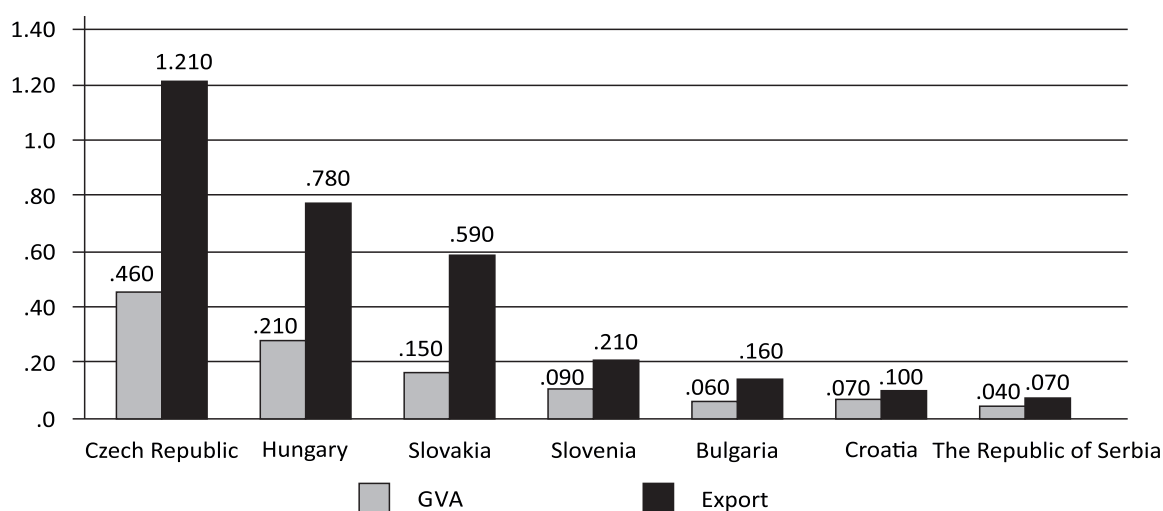
Figure 2 The share in the world manufacturing value added and exports in 2013

Source: Author, based on: UNIDO, 2013b; UNIDO, 201

In the period from 2006 to 2013, the Serbian manufacturing industry recorded the highest growth in labor productivity (measured by the GVA per employee) among the surveyed countries. Its average growth of 13.3% per year was the result of a large reduction in the number of employees in the manufacturing sector (5%) and the significantly lower growth in the GVA (3.2%). Given the level of unemployment, such a productivity growth is unsustainable. Here, productivity growth is not the result of investments and the technological modernization of the production activities that improve competitiveness and create value-added products, as is the case in the observed Central European countries.

The fact that the competitiveness of RS's manufacturing industry is very weak is confirmed by the fact that it comes bottom in almost every category (according to the competitive industrial performance

Table 10 Production trends in the manufacturing industry, 2006-2013

Country	GVA per employee, in EUR			Average growth rate of GVA per employee	Average employee growth rate	Average GVA growth rate
	2006	2013	Change			
Bulgaria	N/A	N/A	N/A	N/A	-1,7	N/A
Czech Republic	21,573	26,627	5,054	+3.3	-0.3	+5.1
Croatia	17,137	19,634	2,497	+2.0	-1.8	-1.5
Hungary	20,299	25,095	4,796	+3.4	-2.0	+0.1
Slovakia	18,945	28,943	9,998	+7.0	-0.9	+5.9
Slovenia	28,308	37,086	8,778	+4.1	-2.8	+0.8
The Republic of Serbia	8,251	19,197	10,946	+13.3	-5.0	+3.2

Source: Author, based on: The Eurostat data, 2015; UNECE, 2015; SOR, 2015

ranking, RS ranks the 73rd out of the 136 ranked world industries and the 34th out of the 38 ranked industries in Europe in 2013 (Figure 3)). All the other countries included in the present research have a higher level of competitiveness, which is certainly due to their more efficient industrial development.

UNIDO's CIP index (Competitive Industrial Performance Index) is the indicator that can be used to measure and analyze the industrial competitiveness of a country. This index measures a country's performance on the interval scale from 0 to 1. Additionally, it also indicates the productivity rate and the implemented structural change. It is a composite index that measures the capacity of the manufacturing industry to produce and export competitive products. Several options are available for calculating the CIP; however, the linear aggregate method applies the following formula (UNIDO, 2013b):

$$CIP_{jt} = \sum_{i=1}^{q} w_i I_{ijt} \qquad (1)$$

Here, CIP_{jt} is the index of the country j in the year t. The weighting factor w_i relates to the i indicators, while the sum of all weighting factors is 1. The weighting factors w_i take the value 1/6 for the indicators MVApc, MXpc, ImWMVA and ImWMT, and the value 1/12 for the indicators MHVAsh, MVAsh, MHXsh and MXsh. I_{ijt} is the value of the indicator i for the country j in the year t. According to the linear method, I_{ijt} is calculated as $(X_{ijt} - minX_{ijt})/(maxX_{ijt} - minX_{ijt})$. X_{ijt} is the value of the indicator i for the country j in the year t, where the *min (max)* are the values of the analyzed indicator in the sample of the surveyed countries (UNIDO, 2013b).

In comparison with the other countries observed, the CIP index of RS's manufacturing industry was 0.031 in 2013 (Figure 4). All of the analyzed countries had the significantly greater values of the CIP index, which means that they had higher productivity rates as well as the intensity of structural changes. This confirms that the levels of the development and competitiveness of the industry in RS and the rest of the countries observed are in correlation with their industrialization intensity.

Such a correlation is further supported by the high value of Pearson's correlation coefficient of these seven countries regarding the newly created value, the CIP index, the exports and the intensity of industrialization in 2013 (Table 11). This is especially evident concerning
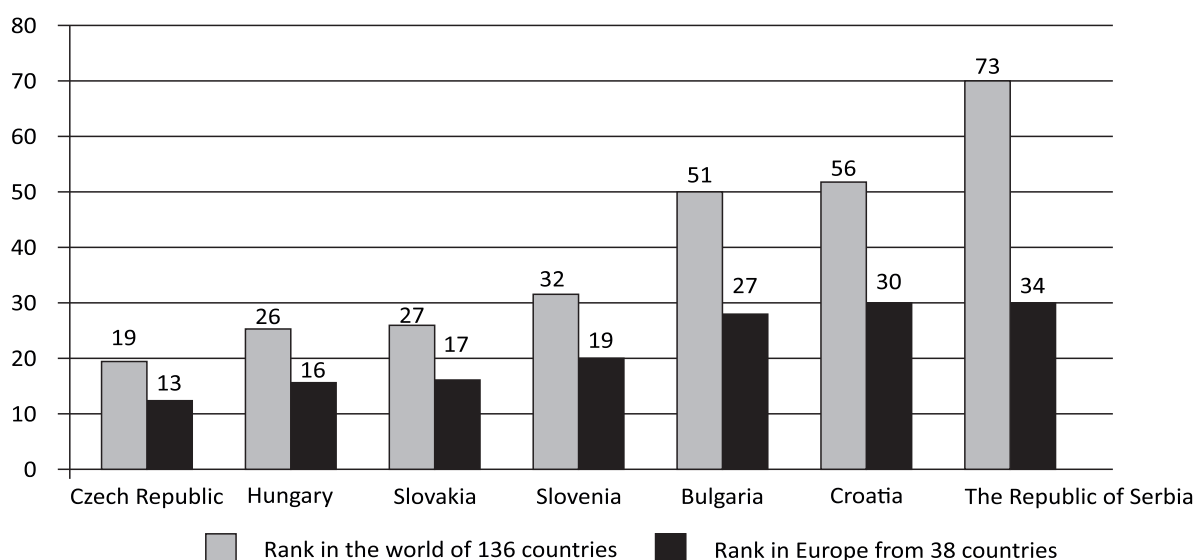

Figure 3 The competitive industrial performance ranking of the observed countries in 2013

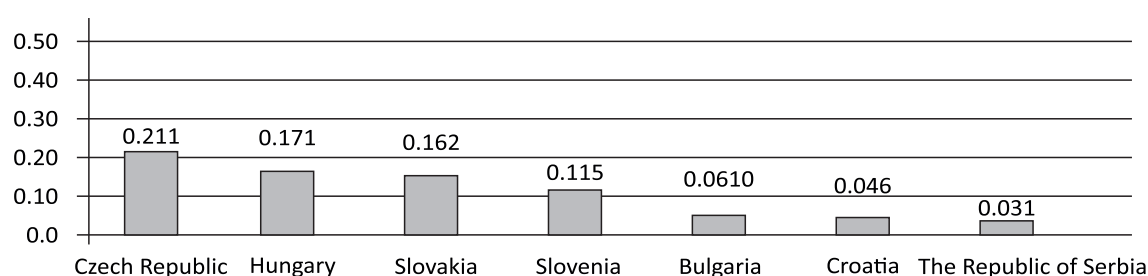*Source*: Author, based on: UNIDO, 2013b; UNIDO, 2015.

Figure 4 The value of the CIP index of the countries surveyed in 2013

Source: Author, based on: UNIDO, 2013b

the value of the medium- and high-tech manufacturing value added share in the total manufacturing value added (MHVAsh).

This also confirms that qualitative structural change, the transfer of knowledge, technological complexity and modernization, i.e. the magnitude of the shift from the traditional products to the new ones characterized by a greater productivity, competitiveness and the value-added created, all affect the attained intensity of industrialization. In the case of RS, the low value added *per capita* and the low value of the composite CIP index, indicate a high correlation between the low development level, low competitiveness and the low intensity of the structural changes concerning the propulsive production activities.

The necessity of structural changes in the major production and export activities

There are three of the twenty-four sectors of the manufacturing industry in RS that generate 50% of value-added products. The main sectors are food,

beverages and tobacco (33%), manufactures of metals (9%) and coke and petroleum products (8%). The structure of the production of the manufacturing industry shows that it is based on resource and labor-intensive products and the products of the low- and medium-low technological intensity (Table 12). In addition to the low level of finalization, these products are of low productivity and low value-added features. This confirms the economic rule that, at a lower level of labor productivity, the production offer is limited to exactly this type of products.

The data on the distribution of the GVA according to the three major production sectors illustrate the differences in the production structure of the manufacturing industry in RS and the observed countries. The principal manufacturing sectors in the mentioned countries are: road vehicles, machinery and equipment, chemicals and chemical products, electrical machinery and apparatus and manufactures of metals. These products are of medium high-technology and medium low-technology concerning the labor intensity and know-how. These are the

Table 11 Pearson's correlation coefficient of the seven observed countries in 2013

MVApc and VAsh	MVApc and MHVAsh	CIP and MVAsh	CIP and MHVAsh	MVApc and CIP	MXpc and MVAsh	MXpc and MHVAsh
0.8288	0.8327	0.7009	0.8798*	0.8794*	0.8716	0.8543

Correlation is significant at the 0.05 level (2-tailed); * Correlation is significant at the 0.01 level (2-tailed)

Source: Author

Table 12 The share of the three major production activities in the GVA in 2013

Country	Section - SITC Rev. 4	Total	Technology intensity - OECD
Bulgaria	Food, beverages and tobacco (18%) Machinery and equipment(11%) Textile, clothes, leather (10%)	39%	Low (28%) and medium-high (11%) technology intensity
Czech Republic	Road vehicles (18%) Manufactures of metals (11%) Machinery and equipment (10%)	39%	Medium-high (28%) and medium-low (11%) technology intensity
Croatia	N/A	N/A	N/A
Hungary	Road vehicles (17%) Machinery and equipment (16%) Food, beverages and tobacco (11%)	44%	Medium-high (33%) and low (11%) technology intensity
Slovakia	Road vehicles (17%) Machinery and equipment (12%) Electrical machinery (9%)	38%	Medium-high technology intensity (38%)
Slovenia	Chemical products (17%) Manufactures of metals (14%) Machinery and equipment (11%)	42%	Medium-high (28%) and medium-low (14%) technology intensity
The Republic of Serbia	Food, beverages and tobacco (33%) Manufactures of metals (9%) Coke and petroleum products (8%)	50%	Low (33%) and medium-low (17%) technology intensity

Source: Author, based on: UNIDO, 2015; Eurostat, 2015

propulsive sectors of production, which are important for employment and technological progress. These sectors also have a greater impact on productivity growth and competitiveness and also generate a higher added value, which further affects their export potential.

Based on the SITC, Rev. 4 and concerning the structure of exports from RS, the largest share belongs to the products listed in Section 7 (machinery and transport equipment 31%), then Section 6 (manufactured goods classified chiefly by material 20%) and finally Section 0 and Section 1 (food and live animals, and beverages and tobacco 17%) (Table 13). Section 7 has recorded growth since 2012, especially the Sub-Section of road vehicles (including air-cushion vehicles). This structure does not follow the structure concerning the participation in the creation of the GVA, which is due to the fact that export follows cyclical trends in the global market and, more importantly, the fact that the major part of the technologically complex components

used in car production are imported. The potential for an increase in the GVA lies in the domestic production of the components that are imported. This would cause a spillover effect to the other sectors, i.e. the production of technologically intensive machinery specialized for particular industries and electrical machinery and appliances, as is the case in the other surveyed countries.

The three leading export sectors, according to the SITC, Rev. 4, point to the unfavorable structure and volume of RS's exports, especially in comparison with the Czech Republic, Slovakia and Hungary. The structure of the exports of these countries is dominated by the production of road vehicles and passenger cars, specialized machinery and data processing, electrical machinery, apparatus and appliances, which all require the use of advanced technology and highly-qualified labor, which is not the case in RS. With its current production and export structure, RS could not compete with the other observed countries. Therefore, future

reindustrialization should be followed by increased labor productivity in the existing manufacturing activities as well as a shift in the production orientation towards highly value-added products.

Source: Author, based on: UNIDO, 2015; Eurostat, 2015

Table 13 Exports from the three major production activities - the share and the volume in 2013

Country	SITC. Rev. 4 Sectors	Share %	Value in million USD
Bulgaria	Sector 6	22%	6,494
	Sector 7	18%	5,197
	Sector 3	15%	4,346
Czech Republic	Sector 7	54%	87,095
	Sector 6	17%	28,058
	Sector 8	12%	18,723
Croatia	Sector 7	24%	2,813
	Sector 6	16%	1,879
	Sector 3	15%	1,735
Hungary	Sector 7	52%	56,353
	Sector 6	12%	11,460
	Sector 5	12%	11,380
Slovakia	Sector 7	57%	48,844
	Sector 6	17%	14,595
	Sector 8	9%	7,371
Slovenia	Sector 7	36%	10,201
	Sector 6	21%	6,000
	Sector 5	18%	5,275
The Republic of Serbia	Sector 7	31%	2,417
	Sector 6	20%	2,913
	Sector 0+1	17%	4,541

Note: Sector 0 - Food and live animals; Sector 1 - Beverages and tobacco; Sector 3 - Mineral fuels, lubricants and related materials; Sector 5 - Chemicals and related products; Sector 6 - Manufactured goods classified chiefly by material; Sector 7 - Machinery and transport equipment; Sector 8 - Miscellaneous manufactured articles

CONCLUSION

Numerous theoretical analyses as well as the economic reality show that industrialization stands as an imperative for successful economic development. Industrialization triggers structural change especially in developing countries. The results achieved in terms of the industrial development prior to the onset of the transition are significant. However, instead of bringing about the qualitative advancement, the beginning of the economic transition in RS marked the outbreak of the profound crisis in industrial development, which has continued to this day. The low rate of growth shows that the crisis in the industry is of a structural nature and that, in such an environment, any shift towards a propulsive production structure is a difficult task to do.

Structural change in the economy and intensive deindustrialization are not the results of industrial maturity and its developed structure. The sudden and premature deindustrialization as well as the implemented concept of transitional reforms and economic development strategies, have led to the devastation of the industry. The first hypothesis that it is necessary to implement structural change and reindustrialization in the Serbian industry is confirmed by the value of the achieved level of the economic development measured by the GDP *per capita*. In 2013, it accounted for 90% of the level achieved in 1990.

The achieved level of the industrial development of RS is very low, especially in comparison with the Czech Republic, Slovakia, Hungary and Slovenia. According to the level of its industry's development, RS is in the group of the least developed industries in Europe and therefore amongst the least developed economies. The country's production capacity, level of technological development, industrialization intensity and export quality are showing a decreasing trend, causing further deindustrialization and thus affecting the low level of productivity and the competitiveness of the industry.

The second hypothesis in this paper, that the level of the development and competitiveness of the industry in RS and the other observed countries is in a direct correlation with the intensity of industrialization, is confirmed by the level of labor productivity and competitiveness. The high growth of labor productivity expressed through the GVA per employee is unsustainable because it is not the result of the shift towards higher value-added production but rather a large decrease in the number of employees. The low value added *per capita* and the low value CIP index relating to the manufacturing industry means a high positive correlation between the low level of development and low competitiveness, on the one hand, and the low intensity of structural changes, on the other.

The main contribution of this paper lies in its critical examination of deindustrialization, structural changes, levels of the development and competitiveness of the industry as well as in its stressing the importance of the reindustrialization of RS. The primary goal of reindustrialization is the growth of industrial competitiveness that would ensure the growth of production, employment, exports, and, most importantly, improve the overall standard of living. With respect to the presented facts and problems of the industry, reindustrialization certainly brings many challenges and requires a lot of effort and investment.

The key limitation in this study is the availability of adequate and comparable data for a sufficiently long period of time, i.e. the data concerning the lower classification levels of the industry, such as branches or groups. This excludes the possibility of applying other complex indicators that are also used to measure the intensity of structural changes in an industry.

The structure of manufacturing production and exports at the sectoral level shows that this structure mainly includes low value-added products. This confirms the economic rule that, at a lower level of labor productivity, supply is limited to exactly this kind of products. Therefore, examining the correlation between the comparative advantage and change in the production structure as well as the impact of structural change on exports and investment in the Republic

of Serbia can be considered as the subject matter of further research.

The findings of this research are also significant for policy makers and the main agents of the economic and industrial policy. The paper underlines that sustainable economic development and the channeling of the process regarding change in the industrial structure, especially in times of crisis, which is currently deeply rooted in the Serbian industry, is impossible without a comprehensive and consistent industrial policy. How successful a country will be in solving the aforementioned challenges is determined by its willingness to create a new development strategy and industrial policy; however, this should not be mistaken for a typical state intervention.

The important message this research sends to industrial policy makers is that this policy should be active and sophisticated in order to influence continued structural changes, the transfer and development of advanced technologies, the development of small, medium-sized and large enterprises as well as develop and implement the export strategy, which is a prerequisite for economic development and combating unemployment, as the burning issues of the society. Such a concept of the industrial policy can influence the creation of a more propulsive structure and a higher value-added industry, which is necessary for the more efficient performance on the global market.

It is essential that, due to the devastated industry, the creators of the industrial policy should initiate continuous structural changes. Such continuous structural changes are conditioned by the creation of a healthy business environment, macroeconomic stability, the availability of capital, by investing in education and the training of required staff, investing in research and development, improving the physical and intangible infrastructure and promoting domestic firms on foreign markets.

REFERENCES

Aiginger, K. (2014). Industrial Policy for a sustainable growth path. *Policy Paper no 13*, WWWforEurope.

Doyle, E. (1997). Structural change in Ireland: The contribution of sectoral employment distribution to labour productivity convergence between Ireland and the EU: 1970-1990. *Journal of Economic Studies, 24*(1/2), 59-71.

European Bank for Reconstruction and Development (EBRD). (29. January 2015). *Statistical databases.* Retrieved 29. January 2015, from http://www.ebrd.com/what-we-do/economic-research-and-data/data.html.

Eurostat. (29. January 2015). *Statistical databases.* Retrieved 29. January 2015, from http://ec.europa.eu/eurostat/data/database.

Fagerberg, J. (2000) Technological progress, structural change and productivity growth: a comparative study. *Structural Change and Economic Dynamics, 11*(4), 393-418.

Jakopin, E. (2012). Post-crisis reallocation of growth factors. *Economic Horizons, 14*(2), 79-90. doi: 10.5937/ekonhor1202077J

Kollmeyer, C. (2009). Explaining Deindustrialization: How Affluence, Productivity Growth, and Globalization Diminish Manufacturing Employment. *American Journal of Sociology, 114*(6), 1644-1674.

Kucera, D., & Milberg, W. (2003). Deindustrialization and changes in manufacturing trade: Factor content calculations for 1978-1995. *Review of World Economics, 139*(4), 601-624.

Lin, J., & Chang, H. J. (2009). Should Industrial Policy in Developing Countries Conform to Comparative Advantage or Defy it? *Development Policy Review, 27*(5), 483-502. doi. org/10.1111/j.1467-7679.2009.00456.x

Lin, Y. J. (2012). New Structural Economics: *A Framework for Rethinking Development and Policy.* Washington: The World Bank. doi: 10.1596/978-0-8213-8955-3

Mickiewicz, T., & Zalewska, A. (2005). De-industrialisation and the post-communist transition: Rowthorn and Wells' model revisited. *Economics Working Papers 59,* Centre for the Study of Economic and Social Change in Europe, SSEES, UCL: London, UK.

Naude, W., Szirmai, A., & Lavopa, A. (2013). Industrialization lessons from BRICS: A comparative analysis. *IZA Discussion Paper No.7543*, University of Maastricht, The Netherlands.

Pack, H., & Westphal, L. E. (1986). Industrial strategy and technological change: Theory *versus* reality. *Journal of development economics, 22*(1), 87-128.

Palma, J. G. (2008). Deindustrialisation, Premature Deindustrialisation, and the Dutch Disease'. In S. N. Durlauf, & L. E. Blume, (Eds.), *The New Palgrave: A Dictionary of Economics*, 2nd edition. Basingstoke: Palgrave Macmillian,

pp. 7-23. doi:10.1057/9780230226203.0369

Republički zavod za statistiku. (2015). Statistička baza podataka

Rodrik, D. (2007). Industrial development: Some stylized facts and policy directions. *Industrial Development for the 21st century: Sustainable Development Perspectives*, New York, NY: United Nations. 7-28.

Rodrik, D. (2008). *Normalizing industrial policy.* Commission on growth and development working paper No. 3. Washington: World Bank. Retrieved June 1, 2009, from http://documents. worldbank.org/curated/en/2008/01/13163290/normalizing-industrial-policy

Rodrik, D. (2009). Industrial policy: don't ask why, ask how. *Middle East Development Journal, 1*(1), 1-29.

Rowthorn, R., & Coutts, K. (2004). De-industrialisation and the balance of payments in advanced economies. *Cambridge Journal of Economics, 28*(5), 767-790. doi: 10.1093/cje/beh034

Syrquin, M. (2007). Structural Change and Development. In A. K. Dutt, & J. Ros, (Eds.), *International Handbook of Development Economics*, Vol. 1, UK: Edward Elgar Publishing.

Szirmai, A. (2012). Industrialisation as an engine of growth in developing countries, 1950–2005. *Structural Change and Economic Dynamics, 23*(4), 406-420.

Szirmai, A., Naude, W., & Alcorta, L. (2013). Introduction and Overview: The Past, Present and Future of Industrialization. In A. Szirmai, W. Naude, & L. Alcorta, (Eds.), *Pathways to Industrialization in the Twenty-First Century-New Challenges and Emerging Paradigms.* Oxford: Oxford University Press. doi:10.1093/acprof:oso/9780199667857.003.0001

Tregenna, F. (2009). Characterising Deindustrialisation: An Analysis of Changes in Manufacturing Employment and GDP Internationally. *Cambridge Journal of Economics, 33*(3), 433–466.

Tregenna, F. (2011). Manufacturing productivity, deindustrialization, and reindustrialization. *WIDER Working Paper 57*, United Nations University, World Institute for Development Economics Research.

UNIDO. (2013a). *Industrial Development Report 2013, Sustaining Employment Growth: The Role of Manufacturing and Structural Change.* Vienna.

UNIDO. (2013b). *The Industrial Competitiveness of Nations - Looking back, forging ahead.* Vienna.

United Nations Economic Commission for Europe (UNECE). 1. February 2015, *Statistical databases.* Retrieved 1. February

2015, from http://www.unece.org/stats/econ.html

United Nations Industrial Development Organization (UNIDO). (29. January 2015). *Statistical databases*. Retrieved 29. January 2015, from http://www.unido.org/en/resources/

statistics /statistical-databases.html

Wade, R. H. (2012). Return of industrial policy? *International Review of Applied Economics, 26*(2), 223-239. doi:10.1080/02692 171.2011.640312

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