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WHAT HAS BEEN DRIVING THE RAPID GROWTH OF SERBIAN MANUFACTURING SINCE 2014 - WHY DOES TECHNOLOGY MATTER?

ABSTRACT

By the end of 2017 Serbia has reached the highest level of industrial production in the last quarter of the century. Rapid growth started in mid-2014. However, this paper argues that industrial dynamics are accompanied by a moderate technological upgrading, insufficient to significant increase of the gross added value of the economy. Furthermore, by means of a theoretical and empirical approach – deductive methods, statistical and mathematical evaluation, the authors have come to the conclusion that there are no uniform development solutions, nor it can be said exclusively that industrialization and its technological development are crucial for the pace of growth. It is a necessary, not a sufficient condition.

Keywords: *manufacturing, export, value added, technological change*

JEL: *L60, O14*

1. INTRODUCTION

The total industrial production in Serbia reached its highest level during the last 25 years in late 2017. The same conclusion stands for the processing industry.

The previously existing two production maximums from this period have been exceeded. The first, achieved in late 1997, immediately after the sale of Telekom and therefore with a domestic demand that was increased artificially and as a one-off

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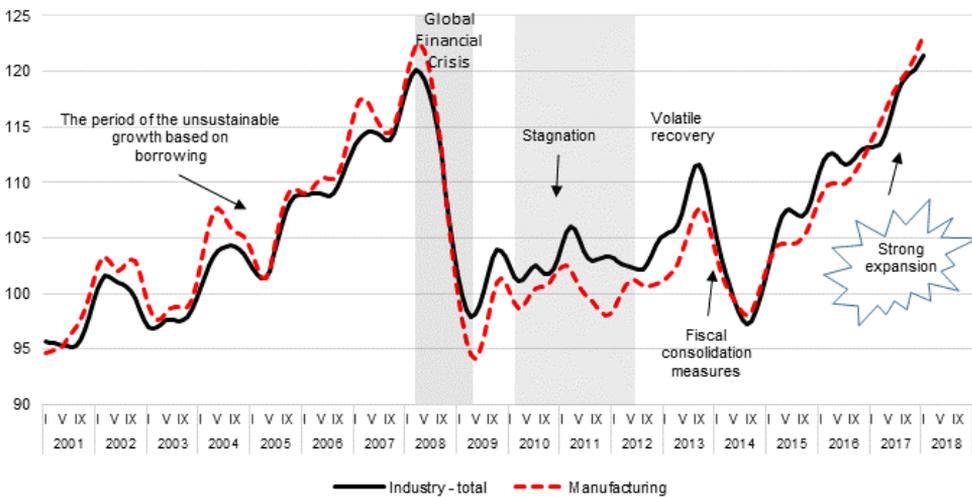
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event, lasted until March 1998³. The second occurred at the dawn of the global economic crisis, at the time of the strongest conjuncture in March 2008.

An interesting fact is that we were unable to find such a positive episode of trending growth in industrial production that started in the summer of 2014 even in the decade preceding the breakup of SFRY. We recall that the growth of the physical volume of industrial production during the nineteen-eighties was only 0.95% year on year, whereas from August 2014 to the beginning of 2018 the average monthly trending increases of production were approximately 0.55% (corresponding to an annual increase of 6.8%).

The strong expansion of activities is also very stable, since the average monthly trending increase continued with the same intensity in 2017, i.e. at 0.54% per month.

Figure 1. Industrial production indices in the Republic of Serbia
(trend cycle, average 2014 = 100)



Source: author's calculation; **Notes:** Time series of Industrial Production Indices are available on the SORS website, in the database <http://data.stat.gov.rs/?caller=0602&languageCode=en-US>.

3 During the second half of 1997 industrial production experienced a sudden jump after the injection of funds obtained through the sale of Telekom (primarily into the sphere of final consumption, but also into revolving loans for businesses). However, the induced growth was very short-lived and lasted only six months (production increased with an average monthly rate of 2.2%). During the subsequent year of 1998 part of these measures have been transferred in an uncontrolled manner, achieving an annual production growth of 3.9% (the effects of Telekom acted as a stimulating, and the strengthening of the outer wall of sanctions as a limiting growth factor). In 1999 production was already lower by 25.6% than during the previous year, primarily a consequence of the NATO aggression, but also the production recession identified during the second half of 1998.

Thus, the existing dynamics of industrial production are satisfactory, however we notice a few interesting moments that need to be commented on. The paper primarily deals with the technological intensity of Serbian industry whose modest development has been recognized as key constraints on maintaining expansive growth over the long term. Before that, let's look at the acute findings of some authors.

2. Review of previous research

According to the Statistical Office of the Republic of Serbia estimate economic growth in period 2015-2017 predominantly was driven by the manufacturing sector. However, it's also recognized by the government that the manufacturing industry made the greatest contribution to growth, although its structure is still dominated by low-processed, low-value-added products (ERP, 2018). Even since the beginning of transition there were no significant changes in industry branches that contribute the most to GVA generation like the hi-tech industry. Some author argue that structural changes in Serbia which occurred during transition have not resulted with sufficient growth that could provide sustainable improvement as compared to either other transitional countries or EU average (Nikolić & Zubović, 2014).

The problem of low specialization was also noticed. The level of specialization of manufacturing sector in Serbia is low in comparison to the phase of the country's industrial development. Many empirical studies (Mičić, et al, 2018) point to the fact that Serbia needs to implement (smart) specialization concept as a new innovative industrial policy agenda in order to effectively channel the investments to technology innovation projects and their implementation in those sectors/industries that have comparative advantage. Smart specialization would encourage structural changes in the manufacturing industry and the development of new manufacturing and productive activities, while the major generators of GVA and employment would shift towards knowledge- and technology- intensive activities.

The frequent topic of research was a phenomenon of reindustrialization (Adžić&Stojić, 2016). Empirical evidence that pointed to the unsustainability of the earlier development model and the urgent need of reindustrialization was first surfaced by a group of authors in the research "Serbian post-crisis economic growth and development model 2011-2020" (USAiD, 2010). Not long after SEC and at that time called 'The National Council for Economic Recovery' established by the Government of the Republic of Serbia issued its own publication "Reindustrialization Strategy of Serbia - A Draft Version" (SEC, 2013) focuses its criticism on the ability of "the market hidden hand" to solve the problems of industrial decline and backwardness in Serbia (Drašković, 2014).

Nowadays, some authors believe that reindustrialization is necessary and possible only in those industries that have considerable potential for growth of competitiveness on the international market. The key assumptions for this are constant growth of innovation and productivity, as well as other factors that essentially rely on new knowledge and new technology. In this context, governments, rather than the markets, are becoming the main change drivers, as they can contribute to creating the necessary industrial state of mind, which implies new redistribution of tasks and effects of labor among the key stakeholders in the process of creating new values: employees, owners, government, science, education, etc. (Pokrajac, et al, 2016).

3. A few facts about the driving forces

Firstly, the impression of the very good results achieved by Serbia is ruined by the persistent low volume, crucially decreased during the first half of the nineteen-nineties. In this regard, since the current production level is still 44.2% lower than average production in 1990, it is easy to calculate that Serbia will have to wait to leave the transitional gap until at least 2026.

Due to the faster growth of industrial production than the growth of the gross domestic product, its relative share in the gross added value of the economy is increasing. It is above the European average and comparable with the most successful countries. This indicator for Serbia in 2017 amounts to 26.4%, while at the same time in Germany industry comprised 25.7% of the total gross added value.

If the GDP's lag after the growth of industry in Serbia were to be retained for a few more years it would very quickly reach the level of the Czech Republic or Ireland, i.e. European countries where industrialization has progressed the furthest, in relative terms.

In addition to stability, the growth of industrial production since 2014 is also characterized by increasing quality. Growth is more sustainable, led dominantly by exports, and during 2017 also by investments. Furthermore, the result is even more important because it was achieved during a time of implementation of severe fiscal consolidation measures that had an unfavourable impact on domestic demand.

The structural problem of Serbia is a low technological level of production that is not generating growth, or is manifested in a divergent trend of the physical volume and gross added value. For example, Serbia holds the world record in relative export growth during the last several years! However, the Serbian industry and exports rely on low-technology, i.e. low-accumulation areas of production. They generate a surplus (good for the balance of payments), but they do not contribute to economic growth. Therefore it should be noted that subsidies for opening jobs, an important

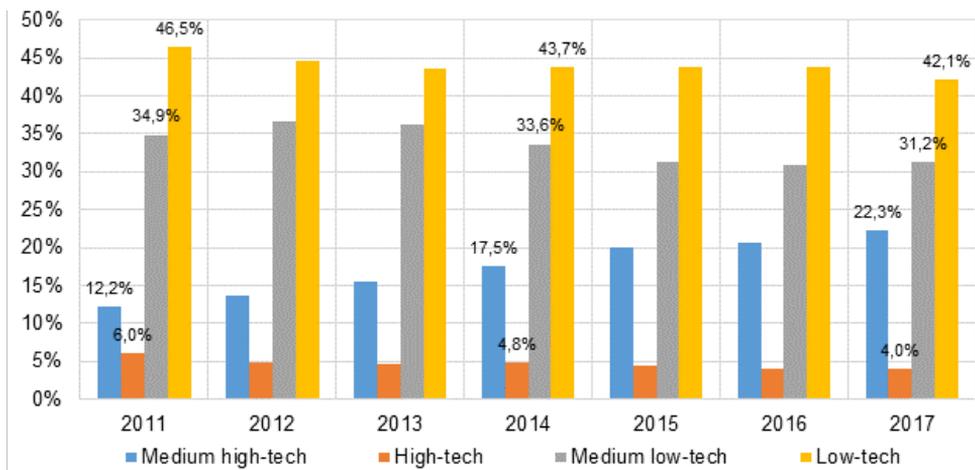
lever for attracting foreign investors during the past four years, do not belong among determinants of the growth of investments that will create a competitive economy – they may even be counter-productive in that regard.

The share of areas belonging to medium-high and high technology is only 26% of the processing industry. Furthermore, this technologically more developed segment of production created only 765 euros per capita in 2016. At the same time this type of production in Bulgaria was worth 26% more, in Romania 2.2 times more, in Slovenia 5.2 times more, and in Germany a whole 10.3 times more.

The key sources of accelerated growth of the GDP that we desire in the mid-term must clearly be more productive activities. Despite serious positive steps in its economy, Serbia remains in a state of structural and technological imbalance, preventing the creation of sustainable economic dynamics. In this regard, an important component of economic policy must be an active structural-investment policy as a mechanism for securing the modernization of the production structure. Economic development in the long-term will be a function of the complexity and efficiency of its production structure. These processes are tied to technological changes and the introduction of innovation, significant investment into education, and the research and development sector.

If, on the other hand, we analyse quality, it is interesting to note certain data regarding changes to the technological structure of manufacturing. Namely, abstracting all methodological problems regarding the division of manufacturing areas according to achieved technological level, during recent years we note a tendency of slight relative structural changes of manufacturing in favour of areas with higher technological content.

Figure 2. Changing the technological structure of Serbian Manufacturing



Source: Author's calculation

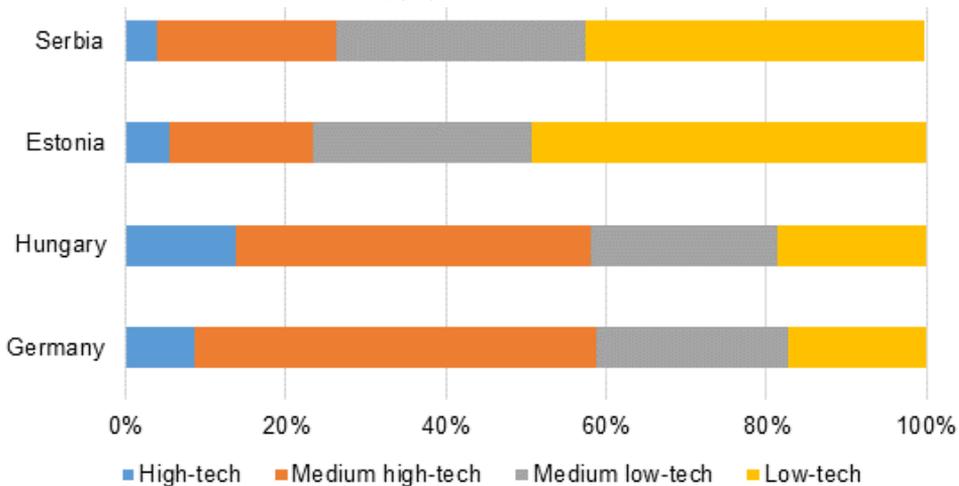
Regarding the period 2010-2017, the share of medium-high technology areas of processing production in generating added value for this sector has doubled, from 11% to 22%. Within this technological subset of manufacturing the highest performance is very steadily registered by the area of chemicals and chemical product manufacture. For example, it is responsible for as much as 46% of the increase of added value of the entire subset of medium-high technological areas during the period 2014-2017. It is followed by the manufacture of unmentioned machinery and unmentioned equipment with 32.1%, and the manufacture of electrical equipment with 12.3%.

The area of manufacture of motor vehicles, trailers and semi-trailers, and the manufacture of other forms of transport showed a single-digit contribution to the growth of added value for this subset of the processing industry, 8.9% and 0.7%, respectively.

High-technology areas, that include the manufacture of computers, electronic and optical products, and the manufacture of basic pharmaceutical products and preparations, reduced their share of the processing industry slightly, exclusively due to the poor performance of the pharmaceutical industry that has experienced, in the long-term, a slight decrease since 2008. Nevertheless, viewed jointly, the areas of high-technology and medium-high technology note a clear growth of relative importance in the generation of added value for the processing sector (e.g. from 17% in 2010 to 26% in 2017).

Is this 26% a sufficient basis to accelerate the tempo of growth of the overall industrial production, and ultimately the GDP? Comparing the technological structure of Serbia with three countries: German, Hungary and Estonia, it is hard to get a clear answer.

Figure 3. Technological structure of the manufacturing sector, in the observed countries in 2017.



Source: Author's calculation

Namely, these three countries have not been selected randomly. Germany is the foundation of European industrialization (creating as much as 28.1% of the total added value of EU industry in 2017). Hungary, due to the presence of global strategic investors is characterized by a specific technological structure comparable with Germany (even more advanced regarding the share of high technology), although viewed by unit value of produced goods it is creating approximately 3.4 times cheaper production per capita⁴. Finally, we chose Estonia as an example of a country with a high per capita income and stable GDP growth that is their opposite regarding the technological structure of industrial production, and thereby, in a relatively worse position than Serbia. Of course, the key development driver in this country are services, and within them, primarily, professional, scientific, innovation and technical activities.

Figure 4. The share of the observed activities in the manufacturing gross value added (GVA) in 2016, in%

Group	Industry	EU28	SERBIA	R&D intensity	Labor intensity	Capital intensity	Energy intensity	Trade intensity	Value intensity
Global innovation for local markets	Chemicals			Black	White	Black	Black	Black	Black
	Motor vehicles, trailers, parts	42	22	Black	Black	White	White	Black	Black
	Other transport equipment			Black	Black	White	White	Black	Black
	Electrical machinery			Black	Black	White	White	Black	Black
Machinery, equipment, appliances	Black			Black	White	White	Black	Black	
Regional processing	Rubber and plastics			Black	Black	Black	Black	Black	Black
	Fabricated metal products	31	44	Black	Black	Black	Black	Black	Black
	Food, beverage, and tobacco			Black	Black	Black	Black	Black	Black
	Printing and publishing			Black	Black	Black	Black	Black	Black
Wood products	Black			Black	Black	Black	Black	Black	
Energy-/resource-intensive commodities	Refined petroleum, coke, nuclear			Black	Black	Black	Black	Black	Black
	Paper and pulp	12	23	Black	Black	Black	Black	Black	Black
	Mineral-based products			Black	Black	Black	Black	Black	Black
	Basic metals			Black	Black	Black	Black	Black	Black
Computers and office machinery					Black	Black	Black	Black	Black
Global technologies/innovators	Semiconductors and electronics	9	3	Black	Black	Black	Black	Black	
	Medical, precision and optical			Black	Black	Black	Black	Black	
Labor-intensive tradables	Textiles, apparel, leather	6	8	Black	Black	Black	Black	Black	
	Furniture, jewelry, toys, other			Black	Black	Black	Black	Black	

Source: author's evaluation; **Note:** the colour intensity represents the range of technology - from black as high tech to white (low-tech).

Therefore, this illustrative example clearly shows that there are no uniform development solutions, nor could it be said that only industrialization and its technological development are key for the tempo of growth. It is a necessary, but not a sufficient condition.

4 For details see: Nikolić, I., Stamenković, S., Kovačević, M. (2017). Investicioni ciklus i institucionalne reforme u 2018. kao uslovi neophodnog privrednog rasta na srednji i dugi rok, a paper in: Naučne konferencije: EKONOMSKA POLITIKA SRBIJE U 2018 g. - Kvalitet institucija i ekonomski rast, 2017, Ekonomski fakultet i Naučno društvo ekonomista, Beograd

On the other hand, these findings should once again be taken with a reserve. Chart 3 shows that a lack of serious production (unlike services, that are on the increase) in the segment of the ICT sector, requiring a high technological level and innovation at the EU level, is the main obstacle to achieving more considerable economic growth rates in Serbia. Furthermore, there is an even larger gap in the group of activities here called Global Innovation for Local Markets. The designers of our industrial and development policy must therefore give primacy primarily to: the automobile industry, pharmaceuticals, mechanical engineering and electrical equipment manufacture. Unfortunately, Serbia could only compensate this gap within a reasonable future timeframe by attracting foreign strategic companies in these fields. Therefore any activities that will result in this are allowed and desirable.

4. Why has agribusiness been stuck during the last five years?

The agribusiness sector is very important for the dynamics of Serbian industry – food production employs over half a million people, while the food industry comprises over one fifth of the total processing industry (just over 21% in 2018). However, over the long term and on average, agribusiness is showing a minimum contribution to the growth of the gross added value of the country (i.e. gross domestic product), while the food industry itself has been a deductive item for years due to poor financial performance.

As further confirmation of this hypothesis we intentionally use 2016 for comparison with previous years, even though it was extremely favourable for agricultural production, yet even this could not contribute significantly to improving the performance of the agribusiness sector. Table 1 clearly shows that the total gross added value in the country is gradually increasing, but food production is stagnant.

Table 1. Average cumulative real GVA growth rates during the observed periods

	2016/2008	2016/2011	2016/2013
Production of food products	-1,7%	0,2%	-0,4%
Production of beverages	-27,1%	-8,0%	-3,2%
Production of tobacco products	-55,8%	-16,4%	14,3%
Agribusiness - total	-0,8%	0,5%	-4,2%
Total economy	3,0%	4,3%	1,8%

Source: Author's calculation; Notes: Time series of GVA by activities are available on the SORS <http://data.stat.gov.rs/Home/Result/0902010301?languageCode=en-US>

Of particular interest is the finding for the production of foodstuffs during 2016 and in comparison to 2013, where it managed to reduce its gross added value level in the

absolute amount by RSD 4.18 billion⁵ while simultaneously the economy created new value by RSD 9.32 billion. Consequently, the food industry decreased the real growth of Serbian economy during this period by an incredible 44.9%.

Since agriculture registered a roughly double-digit year-on-year decrease in GVA in 2017, we anticipate that the food industry will also be significantly reduced (at the moment of writing this paper official results for 2017 were not available), since its physical scope of activities compared to 2016⁶ was reduced by 0.1%. The unfavourable trends have also been transferred to this year.

Numerous factors are contributing to such poor agribusiness performance. We will only list the most important ones here.

Firstly, insufficient demand presents a problem. Strong domestic demand is a key trigger of the dynamics of those areas of the processing industry where economies of scope and the learning curve effects are characteristic. Agribusiness is among these. When the living standard is low, and earnings have been further stagnating in the long-term, or are undergoing a real decrease, however significant the exports may be⁷, agribusiness suffers. The production of food products thus depends mostly on earning trends. Without their significant growth agribusiness cannot recover. Knowing this, we believe the announced considerable increase in salaries in pensions from the end of 2018 has been received with great relief in this industry.

Furthermore, it would seem that exports cannot properly compensate domestic income limitations due to another reason. Namely, it is well known that the main export destination for the food industry is the Western Balkans. Nearly one third of exports are placed on the markets of neighbouring countries that are no better regarding their standard, and where considerable real expansion in this sense in the mid-term is not likely. During 2017 exports to Bosnia and Herzegovina, Montenegro, Macedonia and Croatia only were worth EUR 962 million, representing 34.5% of the total export value of this sector.

By the way, when considering the potential of demand, it should be noted that it is good when it insists on product refinement. This provides an additional impetus for innovation and differentiation of products, more dynamic growth and competitiveness.

5 Value expressed in constant 2010 prices.

6 Note that the food industry is showing a considerable discrepancy between the realized physical scope and newly created value (primarily an indicator of financial performance). Namely, the physical growth of activity in 2016 marked an increase of as much as 6% compared to 2015, while gross added value has seen only a symbolic 0.3%.

7 The total export of the agribusiness sector of the Republic of Serbia in 2017 reached EUR 2.79 bln, and was EUR 1.3 bln higher than imports.

In this regard, the expressed desire, for example, of Germans for various types of local beer, the French for numerous types of cheese or Italians for diverse pasta products is welcome, and these three countries are important net exporters of precisely these products.

Another problem is the structure of production. Much like other areas of the processing industry, agribusiness is dominated by the production of primary products with the lowest technological content. Therefore even the earnings made in exports are low. A confirmation of this hypothesis can be sought in the share of bulk products in the total export of the agribusiness sector. The share of this segment of agribusiness production in Serbia is traditionally between one fifth and one quarter of the total exports, certainly depending on agricultural yields. On the other hand, EU countries on average register a share of bulk products in the exports of the agribusiness sector of merely around 4%. The most successful food industry countries, such as Germany and Italy, have even lower values; 3.1% and 2.4%, respectively. Similar relative shares are exhibited by Greece, Spain and the Netherlands.

Unavoidably, there are also considerable issues with difficult product placement. These limitations include all the difficulties with the placement of products on the shelves of large retail chains, starting from the entry, to immediate positioning in them, in the broadest sense. This is a significant challenge for small and medium-sized enterprises in the food sector in the domestic, not to mention in the foreign, competitive food product market in richer industrialized economies.

State support to this sector in Serbia is also incomparably lower than in EU countries. The role of the state is to strengthen the efficiency precisely of the above determinants of production by adequate policies, programmes and instruments so that it can retain, or even better, sustainably improve the national competitive advantage. EU countries are champions of this. Particularly in agriculture, they endeavour to affect the competitiveness of local food production through immense financial efforts. This is a fact, although it is also a dilemma whether this generates a more efficient agricultural sector.

Investments into research, development and innovation in agribusiness in the Republic of Serbia during recent years are approximately 0.03% of GDP, which is, relatively viewed, comparable with European countries. However, in Serbia, due to the large nominal difference in GDP, per capita allocations for these purposes are approximately four times lower than the EU average, while the lag after the most successful countries in food production is even greater. Without considerable investments into research, development, and innovation there is clearly no success in any industry, and thus in agribusiness either. Production cannot be modernized by itself, nor can its technological level be increased considerably without state support. It is important to realize that this is not an expense, but an investment in the future, and it would seem that our government recognizes this fact.

5. INSTEAD OF A CONCLUSION

The goal of this paper was to emphasize the fact that Serbian economy, due to the reforms undertaken and the improvement of the investment environment, has created a basis for sustainable economic growth in the mid-term. The growth of gross domestic product is primarily led by the dynamic growth of industrial production and investments. However, the results we have obtained show that maintaining high growth rates will be a challenge. The government must accelerate the transformation process of the Serbian economy into an innovation-based economy, which are not tied, like it was the case to date, and not necessarily exclusively, to large companies that are increasingly coming to Serbia.

Our research precisely shows why technology matters to a company's bottom line and exactly what impact it has. Innovation and technological progress will have to depend much more on local smarts and the potential we undoubtedly have. This is the only way to avoid the current destiny of a cheap labour country whose GDP growth depends primarily on the weather conditions.

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ŠTA JE DOVELO DO BRZOG RASTA SRPSKE PROIZVODNJE OD 2014. GODINE - ZAŠTO JE TEHNOLOGIJA VAŽNA?

REZIME

Krajem 2017. godine Srbija je dostigla najviši nivo industrijske proizvodnje u poslednjih četvrt veka. Brz rast je započeo sredinom 2014. Uprkos tome ova analiza pokazuje da je industrijska dinamika praćena umerenom tehnološkom nadogradnjom, i dalje nedovoljnom za bitnije povećanje bruto dodate vrednosti. Uz to, upotrebom teorijsko-empirijskog pristupa - deduktivnih metoda, statističke i matematičke procene, autori zaključuju da ne postoje jedinstvena razvojna rešenja, niti se može reći da su isključivo industrijalizacija i njen tehnološki napredak ključni za tempo rasta. To je neophodan, ali ne i dovoljan uslov.

Ključne reči: proizvodnja, izvoz, dodata vrijednost, tehnološke promene.