Some aspects of the export performance and efficiency in the Romanian economy

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Abstract: *Generally, a large share of the exports of high-tech products in the total exports of a country is the best indication of its high level of competitiveness. Ten years after joining the EU, Romania has an increasing share of high-tech exports, as compared to the EU pre-accession period, being still far from the European average and from its main trading partners.*

The objective of this study is to analyse the performance of Romania's exports, during different periods, before and after the EU accession, taking into account the profile of the international specialization, measured by various indicators as the products and partner countries concentration, the revealed comparative advantages (RCA), the inter and intra industry trade.

The specialization and international cooperation in producing finished and semi-finished products, parts and subassemblies generates high trade volumes within international value chains. However, the international division of labor has deepened, so that the field of competition has passed from the finished products to the intermediary goods, in different phases or stages of technological processing. In this context, our research has been focused also on the structure of Romania's exports, both according to the criterion of the end-use of the exported goods, and in terms of the domestic value content of exports.

Keywords: *exports, revealed comparative advantages, RCA, Grubel-Lloyd indices, inter and intra industry trade, international specialization*

JEL Classification*: F14, F15, O24*

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Introduction

Creating, exploiting and trading new technologies are vital for the competitiveness of a country, in the modern economy. This is because the high technology sectors are key drivers for economic growth, productivity and welfare, and, generally, represent sources of high value added and well-paid employment. [Eurostat]

Technological competitiveness of a country, defined as ability to commercialize the results of R&D and innovation on the international markets, reflects product specialization. The product and countries concentration indices, as "alter-ego" of the specialization, shows to which degree exports and imports of individual economies are concentrated on a few products, or on a few trading partners, rather than being distributed, in a more homogeneous manner, by several products and countries.

The relatively lack of competitiveness of the Romanian external trade is determined by the quite low degree of export diversification as well as by the low export of high-tech products as compared to exports of goods of medium and low technological level.

Digital divide features of the economy create a gap between the developed countries, which have industrial sectors specialized in producing goods with high value added and the developing countries, active in domains with relatively low value added specializations, in the context of a technological process having successions and stages of different degrees of processing.

The developed countries have abandoned a number of industries that have long been regarded as having a high technological level and which, along with the scientific and technological progress, have become of medium- or low-tech level, in favor of the developing countries. For example, England in the 19th century specialized in textiles and wool and then changed to specialization in some machines and ship construction, then in aircraft, pharmaceutical and chemical industries and lately being specialized in digital industry. When it gained a new competitive position of the specialization, it gave up the previous specialization, whose productions were transferred (relocated) to the developing countries.

The liberalization of international exchange of goods, based on David Ricardo's theory of specialization, represented a comparatively perpetual advantage for the developed countries, just because their economies went from a lower degree of the processing of the natural capital to a higher one. So, the developed countries have always been in a quasi-monopolistic position, from technological-scientific and efficiency perspective. That has allowed them to promote the liberalization of international trading, especially in products with a high degree of processing, for which they have had comparative advantages. In other words, there is a perpetuation of the superior competitive capacity

of developed countries, in high-tech areas for which there is virtually no rule of free competition generated by developing countries.

In the developed countries, securing the quasi-monopole position is determined by the speed of technological progress, much faster than in developing countries. This discrepancy in the rates of diffusion of technological progress in both categories of countries (developed and developing) is also valid for the digitalization of the national economy.

Large shares of the high-tech products in the total exports are the best indication of the level of competitiveness of a country. In Romania, ten years after the EU accession, the share of the high-tech exports has increased to 9.7% from 5.9% in the pre-accession period. In 2016, in the developed Member States, and implicitly at the European Community level, the share of the high-tech exports is higher than in Romania. This gap, between Romania and the developed countries, is basically explained by the lack of interest in the Romanian private sector to finance the R&D and innovation expenditures. Up to 90% of this sector is controlled by foreign-owned companies (subsidiaries and branches of multinational corporations) that benefit from the R&D and innovation results of their mother companies. In Romania, the research centers in such companies do not exist or are very rare, insignificant and uninterested in conducting R&D activities. In the countries with developed market economy, the private sector provides between 50% and 80% of the total R&D and innovation expenditure.

1. Brief literature review

Globalization and the gradual multilateral removal of trade barriers have led to an increasing interest in the countries' patterns of trade and specialization. As observed by Farooqui, theoretically, Ricardian theory of comparative advantage tries to predict globalization to create export concentration following specialization. From the very beginning, the Ricardian theory highlighted the benefits the nation gained from specialization of products and from exporting of goods after specialization. Existing literature shows that, due to globalization and nations being more open to trade do have export concentration by products (Farooqui, 2016).

The pattern of export performance is different by country and region and it is changing in time, at different rates and in different directions. According to Lall, a very few countries are able to rapidly expand export earnings and raise their 'quality', change the export structures from the low-technology and skills to the high-technology and intensive labor skill products. "In a liberalizing world, export success is more important than ever to economic performance. It remains directly relevant, as the main means of earning foreign exchange, reaping economies of scale and specialization and accessing new technology. ... It is an indicator of the efficiency of the industrial sector, facing more

direct (because of liberalization) and intense (because of falling transport costs and the new 'rules of the game') competition than before". (Lall, 2001).

The analyses by Michaely on geographic concentration of external trade flows, for 42 countries, suggested two important observations. First of all, the export has tendency to be more geographically concentrated than imports, especially in the countries where the geographic concentration of export and import is high. Secondly, the both developed and developing small countries have higher geographic concentration than the large ones. (Michaely, 1958)

Massell identified some interesting aspects concerning the relationship between instability of export earnings and concentration of exports. According to his conclusions, "neither diversification nor the degree of industrialization appears to explain much of the variation in export instability". He considers that "diversification may be beneficial in other ways, for example, by providing the economy with greater flexibility in adapting the structure of its production to changes in market conditions" (Massell, 1964).

Manisa considers that diversification of the export of a country is essential for diminishing the pressure on balance of payment and also for the growth of more efficient economic sectors for balanced development. (Manisa, 2014)

According to Samen (2010), the pattern of economic development is accompanied by structural changes in exports and expansion of export diversification worldwide. Also, Dennis (2007) finds out that export diversification plays a significant role in the economic growth of the developing countries because the terms of trade are always unfavorable to these countries as they are exporters of primary goods.

Baldwin (2010) argues that, in our days, international trade is not confined any more to exchanges of raw materials and final goods, but it implies a complex flows of goods, services, people, ideas and investments in all types of capital (physical, human and knowledge). He shares the opinon that, in the last century, trade was dominated by goods produced in one country and sold to customers located in other countries. In the early 21st century trade, factories and offices have been unbundled internationally thus creating the trade-investment-service nexus where some of the complex two-way flows that used to take place within factories and offices now take place across international borders. Trade in parts, components and services as well as foreign direct investment are the most easily measurable aspect of this multi-directional trade.

2. Export concentration and diversification

Concentration and diversification in the field of external trade are based on economic efficiency for producers and beneficiaries, at different aggregation levels of the economies trading goods and services.

Concentration can be considered as an "alter ego" of specialization, provided it relies on the optimal consumption of financial, technological, environmental and human capital and which excludes the mono-culture. If this concentration occurs for the high-demand market segments, especially the high-tech ones, then the disadvantages of a so-called mono-culture can no longer occur, but rather the advantages of specialization.

The degree of export concentration can be assessed, depending on the method used, both in terms of the trade structure, by groups of goods (or by economic sectors) and, from territorial distribution point of view, respectively. The Herfindahl-Hirschman index (HH index) is a commonly accepted measure of the concentration by products, as well as of the concentration by countries. The Herfindahl-Hirschman Products Concentration Index measures the dispersion of trade value by an exporter's products, while the Herfindahl-Hirschman Countries Concentration Index does the same, by an exporter's partners. A higher value of the HH index indicates a greater concentration of values by products or partners.

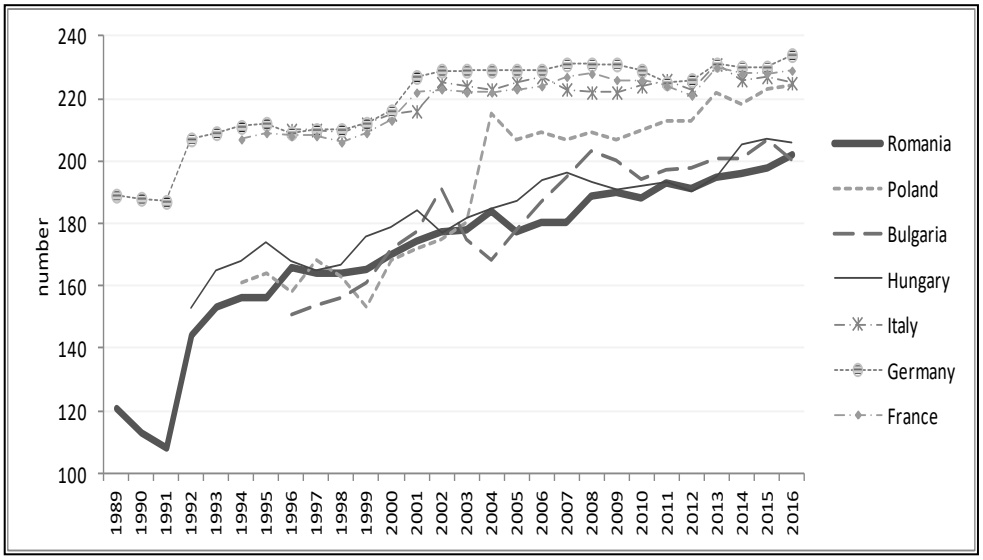
2.1. Export concentration by countries

Export concentration by countries is an indicator of the exporter's dependency on its trading partners. It is, also, an indicator of the danger to the exporter, if its partners set up more or higher trade barriers. Measured over time, a fall in the HH index may be an indication of diversification in the exporter's trading partnerships. A country with a preponderance of trade value concentrated in a very small number of partner countries (markets) will have an index value close to 1 (World Bank, 2013).

$$H_j = \frac{\sum_{j=1}^{n_i}\left(\frac{x_{ij}}{X_i}\right) - \frac{1}{n_i}}{1 - \frac{1}{n_i}} \quad [1]$$

Where: Hj = product index, X is the total value of exports from country i, x is the value of exports from country i to destination market j, and n is the number of partner markets to which country i exports.

Figure 1. Number of export partners, for some EU Member States



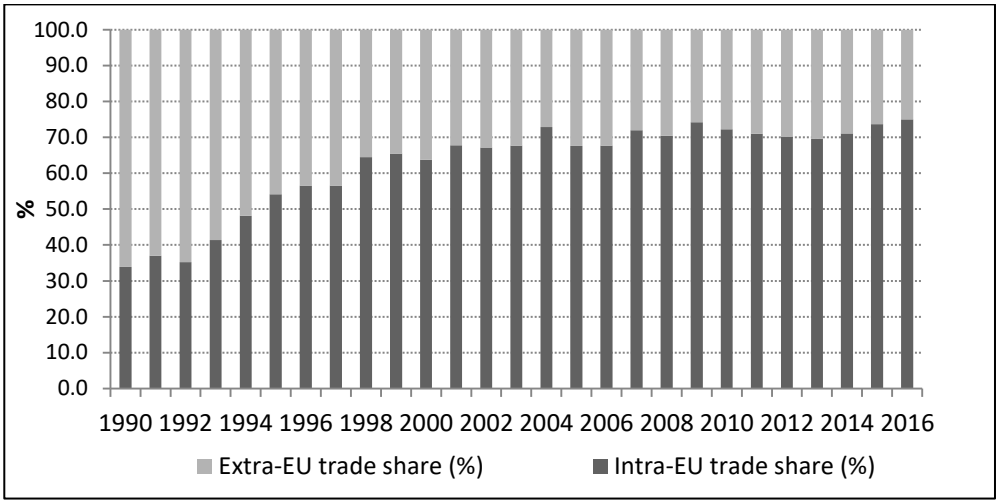
Source: World Integrated Trade Solutions, https://wits.worldbank.org/CountryProfile/en/Country/DEU/StartYear/1989/EndYear/2016/Indicator/NMBR-XPRT-PRTNR# . A market is counted if the exporter ships at least one product to that destination in the given year with a trade value of at least 10,000 USD.

High degree of concentration of trade on the Internal Market of the European Union

According to the INS data, Romania's trade mainly focuses on the Internal Market of the European Union. The share of the intra-EU exports increased steadily, from 63.8% in 2000 to 72.0% in 2007, reaching about 75.1% of total exports of Romania in 2016.

Regarding the destinations of Romania's exports, in the top 10 partner countries in 2016, we find out eight EU Member States (Germany, Italy, Hungary, France, Poland, the Netherlands, the United Kingdom and Bulgaria) and two non-EU countries (Turkey and China).

Figure 2. Shares of the intra-EU and extra-EU flows in Romanian exports of goods (%)



Source: own calculations based on INS data, according to the EU structure corresponding to each year.

Distribution by intra-EU and extra-EU trade is different from one Member State to another. For example, in 2015, the largest share of exports within the EU28 was recorded by Slovakia (85% intra-EU28 exports in total), Luxembourg (84%), the Czech Republic (83%), Hungary (81%), and Poland (79%). On the other hand, in the same year, the United Kingdom (44%) and Malta (45%) were the only Member States that exported more goods to non-EU28 countries than to the Intra-EU28. [Eurostat, 2016]

The main problem, in this respect, is the upper limit up to which a Member State could have trade relations with the other Member States. Can a Member State trade exclusively with other EU Member States? As the statistics show, this share of intra-EU exports in the total export of a Member State varies between 44% and 85%, which means that integration is not only a "trade creation" factor, but also a "trade diversion" one, as a result of at least two elements of influences:

– the EU integration, which stimulates economic development of a country, allowing not only for intra-EU trade growth but also for creating a potential for trade with extra-EU countries;

– the globalization process, which acts objectively in the direction of Romania's trade opportunities with the extra-EU countries, when the criterion of economic efficiency, understood by applying the win-win principle, prevails.

2.2. Export concentration by products

This indicator provides a simple count of how many products (with trade values of at least 10,000 USD) each country exported in a given year.

Table 1. Number of exported products (HS 6-digit level) of some Member States

	1989	1990	1995	2000	2005	2008	2009	2010	2016
Bulgaria				3898	3812	3765	3704	3680	3796
France			4843	4749	4684	4426	4412	4410	4373
Germany	4861	4857	4844	4767	4667	4427	4463	4455	4420
Hungary			3143	3287	3874	3057	3073	3810	4008
Poland			2975	3072	4555	4393	4374	4391	4408
Romania	524	491	3189	3314	3834	3823	3882	3924	3987

Source:https://wits.worldbank.org/CountryProfile/en/country/by-country/startyear/LTST/endyear/LTST/tradeFlow/Export/partner/WLD/indicator/NMBR-XPRT-HS6-PRDCT#. A market is counted if the exporter ships at least one product to that destination in the given year with a trade value of at least 10,000 USD.

The Herfindahl-Hirschman Product Concentration Index measures the dispersion of the trade value by exporter's products.

$$H_i = \frac{\sum_{k=1}^{n_i}\left(\frac{x_{ik}}{X_i}\right) - \frac{1}{n_i}}{1 - \frac{1}{n_i}} \qquad [2] \quad \textit{(World Bank, 2013)}$$

Where: Hi = product index, X is the total value of exports from reporter i, x is the value of exports of product k from country i, and n is the number of products exported by country i.

A country with a trade value concentrated in a very few products will have an index value close to 1. On the contrary, values closer to 0 reflect that exports are more homogeneously distributed among a series of products. Thus, it is an indicator of the exporter's vulnerability to trade shocks. Measured over time, a fall in the index may be an indication of diversification in the exporter's trade profile, which is the case of Romania, according to the results obtained, by the formula [2] (World Bank, 2013) .

Table 2. Indices of export concentration by products, in some EU Member States

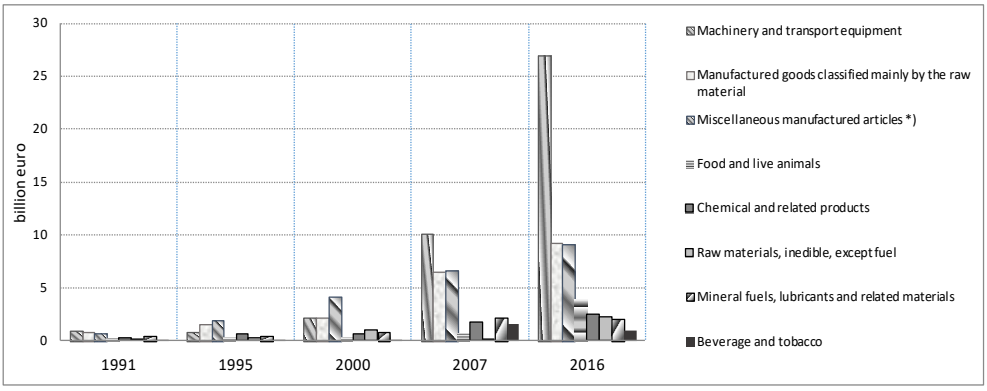
	1995-2000	2001-2006	2007-2016
Bulgaria	0.09641	0.11778	0.11704
France	0.06765	0.08234	0.08689
Germany	0.09181	0.10107	0.09663
Hungary	0.09427	0.13580	0.12610
Italy	0.05434	0.05433	0.05338
Poland	0.07573	0.08290	0.07129
Romania	**0.12851**	**0.12635**	**0.09819**
EU28	0.05736	0.06822	0.06569

Source: own calculation, based on http://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=120.

The results obtained (Table 2) indicate a decline in the concentration of Romanian exports after the EU accession, from 0.12 to about 0.10, but still higher than concentration at the EU28 level. Romania recorded one of the highest export concentration degrees among the selected countries, in the post-association period, 1995-2000. In the post-accession period, the average concentration of Romania's exports is below those of Bulgaria and Hungary and it is comparable with Germany's concentration.

From the point of view of the annual evolution of the product concentration index for export, Romania ranks 39th in 1995, 17th in 2007 and 25th in 2016 at worldwide level.

Figure 3. Structure of exports by product groups, according to SITC, in Romania



Note: *) Miscellaneous manufactured articles - contain processed products, mainly classified by raw material (iron, steel, rubber, metal, etc.) and various manufactured articles (clothing and accessories, footwear, etc.)

Source: own calculation based on INS data, Tempo online database.

The assessment of the external trade concentration is very important, as the results allow analysis of the groups of goods with the most significant weights. Concentration is based on a relatively limited number of product groups that benefit from competitive advantages in terms of human, natural and financial production factors.

The evolution of trade specialization reflects changes in the whole economic system of a country and takes time, because comparative trade benefits cannot be gained quickly, especially as they are structural by definition.

In studying the efficiency of external trade, the profile of specialization is important (Giurgiu, 2008). This could be measured using various indicators, usually by comparative advantages. For the present paper, we have chosen the indicators of the revealed comparative advantage (Bella Balassa) and the intra-industry trade (Grubel-Lloyed) as elements of quantification of international specialization.

The indicator of revealed comparative advantage (RCA), proposed by Bella Balassa in 1965, is calculated as follows:

$$\boldsymbol{RCA} = \frac{x_j^j \Big/ \sum_{j=1}^{n} x_j^i}{x_j^{Wi} \Big/ \sum_{j=1}^{n} x_j^{Wi}} \qquad [3]$$

where:

x_j^i - represents exports of the product j of the country i, and x_j^{Wi} - represents the world aggregate export of product j.

The concept of revealed comparative advantage is widely used in practice to determine the weak or strong sectors of an economy, and applies to trade between countries whose resource endowment is different. This type of trade, between different industries of the partner countries' economies, is also called the inter-industry trade or vertical trade. As a rule, the inter-industry trade takes place between countries with different levels of development, being generated by different production factors endowment, most often aiming to exchange natural resources and primary products for industrial products.

If the RCA is greater than 1, the inter-industry specialization is efficient and the product j has a comparative advantage, because it is more important for the export of the reference country than worldwide level (Giurgiu, 2008)

The indicator of the comparative advantage reflects the extent to which Romania has reaped its relative cost advantages. Based on this indicator, we see Romania's apparent

capacity to capitalize its advantages in different industries, compared to other countries, but also on the share of the main product groups in generating the trade deficit.

In our analysis, we calculated the RCA for Romania, using formula [3], based on the SITC 2-digit level, in 2007 (the first year of the EU membership), and in 2016 (10 years after the EU accession). The results indicate only five groups of goods with significant gains in comparative advantage over the decade under review.

First of all, we mention the "Road vehicles" group, which, although it does not show the largest increase in the comparative advantage, compensates by holding the largest share in the total exports of Romania. Nevertheless with much smaller weights, the groups of "Tobacco and tobacco manufactures" and "Cereals and cereal preparations" have, by far, the greatest comparative advantage and the highest increase in 2016 compared to 2007. Unfortunately, some groups of goods that lost their comparative advantages, during the analyzed period, have large weights in the total exports of Romania, for example "Gas and industrial products made from gas", "Office machines and automatic metalworking machinery", "Non-ferrous metals", "Non-metallic mineral manufacturing", "Other transport equipment", "Footwear". (Annex 1)

Intra-industry trade indicator of Grubel-Lloyd

The formula created by the Australian economists H.G. Grubel and P.J. Lloyd quantifies and follows the evolution of intra-industry specialization, *i.e.* the so-called horizontal (intra-industry) trade that takes place between countries with similar development and involves the exchange of different products from the same (or similar) industries as a result of technical progress, innovations or economies of scale.

$$GL_i = 1 - \frac{|X_i - M_i|}{X_i + M_i} \qquad [4]$$ (World Bank, 2013)

Where: X_j - represents exports from the product / product group / sector i, M_i - imports from product / product group / sector i.

If a country only imports or only exports goods within the same sector, therefore no intra-industry trade, the second term on the right of formula [4] is equal to one and the entire expression is reduced to zero. Similarly, if the value of exports is equal to the value of imports (sector export i = import sector i), the second term on the right of formula [4] is zero, and the expression is reduced to one. Thus, the Grubel-Lloyd index (GL) varies between zero (indicating pure cross-trade) and one (indicating pure intra-branch trade). (World Trade Organisation, 2012)

Annex 2 contains the GL intra-industry indicators, calculated according to formula [4], by SITC 2-digit level; both groups of products with predominantly intra-industry trade, as well as, with predominantly inter-industry trade, in 2016 as against 2007, could be observed.

The best performing sectors are those for which both comparative advantage and Grubel-Lloyed indicators have a growing trend. Voinea argues that if a sector has a comparative advantage, it is good that exports largely cover imports, *i.e* the Grubel-Lloyed indicator should has high values (Voinea, 2002).

As in Annex 2, the most groups of products with high weights, the GL indicator levels dropped between 2007 and 2016, including those groups for which RCA were registerd.

2.3. Export diversification by products

Product diversifications of exports are closely related to the economic development of the countries. More advanced economies export a wider range of goods to a greater number of trading partners. Diversification has as its core the change, in the sense of amplification and diversity of creation, given the unlimited capacity of human tastes and pleasures and the rationalization of effort consumption for the production of goods and services. Diversification is supposed to keep pace with technological progress, which acts precisely in the direction of diversity.

Export diversification is held to be important for developing countries because their export earnings are very vulnerable, being highly dependent on quite few primary commodities. Diversification of products for export is generally viewed as a positive development, especially in the case of the manufactured goods. This is why the export diversification is considered as an important tool for developing countries' policy mix to obtain sustainable earning from exports and further achieve income growth. (Araylim, 2011)

The diversification index indicates to what extent the structure of exports or imports of a given economy, by products, differs from the world pattern. The diversification index takes on values between 0 and 1. A value closer to 1 indicates a greater divergence from the world pattern.

$$S_j = \frac{\sum_i \left| h_{ij} - h_i \right|}{2} \qquad [5]$$

Where: h_{ij} = share of product i in total exports or imports of country or country group j, h_i = share of product i in total world exports or imports.

According to our analyses, after the EU accession, the diversification degree of Romania's exports is closer by the world pattern and comparable to countries such as Poland, Hungary and Bulgaria (Table 3). From the point of view of the annual evolution of the product diversification index for export, Romania ranks 62th in 1995, 22nd in 2007, and 20th in 2016, at worldwide level.

Table 3. Indices of export diversification by products, in some EU Member States

	1995-2000	2001-2006	2007-2016
Bulgaria	0.50894	0.49715	0.46205
France	0.25603	0.27942	0.33011
Germany	0.27978	0.27738	0.32402
Hungary	0.38658	0.36440	0.40655
Italy	0.36329	0.36906	0.36551
Poland	0.44891	0.44814	0.40211
Romania	**0.58006**	**0.53362**	**0.42346**
EU28	0.15827	0.17638	0.21639

Source: own calculation, based on http://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=120

The success of the export is increasingly related to the attractiveness of the foreign direct investments. Given the expanding globalization (with the emergence of some integrated production systems linking several countries) and the role of multinational companies in trade and innovation, it is important for countries to ensure not only more foreign investment but also a better quality of them.

Most trade theories consider that technology has no role in the comparative advantage of a country and that the main determinants are the relative endowments with factors of production. However, developing countries are supposed to be interested in importing and using technologies and innovations from developed countries.

3. Technological structure of exports

The structure of Romania's exports by group of goods changed significantly in the post-accession period, if compared to the pre-accession period, in the sense of increasing the share of products a higher value added.

Considering the total export of Romania, we noticed that the share of "Raw Materials" group dropped from 9.2% in 2000 to 4.1% in 2016, as well as the share of the "Manufactures" category, from 56.3% in 2000 to 30.6% in 2016. In addition, the share of the "Machinery and transport equipment" category increased significantly, from 18.9% in

2000 to 44.5% in 2016. In nominal terms, the "Machinery and transport equipment" grew by almost 25 billion euro between 2000 and 2016, of which 11 billion euro after 2009. Moreover, the value of this category did not diminish when the economic crisis occurred, proving a strong resilience especially in 2009-2010, when external demand, both in developed economies and emerging markets, narrowed significantly.

The relatively weak competitiveness of the Romanian external trade is determined by the low degree of diversification of exports in the pre-accession period as well as by the low volume of exports and imports of high technology. The top 10 most exported product groups, in the post-accession period, is significantly different as compared to the pre-accession period, because of:

- the share of the top 10 product groups (in terms of value) decreased from 49% in 2001-2006 period to 37% in the 2007-2016 period;
- the technological level of the top 10 products is higher - more products incorporate medium and high technology compared to the pre-accession period;
- the foreign direct investment contributed to the improvement of the Romanian export structure, from the perspective of the technological level, but without reaching the performance of the other neighboring or partner member states.

The large share of high-tech products in the total exports of a country is the best indication that it has a superior level of competitiveness and of the value added of exported products.

There are several ways to divide products into types of technology. For our research, we used the OECD 1994 classification (so-called Lall's classification), which is based on the technological activity within each product category.

Romania's export of high-tech products increased in the post-accession period, as compared to the previous one (9.7% vs. 5.9%). They are quite comparable with the share of high-tech exports of Italy and Poland (as percentage in the total individual export), but still much lower than those of Hungary, France, Germany and the EU28 average (17.6% in the 2007-2016 period) (Table 4).

Table 4. Technological structure of exports (%), in some EU Member States

Technological structure of exports (%)		*RO Pre-association period to EU*	*RO Association period to EU*	*RO Pre-accession period to EU*	*RO post-accession period to EU*	*Scope of classification by types of technology*
		1990-1995	**1996-2000**	**2001-2006**	**2007-2016**	
		Primary products				
PP	Romania	7.6	7.8	5.7	8.3	fresh fruit, meat, rice, cocoa, tea, coffee, wood, coal, oil, gas
	Bulgaria		15.7	18.0	22.8	
	Hungary		8.8	6.0	6.5	
	Poland		13.1	9.7	9.7	
	France		7.6	6.7	7.8	
	Germany		4.7	4.6	5.2	
	Italy		3.7	3.8	4.7	
	EU28		7.5	7.2	8.4	
		Resource-based manufactures				
RB	Romania	21.5	18.7	18.6	17.0	meat / fruit, beverages, wood products, vegetable oils, concentrated ores, crude oil / rubber, cement, stone, glass
	Bulgaria		26.2	22.3	25.8	
	Hungary		12.2	9.7	11.5	
	Poland		17.5	17.2	18.1	
	France		14.9	14.5	16.0	
	Germany		11.2	11.4	11.7	
	Italy		12.9	13.8	15.5	
	EU28		16.2	16.5	18.2	
		Low technology manufactures				
LT	Romania	38.7	49.1	44.4	21.9	textile fabrics, clothing, headgear, footwear, leather goods, travel goods, ceramics, metal parts / structures, furniture, jewelery, toys, plastic products
	Bulgaria		28.0	32.9	19.4	
	Hungary		17.0	12.1	9.4	
	Poland		31.4	23.8	20.2	
	France		12.8	12.6	13.1	
	Germany		13.0	12.2	12.1	
	Italy		30.3	27.9	24.7	
	EU28		16.1	14.9	14.2	
		Medium technology manufactures				
MT	Romania	27.9	19.8	24.9	39.7	passenger vehicles and parts thereof, cargo vehicles, motorcycles and parts; synthetic fibers, chemicals and paints; fertilizers, plastics, iron, pipes / tubes; motors, industrial machinery, pumps, switching systems, vessels, watches
	Bulgaria		19.0	16.6	18.6	
	Hungary		35.6	38.0	39.5	
	Poland		28.2	38.2	36.9	
	France		33.7	35.3	33.4	
	Germany		47.2	47.3	45.8	
	Italy		40.4	40.9	41.0	
	EU28		35.8	36.1	35.7	
		High technology manufactures				
HT	Romania	2.6	4.0	5.9	9.7	IT equipment, telecommunication, televisions, transistors, turbines, power generating equipment; pharmaceuticals, aerospace, optical / measurement instruments, cameras
	Bulgaria		5.4	5.4	8.5	
	Hungary		21.3	30.2	27.8	
	Poland		7.5	8.1	12.2	
	France		19.8	20.2	23.1	
	Germany		16.9	18.9	19.1	
	Italy		10.2	10.5	10.3	
	EU28		17.6	18.7	17.6	

Note: This classification does not cover electric power, cinema films, printed matter, special transactions, gold, artwork, coins, and pets.

Source: http://unctad.org/en/Pages/Statistics.aspx

It results, from our analysis that the most extensive and profound ("deep") specializations are occur among the developed economies, characterized by complementarily and diversity of products, not only final but also intermediate.

Currently, the specialization is supported by the segmentation of intermediate and final products within international value chains. Participants benefit more or less from quasi-monopolies of performance and technological progress, in the corresponding segment of the international value chain.

The most interesting value chains, in terms of international specialization and cooperation, relate to the high-tech products and services, including the aerospace, bio and nano-technologies, products and equipment in the pharmaceutical industry and, in general, to the corporate complex multinationals, that transcend the borders of states and national economies (Table 5).

The objective bases of segmentation of different stages of production and re-assembly by the MNE are practically represented by the globalization of markets, *i.e.* the need for an efficient, optimal combination of production factors from the world perspective and the requirements of technological progress without borders, all under the imperative of "sustainable development for all".

Table 5. Categories of high-tech exports, by SITC, in Romania (%)

	1990-1995	1996-2000	2001-2006	2007-2016
TOTAL HIGH TECHNOLOGY	100.0	100.0	100.0	100.0
Electronics-telecommunications	10.0	31.2	48.9	64.5
Scientific instruments	5.3	4.0	8.5	11.9
Computers - office machines	3.7	21.4	8.8	6.5
Electrical machinery	1.0	1.9	3.0	4.4
Non-electrical machinery	12.6	11.3	11.7	3.7
Pharmaceuticals	7.3	3.9	1.5	2.7
Aerospace	9.7	7.9	11.7	2.5
Chemicals	3.9	2.6	1.9	1.6

Source: own calculation, based on NIS data.

4. Export of goods by end-use

The increased fragmentation of production and trade through supply chains is largely due to the enterprises' focus on their core competencies and competitive advantages. This focus may be on innovation and product strategy, marketing and the highest value added segments of manufacturing and services, therefore reducing the direct ownership over "non-core" tasks such as ancillary services and volume production.

Trade in intermediate goods are a direct consequence of the international fragmentation of the production, the extension of vertical supply chains and related sourcing strategies of the companies. According to the outsourcing hypothesis (Feenstra & Gordon, 1996), the companies outsourcing to countries which have comparative advantages in the production of these specific product categories (in order to lower cost) acquire higher quality inputs, and generally improve their competitiveness. Companies in industrialized countries shift the labor-intensive stages of their production process to labor abundant countries with lower wages.

Intermediate goods and services – that is, products used as inputs to produce other products – dominate trade flows, representing 56% of trade in goods and 73% of trade in services in the OECD countries. In 2016, 60% of the exports of Romania represent intermediate goods (Table 6). If we take into account that 59% of imports, in 2016 are intermediate goods as well, it seems that Romania is a net importer (-5.3 billion euro) of such kind of goods.

Table 6. Romania's exports of goods, by end-use

						2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Shares of end-use in total, %	Total export in goods				%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		Intermediate goods				**49.1**	**52.9**	**55.4**	**55.7**	**49.5**	**53.4**	**54.6**	**57.1**	**57.1**	**57.4**	**58.5**	**60.0**
		Household consumption				31.5	27.2	23.3	19.6	19.9	18.1	17.8	18.8	18.1	18.4	18.6	18.3
		Capital goods				7.3	8.6	9.4	9.3	12.5	10.5	10.4	9.3	9.2	9.5	10.1	10.0
		Mixed end-use				1.8	2.3	3.4	5.5	10.6	11.7	10.7	8.5	8.9	7.8	7.3	6.6
			Mixed end-use	Personal computers		0.1	0.2	0.4	0.9	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.2
				Passenger cars		1.3	1.8	2.7	2.9	5.8	5.5	5.2	5.6	6.4	5.7	5.3	5.0
				Personal phones		0.3	0.2	0.1	1.2	3.3	4.5	3.7	0.8	0.6	0.4	0.4	0.3
				Packed medicines		0.1	0.1	0.3	0.4	1.2	1.5	1.6	1.9	1.8	1.5	1.5	1.1
		Miscellaneous				10.3	9.0	8.5	9.9	7.5	6.3	6.5	6.3	6.7	6.9	5.5	5.1

Source: Processing based on data extracted from OECD.Stat, on 09 Feb 2018.

Better understanding on how much domestic value added is generated by the export of a good to a country is crucial for development strategies and industrial policies.

According to OECD data, the foreign content of Romania's export does not evolve constantly in time. It increased to 26.4% in 2015, from the lower level of 22.8% in 2009, after crisis (Annex 3) but the level is lower than in 2006, when it reached 28.2%.

Conclusions

The low degree of the export concentration involves a low degree of specialization but also a great diversification - which is a favorable economic aspect, provided that the diversification is based on medium and high technology products (which is not the case of Romania).

Romania has a high degree of concentration on the internal market of the EU, which implies concerns for increasing the resilience of the economy to possible external shocks and vulnerabilities (considering the over 75% share of intra-EU trade in the total trade of Romania).

Increasing the contribution of the FDIs to improvementing Romania's social and economic performance indicators, including the growth of exports, depends directly on the appropriate measures and on the combination of effective policies that should be considered:

a) stimulating FDIs in high-tech industries with high value added;

b) increasing the share of the reinvested profits of FDI companies in the host economy;

c) improving the Romanian business environment, high-tech absorption capacity and available European post-accession funds;

d) better and rigorous control over the inappropriate profits, such as: transfer pricing, copyright, parallel lending, money market speculation, and so on.

The big ”asset” of Romania is the ”Machinery and transport equipment” sector that is specialized on a medium cost and good quality area. Other sectors where Romania is quite strongly integrated with European economies are those producing low proceesed wooden products, metallurgical products; mechanical machines and devices, electrical apparatus and equipment and parts thereof, textile and footwear.

Romania's export structure has improved in recent years, notably by increasing the share of high and medium technology products, at the expense of primary and low-technology products;

According to data published by the World Economic Forum, the export of high-tech products to Romania occupy, in 2015, the 38th position in the hierarchy of the world export of high-tech products, better than that of the exports total of Romania (the 43th position in world exports 2015).

Romania’s position in the international value chains is on the segment where raw materials predominate and the value added is relatively low. We have the potential to

increase the degree of diversification and specialization, which requires distinct, but also interfering and complementary policies.

Increasing the degree of export competitiveness and selectivity of imports, represent now an issue that, in a fairly high proportion, depends on the FDIs (of 70% on exports and 60% on imports). These must to be oriented, by means of partnerships schemes (public-to-private, private-to-private and public-to-public) towards increasing export and import contributions, to sustainable economic development and increasing social inclusion in Romania.

Romania's trade policy, in accordance with the European directives in this field, does not exclude the promotion of substitution of competitive imports but sanctions, de *jure* and not in all cases *de facto*, transfer pricing strategies between „mother" companies and foreign affiliates, intra-group and barter practices beyond normal market parameters.

Specialization and international cooperation, as well as FDI, are factors of globalization, with positive and less.

The policy of import substitution is an attempt and practice of every national economy, provided that it is able to assimilate competitive products and services, not only at their initial parameters but even to a greater extent, by superior assimilation. This thesis comes in total contradiction with the idea that if we produce inefficiently, we better import, because it can reach the absurd situation where we have to import everything.

According to the World Economic Forum, Global Competitiveness Report 2016, a country could be included in one of the following three stages:

- Stage of growth based on labor and capital endowment
- Stage based on the efficiency of the use of the production factors
- Stage of economic growth, based on innovation.

Romania is in the middle stage, between efficiency and innovation.

Being a medium-sized country, Romania should export goods in which production is specialized, for which it has competitive advantages, trying to use the most successful achievements of technological progress. In order to preserve the competitive advantages that we have, we must resort to the relative endowment with intellectual and imaginative capacity of the citizens, continually and in full compliance with the recent standards, progress, R&D and innovation perspectives and professional training. The policy to stimulate the "brains" and entrepreneurs to stay and not to leave the country must be a priority as important as health and education priorities.

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Annex 1. Romania's comparative advantage (RCA), by main product groups, according to the SITC, in 2016 compared to 2007

SITC 2-digit	RCA			share in total export 2016 (%)	RCA gain "+"/ loss "-"/ const "≅"
	2007	2016	*Difference 2016-2007*		
Road vehicles	0.965	1.807	0.842	11.4	+
Electrical machinery, apparatus and appliances, n.e.s.	1.357	1.724	0.367	3.6	+
Tobacco and tobacco manufactures	2.032	4.855	2.824	0.4	+
Cereals and cereal preparations	0.798	3.998	3.199	0.3	+
Leather, leather manufactures and dressed furskins	1.178	1.636	0.459	1.7	+
Sugar, sugar preparations and honey	0.342	0.559	0.217	1.7	≅
Essential oils for perfume materials and cleaning preparations	0.636	0.823	0.187	4.1	≅
Plastics in non-primary forms	0.439	0.589	0.151	2.0	≅
Power generating machinery and equipment	0.933	1.081	0.149	4.1	≅
Specialised machinery	0.488	0.575	0.087	2.6	≅
Photo apparatus, optical goods, watches and clocks	0.101	0.099	-0.002	1.6	≅
Manufactures of metal	1.301	1.224	-0.078	1.7	≅
Vegetables and fruits	0.332	0.194	-0.138	1.5	≅
Gas, natural and manufactured	0.137	0.109	-0.028	4.7	-
Office machines and automatic data processing machines	0.236	0.155	-0.080	5.0	-
Non-metallic mineral manufactures	0.407	0.242	-0.165	4.4	-
Metal working machinery	1.128	0.592	-0.536	2.5	-
Other transport equipment	1.620	0.964	-0.656	8.7	-
Non-ferrous metals	1.025	0.755	-0.271	3.5	-
Footwear	7.492	2.694	-4.798	1.9	-
Fertilizers	4.754	0.412	-4.342	1.3	-
Iron and steel	2.368	1.340	-1.028	1.2	-

Source: Own calculations based on UNCTAD data (www.unctad.org/fdistatistics), available in December 2017

Annex 2. Romania's intra-industry trade, measured by Grubel-Lloyed formula, based on the SITC, in 2016 compared to 2007

SITC 2-digit	2007	2016	Difference 2016-2007	Share in total export 2007 (%)	Share in total export 2016 (%)
Electrical machinery, apparatus and appliances	0.535	0.458	-0.076	10.7	15.8
Road vehicles	0.731	0.404	-0.327	8.1	15.1
Other industrial machinery and parts	0.644	0.490	-0.155	5.0	6.1
Articles of apparel & clothing accessories	0.189	0.326	0.137	10.7	4.7
Cereals and cereal preparations	0.704	0.308	-0.397	0.6	3.9
Furniture and parts thereof	0.278	0.214	-0.064	3.8	3.7
Rubber manufactures	0.488	0.310	-0.178	2.5	3.5
Petroleum, petroleum products and related materials	0.657	0.650	-0.007	6.8	2.9
Iron and steel	0.521	0.585	0.064	8.1	2.9
Manufactures of metal	0.707	0.638	-0.069	2.9	2.8
Power generating machinery and equipment	0.558	0.543	-0.015	2.2	2.6
Telecommunication and sound recording apparatus	0.849	0.634	-0.214	1.0	2.4
Footwear	0.265	0.366	0.101	4.4	2.2
Other transport equipment	0.233	0.234	0.001	3.6	2.2
Textile yarn and related products	0.792	0.717	-0.074	2.4	2.1
Professional and scientific instruments	0.768	0.489	-0.279	0.6	2.0
Oil seeds and oleaginous fruits	0.297	0.186	-0.110	0.6	1.9
Cork and wood manufactures (excluding furniture)	0.515	0.277	-0.238	1.6	1.8
Miscellaneous manufactured articles	0.790	0.705	-0.086	1.3	1.6
Non-ferrous metals	0.507	0.595	0.088	2.7	1.4
Specialized machinery	0.832	0.686	-0.146	1.3	1.4
Tobacco and tobacco manufactures	0.528	0.298	-0.230	0.5	1.3
Medicinal and pharmaceutical products	0.944	0.797	-0.148	0.3	1.2
Cork and wood	0.112	0.279	0.167	1.7	1.0

Source: Own calculations based on UNCTAD data (www.unctad.org/fdistatistics), available in December 2017.

Annex 3. Domestic Value Added content of exports, in some EU Mmeber States

	%															
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
France	77.2	77.5	78.1	78.8	77.8	76.6	75.0	74.7	75.3	78.5	76.3	75.0	74.1	74.2	73.7	
Germany	79.9	80.1	81.3	81.0	80.4	78.7	76.7	75.8	75.3	78.2	76.8	74.4	74.0	74.2	74.6	
Hungary	48.5	50.8	53.8	52.8	52.6	52.1	50.8	51.8	53.9	55.3	51.4	51.5	52.1	52.6	52.7	
Italy	80.1	80.4	80.9	80.8	79.7	78.0	75.7	74.9	74.3	78.9	75.2	73.6	73.4	74.2	74.6	
Poland	76.2	76.8	75.9	73.3	71.6	71.8	69.1	68.8	69.0	73.0	68.8	67.7	67.0	67.4	67.0	
Bulgaria	66.0	64.4	68.0	65.0	62.2	68.0	55.8	54.3	52.9	63.4	64.0	60.2	58.8	58.4	58.3	
Romania	**77.1**	**76.0**	**77.9**	**76.8**	**73.6**	**72.1**	**71.8**	**74.2**	**73.1**	**77.2**	**78.1**	**75.6**	**74.0**	**75.2**	**74.9**	**73.6**

Source: https://data.oecd.org/trade/domestic-value-added-in-gross-exports.htm for 2000-2014. Own calculation for 2015.