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## Competitiveness of Polish mid-tech and high-tech exports to the European Union (EU-27) in the first decade of the 21<sup>st</sup> century

**Abstract:** The paper addresses the issue of structural changes in Polish exports to the European Union (EU-27) in the period 2001–2011 in terms of the revealed comparative advantages (RCA) and technological intensity (shifts in shares of mid-tech and high-tech industries) taking into account the context of the growing openness of the Polish economy and the substantial orientation to European markets. The principal aim of the research is thus an empirical examination by making use of trade data on the 4-digit level of disaggregation of the Harmonised System and whether the technological intensity of Polish exports was consistent with the evolution of comparative advantages and which of the mid-tech and high-tech sectors became the biggest winners (also losers) in the integration processes within the European common market.

The results suggest a strong dependency of Polish mid-tech and high-tech exports to the EU-27 on the activity of foreign investors (multinational companies) and their technologies being transferred to Poland. This proves to some extent the validity, utility and explanatory potential of the research paradigm of corporate (neo)colonialism and raises a great deal of questions and doubts related to the sustainability of revealed comparative advantages in the sectors covered by the research. One of the serious risk factors is whether and how successful will be the attempts aimed at preserving preferences for international business and developing new, attractive ones as well as still keeping labour costs (wages) at a relatively lower level. These dilemmas may also suggest that the Polish economy is in a position in the near future to take up developmental challenges characteristic of the phenomenon of the middle

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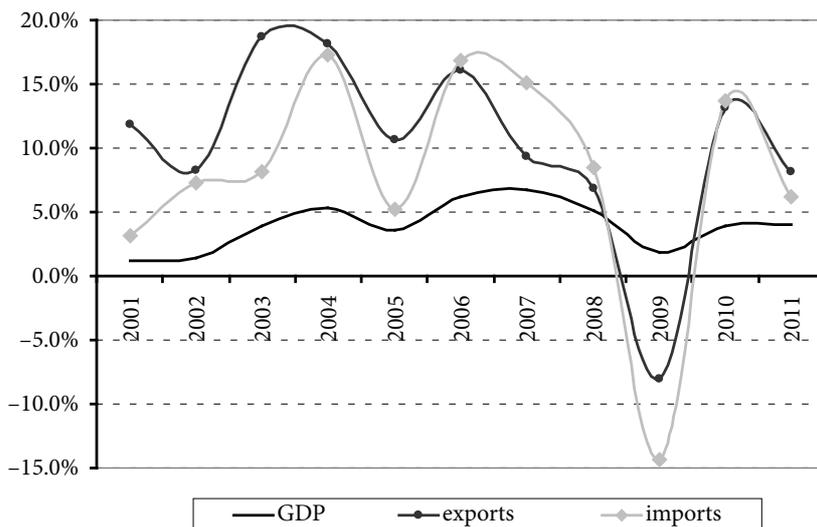
income trap. However the prospects of a dynamic and effective structural catching-up process seem to be unlikely.

**Keywords:** exports, international trade, international competitiveness, technological intensity, Poland.

**JEL codes:** F10, F14, F23, O33.

## Introductory remarks

The first decade of the 21st century has been the period when the Polish economy experienced both dynamic as well as moderate rates of economic growth (Figure 1). Observed changes in the economic cycles were brought about to a great extent by the integration processes with the European Union, i.e. the strategic perspective of membership (pre-accession period) and the formal joining into this integration grouping. The constantly growing openness of the Polish economy, growth of the trade volume and value, the inflow of foreign direct investments (FDIs) accompanied by the transfer of knowledge and technology in the context of internationalisation generally speaking generated a great deal of positive structural changes.

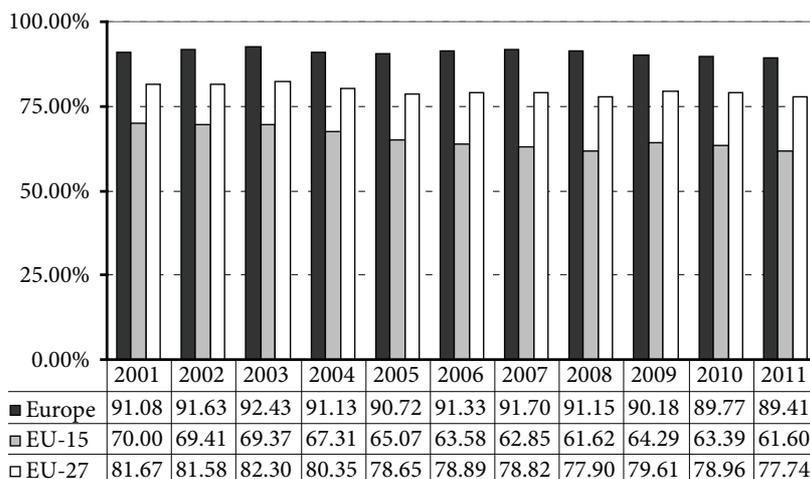


**Figure 1. Growth rates of Polish GDP, exports and imports between 2001–2011**

Source: Author's own calculations [GUS 2012, p. 6; GUS 2013]

Analysing the fluctuations of GDP, exports and imports between 2001–2011 (see again Figure 1) leads to an observation that the dynamics of Polish exports were more sustained in comparison with imports. It may suggest that a certain group of companies selling their products abroad experienced expected gains from their restructuring. They resulted in their greater resilience to the impact of negative external factors (e.g. weaker global consumption), thus proving to some extent their higher competitiveness. On the other hand one has to take into account following facts:

- Polish mid-tech and high-tech exports are highly dependent on the activity of foreign companies operating in Poland which means as well a high dependency on the inflow of FDI's and imports of advanced technological knowledge.
- The geographic structure of Polish exports in the period covered by the research was and still is highly concentrated on European markets (about 90%) which together with the macroeconomic situation, especially in the European Union, clearly determines the dynamics of Polish economic growth and development (Figure 2).



**Figure 2. Percentage shares of European markets in the geographical structure of Polish exports between 2001–2011**

Source: Author's own calculations [Trade Map 2014]

## 1. Research goals and methodological aspects

Having said that, the aim of the research and paper was to empirically examine to what extent the evolution of technological sophistication (capital-intensity) of Polish exports to the European Union (EU-27) in the years 2001–2011 were convergent with the changes of revealed comparative advantages (RCA).<sup>1</sup> To some extent similar research has been undertaken so far by Kellman and Shachmurove [2012] who focused their analysis on the sophistication of Poland's trade patterns with special regard to machinery exports (1980–2009) and the phenomenon of intra-industry trade.

The paper is divided into five sections. In the first one I present the theoretical background of the research. The second part covers the general characteristics of the technological intensity of Polish exports, whilst the third and the fourth are devoted to mid-tech and high-tech commodities exported by Poland in the first decade of the 21<sup>st</sup> century. The author also embarked on an identification of sectors which benefited the most or lost their competitive potential due to integration and new opportunities of doing business under the legal framework of the European Single Market. The last part concludes.

The analysis was carried out by referring to mid-tech and high-tech (technologically advanced) industries, whose average shares to the European Union (EU-27) in the period covered by the research were at least 0.5%. For this purpose the primary data of [Trade Map 2014] were used through the access to the trade statistics of the International Trade Centre (ITC) on the 4-digit (in some cases, if needed, also the 6-digit) level of disaggregation. Selection of mid-tech and high-tech groups was conducted by making use of the classification of the United Nations Conference on Trade and Development (UNCTAD) and the tables converting statistics of the Standard International Trade Classification (SITC) into trade data according to the Harmonised System (HS) [cf. UNCTAD 2012]. Because of the character of data the whole analysis of competitiveness was executed on the meta-level: substantially separated sectors of the national economy [cf. Gorynia 2009, p. 51].

One has also to be aware of the fact that using the indicator of RCA is in fact a measurement of competitive, not comparative advantage, because cost comparisons used for the calculations are based on possibly distorted market prices which are not in equilibrium. Another factor is that wage hikes or cur-

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<sup>1</sup> Calculated according to the formula proposed by Balassa [1965]. A country reveals its comparative advantage when the value of RCA indicator is higher than 1.

rency appreciation could, at least temporarily, eliminate the ability to export any or all goods; what is more, larger than proportional market share can result from subsidies or other price distortions instead of high productivity [cf. Siggel 2006, pp. 138–140, 146].

The concept of the research applied by the author is also based on a model assumption, according to which positive structural changes (here: improved competitiveness of companies represented by growing technological intensity/sophistication of their exports) is rooted in the larger openness for international cooperation and may be interpreted as a reaction for more intense competition pressure because of the presence of European companies on the domestic market as well as of goods imported from third countries. A strategic necessity to sustain and improve their competitive position on foreign markets by companies which internationalised their business models means for them as to how to address a challenge of creating, acquiring and applying new knowledge (in a broad sense diversified types of advanced capital) and practical experience. This factor together with an appropriate, well-designed economic policy and favourable institutional circumstances determines the prospects of continuous improvement of international competitiveness of an economic system [cf. IMD 2014; WEF 2013, pp. 4–9].

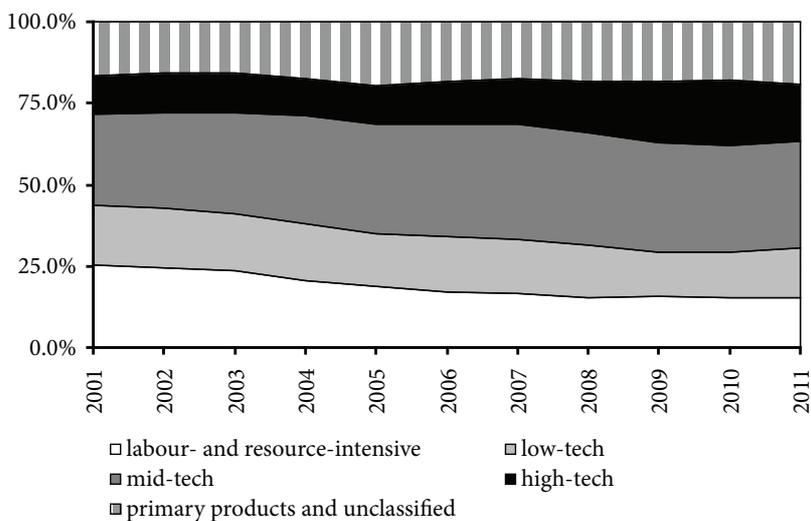
## **2. Technological intensity of Polish exports – general characteristics**

When embarking on an analysis of the evolution of the technological intensity of Polish exports one may instantly observe positive tendencies (Figure 3 and 4), especially the decreasing shares of labour- and resource-intensive goods (by 10 percentage points, to the level of 15.1%) as well as low-tech ones (3 percentage points less in comparison with the year 2001, reaching the level of 15.4%; in 2009 the share was temporarily even lower: only 13.6%). Simultaneously, shares of mid-tech and high-tech goods were expanding, respectively from 28% to 32.9% (in 2007 reaching 35.3%) and from 11.8% to 19.2% (in 2005, shortly after accession to the EU their share hit 19.8%).

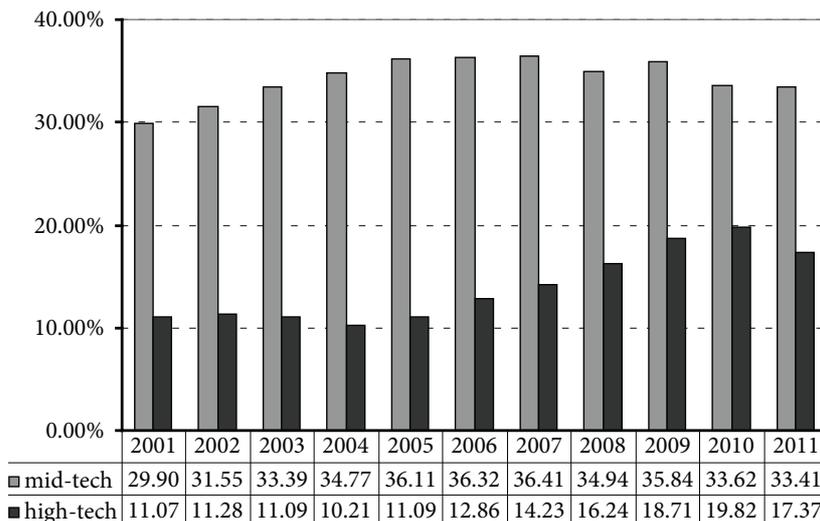
In the case of the exports to the member countries of the European Union (EU-27)<sup>2</sup> shares of Polish mid-tech and high-tech product clusters increased

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<sup>2</sup> This group of countries was a reference point for the whole period covered in the research.



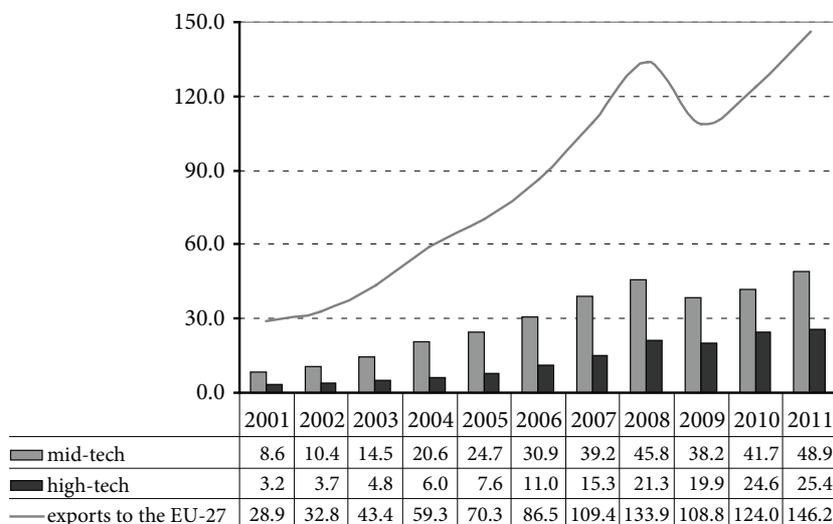
**Figure 3. Technological intensity of Polish exports between 2001–2011**  
 Source: Author's own calculations [Trade Map 2014]



**Figure 4. Percentage shares of Polish mid-tech and high-tech exports to the European Union (EU-27) between 2001–2011**  
 Source: Author's own calculations [Trade Map 2014]

at first, especially during the economic boom in the first years of the membership (2005–2009).<sup>3</sup> However, a slightly negative impact can be identified in the last two years of the decade, when the European economy suffered from the consequences of the financial crisis.

Recognised tendencies may suggest that export-oriented production in Poland is an important link in corporate supply chains. This means, however, that any kind of negative external factors decreasing consumption in highly developed countries may bring about a deep reduction in production plans of big companies. As a result of the Forrester effect (bullwhip effect) [Pluta-Zaremba 2002] trade volume and value may be hit in many ways. Nevertheless Polish mid-tech and high-tech exports have proved their resilience and were rising steadily in absolute numbers (Figure 5).



**Figure 5. Value of Polish mid-tech and high-tech exports to the European Union (EU-27) between 2001–2011 [USD, billion]**

Source: Author's own calculations [Trade Map 2014]

<sup>3</sup> It is worth mentioning that in the period 19<sup>th</sup> Feb 2004–28<sup>th</sup> Jul 2008 the Polish zloty (PLN) appreciated against the euro (EUR) from the level of 4.8986 to 3.2053, which is almost 35% [data ECB 2014]. This may prove a particular resilience of these sectors to the negative impact of an unfavourable exchange rate. At the same time one can claim that there is a tendency according to which the competitive position of sectors producing highly-processed goods is less exposed to external shocks (e.g. turbulence on financial markets and the volatility of exchange rates) as opposed to industries based on resources and labour.

### 3. Polish exports of mid-tech commodities to the European Union (EU-27) between 2001–2011

The aggregate average share of 17 mid-tech product clusters whose individual shares in exports to the EU-27 in the period 2001–2011 remained higher than 0.5% came to 25.3%. Taking into account the fact that the average share of all mid-tech clusters in Polish exports to the EU-27 in the period covered by the research totalled 34.2%, this means a significant degree of concentration and was brought about by three chapters (industries) of the Harmonised System:

- plastics and rubber and articles made thereof (section VII; HS 39: plastics and articles made thereof and HS 40: rubber and articles made thereof),
- machinery and mechanical appliances, electrical and electrotechnical equipment (section XVI; HS 84: nuclear reactors, boilers, machinery and mechanical appliances, parts thereof and HS 85: electrical machinery and equipment and parts thereof, sound recorders and reproducers, television image and sound recorders and reproducers and parts and accessories of such articles),
- transport equipment/automotive industry (section XVII; HS 87: vehicles other than railway or tramway rolling-stock and parts and accessories thereof).

The most characteristic feature of Polish mid-tech goods is a dominant position of a broadly defined automotive industry (production of tyres, engines, motor vehicles and parts). Higher values of the RCA (Table 1) indicator, which confirm a strong,<sup>4</sup> but not always sustainable advantage of Poland in the period covered, usually refer to the production of different elements of motor vehicles (e.g. tyres, engines,<sup>5</sup> parts and accessories<sup>6</sup>), but not complete cars. A significant advantage can be also identified in the case of wires

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<sup>4</sup> One should remember that strong comparative advantages against a trade partner justify a low intensity of intra-industry trade [Pluciński 2010, p. 276].

<sup>5</sup> The share of the former was growing during the decade and reached the level of 1.39% in the year 2011, whereas the share of the latter dropped significantly: from 4.72% in 2004 to about 2% in the years 2009–2011, which was also accompanied by negative changes in the RCA indicator.

<sup>6</sup> Mainly due to parts and accessories of bodies for motor vehicles, steering wheels, steering columns and steering boxes, brakes and servo-brakes and their parts, wheels [see Trade Map 2014]. The share of the whole product cluster HS 8708 in the exports to the EU-27 grew from 3.3% in 2001 to 5.7% in 2010.

**Table 1. Evolution of revealed comparative advantages of the most important mid-tech groups in the Polish exports to the EU-27 between 2001–2011**

HS code	Average share (%)	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
3923	0.58	1.30	1.47	1.62	1.33	1.25	1.37	1.43	1.47	1.38	1.48	1.49
3926	0.58	1.10	1.16	1.21	1.16	1.10	1.25	1.25	1.23	1.12	1.31	1.35
4011	1.12	1.89	1.99	1.98	1.96	2.14	1.98	2.11	1.91	1.93	1.99	1.86
4016	0.58	2.12	2.55	2.92	2.69	2.74	3.34	2.92	3.05	2.86	2.75	2.74
8408	3.47	10.03	9.03	7.92	6.67	6.08	6.00	5.03	4.01	3.67	3.47	3.41
8409	0.71	1.46	1.56	1.66	1.36	1.27	1.22	1.14	1.04	1.04	1.10	1.22
8450	0.51	2.39	2.72	2.73	2.99	2.40	2.99	3.49	3.00	5.34	6.14	6.28
8481	0.53	0.96	1.21	1.33	1.13	1.24	1.30	1.24	1.11	0.81	0.89	0.81
8504	0.55	1.49	1.64	1.68	1.57	1.52	1.59	1.46	1.25	1.19	1.15	1.08
8516	0.54	1.31	1.54	2.00	1.93	2.06	2.06	2.03	2.10	1.92	1.71	1.90
8536	0.76	1.24	1.47	1.54	1.38	1.32	1.25	1.18	1.12	0.97	1.07	1.11
8539	0.58	3.95	4.01	3.84	3.20	3.55	3.53	3.57	3.45	3.69	3.50	3.44
8544	2.27	3.53	3.84	3.87	3.63	3.59	3.36	3.29	2.90	2.37	2.37	2.09
8702	0.57	2.20	3.28	3.65	5.24	5.58	4.94	4.81	5.45	6.77	6.62	6.65
8703	5.97	0.63	0.52	0.62	0.80	0.88	1.04	0.89	1.09	1.35	1.08	0.96
8704	1.07	1.15	1.40	0.44	1.30	1.23	1.05	1.03	0.96	1.48	1.29	1.29
8708	4.92	1.14	1.26	1.43	1.49	1.54	1.57	1.73	1.77	1.98	1.90	1.77

HS codes – 3923: plastic packing goods or closures stoppers, lids, caps, closures; 3926: articles of plastic nes.; 4011: new pneumatic tyres, of rubber; 4016: articles of vulcanised rubber o/t hard rubber, nes; 8408: diesel or semi-diesel engines; 8409: parts for use solely/principally with the motor engines; 8450: household or laundry-type washing machines; 8481: taps, cocks, valves for pipes, tanks for the like, incl. pressure reducing valves; 8504: Electric transformers, static converters; 8516: electric instantaneous water heaters, space heating, hair dryers; 8536: electrical appliances for switching, not exceeding 1000 V; 8539: electric filament or discharge lamps; 8544: insulated wires/cables; 8702: public-transport type passenger motor vehicles; 8703: cars (incl. station wagon); 8704: trucks, motor vehicles for the transport of goods; 8708: parts & accessories of motor vehicles.

Source: Author's own calculations [Trade Map 2014].

and cables. However shares of this product cluster dropped from the level of 2.5–2.7% between 2002–2007 to 1.65% in 2011.

This distinctive concentration in the field of intermediate products requiring further processing for more technically advanced goods leads to a clear conclusion that a producer surplus is usually acquired by entities providing complete final products. At the same time they are able to transfer an essential part of their business risk onto a dispersed network of sub-suppliers which cannot exert their market power. Their strategic goal is thus to sustain production processes at the level of costs appropriate from the standpoint of international tax planning (tax optimisation) in corporate structures.<sup>7</sup>

Also another aspect related to the position of the automotive industry in Poland has to be emphasised. Production of cars, which is one of the most important groups in the Polish exports to the EU-27,<sup>8</sup> was characterised by a weak and not sustainable advantage (temporarily the RCA indicator remained below the critical level of 1.00). This situation, especially by the end of the period covered by the research, may be interpreted as a negative consequence of the global slowdown and excessive dependency of the Polish economic system on the ups and downs of the motor vehicle industry in the world (or rather European) economy. These can negatively affect both exports as well imports, creation of new jobs, development of local companies and networks of local suppliers. Most corporations operating in this sector had to re-think and re-design their strategic plans, reduce mid-run production programmes and suspend decisions on launching new assembly lines for new models of their cars.<sup>9</sup>

Data in the table presented above prove clearly that the structure of Polish mid-tech exports was transforming in a positive direction; its share in total exports was and is growing. However these changes are, in most cases, the effect of investment projects of foreign affiliates cooperating within the broadly defined automotive sector. They are based mainly on the imports of technologies and do not make use of domestic resources. Moreover production of parts and accessories for motor vehicles does not require as much capital

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<sup>7</sup> A corporation externalises costs of its own business operations (low salaries, tax preferences), whereas it internalises its profits.

<sup>8</sup> Its share in the period 2004–2011 fluctuated between 5.6–8.4%.

<sup>9</sup> Multinational companies, for the time being (but for how long?), were pressurised during the recent crisis by numerous interest groups (politicians, trade unions) to think more of their countries of origin. It gives them new opportunities to launch negotiations on aid programmes and investment packages stimulating growth and protecting jobs. However the costs should to be covered from public resources (public budgets).

input as in comparison with the production of complete cars. Local, relatively cheaper and easily replaceable labour employed by such companies, having also in mind structural problems of unemployment and deficit of skills and qualifications, is just a supplementary production factor for processes of mechanisation emphasising the priority of lower costs. These are also feasible for the time being thanks to attractive benefits within special economic zones (SEZ). However assuming that every investment project should have its alternatives and could be re-located to a cheaper country, such external circumstances make cooperative networks with domestic suppliers deliberately looser so they do not develop as envisaged earlier.<sup>10</sup> This in turn explains to some extent the enclave effect characteristic for Polish SEZ and requires new ideas (alternatives) concerning the inflow of investments not related to the automotive industry, measures to attract new FDI's as well as the future of SEZ as a tool of active policy in the structural, industrial and regional dimension [see more: Cieślík 2005; Ambroziak 2009; Pastusiak 2011].

Amongst the mid-tech product clusters whose average shares to the EU-27 in the period covered by the research were between 0.5–1% an apparent and solid advantage was characteristic for the rubber industry (product cluster HS 4016;<sup>11</sup> mainly due to articles of vulcanised rubber nes, other than hard rubber and gaskets, washers and other seals of vulcanised rubber), household equipment (cluster HS 8450;<sup>12</sup> mainly due to automatic washing machines of a dry linen capacity not exceeding 10 kg and cluster HS 8516;<sup>13</sup> mainly due to ovens, cookers, cooking plates, boiling rings, grills and roasters) and the production of lighting goods (cluster HS 8539;<sup>14</sup> mainly due to fluorescent and filament lamps). An export hit, but in a rather niche market, turned out to be product cluster HS 8702 (mainly due to diesel powered buses with a seating

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<sup>10</sup> A scenario of de-localisation is related to the necessity of reducing the potential costs of exit. In Polish special economic zones there are dominantly production units in the form of assembly plants. Their business model is based on exporting and importing and ties with other sub-suppliers and cooperating entities forming corporate production networks together.

<sup>11</sup> A declining sector according to the [Trade Map 2014] (average growth of world imports between 2008–2012 reached 6% which is a reference value distinguishing growing and declining sectors in this period).

<sup>12</sup> A declining sector according to the [Trade Map 2014] (average growth of world imports between 2008–2012 reached only 1%).

<sup>13</sup> A declining sector according to the [Trade Map 2014] (average growth of world imports between 2008–2012 reached 5%).

<sup>14</sup> A declining sector according to the [Trade Map 2014] (average growth of world imports between 2008–2012 reached 0%).

capacity of more than 9 persons<sup>15</sup>) as its share in exports to the EU-27 between 2001–2011 grew nearly fourfold (from 0.23% to 0.85%).

Despite of an initial advantage, the position of the following product clusters deteriorated: HS 8481,<sup>16</sup> HS 8504<sup>17</sup> and HS 8536.<sup>18</sup> A likely explanation of these tendencies were steadily growing imports to the EU-27 from China. Growth rates of the respective groups between 2004–2011, measured by their value, were 261.7%, 194.6% and 162.7%, whereas expansion of Polish exports in the same period for the same groups was weaker (respectively 85.5%, 133.9% and 88.9%).

#### **4. Polish exports of high-tech commodities to the European Union (EU-27) between 2001–2011**

Moving on to the four most important high-tech product clusters whose individual shares in the Polish exports to the EU-27 between 2001–2011 exceeded 0.5% their aggregate share came to only 5.9%. Contrasting it with an average share of 14% for all high-tech groups in Polish exports to the EU-27 in the period covered by the research it indicates that other product clusters are relatively dispersed. Against this background the dominant ones were: the chemical industry (section VI; HS 30: pharmaceutical products) and machinery, mechanical appliances, electrical and electrotechnical equipment (section XVI, HS 84 and HS 85). Others, like mineral or chemical fertilizers, cosmetics, articles of plastics, electric appliances for line telephony,<sup>19</sup> used to be rather of a niche character. What is more, even if taking into account the dominant product clusters, changes in this whole group between 2001–2011 were very diverse.

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<sup>15</sup> A declining sector according to the [Trade Map 2014] (average growth of world imports between 2008–2012 reached 1% only).

<sup>16</sup> A growing sector according to the [Trade Map 2014] (average growth of world imports between 2008–2012 reached 6%).

<sup>17</sup> A declining sector according to the [Trade Map 2014] (average growth of world imports between 2008–2012 reached 4%).

<sup>18</sup> A growing sector according to the [Trade Map 2014] (average growth of world imports between 2008–2012 reached 6%).

<sup>19</sup> Only those whose average share in the exports to the EU-27 was between 0,2–0,5% are enumerated.

The first interesting case is medicament mixtures (HS 3004;<sup>20</sup> mainly due to vitamin and mineral supplements), which despite the lack of comparative advantage (RCA at the level of 0.05–0.3; see table 2) increased their share in Polish exports to the EU-27 more than six times (from 0.18% in 2001 to 1.22% in 2010). What is even more impressive is that the overall value grew at the same time more than 28 times (!) reaching the level of 1.5 billion USD.

Another product cluster which experienced a remarkable and sudden improvement in the years 2008–2009 is automatic data processing machines (HS 8471;<sup>21</sup> mainly due to the group of HS 847149<sup>22</sup>). Their share in Polish exports to the EU-27 rocketed from the level not exceeding 0.2% between 2001–2007 to 2.5–2.7% between 2009–2010 (in 2011 the share of this product cluster fell to 1.98%).<sup>23</sup> The value of foreign sales grew from 150 million USD (2005–2006) to 2.74–3.32 billion USD (2009–2010). According to the report of the Polish Information and Foreign Investment Agency [PAIIZ 2013, p. 4] amongst the 10 biggest companies operating on the domestic IT market there are both producers of hardware, retailers, software providers as well as entities generating their revenues from providing IT services. In most cases (around 70%) these companies are owned by multinational corporations. One may assume that the whole IT sector in Poland benefited from the positive effects achieved thanks to the particular emphasis which had been put on education and training programmes (at different stages of schooling) as well as the high quality of education of IT specialists.

The most dominant high-tech product cluster in the Polish exports, characterised by high values of the RCA indicator and shares fluctuating between 2% in 2004 and 5.9% in 2009, was the production of television receivers (HS 8528;<sup>24</sup> mainly due to colour television sets<sup>25</sup>). However these tendencies can be clearly put down to foreign companies, primarily Asian ones,<sup>26</sup> which started their investment projects in Poland (LG Electronics, Samsung, Toshiba,

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<sup>20</sup> A growing sector according to the [Trade Map 2014] (average growth of world imports between 2008–2012 reached 10%).

<sup>21</sup> A growing sector according to the [Trade Map 2014] (average growth of world imports between 2008–2012 reached 9%).

<sup>22</sup> Digital data processing systems.

<sup>23</sup> Main export markets were: Great Britain, the Netherlands, Germany and France.

<sup>24</sup> A declining sector according to the- [Trade Map 2014] (average growth of world imports between 2008–2012 reached 3%).

<sup>25</sup> 6-digit product cluster HS 852872; a declining one (average drop in world import was 2%).

<sup>26</sup> That is why a meaningful description of this situation appeared in the Polish press: “a giant with foreign legs” [cf. Tumiłowicz 2011].

**Table 2. Evolution of revealed comparative advantages of the most important high-tech groups in the Polish exports between 2001–2011**

HS code	Average share (%)	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
3004	0.56	0.07	0.07	0.05	0.06	0.09	0.11	0.16	0.22	0.22	0.30	0.28
8471	0.87	0.05	0.06	0.06	0.07	0.09	0.08	0.11	0.88	1.78	1.91	1.54
8528	3.70	6.52	7.32	5.59	3.89	4.16	4.72	4.29	4.25	5.23	5.34	4.78
8529	0.77	0.91	1.23	2.30	2.29	1.38	1.53	4.81	4.47	3.02	4.27	2.79

HS codes: 3004: medicament mixtures; 8471: automatic data processing machines, optical readers, etc.; 8528: television receivers (incl. video monitors & video projectors); 8529: parts suitable for use solely/principally with televisions, reception appliances.

Source: Author's own calculations [Trade Map 2014].

Sharp, Daewoo Electronics, Philips) attracted by incentives and preferences offered within SEZ, transportation accessibility in Central Europe together with the expanding network of motorways as well as the membership of the EU. For the latter one can identify a strategic motive of bypassing protective instruments of trade policy (common external tariff) against producers from third countries.<sup>27</sup>

As far as long-term consequences are concerned the inflow of advanced technologies is raising political hopes and is contributing to the promotion of regional development programmes aimed at fostering innovation clusters and at achieving a great deal of potential benefits.<sup>28</sup> On the other hand, however, a factor of uncertainty is the dynamics of technological progress itself and any relative, subjective deterioration in technologies perceived today as modern.

The case of the last product cluster analysed here (HS 8529;<sup>29</sup> parts suitable for use solely/principally with televisions, reception appliances) seems

<sup>27</sup> Sale in this sector grew significantly in 2005 and 2006 (respectively 46.4% and 88.2% y/y) and reached in its peak year 2010 the value of 7 billion USD.

<sup>28</sup> E.g. creating new knowledge and its transference, cooperation with domestic research and development centres, strengthening competences in the education of domestic specialists and experts in this field and creating new Poland-based companies.

<sup>29</sup> A declining sector according to the [Trade Map 2014] (average growth of world imports between 2008–2012 reached 1% only).

to be a classical spin-off from changes in the production of television receivers, being shaped basically by the same external factors (the inflow of FDI). The revealed comparative advantage of this group in the period covered by the research increased whereas fluctuations of exporting value (y/y changes) were quite strong.<sup>30</sup>

## Conclusions

The overall evaluation of the competitiveness of Polish mid-tech and high-tech exports still remains ambiguous. On the one hand there are clear positive changes which occurred in the first decade of the 21<sup>st</sup> century represented by the growing technological intensity, whereas on the other it would not have been possible without the inflow of foreign capital (FDI's). This proves to some extent the validity, utility and explanatory potential of the research paradigm (often regarded as a controversial hypothesis) of corporate (neo)colonialism (in terms of dependency) of the Polish economy [see more: Kieżun 2013]. The number of Polish-owned companies which created technologically sophisticated modes of the business and successfully entered foreign markets remains relatively small. Moreover the factor determining their prosperity is rather rooted in a creative imitation of ideas developed elsewhere but not in the fact of creating their own, not easily imitated competitive advantages. This in turn proves another hypothesis according to which the Polish economy may be perceived through the lenses of imitation lag and a technological gap [Posner 1961]. These phenomena were identified by Gorynia [2002] more than 10 years ago.

This specific situation resulting in development dilemmas seems to be characteristic for countries facing the challenge of the middle income trap [cf. Im and Rosenblatt 2013; Hausner 2013]. Poland has still a lot to offer to foreign investors in terms of a great deal of tax incentives and cost-reducing schemes together with the access to a relatively well-educated and cheaper workforce, proving their potential to increase productivity. However a strategic question needs to be posed and addressed: for how long may these strengths be convincingly and successfully used without any negative interference with social expectations to improve the standard of living and welfare? A serious threat

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<sup>30</sup> In 2003 the exports grew 150.1% (y/y), in 2007 it was even 175,5%, but in 2005, 2009 and 2011 it dropped to respectively 32.9%, 48.7% and 39.1%.

in this context is the lack of a dynamic domestic research and development sector which would be able to generate innovation and sustainable competitive advantages. The effectiveness of programmes aimed at changing the current state of affairs seems to be restricted by the nature of extremely bureaucratic decision making processes from the very beginning, whereas financial schemes, thought to be supportive and logical and the contemporary methods of dealing with applicants and scarce public money, by definition cannot be concomitant with the creative essence of innovativeness.<sup>31</sup> What is even more daunting is that domestic small and medium-sized enterprises, which are supposed to play a leading role in creating innovation, still have to face numerous barriers to their development.<sup>32</sup>

Taking into account the context of the first years of membership in the European Union, the existing competitive and development gap this may have a tendency to be preserved, especially when companies operating in Poland are treated as locations where technological solutions developed by the research and development centres of highly developed countries will be applied mainly because of reasons which emphasise the lower costs of doing business, as well as due to political strategic vision (or necessity?) to keep them low. In such circumstances the prospects for a dynamic and effective structural catching-up process seem to be unlikely.

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<sup>31</sup> Should the government and public administration play the leading role in stimulating or just catalysing these processes?

<sup>32</sup> This issue remains a subject of numerous research projects, but they seem to have no impact on the merits and quality of provisions determining legal and institutional environment for doing business. It has to be emphasised that innovative plans, if not supported by proper incentives, are perceived primarily as a cost which has to be paid. Only then an innovator may consider potential benefits of their creative idea.

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