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# Road Transport in Poland - Status and Development Prospects

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***Abstract:***

***Purpose:*** *The purpose of this article is to present the arguments that motor vehicle transport in Poland has a significant impact on the economic development of the country, not only creating prospects for the development of the Polish army (modern equipment and armaments) but providing citizens of the Republic of Poland with the opportunity to move safely from place to place with modern car fleet on newly built roads.*
***Methodology:*** *Statistical information collected from available sources and reports is the basis for the analyses presented in the article. The primary research method is observation, analysis, and inference. Available source materials from Polish statistical institutions and ministerial ones have been analyzed, and the industry transport journals.*
***Findings:*** *Motor vehicle transport has a significant share in generating GDP. Since 1990, motor vehicle transport in Poland has been developing rapidly and over the last 30 years has been significantly stimulating the economy, created jobs, was the leaven of the scientific and technical progress, made a significant contribution to exports, promoted local investments, and created conditions for cooperation with other industries and science.*
***Practical Implications:*** *Many detailed threads have only been mentioned and are waiting for further development. However, the most important is the decision on the Polish state's support for the further development of the Polish automotive industry, which in the long term will contribute to the security of the Polish state and its inhabitants.*
***Originality/Value:*** *The lack of a synthetic study illustrating Polish motor vehicle transport development in the last 30 years has been identified. The article analyzes Polish motor vehicle transport in the years 1991-2020, comprising the analysis of the current condition of motor vehicle transport in Poland and its perspectives in the next few years.*

***Keywords:*** *Civil engineering, transportation, road transport, road infrastructure, economics, management, forecasts.*

***JEL Classification:*** *L91, N74, O20, O30, R42.*
***Paper Type:*** *Research article.*

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## 1. Introduction

The article results from many years of research at the Motor Transport Institute in Warsaw and the research conducted by the authors on car transport in the years 1945-1990. It concerns a large part of the Polish economy, motor vehicle transport. Many works on the development of motor transport in Poland between 1945 and 1990 were developed at the Institute of Motor Transport, which is one of the forerunners of research and projects improving the transport system Polish, with a group of such outstanding scientists (unfortunately deceased) dealing with this issue as Marian Madeyski or Elżbieta Lissowska (Madeyski *et al.,* 1978; Madeyski, 1973). IMT is currently researching the economic situation in road transport and vehicle autonomy on transport development. The Institute also researched developing the country's transport system regarding road infrastructure on the Ministry of Infrastructure and Development (Automotive, 2020). However, a gap was identified in the studies - the lack of a synthetic study illustrating Polish motor vehicle transport development in the last 30 years, i.e., between 1991 and 2020. The article analyzes Polish motor vehicle transport in the years 1991-2020, comprising the analysis of the current condition of motor vehicle transport in Poland and its perspectives in the next few years.

Considering the development of motor vehicle transport in Poland between 1991 and 2020, we claim that in the years 1991-2020, this segment of the economy is one of its most vital branches. It has a significant impact on the development of Polish GDP, and its importance, despite the adverse effects of the COVID19 pandemic, will increase in the coming years. Since the political transition in 1990, its role has increased over the years, and today motor vehicle transport in Poland is the "driving force" of the Polish economy, employing nearly one million people. The purpose of this article is to present the arguments that motor vehicle transport in Poland has a significant impact on the economic development of the country, not only creating prospects for the development of the Polish army (modern equipment and armaments) but providing citizens of the Republic of Poland with the opportunity to move safely from place to place with modern car fleet on newly built roads.

Road transport in Poland has been systematically, and what is essential dynamically, developing since 1990. However, there was no reliable and synthetic analysis of its condition over the past 30 years and no conclusions about its prospects. The authors decided to use this research gap and analyze the Polish road transport from 1990-2020 in this scientific paper. The structure of this material is one hefty unit consisting of three sub-chapters. The first one concerns the history of automotive transport development in Poland between 1991 and 2020, the second one, the development of road infrastructure, the third one, the development of the automotive industry in Poland, the fourth part forecasts for the coming years. The entire work is finished with relevant conclusions and proposals.

Statistical information collected from available sources and reports is the basis for the analyses presented in the article. The primary research method is observation,

analysis, and inference. Available source materials from Polish statistical institutions (Statistics Poland, SOIS, Samar, IMT) and ministerial ones have been analyzed. Also, literature was analyzed, including journals, such as "Roczniki Statystyczne" (Statistical Yearbooks) and industry transport journals. Regarding the research topic, the analysis of the available specialist literature and web data was carried out.

## 2. Literature Review

### 2.1 Motor Vehicle Transport in Poland 1991-2019 - Native Car Fleet

The turn of the 80s and 90s of the 20th century was the moment of great political, socio-economic transformation. The collapse of the communist system, and the following opening of borders to the duty-free second-hand cars import, meant that, on average, in the 1990s, around 350,000 vehicles were imported. In these circumstances, Polish automotive factories faced a challenging situation because customers who had never been solicited disappeared. Under the new system, buyers had to be encouraged to buy a car, and it turned out that domestic factories did not have the organizational structures or procedures needed to operate smoothly on a free-market basis. There were thousands of vehicles waiting to be sold in warehouses in Polish factories, and the production had to be reduced in order not to increase inventory. FSO was the worst affected by the crisis. FSM already in November 1990 became a joint-stock company (S.A.), and in June 1992, the opening balance sheet of the Polish-Italian company Fiat-Auto Poland was drawn up.

FSO was not similarly transformed. In 1991, 11 organizational structures were separated from FSO Żerań, and many companies were created from that place, which FSO wholly or partially owned. It was an effective procedure in the short term, and in 1992 FSO achieved a positive financial result. In 1995, the number of external co-operators increased to around 1400 and was seven times greater than in 1991. High-quality products were demanded from suppliers and one another. FSO Polonez motor vehicle, including delivery van models (FSO Polonez Truck), has become a sought-after product, and FSO took over 33% of the sales market for passenger cars in Poland.

Simultaneously, while developing domestic production, there were systematic discussions about a strategic partner for FSO, and there was also a timid idea of the factory's privatization. Together with Citroen, in FSO-ZSD Nysa, an industrial assembly of C-15 vans and then Berlingo was agreed to purchase diesel engines for Polonez. A contract has been concluded with British Rover to supply internal combustion engines with a 1.4 dm3 capacity. The agreement with General Motors concerned the assembly of Opel Astra motor vehicles in FSO. In 1994, Polish President Lech Walesa visited South Korea, which resulted in talks with Daewoo. On 18 January 1996, the FSO state enterprise was liquidated to privatize the plant. On 29 February 1996, the plant was converted into a 100% state-owned company called FSO Motor Sp. z o.o. (FSO Motor Ltd), on 14 March 1996, an agreement was signed to create a state-owned company with the Daewoo group called Daewoo-FSO Motor.

On 28 March 1996, the actual operation of this Polish Korean company began. The Koreans began modernizing the factory in Żerań. Over three years, their investments and purchases reached $1.2 billion. Initially, Daewoo models were assembled in FSO: Tico, Espero, and Nexia in Lublin. Meanwhile, Polonez was modernized.

In 1996, Daewoo car sales jumped by as much as tenfold. From 3 709 units in 1995 to 37 821 units a year later. Adding Polonez figures, Daewoo had 97 387 units sold, which ensured a market runner-up position with a 26% share. Passenger cars' assembly volume reached 37 639 units and the production 66,101 units (Polonez). In October 1997, new Daewoo models were unveiled Lanos, Nubira, and Leganza, whose production started in September 1997 (Lanos) and then in December 1999 (Nubira and Leganza). The assembly of Daewoo Matiz, which replaced Tico, began in October 1999.

FSO's former subsidiaries were merged with Korean plants, and the total Korean investment in parts and component plants amounted to approximately PLN 365 million. Daewoo also acquired a 40% share in Andoria Andrychów plants, intending to upgrade its diesel engines. In 1999, for the first time, more than 200 000 cars left the factory in Żerań. The share of Polish parts in these products was 60%, i.e., the so-called national product criteria were met, which allowed the duty-free sale of these products to the European Union countries. In 1998, the first Daewoo cars from the Żerań factory were sent to Italy, France, and Germany.

Unfortunately, the Polish Korean company's good performance was suddenly halted by the financial crisis that hit South Korea and the Korean companies. Daewoo's considerable debts in Korea forced the sale of the company. The car factory in Żerań was restructured, but the number of cars produced was declining, and in 2001, only 32 700 cars were produced, the same number as in 1966-1969. In November 2000, the Daewoo Motor Polska factory in Lublin was declared bankrupt. In 2001, the following Daewoo models' assembly ceased, Leganza, Tacuma and Tico, and Polonez Cargo Plus. In 2002, the production of Polonez and the Daewoo Nubira car finished. In 2004, after the departure of the Koreans, the name FSO was reinstated, and FSO Matiz and FSO Lanos were produced.

In 2005, an agreement was signed with the Ukrainian company AwtoZAZ, which took over the factory. The Ukrainians signed a licensing agreement with General Motors in mid-2006 to produce the Chevrolet Aveo, whose production at FSO started in 2007 and lasted until 2011. A total of 126 622 units of this car were produced in Warsaw. Daewoo/FSO car sales closed at 557 135 between 1993 and 2008. Since June 2015, the Cypriot company Alemeda Investments LTD, based in Limassol, has been the main shareholder of FSO. The company was formed in February 2015 by the UkrAWTO group, which transferred 95% of the shares of the Żerań factory to the group. In general, it can be written that the FSM factory and then Fiat Auto Poland in Śląsk produced more vehicles than in FSO between 1989 and 2002.

***Table 1.*** *Number of Daewoo/FSO cars manufactured between 1993 and 2008*

| Daewoo/FSO | Number of units |
|---|---|
| Tico | 151 303 |
| Matiz | 149 953 |
| Lanos | 148 913 |
| Nexia | 43 802 |
| Nubira | 35 374 |
| Espero | 21 628 |
| Leganza | 4 468 |
| Musso | 958 |
| Tacuma | 379 |
| Damas | 170 |
| Korando | 123 |
| Chairman: | 64 |
| **Total** | **557 135** |

***Source:*** *Own elaboration.*

***Table 2.*** *The comparison of passenger car production in FSM and FSO/Daewoo from 1989 to 2002 (own elaboration based on Szelichowski, 2003)*

| Year | FSM | FSO/Daewoo | Total |
|---|---|---|---|
| 1989 | 209632 | 85289 | 294921 |
| 1990 | 191552 | 81592 | 273144 |
| 1991 | 129490 | 40180 | 169670 |
| 1992 | 14500 | 75386 | 89886 |
| 1993 | 262200 | 70450 | 332650 |
| 1994 | 248000 | 85588 | 333588 |
| 1995 | 278000 | 69802 | 347802 |
| 1996 | 292400 | 79483 | 371883 |
| 1997 | 328000 | 104906 | 432906 |
| 1998 | 336160 | 145272 | 481432 |
| 1999 | 343063 | 196227 | 539290 |
| 2000 | 292391 | 94540 | 386931 |
| 2001 | 198018 | 32746 | 230764 |
| 2002 | 158516 | 25016 | 183532 |
| **Total** | **3281922** | **1186477** | |

***Source:*** *Own elaboration.*

The automotive industry in Poland has also developed outside FSO and FSM. In Śląsk, on 70 hectares of special economic zone, the Opel car factory in Gliwice, owned by General Motors, was erected in 22 months. It was opened on 29 October 1998. It produced Opel Astra and Opel Vectra. In 1999, Opel Agile production began in Gliwice, and between 2000 and 2001, 100 000 vehicles per year left the factory in Gliwice.

In Wielkopolska since 1993, on the premises of the former Fabryka Samochodów Rolniczych (Agricultural Motor Vehicle Factory) in Poznań, German Volkswagen has assembled Transporter T-4 vans and since 1994 Skoda Favorit model and later Felicia and Octavia ones. Volkswagen Polo and Bora and Audi cars and Spanish Seats were also directed at the assembly stations in Poznań. In 1999, a diesel engine factory was put into operation in Polkowice, which worked for 19 plants of the Volkswagen group. In the years 1994-1998, Ford was also installed in Poland. In Płońsk, Ford models were assembled, Escort, Ka, Focus, Mondeo, and delivery van Transit. In 1999 the plant was liquidated. In Lublin between 1993 and 1995, Peugeot assembled model 405. Poland becomes a tycoon in terms of the number of propulsion systems produced, about 2 million per year.

After the political and socio-economic changes of 1989-1990, Polish automotive plants were privatized within a few years. Fiat Auto Poland acquired FSM, FSR by Volkswagen, FSC, and FSO by Daewoo. The Jelcz and Star factories were also privatized. Many of the measures taken by Western companies to take over Polish automotive companies' assets are considered at least controversial today. After the Daewoo Group collapse, car production was also stopped at FSO in Warsaw. In the post-factory areas of FSO in Warsaw, residential housing is currently planned. After the collapse of Polish factories, a massive import of used cars from Western Europe multiplied the car fleet on Polish roads.

In 2019, 32 037.3 motor vehicles were registered in Poland, including 24 370.1 passenger cars. This number has been steadily increasing over the last few years. The number of vehicles registered for the first time in the country (new and used vehicles imported from abroad) was 2.1% higher than in 2018. Registrations of most types of vehicles increased, including mopeds (by 12.8%), motorcycles (by 11.9%), special vehicles (up 9.1%), agricultural tractors (up 6.3%), trucks (up 3.0%) and passenger cars (up 1.6%). On the other hand, the number of registrations of tractor units (by 7.7%) and buses (by 3.1%) decreased. The upward trend has been sustained and persisted in Poland since 1990 (apart from slight fluctuations and decreases in buses and tractor units).

The number of registered passenger cars at the end of 2019 was 24.4 million and was 4.0% higher than a year ago, with 20.5 million cars under 30 (3.2% more than in 2018). There were 635 cars per 1 000 inhabitants (610 in 2018), including cars under 30 – 535 (in 2018 – 518). The share of passenger cars up to 5 years old increased (from 10.5% in 2018 to 11.2% in 2019), 16-30 years old (from 42.3% to 42.4%) and over 30 years (from 15.0% to 15.7%). In addition to increasing car fleet, the availability of good quality road infrastructure in modern motorways and expressways has also increased (Tables 3 and 4).

***Table 3.*** *The number of kilometers of national roads in Poland between 2004 and 2019 (after EU accession).*

| **Year** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** |
|---|---|---|---|---|---|---|---|---|
| Total no. of roads | 379455.5 | 381462.8 | 382615.4 | 383053.1 | 383313.2 | 384830.0 | 406122.1 | 412263.7 |
| National roads | 18368.1 | 18287.3 | 18439.2 | 18546.2 | 18520.4 | 18578.7 | 18607.9 | 18801.1 |
| **Year** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** |
| Total no. of roads | 412335.1 | 413529.8 | 417026.0 | 419636.4 | - | 422302.8 | 424563.0 | 424914.8 |
| National roads | 19182.1 | 19295.8 | 19293.4 | 19292.8 | - | 19410.2 | 19403.1 | 19450.8 |

***Source:*** *Own elaboration based on Transport, 2004-2020.*

***Table 4.*** *The number of motor vehicles in Poland between 2004 and 2019 (after EU accession).*

| Year | Total no. of motor vehicles | Motorcycles | Passenger cars | Buses | Specialized cars | Mopeds | Lorries |
|---|---|---|---|---|---|---|---|
| 2004 | 16 701 072 | 835 791 | 11 975 191 | 82 676 | 96 866 | - | 2 262 923 |
| 2005 | 16 815 923 | 753 648 | 12 339 353 | 79 567 | 96 224 | - | 2 177 901 |
| 2006 | 18 035 057 | 784 176 | 13 384 229 | 83 496 | 102 717 | - | 2 246 294 |
| 2007 | 19 471 836 | 825 305 | 14 588 739 | 87 586 | 110 439 | - | 2 345 068 |
| 2008 | 21 336 913 | 909 144 | 16 079 533 | 92 401 | 122 427 | - | 2 511 677 |
| 2009 | 22 024 697 | 974 906 | 16 494 650 | 95 415 | 131 597 | 833 817 | 2 595 485 |
| 2010 | 23 037 149 | 1 013 014 | 17 239 800 | 97 044 | 139 680 | 922 126 | 2 767 035 |
| 2011 | 24 189 370 | 1 069 195 | 18 125 490 | 100 299 | 149 222 | 1 032 980 | 2 892 064 |
| 2012 | 24 875 717 | 1 107 260 | 18 744 412 | 99 858 | 149 774 | 1 100 296 | 2 920 779 |
| 2013 | 25 683 575 | 1 153 169 | 19 389 446 | 102 602 | 162 401 | 1 163 441 | 2 962 064 |
| 2014 | 26 472 274 | 1 189 527 | 20 003 863 | 106 057 | 163 168 | 1 216 578 | 3 037 427 |
| 2015 | 27 409 106 | 1 272 333 | 2 072 423 | 109 844 | 172 079 | 1 259 187 | 3 098 376 |
| 2016 | 28 601 037 | 1 355 625 | 21 675 388 | 113 139 | 182 245 | 1 292 200 | 3 179 655 |
| 2017 | 29 634 928 | 1 427 115 | 22 503 579 | 116 090 | 191 134 | 1 327 872 | 3 248 538 |
| 2018 | 30 800 790 | 1 502 888 | 23 429 016 | 119 471 | 205 917 | 1 349 912 | 3 338 166 |
| 2019 | 31 989 313 | 1 587 031 | 24 360 166 | 122 604 | 216 351 | 1 375 004 | 3 436 184 |

***Source:*** *Own elaboration based on (Transport, 2004-2020).*

The number of lorries (including heavy goods vehicles) amounted to 3.4 million at the end of 2019, 2.9% more than a year ago, with the number of vehicles under 30 years old amounting to 2.7 million. The number of tractor units at the end of 2019 was 447 300, 6.5% higher than a year ago.

At the end of 2019, 122 600 buses were registered (2.6% more than in 2018). In 2019, 1 921.1 million tonnes of cargo were transported by motor vehicles, i.e., 1 921,1 million tonnes of cargo. 2.6% more than in 2018, 4.6% more ton-kilometer transport work was carried out. We do not yet know the results for 2020, but it is likely that due to the COVID19 pandemic and the associated lockdown, 2020 will be exceptional,

with the possibility of significant decreases in this regard. The achieved volume of freight transport by car, expressed in tonne-kilometer, represented 16.4% in the total transport of European Union countries in 2019, which placed Poland among the 28 European Union countries in second place (behind Germany). Poland's share was the highest in international transport and accounted for almost a third of the total transport in the European Union countries.

## 2.2 Road Infrastructure

The development of infrastructure in Poland in the last thirty years can be divided into two intervals 1991-2003 and 2004-2020, namely before EU accession and after Poland acceded to the European Union. It is connected with using EU funds to develop road infrastructure in Poland.

The development of road infrastructure after the accession to the European Union is presented in Table 4. The most significant number of roads, namely 660 km, was put into operation in a year when Poland was the co-organizer of the big event, the European Football Championship "Euro 2012". The second record year was 2019 when 460 km of routes were put into operation. The specificity of road construction in Poland makes the investment process spread over the years. In 2021, General Directorate for National Roads and Motorways carries 96 tasks with a total length of 1 225.2 km, including 32 tasks with a total length of 458.7 km in the tender and the preparation 101 tasks length of 2 134.3 km. According to the schedule, a total of 3 818,2 km of routes (General Directorate, 2021) will be put into operation within the European Union's immediate perspective (2021-2027).

***Table 5.*** *The number of kilometers of new motorways, expressways, and national roads put into service between 2004-2020.*

| Year | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** |
|---|---|---|---|---|---|---|---|---|---|
| Km | 82,9 | 122,3 | 181,5 | 366,5 | 438,7 | 406,4 | 346,3 | 424,3 | 660,2 |
| Year | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** | TOTAL |
| Km | 383,9 | 332,5 | 83,8 | 137,0 | 355,7 | 321,4 | 460,0 | 137,8 | 5241,4 |

***Source:*** *Own elaboration based on (Transport, 2004-2020).*

As of 18 January 2021, there are 4 269 expressways in Poland, including 1 712 km motorways and 2 557 km expressways. In 2021, works are underway on the A1, A2, and A18 motorways, and plans have been made to extend the A2 and A4 motorways with an additional third lane. There are 139 km motorways under construction, a further 114 km is under tender, and further kilometers are in preparation. The motorway network in Poland is expected to reach 2 100 km. Motorways in Poland have two lanes on opposite carriageways, only on sections running near the big urban agglomerations the number of lanes is increased. The section of the A1 is built today, between Piotrków Trybunalski and Częstochowa, will be the most extended section

of the three-lane motorway. Most motorways in Poland also have a reserve of land to add road lanes (General Directorate, 2021).

The COVID 19 pandemic did not stop the construction of roads in Poland. In 2020, the most significant number of road sections put into operation was on express routes. In 2020, 137.8 km of new national roads were implemented, including 18.3 km of highway, 104.9 km of expressways, and 14.6 km of national roads. In 2020, tenders were launched for a further 600.2 km of roads, and contracts were signed for a further 450 km of road sections. In 2021, at least 385 km of new motorways and expressways are planned to be made available, including 39.6 km of motorways, 308.2 km of expressways, and 37.7 km of national roads. Tenders will also be launched for a further 680 km of routes.

### 2.3 Automotive Industry in Poland

The motor vehicle market has rapidly developed since Poland accessed the European Union. Only the COVID 19 pandemic slowed down this development in Poland and throughout the European Union. A total of 9.9 min of cars were registered in the European Union in 2020. That is 23.7%, less than in 2019. The pandemic has led to a collapse in car sales on a previously unprecedented scale. Last year's (2020) sales were the lowest since 2013 when the automotive industry saw six consecutive years of declines due to the global crisis of 2008-2009. We have seen the sharpest decline in the European automotive sector's history regarding the percentage change. Among the region's major car markets, Spain (-32.3%) recorded the most profound decline, followed by Italy (-27.9%) and France (-25.5%). A smaller, 19.1% decline occurred in Europe's largest market - Germany. In Poland, sales decreased by 22.9%. It will take time to make up for last year's losses.

According to government data, including the information from Minister of Climate and Environment Michał Kurtyka in Jaworzno starting from 2024, Electro Mobility Poland Company (EMP) is expected to produce electric cars called Izera. The vehicle was unveiled at the end of July 2020 in two prototypes: a white SUV and a red hatchback. The eclectic drive used in these cars will achieve acceleration from 0-100 km/h in less than 8 seconds. Izera will drive up to 400 km on a single charge. Izera can become a part of a long-term change in the national economy and an opportunity to develop electromobility in Poland. Polish eclectic cars will provide the opportunity to create a national specialization in the automotive industry and support companies in building a competitive offer in the global market. This vehicle's production is expected to lead to the development of native companies and new technological solutions.

Creating a sizeable automotive consortium in our country is an opportunity for Poland because automotive companies have a turnover equal to some countries; for example, the revenues of a tycoon - the Volkswagen group producing 10 million vehicles a year reach half of the GDP of the Republic of Poland. The disadvantage is that Izera does

not have its production of batteries and engines, which will have to be done by external (foreign) companies. The chassis and electronics are also likely to come from abroad, so the product's key components will be manufactured outside Poland. Izera's production is scheduled to start in 2024 with intense foreign competition. Low domestic demand can interfere with the sale of the vehicle – the most popular brand in Poland, Skoda sells about 60 thousand vehicles, so the assumed 100 000 copies of Izera would be challenging to sell only in Poland, and one needs to plan the export. EMP plans to build a factory producing 100 000 electric cars a year, with 2 000 employees expected to work in manufacturing. The cost of building such a factory is at least PLN 2 billion. In total, however, about PLN 5 billion will be needed because the cost of the investment in Jaworzno should be added to the construction of the entire model range and the customer service and sales network. EMP counts on the state's support (Ordinance, 2019).

The exceptionally high dynamics of motor vehicle warehouse market development need to be emphasized. In 2020, for the fourth year in a row, more than 2 million sqm will appear on the market, with an average of 2.45 million sqm over the previous three years. Total inventory exceeded 20 million sqm in 2020, and a further million borders will be broken in 2021. Only in the last five years (2015-2020) has the sector's size doubled, which means that the product offer on the Polish market is also beautiful in terms of age structure and the standard of storage space offered, which is an additional advantage of the Polish market, recognized by both domestic and foreign companies.

### 2.4 Forecasts of the Development of Polish Car Transport

In Poland, motor vehicle transport, which dominated other competitive modes of transport, came to the fore from all transport modes. The actual competitive advantage of road transport over other modes of inland transport is determined primarily by economic considerations, as well as by the qualitative characteristics of this transport branch, m.in.: high spatial accessibility, easy accessibility of transport service providers, relatively high commercial speed, door-to-door delivery, "just in time," "single-mode." In 2021, as planned, road infrastructure will continue to develop, and new motor vehicles will arrive on the roads with new motorways and expressways (Osińska and Zalewski, 2020). In 2018, Poland's expressway network was increased by 321.4 km and is now 2 092 km. At the beginning of 2019, Poland has 3 730.7 km of expressways, including 1638.5 km of motorways (A2, A4, and A1) and 2 092.2 km of expressways. The Polish government plans that the entire road network is 7 650 km long. The process of supplementing the road network is underway, primarily creating the country's motorway road backbone, strengthening significantly delayed road infrastructure in metropolitan cities, or removing transit traffic outside the borders of many settlement units. On 29 January, a contract was signed to design and construct a section of the S19 expressway between Ploski (nad Narwią) and Haćki (near Bielsko Podlaskie). The completion of this section is scheduled for 2024 (General Directorate, 2021).

As more investments are made, the car fleet on the roads will increase. New routes will help locate further investments, including in the automotive sector (Automotive, 2020). By the end of December 2021, drivers are expected to have at least 385.5 km of new roads, including almost 40 km of motorways and more than 308 km of expressways. Among them will be, for example, a tunnel on the Ursynów section of the Southern Ring Road of Warsaw (S2 POW), which will connect both parts of the ring road, improving the conditions of travel for both residents of the capital and surrounding towns, as well as people passing through Warsaw on the east-west line. In 2021, the plans include the delivery of a total of 39.6 km of motorways, including the A1 section: Tuszyn - Piotrków Trybunalski South (15.9 km), Kamieńsk - Radomsko (16.7 km), Radomsko - border province between Łódzkie and Śląskie (7 km).

## 3. Conclusions

The article presents the general characteristics of Polish motor vehicle transport at the end of January 2021. Looking at the data presented, we would argue that Polish motor vehicle transport will continue to develop dynamically despite the COVID 19 pandemic and the associated restrictions. For a few more years, the car fleet will continue to grow on systematically upgraded Polish roads. These will be both imported vehicles and ones manufactured in Poland. Transport automation will be conducted primarily in logistics and warehouse centers. The number of new vehicles produced in Poland and sold to customers will increase. Unfortunately, the lockdown associated with the COVID 19 pandemic slowed the development pace. It is unknown whether the collapse will last only a year, two years, or more.

Nevertheless, automotive investment in our country will increase, as evidenced by new road networks such as Via Baltica, Via Carpatia, the construction of the missing sections of the A1 and A2 motorways. Additionally, projects for the construction of modern electric cars, such as the Izera. The role of Polish motor vehicle transport in the country's economic life will also increase even more when one considers the government declarations on the production of one million native electric vehicles in Poland. Thus, motor vehicle transport will be crucial in economic development and the security and defiance of our country as a whole, including the development of transport infrastructure (Automotive, 2020). Particular attention needs to be given to the development of road infrastructure in the eastern, as yet underinvested, part of the country.

Motor vehicle transport is one of the essential branches of the modern Polish economy. It has a massive impact on the development of the Polish GDP and its importance in the coming years, despite the anticipated economic slowdown (COVID19 pandemic), which will continue to grow. Motor vehicle transport contributes to Polish economic development, translating into the country's internal and external security both within NATO and the European Union. Investments in motor vehicle transport in Poland constitute a vital contribution to the Polish economy's development, which translates

into increased state security, e.g., through the modernization of the Polish car fleet and the expansion of the existing road network.

Observed since the early 1990s, the development of motor vehicle transport in Poland, employing hundreds of thousands of employees, still requires creating a complete road network with a clearly defined "backbone" of the motorway (Chęcińska-Kopiec *et al.*, 2019). Currently, the road network (motorways and expressways) is only about 50% ready, and work is underway to complement it, especially in the east of Polish (Via Baltica, A2, S19). Fortunately, the Republic of Poland has the opportunity to do so using EU funds in the 2021-2027 financial perspective, allocated mainly to develop socio-economic infrastructure (Automotive, 2020).

Poland's accession to the European Union in 2004 only intensified the constant developmental trend observed since 1990. The economic, social, and economic breakthrough in the Polish economy after 1990, including in-car transport, was an analyzed phenomenon in Poland and out of the country (Waters, 1993). The number used by Poles and largely imported: passenger cars, truck tractors, buses, and motorcycles has rapidly increased.

The authors' analysis clearly shows that road transport successfully won the competition with rail transport not only in terms of cargo transport, but also, due to greater spatial accessibility, in passenger transport. The vehicle number increased dynamically, but the modernization and expansion of the road infrastructure did not follow. The insufficient and insufficiently developed network of expressways and motorways, as well as their low quality, were not able to cope with the increased mobility of the growing and this led to congestion on roads, in cities (where there were no ring roads) and on the borders of the Republic of Poland, where there were (and in the eastern part of the EU still do) many hours of congestion. Traffic jams increased the costs of transport, especially commercial road transport (Balke, 2013) and thus more environmental pollution (Bebkiewicz *et. al.*, 2020). The greater emission of e, aust gas,e to the degradation of the natural environment and reduce the significant quality of life of the inhabitants.

Only a few years after Poland joined the European Union, the backbone of the motorway network and express roads began to be built. One of the first "swallows" was the A2 motorway, which was connected to Warsaw in 2012, 8 years after joining the EU. The road network is presented all the time - the A1 and A2 motorways remain unfinished so far and most expressways, which is a challenge for the next Polish governments in the coming years. The authors' analysis shows that road transport following the automotive industry that complements it has become an essential element of the country's development and security. In addition to the system of military alliances, a developed network of modern roads and efficient communication increased the country's security and its citizens (Kukla, 2018). All this in the face of globalization, which, thanks to technological progress and the development of the Internet, has reduced the distance between countries and people (Romanow, 2008).

Due to the progressing globalization, transport systems are increasingly unified despite linguistic, cultural, and geographical differences (Taylor, 2021) and more and more developed, favored by the development of transport telematics in Poland.

Over the last 30 years, road and road transport in Poland has changed and modernized tremendously, becoming an essential element of the European Union transport system. The development of transport is favored by the transit location of Poland, lying on the most critical longitudinal and latitudinal European routes from the west to the east and from the north to the south of Europe, in the trans-European transport corridors (Zakrzewski and Nowacki, 2016, Makeev *et al.*, 2018). Well-developed logistics centers are being built in the vicinity of modern roads and urban agglomerations. (Zakrzewski, 2016). Polish road haulers are among the most significant on the European market, and at the same time, one of the most competitive. The analysis presented in the article shows that road transport in Poland will continue to develop dynamically over the next ten years.

We strongly believe that the objective of this article has been fully achieved. Nevertheless, we are aware that many detailed threads have only been mentioned and are waiting for further development. However, the most important is the decision on the Polish state's support for the further development of the Polish automotive industry, which in the long term will contribute to the security of the Polish state and its inhabitants.

**References:**

Automotive Industry Report 2020/2021. 2020. PZPM, Warsaw 2020.

Balke I. 2013. Business situation in the freight road transport in Poland. Archives of Transport, 27(3), 15-24. DOI: 10.5604/01.3001.0004.0105.

Bebkiewicz, K., Chłopek, Z., Lasocki, J., Szczepanski, K., Zimakowska-Laskowska, M. 2020. Analysis of Emission of Greenhouse Gases from Road Transport in Poland between 1990 and 2017. Atmosphere, 11(4), 387.

Chęcińska-Kopiec, A., Siguencia, L.O., Grodek-Szostak, Z., Marzano, G. 2019. Transport infrastructures expenditures and costs analysis: The case of Poland. Proceedia Computer Science, 149, 508-514. https://doi.org/10.1016/j.procs.2019.01.169.

Ekspercki projekt koncepcji przestrzennego zagospodarowania kraju do roku 2033 (Expert draft of the national spatial development concept until 2033). 2008. Warsaw. Retrieved from: http://www.pzpm.org.pl/.

General Directorate for National Roads and Motorways. 2021. Retrieved from: https://www.gddkia.gov.pl/.

General Directorate for National Roads and Motorways. 2021. Retrieved from: https://www.gddkia.gov.pl/pl/a/40782/Czwarta-umowa-na-podlaskim-fragmencie-S19-podpisana.

Kukla, W. 2018. The infrastructure of road transport in Poland in shaping the state security. Transport Economics and Logistics, 80, 139-148, DOI: 10.26881/etil.2018.80.15.

Koncepcja polityki przestrzennego zagospodarowania kraju 2030. 2011. Załącznik do obwieszczenia Prezesa rady ministrów z dn. 26.07.2001 poz. 432 (The concept of the national spatial development policy 2030. Annex to the announcement of the

Prime Minister of July 26, 2001, item 432). Government Center for Strategic Studies, Warsaw 2011.
Koncepcja przestrzennego zagospodarowania kraju 2030 (National spatial development concept 2030). 2011. Ministry of Regional Development, Warsaw.
Madeyski, M., Lissowska, E., Morawski, W. 1978. Transport, rozwój i integracja, (Transport, development and integration). WKiŁ, Warsaw.
Madeyski, M. 1973. Przesłanki kształtowania zintegrowanego systemu transportowego (Prerequisites for shaping an integrated transport system), 1. Warsaw.
Makeev, V.A., Belikova, M.V., Isaev, A.K., Stratan, D.I. 2018. Formation of an Integrated Financial Regulation System of Transport Corporations' Economic Development. European Research Studies Journal, 21(2), 377-387. DOI: 10.35808/ersj/1264.
Osinska, M., Zalewski, W. 2020. Determinants of Using Telematics Systems in Road Transport Companies, European Research Studies Journal, 23(2), 474-487. DOI: 10.35808/ersj/1604.
Przybylski, R. 2021. Sto lat na poboczu (One hundred years on the side of the road). Rzeczpospolita Plus Minus, 18(118690), Plus Minus 3, (91452), 15-17.
Regulation of the Council of Ministers of 24/09/2019 changing the regulation on the network of motorways and expressways. Journal of Laws, RP, 1819.
Road construction in Poland: 2020 summary. 2021. Tygodnik Motor, 3, 8.
Romanow, P. 2008. Road transport in Poland during the globalisation process, LogForum, 4(4), 1.
Szelichowski, S. 2003. Sto lat polskiej motoryzacji (One hundred years of the Polish automotive industry). Krakowska Oficyna SAB, Cracow.
Taylor, M.A.P. 2021. Road transportation systems. In: Climate Change Adaptation for Transportation Systems. DOI: 10.1016/B978-0-12-816638-3.00007-6.
Transport - wyniki działalności 2004-2019 (Transport - activity results 2004-2019). GUS (Central Statistical Office), Warsaw.
Waters, C.D.J. 1999. Changes to road transport in Poland during a period of economic transition. International Journal of Physical Distribution & Logistics Management, 29(2). DOI: 10.1108/09600039910264704.
Zakrzewski, B., Nowacki, G. 2016. Pan-European Transport Corridor No. 2 and the development potential of Mazovia municipalities, Autobusy. Technika, Eksploatacja, Systemy Transportowe, 1725.
Zakrzewski, B. 2016. Logistics Centres of Eastern Poland in The Pan-European Transport Corridor, 2. Zeszyty Naukowe Uniwersytetu Szczecińskiego Problemy Transportu i Logistyki, 34, 2.