Transport of the Future

Report on prospects for the development of road transport in Poland in 2020-2030

This report was prepared by PwC for and in substantive cooperation with the Transport and Logistics Poland Employers’ Association.
Dear Readers,

The transport market is currently witnessing changes on an unprecedented scale – in response, at the invitation of the Transport and Logistics Poland Employers’ Association, we have prepared this report. The purpose of this document is to summarize the anticipated directions of development of the Polish road freight industry over the next 10 years. Since we published our "Drivers' Labor Market" report in 2015, changes in the industry have currently gained momentum. The dynamic surge in tonnage and transport performance (ton-kilometers) still continues, as does the shortage of drivers in the labor market. Currently, however, Polish carriers must also be ready to face further legal challenges (including the regulations of the "Mobility Package") and technological challenges (especially digitization and autonomous transport). Given the diversity of the anticipated changes, this report carefully sifts through their various dimensions in order to determine the most likely industry development scenario.

Dear Readers,

The Polish road transport industry stands at a crossroads. Over the last 10 years, dynamic growth has been observed both in Poland and on European markets. Polish carriers’ strong sense of entrepreneurship, high quality of services and indisputably lower labor costs have allowed them to build a leading position in Europe. However, changes in local labor markets and administrative/legal barriers introduced in many EU countries have levelled out their advantages, including those stemming from labor costs. Moreover, that’s not the end of the story. Polish carriers have found themselves under strong pressure from interest groups striving to gradually limit access to the European road transport market by having specific amendments introduced to EU law. These legislative initiatives, including the proposal called the "Mobility Package", were originally justified in terms of concern for employees’ wellbeing. However, with each subsequent stage of work it has become more apparent that their true goal is nevertheless to protect domestic markets in Western Europe from foreign competition, such as that posed by Polish carriers. In the long term, many carriers are also asking themselves such questions as these: To what extent will new technologies shape competitive advantages in the market? What actions should they take not to just maintain their position, but also ensure further development based on new technologies? Together with partners (Santander Bank Polska, DAF, Uber) and using the help of an independent adviser, we decided to draw up this report in order to address such questions. The report also contains recommendations for Polish government administration. Without cooperation on its part, Polish carriers will not be able to maintain their current position. Joint efforts should focus on fostering further growth, on improving social conditions of employees and on effective environmental protection. Our hope is that this report will facilitate dialogue and understanding of the industry's needs and serve as the basis for effective action, which is urgently necessary.

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On the scope of this report

Our analysis of the Polish road transport industry, as presented in this report, covers road carriers providing full truckload (FTL) and less than truckload (LTL) transport services in Poland and abroad, but operating from the territory of Poland. The report contains predictions for 2020-2030, starting with a summary of the current situation (2018-2019). It is also supplemented with a forecast of market growth in the 5-year period from 2018 to 2023. The future hypotheses included in the report are based on observation of trends and first sightings of changes in various areas. All hypotheses contained herein are conditional, therefore we encourage you to read the report, make your own judgements and participate in the discussion about the industry’s developmental needs.

The report is an independent assessment of the market’s future by PwC. However, its predictions are also based on interviews with industry representatives as well as data from external sources. In working on the report, we conducted about 30 interviews with representatives of small, medium-sized and large enterprises in the industry, so as to compare forecasts against real business expectations. Specific chapters of the report contain references indicating sources of data and opinions presented. While preparing the report, we strove to verify them so as to identify the most likely future scenarios.

Maciej Starzyk
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Summary, key findings
5 forces shaping road transport in Poland in the coming years

1. Growth in domestic and import/export volumes
   - Total increase in volume (tonnage) in the Polish industry over 4 years (2018-2022), proportionally increasing total transport performance
   - 23%

2. Reorganization of international freight (due to EU law changes)
   - Simulated decrease in total transport performance in the Polish industry after 2022, if international transport performance were to drop by 20% as a consequence of the EU’s Mobility Package provisions
   - 13%

3. Driver shortages
   - Increase in operating costs by the end of 2020 projected by carriers, as compared to 2018
   - 7-15%

4. Digitalization
   - 200,000
   - Estimated level of driver shortage in 2022, if current supply gap persists
   - 5%

5. Industrialization
   - Potential for cost savings thanks to autonomous transport available after 2025
   - 28%

Drivers of change:

- Autonomous vehicles
- LNG, electric, hydrogen
- Process automation
- Platformization
- Advanced technology
- Digital giants

- Autonomous vehicles: 28%
- LNG, electric, hydrogen: 2018
- Process automation: 5%
- Platformization: 54%
- Advanced technology: 73%
- Digital giants: 2018
1.1 Increase in domestic, import and export transport services

In the period 2018-2022, the Polish road transport sector can be expected to see a total increase in volume of almost 23% (in terms of tonnage of transported goods).

- The Polish road transport sector is currently at the peak of its growth phase. It is estimated that the tonnage it handles will increase from approx. 1.17 billion tons in 2018 to approx. 1.44 billion tons in 2022, with an average annual increase of 5.3%.

- The dynamics of transportation services provided by Polish carriers in the years 2018-2022 will remain positive, but will start to slow down in comparison to the present due to projected slowdown of economic indicators affecting the industry.

- So far, the international transport segment has been developing faster than domestic transport. After 2022, this trend may be reversed due to the changes in EU legislation identified below.

- The industry growth forecast was based on tonnage (rather than transport performance, in ton-kilometers) because of the closer correlation between tonnage growth and economic indicators, but in the long term it can be assumed that transport performance will also increase proportionally to tonnage.

In the opinion of industry representatives, the factors presented in this report will, by the end of 2020, lead to an increase in industry costs of 7-15% as compared to 2018.

- These factors include the impact of the introduction of the “Mobility Package”, a persistent shortage of drivers in the labor market, increased costs due to environmental regulation and increased road toll rates.

- With the observed low level of margins in the sector (EBIT = 3.62%), increased costs may lead to the elimination of the least efficient entities from the market. Due to the expected changes, large-scale companies are likely to perform better.

In the near future, a significant shift in demand towards domestic services (and a smaller one towards less-than-truckload [LTL] services) can be expected.

- The geographical shift in services will be a consequence of further economic growth in Poland, economic slowdown in Western Europe and expected restrictions on foreign operations.

- According to industry representatives, quality expectations concerning more precisely timed deliveries and the exchange of information between carriers and customers will also increase.

Poland’s projected economic development will not be possible without continued growth in the transport segment. We can observe signals indicating the continuation of trends supporting the country’s economic growth, such as European operators opening distribution centers there. The growth forecast for the industry in the period 2018-2022 is based on two factors:

- expected positive changes in demand for transport services in the internal market (in Poland) due to GDP growth forecast at 3% in the period 2018-2022,

- Poland’s foreign trade growth of 7% in the period 2018-2020 and its positive level in 2021 and 2022.

- In the long term (2023-2030), negative changes in demand for services of Polish carriers in the EU-28 (as a consequence of the regulations of the “Mobility Package”) are perceived as a huge threat to the industry and therefore forecasting beyond 2022 is currently not possible.

In 2019-2022, T&L companies should use the projected market growth to gradually expand their business profile, while at the same time balancing domestic and foreign sources of revenue.

State administration will be able to influence market growth by supporting the further development of transport infrastructure. It is worth noting, however, that the lack or shortage of infrastructure in the country does not limit expansion of the industry, though it may have a significant impact on the effectiveness of transport operations conducted in Poland.
**Infographic 1: Development of the Polish road freight sector**

- **23%** - Expected total growth of volumes in the Polish road freight transport industry in the years 2018-2022 (tonnage of transported goods)
- **7-15%** - Level of cost increase in the industry by the end of 2020, as expected by transport companies

**Forecast tonnage in the road freight transport industry 2015-2025 (million tons)**

- 886 (2015)
- 948 (2016)
- 1,097 (2017)
- 1,170 (2018)
- 1,236 (2019)
- 1,294 (2020)
- 1,361 (2021)
- 1,436 (2022)

23% increase in the years 2018-2022

Uncertain future after 2022

**Forecast tonnage increase**

- **4.7%** - Average annual growth of domestic transport in the years 2018-2022 (tonnage)
- **6.9%** - Average annual increase in international transport in the years 2018-2022* (tonnage)
- **?** - Increase in cross-trade, cabotage, import and export transport at risk after 2022

- Projected GDP growth / economic development for Poland
- Poland’s foreign trade growth
- Regulations – impact of implementing the “Mobility Package” after 2022

*Before the consequences of the “Mobility Package” materialize in the market
Source: PwC’s own study based on forecasts of factors in component industries
1.2 Reorganization of international transport due to changes in EU law

At the level of the EU-28, fundamental changes to road transport regulations are planned, including the provisions of the "Mobility Package" and changes to the legislation on coordinating social security systems and other social regulations.

These changes will certainly trigger the following effects in the industry:

1. Increased costs of transport networks (due to reduced efficiency) and increased labor costs.
2. Decreased revenues related to restricted access to the market in the scope of cross-trade and cabotage services and, consequently, also of import and export of goods.
3. The shifting of Polish carriers’ services from EU markets to the Polish market.
4. Increased risk and barriers to doing business, especially for small carriers due to increased complexity of regulations.
5. Forced internationalization of carriers which today operate on many foreign markets from the territory of Poland.
6. Increased concentration as a result of bankruptcy of small enterprises which do not have appropriate shares of transport in Poland and on foreign markets in their operations.

A reduction of transport performance in international transport services, e.g. by 20%, would mean reduction of the total transport performance by Polish carriers by nearly 13%. Foreign transport by Polish companies constitutes as much as 64% of their total transport performance services, so the majority of the Polish carriers’ activities are threatened by changes in the law.

Growing environmental protection requirements will also increase costs (with expectations of lower CO₂ and pollutant emissions, the use of more eco-friendly engines and local restrictions on the traffic of vehicles with internal combustion engines).

An insufficient level of development of national legislation in the area of new technologies may hinder their implementation by Polish carriers, giving foreign ones the advantage.

On 4 April 2019, the European Parliament adopted a report on the "Mobility Package", including specific regulations dealing with the posting of workers, admission to the occupation of road transport operator and to EU markets, as well as social aspects (including working time) and the activities of controlling institutions. This means that changes are unavoidable.

The new regulations may start to partially affect the market from mid-2020. We expect that up to 2022, Polish road transport sector will not be affected by them and will grow as expected, adapting to the changes. Growth after 2022 will certainly be severely constrained by increased enforcement of compliance with the new legislation.

Starting from 2022, regulatory changes related to the "Mobility Package" may prevent Polish carriers from providing a large share of their cross-trade and cabotage services, which account for 23% of their transport performance (36% of transport performance in international transport).

Restrictions on Polish carriers’ access to Western European markets may increase competitive pressure from companies across Poland’s eastern border, which are currently not bound by similar requirements. The effects of the legislative changes may also include operators working at the European level shifting their supply chains towards Poland and Polish carriers shifting their activity to Poland.

Large carriers operating mainly abroad can adapt their operations to the new rules emerging from the changes in EU law by opening representative offices in EU countries other than Poland. They may also expand their activities (transports) within Polish territory. However, domestic demand will not allow the current growth rate of the industry in general to be maintained.

Medium-sized and small businesses might move their registration to countries where they provide services, reducing foreign volumes in favor of domestic ones or increasing domestic volumes.

Polish state administration may also take measures to support the industry. It is able to influence the legislative processes in the arena of the European Parliament, the European Commission and the Council of the European Union, as well as to introduce regulations supporting the operation of groups of smaller entities as consortia in order to increase their efficiency and reduce costs for a single carrier. State administration may also create preferential conditions for the activity of companies, to an extent that does not constitute state aid in the meaning of EU law.
Infographic 2a: Simulation of legislative changes’ impact on the Polish road freight transport industry

-13%
Simulated decrease in total transport performance of the Polish road freight transport industry if international transport performance in the industry drops by 20%

64%
Share of international transport in the total transport performance of Polish carriers

Infographic 2b: Map of regulations and their impact on the Polish road freight transport sector

Key areas of regulatory changes

1. Regulation of market access and occupation admission
   - Amendment of the Regulation of the EP and of the Council (EC) No 1071/2009
   - Amendment of Regulation (EC) No 1072/2009

2. Social regulation (incl. working time)
   - Plans to amend Regulation (EC) No 561/2006

3. Inspection and control institution regulation

4. Environmental regulation
   - Restrictions imposed by local authorities on heavy goods vehicle traffic

5. Regulation of new technologies
   - Low level of sophistication of Polish law with regard to new technologies in transport

Possible direct impacts

A. Increase in costs as a result of lower efficiency of transport networks and increased labor costs driven by changes in the law
B. Decreased revenues due to restrictions in market access
C. Increased risk and barriers in doing business due to growing regulatory complexity

Possible indirect impacts

D. Internationalization of large carriers as a result of new law limiting the possibility of providing services from another country
E. Increased market concentration as a result of new law limiting opportunities for smaller entities to compete in the market
F. Additional expenditures by carriers to minimize the effects of changes in the law (by increasing services provided in the domestic market and in import/export)
G. Shifting supply chains towards Poland
H. Increased costs due to restrictions and growing environmental requirements, including the need to purchase/replace rolling stock
I. Legal obstacles to implementation of new transport technologies in Poland
J. Carriers from Western EU countries gaining a technological advantage in transport

Source: PwC analysis
1.3 Driver shortages

The existing shortage of drivers with desired skills is very likely to grow to the level of nearly 200,000 drivers (20% of labor demand) in 2022.

- In 2015, the shortfall was estimated at around 100-110,000 drivers, i.e. more than 15% of the total supply, estimated at 600,000-650,000, as compared to the demand, estimated at nearly 730,000 drivers.

- The industry representatives we interviewed reported that, in their estimation, at the end of 2018 this gap reached 20% of demand (in qualitative terms, i.e. the shortage of workers with sufficient skills).

- Keeping the projected market growth intact and assuming that the gap remains close to the current 20%, the total shortage of drivers in the industry is expected to reach nearly 200,000 in 2022, with demand at around 950,000.

- Implementation of autonomous vehicles will be a revolution for the industry, but it will not offset the driver shortage in the short term. It is estimated that fully autonomous solutions will only be available on the market after 2025. In the initial phase, the implementation of autonomous solutions will require expenditures, but in the long run it will allow for greater cost advantages.

- Progressing autonomization and digitalization will in the long term require the development of personnel with new skills, including IT specialists. This will also mean an opportunity to make working in the transport sector more attractive to young people.

Unfavorable changes in the drivers' labor market will mainly be caused by:

- further projected growth in transport volumes in the industry, of 5.3% per annum until 2022,
- a possible decrease in the labor supply – the age structure of drivers indicates a high average age and a low number of people entering the profession,
- low attractiveness of the profession of driver and insufficient resources for driver training,
- demographic factors – an ageing population, migrations and a shrinking population.

- The assumption used in our calculations – that the current driver shortage level reported by carriers will persist – is an optimistic one. With no change in supply, the labor force gap could increase even further due to demographic and social factors (there is a risk that even the current number of drivers in the profession will not be retained).

- The insufficient number of drivers will also lead to increased payroll costs in the industry and, as a result, may lead to higher freight rates. Implementation of autonomous vehicles will not offset this shortage in the short term.

- Transport companies should prepare for growing multiculturalism in their human resources. In 2018, 72% of all drivers from outside of the EU working in Poland were Ukrainian. If the Ukrainian personnel resources become depleted in the nearest future, carriers may also consider recruiting employees from Central Asia (e.g. Uzbekistan) or South and East Asia (e.g. the Philippines). Although there are shortages of drivers also in some foreign markets, employment in Europe remains attractive for employees from outside the continent due to wage differences.

- It will also be necessary to introduce professional human resources management to respond to the expectations of drivers from the new generation, reducing their turnover and increasing employee attachment to the employer. According to the industry representatives, young workers increasingly expect to be able to stay at home regularly, stay in touch with friends and family and maintain contact with their employers through digital communication technologies.

- State administration should focus its efforts on supporting and subsidizing the process of obtaining driver qualifications in the country and on simplifying the procedures related to employing foreign drivers.
Infographic 3. Shortage of drivers in the Polish labor market, its root causes and possible action

- Increased demand for labor in the industry
- Risk of a decline in labor supply / insufficient labor market entries
- Lack of substitutes, limited migration of drivers in the Polish market

Employment demand and supply of drivers in Poland (thousands)

- **20%** Level of driver shortage in the market, as perceived by carriers in 2018
- **~200 K** Gap in the number of drivers in the market in 2022 (assuming 20% driver gap)

Possible actions by the state administration

- Supporting the development of social infrastructure for drivers
- Supporting the processes of foreign drivers obtaining work permits and relevant documents
- Supporting the recruitment and training of young drivers who have completed vocational school with a driver/mechanic profile

Possible actions by carriers

- Recruitment from more distant countries
- Enabling drivers to return home and travel shorter distances more often
- Building partnership with drivers through openness and readiness to set rules of cooperation together

Source: PwC study based on industry growth forecasts and interviews with industry representatives.
1.4 Digitalization

Digitalization of transport in Poland is progressing in the following four areas:

1. **Basic digitalization** – including measures currently underway: IT implementation of processes, automation of administrative services, optimization of transport networks thanks to the use of geographic network modeling solutions.

2. **Market platformization** – ongoing development of digital platforms for ordering online services from a large base of service providers.

3. **Digital giants** – ongoing entry into the transport and logistics market by large companies that have emerged due to digital technologies, such as Amazon, Uber, Asos, Ocado (and many others).

4. **Advanced digital technologies** – intensification of advanced solutions entering the market in the area of telematics, artificial intelligence and blockchain-based solutions, expected after 2022. Currently these are still in the test phase.

Implementation of digitalization solutions will be crucial for reducing operating costs, adapting services to changing customer needs and implementing solutions with high added value. In the short term, however, they will be available to large carriers who will have the capacity to implement them, which may create an additional barrier for smaller businesses and increase market concentration.

**Substantiation and comments**

- The current level of digitalization of the road freight transport sector is low because in recent years, transport carriers did not need technology in order to grow. Global carriers see digitalization as a new source of revenue, but for local ones it will be more a source of efficiency gains.

- Platformization of transport services is already visible in passenger transport. Platforms for ordering services online exist in freight transport, but lacking a consumer dimension they do not operate on a massive scale. Also, some digital giants (such as Uber) are taking steps aimed at offering efficient platforms for ordering freight services.

- Intelligent transport systems and solutions based on artificial intelligence or blockchain are in the testing phase, so they are likely to appear on the market on a larger scale between 2022 and 2023. In the initial phase (before the standards emerge), they will remain beyond the reach of small market participants due to high investment expenditures for their implementation.

**Recommendation**

- Larger carriers should urgently carry out basic digitalization of internal processes (especially administrative, transport management [TMS]) and external ones (platformization of service sales) so as to enable advanced digital solutions, such as telematics-based intelligent transport systems, to be deployed in the long term.

- Small carriers should tackle the "digital divide" by using digital services and standard solutions that will be available at affordable prices (e.g. emerging digital platforms).

- Public administration should focus its efforts on supporting standard-setting in the industry and creating business networks that will enable digitalization of many dispersed market entities. Such actions could include, for example, creation of a common network infrastructure for the industry and creation of regulations that support the implementation of new technologies.

- Suppliers of IT and telematics solutions for the industry (including vehicle manufacturers) may create ready-made solutions and standards that will be applied in a very dispersed market in the form of "technology as a service".
Infographic 4. Transport digitalization – predictions, impact of digital giants

68% of transport & logistics CEOs surveyed expect that changes in core technologies of service provision will be disruptive to their business.

65% of transport & logistics CEOs surveyed expect changes in distribution channels impacting their business.

Expectations regarding transport digitalization

54% of T&L executives surveyed said they expect revenues to grow thanks to digital technologies.

73% of T&L executives surveyed said they are already making investments in the Internet of Things.

22x expected growth in value of the sharing economy in the years 2013-2025.


68% of T&L executives surveyed said they are already making investments in artificial intelligence (AI) technologies.

Examples of digital giants’ activities in T&L

2013
Alibaba establishes Cainiao Network (a logistics platform, developed successively in the following years)

2014
Zara introduces RFID tech in its supply chain

2017
Zalando launches Zalando Fulfillment Solutions

2017
Uber launches Uber Freight, a digital platform for freight transport services, which later enters Europe in 2019

2018
Amazon opting out of third party logistics services, instead launching its own

2019
Diverse ecosystems of digital giants’ transport services are ready for dynamic growth

Sources: PwC Survey "CEO Survey 2018" (Responses relate to projections for 2018-2022); PwC Report "The Sharing Economy – Consumer Intelligence Series"; PwC Report "Digital IQ Survey 2017".
1.5 Industrialization – autonomous vehicles and alternative drives

The fifth force that will revolutionize road transport and fill the driver supply gap in Poland over the next decade will be industrialization. The transition from a traditional to an industrialized transport industry will be driven by two technological trends:

1. **Autonomous vehicles** – This will enable operating costs to be reduced by about 15% by 2025 due to a reduction in labor costs, and potentially even to a level that is about 28% lower around 2030 (as compared to 2016). It will also reduce the demand for drivers and increase the demand for autonomous system specialists (including programming, configuration, maintenance, day-to-day supervision).

2. **Alternative drives** – This will adapt the industry to growing CO2 emissions requirements and enable transport costs to be reduced in the long term, but this impact will not be seen until 2025 at the earliest. In the short term, the diesel engine will remain the standard, as it currently dominates the industry. In last-mile transport, including in urban areas, faster popularization of electric and CNG vehicles can be expected, and on long journeys LNG-powered vehicles can be expected to become more popular faster. The hydrogen propulsion system in road freight in Europe currently remains in the testing phase.

The development of new technologies requires great investment, so solutions in the area of autonomy and new drives will be more easily accessible to large carriers with higher investment capacity, which may be a factor increasing the level of concentration in the industry.

**Substantiation and comments**

- Technologies related to autonomous vehicles are currently being tested. This is why more extensive use of autonomous vehicles can be expected after 2025. For the same reason, their wider use can first be anticipated outside urban areas (on motorways) and in enclosed areas. In the middle of the next decade, partial autonomy in the form of vehicle platooning, with one driver operating several vehicles, will become popular. Only closer to 2030 will we possibly see implementation of fully autonomous vehicles on a larger scale.

- In the area of alternative drives, vehicles with LNG propulsion have already come into service. Vehicles with electric propulsion are also appearing in last-mile transport in cities, where the need to charge the vehicle does not hamper its performance. On the European market hydrogen-powered trucks have not yet arrived – such drives are already in use, e.g. in urban buses, but on a very limited scale. The main barriers to the popularization of alternative drives are the lack of charging and refueling infrastructure and the high production costs, which result in an uncompetitive price of vehicles. Therefore, to popularize them, support from public administration is necessary and they should not be expected to be deployed on a large scale by 2025.

**Recommendations**

- Transport companies should implement advanced technological solutions in the area of autonomy and alternative drives to reduce costs in the long term. In the short term, the necessary level of their investment will increase. The key to success in the marketplace will lie in boosting margins through technological advantages that result in lower labor and infrastructure costs. However, these solutions may prove too expensive for small carriers.

- Public administration should create conditions for the implementation of automation/autonomization and the development of new drives (for example, regarding the development of charging and refueling infrastructure, tax reductions, concessions for infrastructure provision, efficient and appropriate use of a low-carbon fund).
Infographic 5: Predicted impact of autonomous transport and alternative drives on road transport

Around 2020

**Process automation**

The application of software for process automation reduces costs by approx. **5%** compared to 2016

Around 2025

**Partial autonomy**

Vehicle platooning, with driver supervision or remote control, reduces costs by approx. **15%** compared to 2016

After 2025

**Full autonomy**

Driverless vehicles, with remote control, reduce costs by approx. **28%** compared to 2016

**Freight trucks in 2030: autonomous, with alternative drive**

- **Electric drive**
  - Practical for vehicles with GVW <3.5T in urban areas
  - Application in trucks requires overhead power supply (tested in Germany in 2019)

- **LNG/CNG drive**
  - Launched in Europe
  - Use restricted by availability of refuelling stations, vehicle prices
  - Supported by the German Government

- **Hydrogen drive**
  - Currently under testing in urban transport
  - Heavy-duty trucks with this drive in the testing phase in the US

Source: PwC study
1.6 Industry development roadmap

**Figure 1.** Map of road transport development in Poland in the coming years (starting from 2019)

Source: PwC analysis; area/force numbering aligned to summary, detailed factor numbering aligned to Appendix 1.
Polish road transport in the EU-28 context – observations from the last decade, the role of road transport in the economy
Over the last decade, the Polish road transport industry has been experiencing dynamic growth due to the opening up of access to freight transport markets in the EU-28\(^1\) and the recovery after the 2008 economic crisis. The last 10 years have also shown that road transport is highly susceptible to the economic cycle and that it plays an important role in the economy in terms of added value created and revenues generated for the state budget.

The event that most shaped the beginning of the last decade in the economic life of Europe was the crisis of 2008. One consequence of this economic crisis was a reduction in transport performance (total ton-kilometers) in the road transport industry on the whole-EU level over the next 4 years. Eurostat data indicate that the total ton-kilometers performed fell from 1.89 trillion tkm in 2008 to the range between 1.69 and 1.77 trillion tkm in 2009-13. The level from 2008 was not exceeded until 2017, when transport performance carried out in the EU reached the level of almost 1.92 trillion tkm, outperforming the pre-crisis result.

Chart 1 summarizes the average levels of growth in transport performance in the EU-28 over 4-year periods (taking into account the forecasts for 2019). Analyses in shorter periods show a high volatility of the transport industry compared to GDP, but analysis over 4-year periods shows a correlation between the average growth levels of the industry and GDP growth. In the 4-year period following the beginning of the crisis, negative GDP growth was accompanied by negative growth in the industry. In subsequent periods, increasing GDP growth has been accompanied by even higher increases in transport performance. This means that the transport sector is highly susceptible to the dynamics of economic growth. Any future economic crisis is therefore likely to distort growth in the freight transport markets.

Chart 2 presents the overall volume of transport performance carried out in the road transport sector in the EU-28 and the share of Polish enterprises of road transport in the EU territory.

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\(^1\) Our analysis in this report refers to the territories or economies of 28 EU countries (EU-28), unless otherwise indicated.
Polish road transport in the EU-28 context – observations from the last decade, the role of road transport in the economy

Chart 2. Total transport performance of carriers from EU-28 countries and the share of Polish carriers, 2008-2017 [trillion tkm]

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Performance</th>
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<tbody>
<tr>
<td>2008</td>
<td>1.89</td>
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<tr>
<td>2009</td>
<td>1.70</td>
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<td>2010</td>
<td>1.76</td>
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<td>2016</td>
<td>1.83</td>
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<td>2017</td>
<td>1.92</td>
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Source: PwC analysis based on Eurostat data

In the years 2008-2017, Polish carriers’ share of transport performance carried out in the road freight transport sector in the EU-28 increased dynamically, doubling over the period to reach the level of 18%. Currently, Polish enterprises rank first in terms of their share in the total transport performance in the EU-28, followed by German and then French carriers.

Road freight transport services may be provided in three separate ways, which should be treated as separate fields of activity: within the territory of the carrier’s country of origin, or handling goods imported/exported to and from that country, or in terms of exporting transport services themselves (in the form of cross-trade and cabotage). Chart 3 presents changes in the participation of Polish transport entrepreneurs in transport performance in these distinct fields of activity on the territory of the EU-28.


As is evident, the increased share of Polish companies in the total transport performance carried out in the EU-28 was a result of the increased shares in all three fields of activity in 2008-2017:

- services carried out in the country of origin of a given carrier (increase in share from 6% to 10%),
- services handling imports and exports of goods to/from the given carrier’s country of origin (increase from 14% to 29%),
- exported services such as cabotage (increase from 23% to 33%) and cross-trade (increase from 6% to 40%), carried out by carriers from a given country in other UE-28 countries.

The increases in the first two fields mentioned above are related to the growth of Poland’s GDP and foreign trade. The growth in the third area, in turn, is related to the entry of Polish carriers into the EU-28 export market of transport services after Poland’s accession. Polish carriers built up their scale of operations in this period thanks to the location of production facilities in Poland; because of their access to employees and their cost advantage, they were able to handle newly exported volumes of goods. They also used the opportunity to diversify their services, building cabotage services on the basis of exports.

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2 Definitions of key terms used in this report are indicated in the dictionary at the end of the report.
The road freight transport sector plays a key role in the economy. In terms of gross value added, both the Polish economy and the entire EU-28 economy is characterized by a high share of services. Over the last decade, the structure of the share of services, industry and agriculture in the total value added in Poland has not changed significantly. However, over the period one can observe an increase in gross value added generated by the road transport sector within the services sector. In 2008-2016, at the EU-28 level, the added value generated by the sector grew by 1.7% annually on average, and in Poland by 6.8%. In Poland, the total added value of the transport and logistics sector in 2017 amounted to 6.6% of the total added value generated in the economy (PLN 115 billion) and 6.0% of GDP (119 billion).

The increase in the value added created by the road transport sector in Poland and the EU is higher than the increase in the total value added created in the economy, which at the same time (2008-2016) amounted to an annual average of 4.9% in Poland and 1.6% in Europe.

The transport sector also plays an important role in the economy in terms of the state budgetary revenue it generates. It is estimated that for every 100 km driven each truck generates approximately PLN 208 of budgetary revenue on average (specific averages for different classes of vehicles are shown in Figure 2). These inflows depend on the permissible total weight of the vehicle. They include fuel consumption-related fees (such as VAT, fuel tax and excise duty), road tax, environmental tax, registration fees, and tax and social charges for entrepreneurs and drivers (including VAT, PIT, CIT and ZUS).

Figure 2. Value of state budget revenues generated by trucks of different classes for every 100 km driven

<table>
<thead>
<tr>
<th>Class</th>
<th>PLN</th>
<th>GVM</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5 - 7.5 t</td>
<td>148</td>
<td>GVM</td>
</tr>
<tr>
<td>7.5 - 12 t</td>
<td>178</td>
<td>GVM</td>
</tr>
<tr>
<td>12 - 40 t</td>
<td>232</td>
<td>GVM</td>
</tr>
<tr>
<td>&gt;40 t</td>
<td>278</td>
<td>GVM</td>
</tr>
</tbody>
</table>

Source: PwC analysis

3 For the purpose of calculations, fuel consumption was assumed at the average level of 31 l/100 km, the price of diesel oil at PLN 5.6 per liter. The tax on vehicles was calculated per 100 km on the basis of average truck mileage in Poland, and the registration fee was calculated on the basis of average mileage and average age of the truck in use. The environmental fee was calculated using special calculators available on the websites of the Voivodeship Marshall’s Offices.
Economic factors supporting the development of the industry in coming years
In the coming years, the projected GDP growth in Poland and the EU-28 as well as increased trade will contribute to increased demand for transport services in Poland and, to an even greater extent, in international markets. In the longer term, due to legislative changes, we may expect a slowdown in the development of the international segment.

Analysis of the impact of economic factors on the nearest future of the Polish road transport sector allows the following conclusions to be drawn:

1. Poland’s GDP growth forecast at the average annual level of 3% by 2022 in real terms will translate into a total increase in tonnage serviced in the country by 20.1% in the period 2018-2022, and, consequently, into an increase in transport performance.

2. Annual growth in the value of Poland’s foreign trade averaged 7.7% between 2010 and 2017. A further increase of 7% annually on average by 2020 (total forecast for goods and services) will create an opportunity to increase transport volumes by 30.5% (tonnage) in the period 2018-2022 (and a proportional increase in transport performance) in international transport.

3. Maintaining the current turnover in cross-trade services and cabotage in the EU-28 is questionable despite positive forecasts of an increase in internal trade in the EU-28, given the expected impact of the provisions of the “Mobility Package” after 2022.

4. Other transport modes (rail, river, air, maritime) will not limit growth in road transport. Road transport, which currently accounts for more than 50% of all transport performance (ton-kilometers) in the EU-28, will remain the largest segment of the total transport sector in the coming years, due to its dynamic growth and slower growth in other transport modes.

5. The development of infrastructure will influence local, regional and global trade routes. At the same time, although it will have a limited impact on growth in the industry, it will contribute to improved efficiency. Initiatives such as the European TEN-T route network or China’s Belt and Road Initiative will contribute to the development of infrastructure both in Poland and Europe. In the following years Poland can expect to see a partial slowdown of investments implemented from EU and domestic funds. These phenomena will not significantly limit or support the growth of road transport.

Chart 4 summarizes the forecast growth of volumes in particular segments of the transport sector in Poland.

Chart 4. Growth forecast for the Polish transport sector by mode, 2018-2022 [M t]

The increase in total tonnage handled by the Polish transport sector between 2018 and 2022 is forecast at 20%. This is composed of an increase in the road transport sector from 1.17 billion tons in 2018 to 1.44 billion tons in 2022 (an increase of 22.8% over the period), and growth in the maritime and railway segments (by 10.4% and 9.7% over the period, respectively).

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4 IMF.
5 GUS.
6 OECD.
7 European Commission – Statistical PocketBook, downloaded 09.06.2019.
3.1 Impact of domestic economic growth in Poland over the industry, development prospects

The forecast economic growth and Poland’s investment attractiveness will certainly translate into increased transport volumes (tons) and transport performance (ton-kilometers) in the industry in Poland at a level exceeding 20% in 2018-2022.

Due to a higher level of correlation between GDP growth and transport tonnage (as compared to the correlation with transport performance), we used tonnage to forecast growth in the industry. Transport performance (ton-kilometers) is more volatile in the short term, but it can be assumed that an increase in tonnage in the long term will also translate into a proportional increase in transport performance.

Between 2008 and 2017, GDP in real terms increased by more than 30%, driven by average growth close to 3.2% per year. The domestic market for imported goods measured by tonnage increased by 37% in that period, growing at an average annual rate of nearly 4%. As shown in Chart 5, in the majority of periods positive GDP growth is accompanied by a positive tonnage growth.

Chart 5. Annual growth rates of real GDP and domestic road transport sector in Poland (tonnage) in 2005-2017 [%]

Through 2023, the average annual GDP growth in Poland is projected at 3%.9 Even in the case of a slowdown in Western Europe, economic development will be supported by the following factors:

- A large and receptive internal market and an increasingly affluent society, which will translate into increased consumer demand,
- EU funding to support investment,
- Lower labor costs in comparison to Western European countries (despite the increase in recent years, wages in Poland are still approx. 3 times lower than e.g. in Germany),10
- An attractive location drawing in foreign investments in industrial plants and distribution centers (as exemplified by the recent investments of Amazon, Zalando and Lidl),
- A solid institutional system in comparison with the CEE region (a high rating in the "Doing Business" ranking).11

Chart 6. Forecast of real GDP growth in Poland [%]

Source: IMF

In a long run (through 2030), as Poland gradually catches up to the developed economies, its GDP growth is likely to slow down. Despite further development, in the period 2023-2030 growth in the domestic transport industry may also decrease. The transport sector will also be vulnerable to possible periodical economic crises. The main economic risk factors include an ageing and declining population, labor shortages and a possible drop in EU funds inflow.

20.1%
Projected increase in the total domestic tonnage served by the Polish road transport sector in the years 2018-2022

9 PwC analysis based on OECD forecasts.
10 Eurostat.
3.2 Growing international trade as a driver for Polish transport companies servicing imports and exports of goods

The Polish road transport sector will grow in the area of import/export services. The predominant share of the EU-28 countries in the structure of Poland’s foreign trade may, however, make it difficult to diversify revenues.

Poland’s share in the total EU-28 trade in goods is systematically growing – it amounted to 3% in 2008, and increased to 4% in 2017. This was largely due to the development of export sales, supported mainly by foreign investments and the weak exchange rate of the Polish zloty. In 2008-2017, annual growth in the value of trade in goods (i.e. trade excluding services) averaged 6.8% for imports and 8.8% for exports. As a result, from 2015 onwards Poland became a net exporter.

In 2018, 80% of exports and 69% of imports went to / came from the EU-28. In the case of exports, this share has been increasing in recent years due to the economic crisis in Russia.

In 2018-2020, Poland’s total foreign trade (including services) is projected to increase by nearly 7% annually, which will convert into an increase in the tonnage serviced in imports and exports by Polish carriers. Through 2023, annual growth in trade should remain positive. This will be supported by GDP growth in the EU-28 in 2018-2023, projected as an average of 1.8% and by lower labor costs in Poland compared to Western European countries, which will continue to attract foreign investment.

Increased value of trade translates into increased international transport of goods imported/exported. As shown in Chart 8, in 11 out of the 13 years constituting the entire analyzed period, the pace of growth in both transport and trade were simultaneously above or simultaneously below their average values.

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12 Eurostat.

13 PwC analysis based on OECD data.

14 IMF.
It should be noted, however, that this is probably the last moment of such dynamic development – its pace may be lower than in the previous years due to the slowing down of GDP growth in Germany or the expected Brexit. In the 2024-2030 perspective, as European markets become saturated, the likelihood of a further decline in the pace of growth in trade between Poland and the EU-28 increases.

Figure 3. Main countries of origin/destination of goods imported to / exported from Poland

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Germany</td>
<td>215.27</td>
<td>7%</td>
<td>Germany</td>
</tr>
<tr>
<td>China</td>
<td>111.56</td>
<td>11%</td>
<td>UK</td>
</tr>
<tr>
<td>Russia</td>
<td>70.75</td>
<td>4%</td>
<td>Czech Republic</td>
</tr>
<tr>
<td>Italy</td>
<td>48.19</td>
<td>4%</td>
<td>France</td>
</tr>
<tr>
<td>France</td>
<td>35.04</td>
<td>4%</td>
<td>Italy</td>
</tr>
<tr>
<td>Netherlands</td>
<td>34.60</td>
<td>7%</td>
<td>Netherlands</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>32.83</td>
<td>6%</td>
<td>Russia</td>
</tr>
<tr>
<td>USA</td>
<td>27.28</td>
<td>10%</td>
<td>Sweden</td>
</tr>
<tr>
<td>Belgium</td>
<td>23.84</td>
<td>7%</td>
<td>Spain</td>
</tr>
<tr>
<td>UK</td>
<td>23.30</td>
<td>5%</td>
<td>USA</td>
</tr>
</tbody>
</table>

64.7% top 10 share of total imports
66.4% top 10 share of total exports

Source: GUS

Expert Comment

“Growth in the industry is contingent on the demand for services – the demand on the domestic market outweighs the supply, and rates remain on a similar level. In recent years, Poland’s economy has shown resilience to crises, unlike those of Western countries. Large Polish companies often do not participate in the domestic market, due to lower earnings. Therefore, international cooperation, especially with Germany, is crucial for driving the development of European transport. Not just Poland’s trade with other countries, but also international trade which doesn’t involve Poland is important.”

Maciej Zwyrtek
Kuźnia-Trans
Economic factors supporting the development of the industry in coming years

3.3 Operations of Polish carriers on the European market in terms of exported transport services (cross-trade, cabotage)

Despite the expected growth in the GDP and internal trade of the EU-28, Polish carriers may see their current dynamic growth in cross-trade and cabotage turnovers slow down if their access to the market becomes limited.

Cross-trade and cabotage are an important part of transport companies’ range of services and are an important factor in eliminating empty runs, which boosts transport efficiency. As shown in the previous chapters, the growth in Poland’s foreign trade and access to the market have translated into dynamic development of Polish carriers’ activity in the field of cross-border transport services. The shares of particular fields of activity of Polish carriers in the total transport performance and tonnage\(^{15}\) handled by Polish carriers are presented in Chart 9.

Chart 9. Share of individual types of transport in total transport performance and total tonnage of Polish carriers, 2017 [%]

![Chart showing the distribution of transport performance and tonnage](chart-image)

Source: Eurostat, PwC analysis

While exported transport services\(^{16}\) (cross-trade and cabotage) constituted only 8% of services (taking into account international and domestic transport) in 2017 in terms of tonnage, due to much longer distances performed during its implementation, they accounted for 23% of the total transport performance (expressed in ton-kilometers) during the same period.

In total, freight transport services in the fields of import, export, cross-trade and cabotage account for 64% of the total transport performance handled by Polish carriers. Therefore, the changes in access to foreign markets described in Chapter 4 will have a huge impact on the activity of Polish entrepreneurs. For example, limitations on the activity of Polish carriers leading to a 20% decrease in revenues from these services would translate into an almost 13% decrease in the total value of the market (international and domestic).

**64%**

Share of total transport performance of Polish carriers accounted for by international transport (import, export, cross-trade and cabotage)

Growth in the overall cabotage and cross-trade market in the EU-28 is correlated with growth in intra-EU trade, as shown in Chart 10.

Chart 10. Comparison of changes in the value of intra-EU exports (EU-25) and EU cross-trade and cabotage tonnage, 2005-2017 [%]

![Chart showing the comparison of changes](chart-image)

Source: Eurostat

The value of intra-EU exports in the years 2008-2018 increased by an average of 3% per year to EUR 3.519 trillion in 2018.\(^{17}\)

The tonnage of goods transported by Polish carriers in the segment of intra-EU trade services increased annually on average by over 39% and 11%, respectively, for cross-trade and cabotage in the years 2008-2017.

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\(^{15}\) Tonnage of transported goods is the correct unit for forecasting the turnover of the industry on the basis of economic indicators, as it exhibits a closer correlation with, for instance, growth in GDP or foreign trade. Transport performance (ton-kilometers) is better suited as a gauge for analyzing segment shares or market players, as it renders the turnover of companies operating in different market segments comparable.

\(^{16}\) Cabotage and cross-trade themselves constitute exported services because they are carried out outside the carrier’s home country, with neither the starting point nor the end of the route located in Poland.

\(^{17}\) Eurostat.
In the following years, intra-EU trade is expected to continue to grow, closer to 2012-2015 levels, thanks to the projected average annual growth rate of 1.8% of real GDP in the EU-28 between 2018 and 2023.  

In the longer term, the development of trade with non-EU countries should allow for positive growth in exports and imports of the EU-28.  

While the liberalization of access to the EU-28 market for Polish entrepreneurs has so far enabled them to develop their exported transport services, their further opportunities for exporting services will depend to a large extent on the legal and political factors analyzed in the next chapter. The introduction of the “Mobility Package” provisions significantly threatens Polish carriers in the area of cross-trade and cabotage.

1.8% Average GDP growth rate in the EU-28 projected for 2018-2023

Expert Comment

“The transport sector is highly vulnerable to economic fluctuations in the European Union. Demographic changes, geopolitical tensions and the increasing impact of legal regulations increase the uncertainty as to how the economy will develop in the long term. As a result, strategic planning and a readiness to react quickly to different market scenarios are gaining in importance. It is worth noting that the existing competitive advantage in the form of lower labor costs will start to lose importance, with comprehensiveness, flexibility and adjustment of services to market needs gaining importance. So far, companies have invested heavily in rolling stock development, while in the years to come the focus will be on digital solutions and process quality.”

Martyna Dziubak
Santander Bank Polska

18 IMF.
3.4 Geographical structure of the EU’s foreign trade and prospects for the development of new trade routes

In 2018, the share of the value of exports to non-EU countries in total EU exports amounted to 36% (EUR 1.995 trillion). In the years 2008-2018, it grew at an average annual rate of 4.1%, while intra-EU exports grew at 2.5%. If this growth continues in the coming years, by 2030 the share of non-EU countries in the EU-28 export structure will increase to 40%, which will translate into an increase in demand for transport services on routes outside the EU-28. The predicted increase in the importance of non-EU countries as markets is also confirmed by demographic changes. By 2030, the population of Asia is expected to grow by 445 million and that of Africa by 183 million as compared to 2018.

Population projections for the EU-28 show a slight increase (less than 0.1% annually) until 2030, when the EU-28 population will reach almost 515 million people, followed by a gradual decline.

Much of the transport activities servicing non-EU markets are provided by sea or air, but for Polish haulers, the EU market will continue to be the main area of activity. Development in destinations outside the EU-28 may, however, prove to be an attractive way to diversify revenues. By 2030, the following directions may turn out to be the most promising for road transport.

A. The New Silk Road

Investments conducted as part of the Belt and Road Initiative are aimed at supporting the growth of trade between the countries of Europe and Asia, in particular China. The value of EU-China trade exchange increased on average by 6% annually in the years 2008-2018.

Figure 4. Selected investments planned in Europe in connection with the Belt and Road Initiative

Source: PwC analysis
Economic factors supporting the development of the industry in coming years

China's population is already estimated to be close to 1.5 billion people.\(^{23}\) Between 2018 and 2024, China's projected average GDP growth will be 6% and its average GDP per capita will be USD 26,400 (approximately the level as was reached in Poland in 2014).\(^{24}\) Such dynamic development will probably translate into a further increase in trade.

B. Eastern and Southern EU-28 countries, Russia and Turkey

The development of these directions will be supported by the construction of new TEN-T corridors – Via Baltica and Via Carpatia.

One third of the Via Baltica network has already been completed and the rest of the infrastructure is currently under construction. The North Sea – Baltic route is already completed along the section connecting Warsaw to the western border, work is still required on the section connecting to the Polish border with Belarus. In the case of the North Sea – Baltic Sea corridor, it is assumed that the roads in Poland will be fully operational by 2020, whereas the Polish section of the Baltic – Adriatic corridor is to be completed by 2024.

Via Carpatia, on the other hand, is to be ready in 2025, connecting the south with the north of Central and Eastern Europe – from Lithuania to the Romanian port of Constanța on the Black Sea and Greece’s Thessaloniki on the Aegean Sea. The total length of the Via Carpatia route in Poland will be approximately 760 km. Moreover, Via Carpatia will connect Eastern Europe with the sea route of the New Silk Road.

Taking into account economic factors, the projected economic revival in Russia and Turkey may be an opportunity for the development of transport. Between 2018 and 2023, the expected GDP growth in these countries will be 1.6% and 1.9%, respectively.\(^{25}\) It is worth noting that Turkey itself not only has a large internal market (with approx. 82 million inhabitants\(^{26}\)) but it is also a “gateway” to the Middle East. Before the current crisis, EU-28 exports to Turkey reached EUR 85 billion\(^{27}\) in 2017. The resumption of trade growth will be possible once the political and economic situation has stabilized.

C. Countries of North Africa and the Middle East

The total population of Africa is estimated at 1.27 billion.\(^{28}\) In North Africa alone, the population in the developing countries will increase from 233 million in 2018 to 264 million by 2030,\(^{29}\) which, given the economic growth of the region, may create an attractive export market in the future. In addition, given that European companies will be seeking to optimize production costs, African countries, due to their lower labor costs, may in the future be an alternative to Eastern European countries in this respect. However, this will require strengthening of the institutional system and stabilization of the political situation.

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23 UN Population Division.

24 According to purchasing power parity, IMF.

25 IMF.

26 UN Population Division.

27 Eurostat.

28 IMF.

29 UN Population Division – Algeria, Egypt, Libya, Morocco, Sudan, Tunisia, Western Sahara.
3.5 Road transport in relation to other transport segments

Despite the European Commission's support for alternative means of transport, road transport has been increasing its share in the structure of transport performance in the EU-28. In 2016 it was over 50% and should maintain this level in the coming years.

Road transport's share of total freight transport performance (ton-kilometers) by EU-28 operators is presented in Chart 11. In the analyzed period (2008-2016), the share of transport performance by air transport did not exceed 0.1%. The share of rail transport remained in the range of 10.3-12.5%, and inland waterways in the range of 3.8-4.8%. The share of maritime transport decreased in this period by almost 5 percentage points, from 38.1% in 2008 to 33.3% in 2016. This means a shift in the structure of freight transport over recent years in favor of road transport.

According to the "White Paper on Transport" published by the European Commission in 2011, 30% of road freight transport over 300 km should by 2030 be shifted to other modes of transport, such as rail or waterborne (maritime or inland waterway). The target is set at 50% by 2050. However, current changes in the shares of transport modes indicate the opposite trend.

Comment on passenger transport

Passenger transport in the EU-28 countries is divided into land, sea and air transport. Over the last decade, the dominant mode of transport has been land transport. The largest share in passenger transport (70%) is held by passenger cars. In recent years, the fastest growth could be observed in the air transport market, which accounts for approximately 10% of all transport performance (passenger-kilometers, or pkm, 2016) – this sector grew annually on average by 3% in the years 2008-2016. In this period, the sea passenger transport sector decreased at a comparable rate. Urban transport is also changing, as evidenced by the 1.5% annual increase in the tram and underground metro market in the same years. Although it is not apparent from the data in Figure 12, consumer behavior with respect to car travel in urban areas is also changing and the use of taxi and passenger services offered via digital platforms is increasing.

Shifting transport to rail or inland waterways requires huge investments in infrastructure; road transport will continue to grow in the 3- to 5-year perspective. Therefore, no significant competition from non-road modes of transport should be expected.

Chart 11. Freight transport performance by EU-28 operators by mode, 2008-2016 [billion tkm]

Source: European Commission

Chart 12. EU-28 passenger transport performance by mode, 2008-2016 [billion pkm]

Source: European Commission
Political, legal and environmental factors, consequences of the “Mobility Package”
The European Parliament and the EU Council are working to amend several pieces of legislation that were originally intended to improve the social situation in the sector. Unfortunately, these changes have become focused on solutions limiting the access of carriers to the markets of other European countries, which will also increase the costs and risks of transport companies’ operations. Some of the most important changes at present are the provisions of the “Mobility Package” adopted by the EU Council on 4 December 2018, then by the European Parliament on 4 April 2019. What still lies ahead is the final stage of legislative work – negotiations between the Council, Parliament and the European Commission (so-called “trilogue” talks) on its final shape. It is expected that this process will be completed in 2019 and that the provisions of the Package will be implemented within 0.5 to 1.5 years.

This chapter analyses the political, environmental and legal factors. The analysis covers changes in both national and EU law, as international haulers operate across the EU.

Our analysis of current and potential regulations has been subdivided by types of law; in most of these fields we observe changes with a distinctly negative impact.

1. **In the field of regulating access to the market and carrier profession**, we should expect to see the administrative restriction of carriers’ area of operation to the country in which they are headquartered, as well as new requirements preventing long-haul transport operations and impeding the efficient use of transport (for instance, the introduction of a new obligation for each vehicle to carry out a transport operation of “loading or unloading in the country of origin” at least once every 4 weeks).

2. **In the field of social regulations** (including working time), the adopted changes will impose new obligations on companies (e.g. to provide accommodation outside the vehicle’s cabin, despite European roads not offering necessary infrastructure) and complicate employment rules (e.g. obligations to register drivers in many EU Member States, to pay wages and other benefits in accordance with the local law of the state in which transport operations are carried out, and to pay social security contributions for drivers working there).

3. **In the field of inspection institutions**, the changes aim at creating new entities inspecting the activity of entrepreneurs and the intensification of inspection activities carried out by those currently functioning, as well as the coordination of such activities between EU-28 Member States.

4. **As a result of new environmental restrictions** (including those related to CO₂ emissions), an increase in costs can be expected.

5. **In the field of technology regulation**, it can be observed that the law in Poland and the EU not only fails to keep pace with the development of new technological solutions, but it also constitutes a barrier to their development (e.g. in the field of autonomy).

From the perspective of Polish carriers, the most influential areas of legislation (access to the profession and to the market, social regulations and oversight) will result in three direct effects: increased costs, decreased revenues and increased risk of doing business.

(A) **Increased costs as a result of decreased efficiency of transport networks and increased employment costs, dictated by changes in the law, with a simultaneous lack of qualified employees on the labor market**

The changes in legislation may result in a decline in efficiency in operational and administrative areas, resulting in an increase in payroll costs. The introduction of an obligation for vehicles to return to base on a regular basis will also make it necessary to drive more kilometers (empty mileage) to service volumes. Despite the fact that international freight drivers are a relatively well-paid group compared to the Polish economy, the regulations can be expected to additionally increase their payroll costs. To a large extent the increase in costs can be expected to translate into higher prices, but these will nevertheless not fully offset the cost increase.

(B) **Decreased revenues due to restricted market access, especially in cross-trade and cabotage**

The restrictions imposed by the new regulations, narrowing the main activity of carriers to their country of origin and increasing their costs and risks, will result in some cross-trade and cabotage services becoming impossible or unprofitable. Cross-trade and cabotage services in 2017 constituted a total of 23% of Polish carriers’ total transport performance, whereas services performed in the area of Poland’s foreign trade (imports and exports) constituted 41%. This means that international transport services together constitute as much as 64% of the total transport performance; all these services are threatened by changes in the law.
Increased risk and barriers to doing business due to increased complexity of regulation

While the increased business risk is difficult to measure, there is no doubt that it will affect Polish carriers. This will be mainly due to the fact that Polish carriers will be subject to different legal systems, both in individual EU-28 countries and in the EU as a whole, as well as to the increased activity of regulatory institutions.

Over the next few years, we should expect four indirect effects that may occur as a result of legislative changes: the internationalization of large operators, an increase in the level of market concentration, an increase in the significance of the market in Poland, and a shift in supply chains towards Poland.

1. Internationalization of large carriers in response to regulatory restrictions on access to other countries

Because of future restrictions on the activities of temporary agents in non-resident services, entrepreneurs may seek to establish themselves in different EU Member States in order to maintain their ability to operate internationally. Some Eastern European carriers have already attempted to internationalize their operations by registering representative offices in Poland. Some companies with Polish capital have already done likewise. It should be borne in mind, however, that such solutions will be available mainly to large companies. Moreover, a serious difficulty may be posed by the provisions of the EU “Company Law Package” currently in the legislative pipeline.30


2. Increased concentration as a result of the law limiting the ability for smaller entities to compete in the market

It is highly likely that competition will be restricted as a result of increased barriers to entry. For smaller operators, in particular those providing long-distance transport services, the difficulties of doing business are relatively high and will increase further. Restrictions will apply to virtually every field of activity – from increased operating costs to greater difficulties in the recruitment of employees by small entities. There will also be difficulties related to the fulfilment of administrative and information obligations, as well as to the proper interpretation of foreign regulations in the absence of extensive administrative and legal support facilities. Small carriers are also much less able to absorb the impact of changes in managing their network of connections. For example, the mandatory return of a vehicle to Poland every few weeks will have a much greater impact on the costs and level of service provided by a small entrepreneur owning several vehicles than on a larger transport company. The fixed costs associated with setting up in a new market will pose a higher barrier for small entrepreneurs. They will be much more sensitive to the activities of inspection institutions, from which larger entrepreneurs can effectively defend themselves thanks to their legal support.

3. Minimizing the negative effects of changes in road transport regulations by increasing in the volume of services provided domestically and in import/export

The growth in the domestic transport and logistics industry and in connections to and from the country will enable Polish carriers to rebuild part of their revenues. Unfortunately, transports carried out within Poland represent only 36% of the total transport performance handled by Polish carriers. Therefore, even an increase in domestic transport performance in excess of 5 percentage points may not be sufficient to fully fill the gap created by regulatory changes, and may at most mitigate their negative impact.

4. Supply chains shifting towards Poland

The increased transport costs throughout Europe, combined with the development of new trade routes, may lead to an increase in the attractiveness of logistics services in the area of warehousing and transshipment services provided from Poland. This may lead to a shift in logistics services towards Poland, especially in the case of large operators.
4.1 Changes related to access to the occupation of carrier, to the carrier market, and to the occupation of driver

The proposed changes to the requirements for road transport operators will not only reduce market access for operators, they will also significantly complicate and increase the risk of doing business.

In line with the proposals contained in the EP report on the “Mobility Package”, the main share of driver activity should be linked to the hauler’s country of origin. This means that most of its transport activity should be national or bilateral (loading or unloading in the country of origin). Cross-trade or cabotage operations may be carried out occasionally, representing a smaller part of the hauler’s activity.

One consequence of this is a narrowing of carriers’ freedom to conclude contracts. So far, they have been able to conclude contracts for the provision of transport services throughout the EU-28. After the implementation of such changes, they will be able to conclude contracts limited to transport to and from the country in which they are established, or contracts for transport with a dominant relationship to and from that country.

The solutions adopted in the general approach developed by the EU Council on the “Mobility Package”, which do not provide for any exemptions from the provisions on posted workers for cross-trade and cabotage transport, are also aimed at restricting market access.

Considering that transport outside the territory of Poland constitutes a significant part of transport performed by domestic carriers, it can be expected that after the introduction of restrictions, the number of transports performed by Polish carriers on the EU market will be reduced. Considering that international transport constitutes 64% of the transport performance handled by Polish carriers, its reduction by 20% would mean a decrease in the turnover of the entire industry by almost 13%. Due to the fact that alternative directions (outside the European Union) will not fill the gap, the liquidation of enterprises and jobs in Poland can be expected. One way to respond to the new requirements may be to re-headquarter a company to whichever country of Western Europe where a significant part of its transport services are performed. The increased costs related to the relocation of the operational center would be compensated by full access to the internal market of that country. However, such an alternative scenario will be possible mainly for large and some medium-sized companies.

It should be borne in mind that cross-border transformations of companies will be subject to restrictions resulting from the planned new provisions of the Company Law Package.

Changes that reduce the efficiency of medium- to long-distance transport operations include restrictions on taking a regular weekly rest period in the vehicle or away from the driver’s permanent residence, and the requirement that every vehicle at the carrier’s disposal should return to the country of establishment at least once every four weeks to carry out a loading or unloading transport operation. These proposals have already been adopted by the EP in the form of its report on the "Mobility Package". The consequence of implementing these changes may be a reduction in the supply of transport services in relation to and from the peripheral countries of the EU-28 and an increase in the costs of trade in goods with these countries. This may in turn lead to changes in the existing supply chain to and from these countries.

It is likely that the competitiveness of EU carriers in transport to and from the EU will deteriorate in relation to non-EU competition. This is particularly true of EU-28 relations with the former USSR, e.g. Ukraine, Belarus, and EU-28 relations with Central Asia. In the case of operations on particularly long routes (e.g. the New Silk Road), this may also mean that EU-28 carriers will be excluded from such operations. An alternative solution may be for carriers to establish subsidiary companies in non-EU countries in order to continue operations on routes to and from these countries.

Among the changes that reduce the efficiency of transport operations in terms of the use of vehicle space and minimization of empty mileage, the following should be pointed out:

- limiting carriers’ ability to perform cross-trade transports and bringing such transports under the posted-worker regulations,
- extending the application of posted-worker regulations to vehicles carrying combined partial loads loaded/unloaded in separate transport operations,
- the further tightening of cabotage rules, including the introduction of “cooling off periods” in such transport operations and their full coverage under posted-worker rules,
- multidrop operations being excluded from the permissible cabotage operations.
These proposals are contained both in the general approach to the "Mobility Package" adopted by the EU Council and in the report adopted by the EP.

Implementation of these changes will result in a number of unfavorable consequences, such as increased road transport costs, a deepening of problems involving the shortage of drivers on the European labor market, an increase in congestion on the roads, an increased problem with deficiencies in parking infrastructure and an intensification of the negative impact on the natural environment (due to the need to perform empty runs).

These changes may be partially offset by the potential benefits of new technologies that can be implemented in road transport (described in chapter 6).

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**Expert Comment**

“As digitization progresses, carriers must learn to interact with technology. Buying new software or hardware will not automatically bring any benefits. In an inefficient process, technology is completely useless and may even exacerbate existing inefficiencies. On the other hand, completely replacing interpersonal contact with the driver in favour of exclusive command handling on the on-board computer will cause the employee to feel alienated and less motivated. As such, benefits gained in one area will be outweighed by negative consequences in another. The trick is to find the right balance and look at the company as a whole.”

Pawel Trębicki
Raben Transport
Political, legal and environmental factors, consequences of the “Mobility Package”

4.2 Social regulations (posting, mobile workers, working time)

The most important changes in the regulation of the transport market covered by the "Mobility Package" involve the application in road transport of the provisions on posted workers and of the "Rome I" Regulation concerning the jurisdiction of law in relation to contractual obligations.

The adoption of the "Mobility Package" will mean that the rules on posted workers, as amended in 2018, will apply to road transport. Until then, the existing regulations apply to employed drivers. The amended provisions on posted workers and detailed solutions in this area contained in the "Mobility Package" will increase drivers' labor costs and the risk of criminal or administrative liability for entrepreneurs. As a consequence, the changes will lead to a reduction in the competitiveness of carriers from peripheral EU countries. These effects are linked to a number of consequences:

- Increased drivers' labor costs will result from the introduction of an obligation to pay wages not just at the minimum level, but at the same level as in the host countries. In addition, the new rules on posting explicitly exclude the possibility that allowances defined as reimbursement of expenses (e.g. Polish allowances and flat-rate accommodation) may be deducted from wages, although in some countries they are, according to established case-law, disconnected from the actual cost of living of the worker. The risk of cost increases is additionally augmented by issues of regulation of working time, breaks and rest periods for drivers, which may also be subject to change.

- Higher labor costs may also be caused by the need to employ drivers on the basis of the law of the country where the driver habitually carries out his work, as a result of changes linked to the enforcement of the "Rome I" Regulation. The under-specification of these proposals will make it possible to carry out quite far-reaching simplifications in the administrative practice of individual Member States. This may lead to the verification of the relevant legal system to which the driver is subject at any given moment by analyzing the records of a second-generation intelligent digital tachograph, recording the driving time in individual countries.

- Considering that the majority of transport carried out by Polish carriers is performed in Germany, it may turn out that these carriers will be forced to employ drivers in accordance with German law, according to the rules specified therein, on pain of having their transport rights revoked. This also applies to the payment of social security contributions. The contributions due for the work of a Polish driver employed by a Polish company will be paid into the German social security system.

- Depending on the economic situation and orders received, the legal grounds of a given driver's employment relationship may change over time. This in turn creates problems related to the aforementioned increase in risk.

These changes may lead to market exits or the reduction of activity on the part of carriers from countries with a lower level of economic development, with the consequent loss of jobs. It may turn out that if the law of another country is to be applied to a carrier's economic activity and a significant share of taxes and public levies are to be paid in that country, then the more capital-strong companies will move to their territories. This will enable them to fully benefit from market access and privileges for local companies.

The increase in labor costs may be affected by the final stage of legislative work, the revision of EU legislation on the coordination of social security systems (Regulation 883/2004 and its implementing rules). The proposed solutions pose a risk of a Polish employer being recognized as an employer under foreign law for the purposes of social security. The consequence would be the need to register drivers in another EU-28 member state for social insurance purposes and to pay contributions for this insurance in that state in accordance with the rules and in the amount specified by the law of that state.

The proposed provisions on compulsory regular weekly rest will also affect, in particular, longer distance working carriers and drivers from peripheral countries in relation to the economic center of Europe. Some of the principles arising from the new regulations will not be feasible for entrepreneurs. An example of this is the obligation to provide overnight accommodation for the driver outside the vehicle's cab during regular weekly rest periods. Unfortunately, throughout Europe, there is a lack of sufficient accommodation facilities linked to the road network, especially as regards the main transport routes.

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31 This means that the provisions of local collective labor agreements must be applied.
4.3 Inspections and the jurisdiction of supervisory bodies

As far as the functioning of supervisory bodies is concerned, there are discernible tendencies towards the creation of common European institutions enforcing the law through inspection activities or social security.

Key legislative acts in the field of inspection bodies include issues such as tachographs for road transport, harmonization of certain social legislation relating to road transport, technical inspections of roadworthiness, electronic road toll collection systems and facilitating cross-border exchange of information on cases of fee non-payment.

One of the most far-reaching changes in this field is the introduction of the Regulation of the EP and of the Council establishing the European Labor Authority. It creates a common European institution competent for employment issues and has an impact on social security policies as well. For a Polish carrier, this means the establishment of yet another institution requiring reporting on its operational activity, as well as the risk of significant changes in the current social security settlement systems for posted workers (the task of this institution will be to handle the cases of employees performing work in the territories of various EU-28 countries).

The risk of doing business will be increased by practically every one of the legislative initiatives now in the pipeline. The new initiatives increasingly complicate the rules for doing business in the field of road transport. The standards introduced and planned are often not fully understood at the time of implementation, and their initiators themselves stress that interpretations will be developed in the course of judicial practice.

It is estimated that the increased risk will not be compensated for by an increase in the profitability of the service for a long time to come. One example can be found in the introduction of the German Minimum Wage Act (MiLoG) on 1 January 2015, which provides for penalties for carriers’ contractors. This has turned carriers from less economically developed countries into risk-contributors, rather than partners on an equal footing. This was noticed and valued by German insurers, who introduced a new product – insurance against the risk of doing business with Polish carriers, among others. The current proposals contained in the reports of the MEPs’ rapporteurs go much further. The contractor is to be responsible for infringements of the provisions on posting or on the application of the "Rome I" Regulation (provisions requiring drivers to be employed on the basis of the law of the country where the driver usually performs work).

The changes that pose administrative barriers particularly to micro- and small businesses include the necessity to apply national labor law regulations of the EU Member States in which transport operators operate. The reasons for this include the plans to implement increasingly strict regulations on posted workers, as well as the provisions of the Rome I Regulation. In practice, the changes lead to the application of multiple (even up to a dozen) different foreign labor law systems to employed drivers and to the performance of numerous administrative and information duties that generate significant costs, as it is necessary to create jobs dedicated to handling these tasks. In order to apply foreign law in relation to employed drivers, the carrier needs to have not only knowledge of foreign provisions of domestic law, but also the provisions of binding collective agreements and judicial and administrative case-law in this respect. The impact of these changes will be significantly amplified by the introduction of new competences in the area of existing and new inspection bodies.

While large businesses with significant financial capabilities will be able to adapt to the requirements (with greater or smaller degrees of success), it is not possible for micro or small businesses. The barriers we have listed could restrict access to European markets predominantly for these businesses.

Expert Comment

“It is important for haulers and drivers to understand and correctly apply the relevant regulations. In addition, the provisions of generally applicable law overlap with the provisions of collective agreements (national, local, sectoral, etc.), which complicates its correct interpretation. The impact of the risk of incorrect application of complex rules is evident in France – concerns about this, the risk of disproportionately high sanctions and the aggressive actions of the inspection services there have led to the withdrawal of many operators from this market.”

Maciej Wroński
TLP
4.4 Restrictions for new technologies

Innovative technologies offer an opportunity for the transport sector to increase efficiency and reduce costs, but regulations often fail to keep pace with technology development and this limits the possibilities for implementing new solutions.

A large number of new technologies are expected to emerge in transport in the coming years. Their implementation often leads to the emergence of completely new services and risks to the environment, which in turn entails a need for new legislative initiatives to regulate the use of these technologies. A very good example of such initiatives can be found in the following:

- Regulations for passenger transport that have been adopted at the level of different countries since the transport services such as Uber, Bolt (Taxify) or Lyft were launched,

- Regulations concerning drone operations, such as the Regulation of the Polish Minister of Transport, Construction and Maritime Economy of 26 March 2013, which defined the conditions for their use in Poland,

- Regulations in the area of transport autonomy – more than half of the states in the USA have already implemented regulations specifying the conditions for testing of unmanned vehicles. Similarly, in 2017, the German Parliament passed a law on this matter. Italy has the first complete European law on testing of autonomous vehicles up to level 5 (full autonomy). In France, it is planned to implement legislation in this area in 2019,

- Regulations in the area of electronic transport documents, the so-called e-CMR.

From the perspective of the Polish road freight transport sector, regulations concerning the model based on sharing, alternative drives, autonomous transport and Longer Heavier Vehicles (LHV) are particularly important. Despite the good example of the implementation of drone regulations, the lawmaking practice of Poland, as well as many other EU countries, does not fully stay apace of technological development. The harmonization of the law between the EU-28 countries is also slow and so, for example, the regulations allowing the use of LHVs are in force only in just a few EU-28 countries (including Belgium, the Netherlands and Scandinavian countries).

On the political side, at the EU-28 level, there are no signs indicating active support for technology development, so without action on the part of the national state administration, we cannot expect that technologies will be dynamically implemented in Poland.

4.5 Restrictions on the scope of activity and other environmental requirements

The transport sector, and road transport in particular, contributes to more than ¼ of the CO2 emissions generated in the EU. Social and legislative pressure is leading to increased environmental protection requirements and consequently transport operators’ growing costs.

Steady growth in the transport sector over recent years has contributed to increasing greenhouse gas (GHG) emissions. At present, only the energy sector has higher emissions than the transport sector. Although overall EU-28 GHG emissions fell by 7% between 2010 and 2016, decreasing by an average of 1.2% each year, in the transport sector the decrease in emissions was almost negligible. Over the period as a whole, emissions fell by 0.1% through an average annual reduction of 0.01%.

Chart 13. Total greenhouse gas emissions generated in the EU-28 and % generated by the transport sector, 2010-2016 [million tons of CO2 equivalent]

![Chart 13. Total greenhouse gas emissions generated in the EU-28 and % generated by the transport sector, 2010-2016](image)

Source: European Commission

EU targets are increasingly reducing GHG emissions from the transport sector. The European Union set a target for the reduction of CO2 emissions from heavy goods vehicles for the first time in 2018. The 2019-2025 target is a 15% reduction in gas emissions and a 30% reduction by 2030. As local governments increasingly impose restrictions on the use of high-emission vehicles in cities, for example, transport operators serving urban areas will need to replace their fleets with low-emission ones in order to meet new requirements. However, this entails additional costs. A CNG heavy goods vehicle is currently about 40% more expensive than a conventional engine and electric cars can be up to 4 times more expensive than diesel due to their low availability.

32 Reuters, European Council.
At the EU-25 level, the number of motor vehicles in use has increased between 2012 and 2016, with an average annual increase of 1.4% for passenger cars, 1.4% for light commercial vehicles and 0.7% for trucks. The increase in the number of vehicles explains why transport emissions are falling slightly. This is also due to non-EU vehicles, which often meet lower standards than Euro 5 or Euro 6. It can be inferred from this that with further increases in the number of vehicles, it may be difficult to achieve the EU's targets.

In terms of newly introduced regulations, attention should be paid primarily to the plans to update Regulation (EC) No 715/2007 of the EP and of the Council of 20 June 2007 on type approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information. The update sets as its objectives the promotion of efforts to harmonize legal regulations among the EU-28 countries, the change of rules concerning fleets with the indication of the trajectory of reduction, as well as the need to increase the share of zero- and low-emission vehicles in fleets by 2030.

Another important aspect of the legal and political situation surrounding environmental protection is the restrictions imposed by local authorities (in particular municipal authorities) on truck traffic. Figure 5 presents a summary of current and planned restrictions in selected cities. It should be remembered that this is a progressive process and with time more and more towns and cities may join the group with traffic restrictions.

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33 ACEA.
<table>
<thead>
<tr>
<th>City</th>
<th>Type of restricted vehicles</th>
<th>Time horizon</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hamburg</td>
<td>Not meeting requirements of Euro-5</td>
<td>Since May 2018</td>
<td>First German city to introduce restrictions on selected streets</td>
</tr>
<tr>
<td>Stuttgart</td>
<td>Not meeting requirements of Euro-4</td>
<td>Since January 2019</td>
<td>Prohibition to enter selected parts of the center</td>
</tr>
<tr>
<td>Aachen</td>
<td>Not meeting requirements of Euro-4</td>
<td>Since February 2016</td>
<td>Prohibition to enter the center</td>
</tr>
<tr>
<td>Mainz</td>
<td>Old diesel cars – the form of restriction has not yet been defined</td>
<td>Since September 2019</td>
<td>Limitations will be introduced if the city does not reduce the level of nitrogen dioxide in the air.</td>
</tr>
<tr>
<td>Berlin</td>
<td>Not meeting requirements of Euro-5</td>
<td>Since August 2019</td>
<td>Prohibition to enter 11 streets</td>
</tr>
<tr>
<td>Paris</td>
<td>With diesel engine not complying with Euro-4 and petrol requirements, not complying with Euro-3 and 2</td>
<td>Since July 2019</td>
<td>Prohibition of entry into 79 municipalities of Grand Paris</td>
</tr>
<tr>
<td></td>
<td>Only electric and hydrogen-powered cars in the long term</td>
<td>Starting from 2030</td>
<td></td>
</tr>
<tr>
<td>Milan</td>
<td>Not meeting requirements of Euro-3</td>
<td>Since January 2019</td>
<td>No movement within the city limits from Monday to Friday</td>
</tr>
<tr>
<td></td>
<td>Not meeting requirements of Euro-4</td>
<td>Starting from October 2019</td>
<td></td>
</tr>
<tr>
<td>Turin</td>
<td>Not meeting requirements of Euro-3 and 4</td>
<td>Since December 2017</td>
<td>Depending on the state of the air, the city imposes a ban on driving on Thursdays and Fridays during the day.</td>
</tr>
<tr>
<td>Rome</td>
<td>All with diesel engine</td>
<td>Starting from 2024</td>
<td>Prohibition to enter the center</td>
</tr>
<tr>
<td>Madrid</td>
<td>With diesel engine not complying with Euro-4 and petrol engine not complying with Euro-3</td>
<td>Since October 2018</td>
<td>Prohibition to enter the center - not applicable to residents of the zone</td>
</tr>
<tr>
<td></td>
<td>All with diesel engine</td>
<td>Starting from 2025</td>
<td></td>
</tr>
<tr>
<td>London</td>
<td>Not meeting requirements of Euro-4 and 5</td>
<td>Since 2018</td>
<td>A charge of £10 per day for driving in the defined area from Monday to Friday from 7:00 am to 6:00 pm.</td>
</tr>
<tr>
<td></td>
<td>With diesel engine not meeting Euro-6 and petrol engine not meeting Euro-5</td>
<td>Since April 2019</td>
<td>Introduction of ULEZ (Ultra Low Emission Zones) - a £12.5 fee to be applied in the T-Charge zone throughout the year</td>
</tr>
<tr>
<td>Brussels</td>
<td>With diesel engine not meeting Euro-2 and petrol engine not meeting Euro-1 or not meeting Euro-2 requirements</td>
<td>Since January 2019</td>
<td>Prohibition to enter the city</td>
</tr>
<tr>
<td></td>
<td>With diesel engine not meeting Euro-5 requirements and petrol engine not meeting Euro-2 requirements</td>
<td>Starting from 2025</td>
<td></td>
</tr>
<tr>
<td>Oslo</td>
<td>All cars</td>
<td>Starting from January 2020</td>
<td>Gradually from January 2020</td>
</tr>
<tr>
<td>Antwerp</td>
<td>With diesel engine not fulfilling Euro-3, with particulate filter and petrol engine not fulfilling Euro-1</td>
<td>Since February 2017</td>
<td>No entry to the city center and Linkeroever</td>
</tr>
<tr>
<td></td>
<td>Cars with diesel engine not meeting Euro-6 and petrol engine not meeting Euro-3</td>
<td>Starting from 2025</td>
<td></td>
</tr>
</tbody>
</table>

Source: PwC analysis
Social factors – driver shortage
The noticeable shortage of qualified drivers in the Polish road transport sector is likely to deepen and have a negative impact on growth in the turnover of carriers. In the coming years, an increase in demand for road transport services can be expected, which is likely to create higher demand for drivers’ labor. In 2015, the shortage of drivers was estimated at 100,000-110,000 out of a pool of 600,000-650,000 jobs (i.e. 15 to 18%). The level of shortage currently felt by the industry is 20%. This means that the scale of the shortage has slightly increased, which, when compared to forecasts of growth in demand for transport services, poses significant risks to the industry. At the same time, it should be noted that this shortage is primarily of a qualitative nature. While transport companies are currently able to fill almost every job position, about 20% of drivers do not have the skills appropriate to ensure high efficiency of work in terms of travel costs (economical driving) or operation time (the ability to efficiently perform parking maneuvers in logistics parks without generating time shifts in operations on the part of warehouses). Small carriers have much greater problems with recruiting employees in the current situation.

In terms of the risk posed by the driver shortage, this chapter analyses five market forces: the supply of drivers in the market (number and quality of drivers), demand from employers, availability of substitutes for drivers’ work (such as technology, other means of transport), migration and entry into and exit from the labor market. Analysis of social factors influencing the industry leads us to the following conclusions:

1. The projected increase in turnover in the industry will translate into increased demand for labor, which may deepen the shortage of drivers in the next 5 years. Estimates indicate that by 2022 there may be a shortage of 200,000 drivers due to the negative balance of entry and exit from the profession, with the simultaneous growth of the industry.

2. Even maintaining the current supply is at risk due to the age structure of the industry and increasing driver expectations of living standards (competition from other industries, insufficient quality of social facilities, long distances away from home), which may aggravate the demand gap.

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34 Due to the identified deepening shortage of drivers on the market, interviews conducted among industry representatives were used as a starting point in analyzing the changes perceived by the industry in terms of labor supply.
3. **In terms of market entry, insufficient resources for driver training** may constrain efficient transport operations and measures taken to reduce the gap between demand and supply do not fully address the problem. Further action is needed in this area.

4. **Migration of drivers will not allow the gap to be filled**, as drivers from the eastern border who meet the needs of carriers are already starting to be in short supply. An interim solution could be to hire drivers from Asian countries (e.g. the Philippines, Vietnam, Nepal, Uzbekistan, Kazakhstan, Tajikistan), although these countries also already have noticeable shortages of drivers.

5. **Technological substitutes for human labor are not yet sufficiently developed** to fill the human resources gap, and rising wages for drivers will no longer solve the problem. In the transport sector, full automation will be possible in 5 to 10 years at the earliest.

These factors can be expected to produce two effects:

a. Shortage of drivers with skills at the level expected by the industry, resulting in a risk of shortage of full staff for the rolling stock owned by haulers,

b. Increased costs due to supply and demand imbalances and increased financial expectations of employees in the industry.

5.1 **Changes in demand for drivers in Poland**

The increased demand for drivers' work due to the increased turnover in the road transport sector may result in staff shortages at the level of nearly 200,000 drivers in 2022.

Demand for transport services is growing dynamically and the pace of transport growth is much faster than the rate of employment growth.

**Chart 14. Comparison of driver labor supply and demand in Poland [k drivers]**

It is estimated that in 2015 there were around 600,000-650,000 professional drivers, of which 500,000-550,000 were truck drivers. The shortage of drivers amounted to about 100,000-110,000 people (over 15% of the total supply). The demand was estimated at about 730,000 drivers. Given the increase in demand, the 20% gap scenario can be expected to lead to a driver shortage of 200,000 in 2022 compared to an estimated demand of around 950,000 drivers. The number of people leaving the profession has been estimated at about 25,000 per year. In the years 2012-2015, initial qualification was obtained by about 35,000 people, meaning that the annual inflow of drivers to the profession did not exceed 10,000-15,000.\(^{35}\) The scale of entry into the occupation compensates for exits from the occupation but is not able to fill the gap created over the years, as the number of new drivers entering the market only maintains the gap at a constant percentage.

\(^{35}\)PwC “Driver Labor Market in Poland” report.
5.2 Changes in the labor supply of drivers – analysis of demographic factors

Reduced interest in physical labor together with Poland’s economic development and the ageing of its population will have a negative impact on the supply of drivers on the labor market.

Like most developed countries, Poland is characterized by a declining birth rate and an ageing society. Forecasts indicate that the population will decrease by nearly 400,000 in the years 2020-2025, which means by more than 1%. Although the decline will be slight in the nearest future, in the longer term the population decrease could prove more tangible. By 2050 the population is meant to decrease by 11%, to around 34 million people. There will be fewer people of production age, in favor of people in post-production age. These changes will deepen personnel shortages in key sectors of the economy, especially in the transport sector.

In 2016, there were 4.3 million people in Poland with truck driver licenses – these are mostly men over 35 years of age. The age group from 35 to 44 years of age, as well as each subsequent one, represents about 20% of the total supply on the market. Assuming that the age structure of professional drivers is similar to that presented in Figure 15, it can be expected that nearly 20% of people currently entitled to drive heavy goods vehicles have already reached retirement age, so it is very likely that they will leave their jobs within the next 5 years. The next group representing more than 20% of the supply consists of drivers who will reach retirement age between 1 and 10 years from now. This means that by 2030, up to 40% of current drivers may leave the market only because they will have reached retirement age.

Those under 35 years of age account for 17% of all licensed drivers, indicating lower interest in the driver's profession among younger age groups. Employment in the industry is dominated by men, and the percentage of women among those with qualifications is only slightly above 0.4%. A lack of interest in the freight transport industry among women is also a factor limiting the supply of employees.

Chart 15. Age structure of people with truck driver licenses in Poland, 2016 [%]

Source: General Inspectorate of Road Transport.
It is also worth noting that these data relate to persons who are licensed to drive heavy goods vehicles; only some of them are employed as professional drivers.

If the age structure of professional drivers is consistent with the age structure of authorized persons, this poses a very high risk to maintaining the current level of labor supply in the market.

**Expert Comment**

“For Polish transport companies, there is a growing problem with the low availability of drivers on the market. The inflow of workers from Ukraine and Belarus helps to partially solve the problem, but the deficiencies are still visible. Another issue is the skills and quality of drivers’ work. Those already trained in Poland often do not have sufficient practical skills and the problem is even more acute for drivers from other countries. There are also problems in communication between forwarders and drivers.”

Rafał Choma
Chomar

5.3 Drivers entering the labor market

Measures aimed at increasing the supply of drivers in the market will have an effect in the medium term, but are likely to be insufficient to cover the labor market gap.

The problem of labor shortage has been noticed by the Polish authorities; therefore, since 2016, 27 new vocational schools have started offering a driver/mechanic profile. In the school year 2018/2019 there were already 136 such vocational schools in Poland.

**Figure 7. Number of vocational schools offering a driver/mechanic profile in 2016/2017 and 2018/2019**

Source: PwC analysis

Thanks to this, we can expect an increase in the number of people entering the driver’s profession within 3-5 years (the education in such classes lasts 3 years). It should be remembered, however, that graduating from a vocational school with the appropriate profile is not the end of the education necessary to enter the driver’s profession. The costs of obtaining a driver’s license are estimated at over PLN 10,000, and the additional initial qualification course increases the costs to about PLN 13,000, raising the level of barriers to entering the profession. Each additional qualification increases the costs by PLN 400-1600, depending on the type of qualification.

Newly opened classes with a driver/mechanic profile help to reduce the barrier to entering the driver’s profession by up to 40%, as their completion leads to an initial qualification. Assuming the current number of schools with classes with driver/mechanic profiles, more than 4,000 new driver candidates will enter the market in 2021, and more than 12,000 in 2024. However, these figures are still too low in relation to the estimated demand for labor and the likely level of exits from the profession – maintaining the current demand/supply ratio would require...
around 15,000 drivers\textsuperscript{36} to enter the market every year over the period of 2019-2022 alone.

The problem faced by haulers is not only a shortage of drivers with formal qualifications, but also an insufficient level of skills. According to employers in the road transport sector, young drivers who are still gaining professional experience generate the largest work quality issues. Therefore, employers are sometimes reluctant to hire them, as they require longer training and even an initial training period with an experienced employee.

Large transport companies often decide to organize their own training for drivers, in order to improve their competence and prepare them for future work (including the efficient and safe operation of vehicles and equipment). In the opinion of carriers’ representatives, the training system does not ensure the possibility of acquiring these skills, because:

- It is based on too many theoretical classes and too few hours of practical driving lessons,
- Even if the training takes place on simulators, they are not used to their full potential,
- Drivers learn to drive smaller trucks than those they later face in real-world work.

In practice, the aim of the courses is often merely to tick off formalities rather than actually prepare the driver for the profession, so the burden of preparing them for the profession falls on the haulers.

Moreover, the transport sector and the profession of driver itself are not considered attractive. The driver’s job is seen as linked to a number of disadvantages, such as insufficient social infrastructure, frequent and long periods of isolation from family and friends, and very tight controls on working and rest times.

Such work-related inconveniences are not fully compensated for by drivers’ wages, although they remain attractive. The average salary of drivers operating on international routes is estimated at over PLN 7,000 net, and on domestic routes at approximately PLN 5,000 net (these amounts include bonuses to the base salary).\textsuperscript{37} These are relatively attractive amounts, taking into account the fact that the education of drivers often does not exceed the vocational level, the median salary for which in Poland is just over PLN 2,000.\textsuperscript{38}

High earnings are the result not only of the basic salary, but also of the numerous allowances that apply to drivers, especially those on international routes. These include lump sums for accommodation, business travel allowances and other allowances. It is thanks to these allowances that drivers’ earnings are so attractive, given that they are often formally employed with low basic wages, or even on a part-time basis. The average length of service in the driver’s profession in 2015 was 13 years, and the average driver worked for one employer for 2 to 5 years. Among the causes for such high employee turnover is the fact that it was easy to find a new job due to low saturation of the market.

A way to increase the driver’s interest in work may also be to create more comfortable working conditions for carriers and infrastructure owners. An important aspect is the development of roadside infrastructure, such as car parks, hotels, sanitary facilities and recreational facilities, so that drivers can rest in comfortable conditions.

Polish carriers may also devote more attention to relations with drivers, who increasingly expect better service through HR (Human Resources) functions. They require partnership-based treatment, openness and willingness to jointly determine the rules of employment or flexibility in working time planning. Although the driver’s job is inextricably linked with travel, the key aspect is the length of routes.

This means that the time spent away from home, and then the time that drivers can spend with their families, is important. To meet these expectations, haulers would need to have more drivers and better route planning capabilities to ensure longer stays at home. Management of this area requires the professionalization of human resources management on the part of carriers, both large and small.

\textsuperscript{36} PwC estimates.
\textsuperscript{37} Transjobs.eu.
\textsuperscript{38} Eurostat.
5.4 Driver migrations

Employment of foreign drivers contributes to help fill the gap in the labor market – if there is an insufficient supply of foreign drivers from just across the eastern border, Polish carriers may search farther afield, in Asia.

Estimates show\textsuperscript{39} that:

- From 2019 to 2025, about 400,000 people will come to Poland, and by 2050, another 1.8 million people will have come to Poland.
- By 2025, approximately 350,000 people will have left the country, and by 2050, just over 1 million will have left.

As a result, the migration balance in Poland will be positive and it is estimated that in 2050 it will amount to over 850,000 people. Foreign workers will help to fill the gap in the drivers’ market. Already today, Polish trucks are being driven by over 65,000 drivers from other countries, mainly from Ukraine and Belarus (72% and 24% of foreign drivers respectively), but also from Russia and Moldova.\textsuperscript{40} Those from other countries are a small group.

Chart 16. Foreign drivers working in Poland, broken down by country, 2018 [%]

Employees from these directions are attracted by attractive earnings in Poland and the political situation in Eastern Europe. An additional advantage of working in Poland is its cultural proximity and relative ease of learning the Polish language, which reduces barriers to economic integration. It is not certain how many drivers can still come to Poland from Ukraine or other countries near the eastern border, but carriers also have other recruitment directions at their disposal, including Asian countries.

\textsuperscript{39} GUS
\textsuperscript{40} GITD.
such as Uzbekistan, India, Nepal, the Philippines and Vietnam. In some of these countries the supply of workers is also growing depleted, which is exemplified by the estimated shortages in individual countries – in India – 20-26%, in China about 4 million, in Thailand 15-20%. Nevertheless, drivers from Asian countries may take up employment in Poland due to significant differences in wages.

However, the supply of labor alone is not enough – there is also a need to make it easier for foreigners to speed up the process of validating driving licenses and permits for driving heavy goods vehicles, as well as obtaining residence and work permits. The challenge of recruiting drivers from Asian countries is represented by significant cultural differences, differences in driving behavior across countries and varying attitudes of workers towards work. Administrative procedures are also a barrier, as there are no simplified employment procedures for Asian workers, and it can take up to more than a year to compile the documentation to allow such a person to commence working.

5.5 Autonomy as a way to fill the shortage of drivers in labor market

Although autonomy is sometimes considered a threat to jobs, it will offer a practical solution to fill a shortage of drivers in the market. Unfortunately, this will happen in no less than five years' time, or more likely 10 years' time.

According to PwC analysis from late 2020, automation in transport will be faster than in any other sector, which will probably have a positive impact on the industry and help to fill the growing shortage of personnel. It can be assumed that it will begin to fill the gap in the perspective of at least 5 years, and the real effects will be observed in the perspective of 10 years. Therefore, automation is not a short-term solution for the shortage of supply on the labor market of drivers, but it is a real opportunity in the long run.

Despite projections indicating that in other sectors automation will slow down after 2020, in transport it can be expected to continue at least until 2030.

Expert Comment

“Business efficiency is not only about improved vehicles, but also about more efficient drivers. Autonomous vehicles can be used very well in places where traffic is relatively isolated – they may find practical application in transshipment hubs, for instance. Platforms that make it possible to analyze transport efficiency indicators will propose changes in loading and chain management. Autonomy of vehicles or machines can have a revolutionary impact on every area of the company.”

Zbigniew Kołodziejek
DAF

41 Iru.org.
42 China Daily.
43 Chiang Rai Times.
Technological revolution as factor of change in the road transport industry
Technological revolution as factor of change in the road transport industry

The road transport industry now stands on the threshold of a major transformation, triggered by the introduction of digital technologies, software-based and telematics-based solutions, automation and the development of alternative drives. Unfortunately, the new solutions may not be accessible to smaller carriers, due to limited resources.

According to PwC's 21st CEO Survey, as many as 68% of CEOs and directors of global transport and logistics companies expect changes in key service technologies to exert a breakthrough impact on their operations.

The anticipated impact of these technological changes is unprecedented, as in recent years, apart from rising engine efficiency and growing transport volumes, significant technological progress has not been observed in the industry. The diesel engine, in use for decades, remains standard in EU road transport. According to ACEA data for 2016, more than 96.1% of vehicles in the EU-28 with GVM >3.5 tons were diesel-powered. Interestingly, this figure actually rose slightly from 95.5% in 2015, which means that diesel is still the main solution in European markets.

Basic digitalization has three dimensions:

a. computerization of the internal processes of transport industry companies,

b. platformization of sales of services, including automating processes at the point of contact with the customer,

c. emergence of digital giants – large distribution companies that have scaled up their operations through the digitalization and platformization of sales processes (such as Amazon) are starting to put pressure on logistics service providers.

Advanced digital solutions will become implementable (e.g. intelligent transport systems or block-chain solutions) after the year 2023, once basic digitalization is in place.

Vehicle autonomy will have a gigantic impact on the market, reducing transport costs by up to 28% after 2025 (particularly by reducing driver employment costs). However, it will take 5 to 10 years before technological solutions in this area reach maturity.

Alternative drives can be expected to come into broad use in Poland in more than 5 years’ time, while further reduction of fuel consumption in conventional engines will be difficult (optimization has already progressed in this area in the last two decades).

New freight transport technologies can boost the availability of cargo space, help reduce costs and enable optimization of labor-intensive activity, although they will not be as important for the cost-effectiveness of the industry as autonomy or alternative drives.

Expert Comment

"Digitalization is already underway and it will continue. It is of an evolutionary nature, because new solutions are being developed on the basis of already available technologies. Alternative-drive vehicles are not being used on a large scale yet. There are high hopes for the use of hydrogen, which has not yet been brought to market. The groundbreaking change that currently requires the most focus and investment outlays is vehicle autonomy.”

Ireneusz Frankowski
Miratrans
6.1 Basic digitalization of transport and logistics (internal processes, platformization, impact of digital giants)

Digitalization of the transport and logistics sector is already happening now and will continue over the next 10 years, affecting the growth in transport companies’ revenues, enabling cost reduction as well as improving service quality.

The transport and logistics sector already now faces large opportunities for development through digitalization, as the necessary enabling technologies are already mature (as shown in examples presented in this chapter).

Digitalization is no longer all about administration, accounting and internal processes. It also means entering the realm of enabling new business processes (such as controlling the physical conditions in transport, electronic clearance of goods at terminals) as well as changing the way businesses cooperate with their customers and enter into contracts (through ”platformization” of service transactions).

Figure 8. Old and current approaches to digitalization of enterprises

Transport companies are using digitalization to boost revenues, to simplify processes, to reshape their services, products and business models, and to reduce the impact of skills shortages. Example applications of digitalization in various segments of transport and logistics are shown in Figure 9.

Figure 9. Examples of digital solutions in different fields of transport and logistics

Transport companies point out that the shortage of personnel with competences in the area of digital technologies poses a significant barrier to the development of digital solutions. 58% of surveyed representatives of transport and logistic companies feel it is difficult to find people with the skills necessary to develop digital technologies.45

Basic digitalization affects transport in three areas:

(a) automation of processes and IT implementation,
(b) platformization of sales of services, and
(c) the reshaping of the transport industry by digital giants (the advanced digitalization of telematics-based technologies is described in the next chapter).

The first area of basic transport digitalization: computerization of transport enterprises and automation of processes.

There are many examples of this trend in the transport sector itself – ranging from integration of ERP and WMS systems so as to enable dynamic management of delivery windows for transported goods, through service ordering platforms described below, to the electronic processing of transport documentation at intersection points between process participants, to digital transport management. Such services will soon no longer be perceived as innovative, as they will become the norm in the market. This applies to both freight and passenger transport.

From the perspective of carriers, the most important basic technologies include Transport Management (TMS) and ERP systems allowing for automation of administra-

45 PwC CEO Survey 2018.
Technological revolution as factor of change in the road transport industry

tive processes. The digital revolution is based on phenomena similar to those observed in other industries. Importantly, the sector is experiencing skilled workforce shortages, making administrative process automation solutions necessary. It is also important to change the behavior of consumers and businesses, in particular in terms of shifting orders for services and trade in goods to the Internet, and to increase the availability of Internet technologies, applications, databases and ERP systems (already considered simple).

The second area of basic transport digitalization: platformization of transport service sales.

Examples of platformization can be found both in taxi and personal transport services such as FreeNow (myTaxi, developed by Daimler and BMW), Uber and Poland’s iTaxi, as well as in freight transport services, such as real-time, online freight exchange platforms for short- and long-haul transport, which in turn allow for integration into transport systems.

54% of representatives of global transport companies feel that digitalization offers a way to increase revenue, while 16% believe that it can increase profits. Chart 18.

![Chart 18. Overall expectations of transport businesses with respect to digitalization [% share of companies that selected the answer](source: PwC Digital IQ Survey)

Platforms and companies offering vehicle-sharing in the passenger market have gradually started to move into freight transport, by starting to offer commercial vehicles. Thanks to this, in the future regional carriers will be able to use third-party assets to provide transport services beyond their standard range.

Comment on passenger transport

“Sharing economy” services have their source in the passenger transport sector, and it is there that they are developing most dynamically, with such companies as Uber, Bolt (Taxify), Lyft and BlaBlaCar appearing on the market in recent years. Their rapid growth is making service-sharing popular in the passenger transport market and changing the market structure. Companies such as Panek, Traficar and 4Mobility, which offer short-term car rental, have also expanded their activity. In addition, Innogy has introduced the third largest electric carshare scheme in Europe.

The platformization described above facilitates the rapid colonization of new industries by digital companies that have achieved large scale operations in other markets. One example is Amazon Home Services, based on the Amazon platform, which originally started off selling music and video content and subsequently books. Despite operating across Europe, transport platforms have not yet acquired a large share of the industry. For example, in 2018 Germany’s Timocom generated revenues of EUR 74.6 million while the revenues of Poland’s Trans.EU stood at PLN 111.3 million. Compared to the industry as a whole (total turnover in Poland in 2017 was estimated at PLN 119 billion), they hold small market shares. This makes transport an attractive area for digital giants, characterized below.

Expert Comment

“Platformization allows carriers to provide services without worrying about acquisition of customers (who are provided by the platform itself) and additionally, thanks to larger transparency of operations, it eliminates market dysfunctions, such as poor service quality and even illegal activities of carriers aimed at eliminating local competition.”

Michał Leman
Flixbus

The sharing economy goes beyond platformization, facilitating the sharing of specific resources. It has gained popularity in passenger transport sectors, where companies operating on a shared basis have developed significantly and achieved great popularity.
Technological revolution as factor of change in the road transport industry

By 2025, it is estimated that global revenue generated by sharing-economy entities will amount to over USD 335 billion\(^4\) (including transport and other services of general interest), matching the rental industry. This also means increasing platformization, which will create an opportunity for transport companies to further improve their efficiency.

Sharing-related solutions can also be expected to enter the road freight transport services market. The first examples of solutions functioning in this area include startups such as Uber Freight, uShip, in which DB Schenker has invested and Saloodo.com, which operates within the DHL Group. Another segment where the sharing economy has a chance for dynamic development is last-mile logistics in the area of shared delivery services. Such solutions are, for example, offered by the start-up Cargomatic, which connects forwarders who need to deliver goods to a given address with carriers who have unused space and can take additional goods.

**Expert Comment**

“The development of platforms such as Uber has not only permanently changed the face of the transport and public transport market, it has also revolutionized the way we move around a city. The future of the platform is heading towards creating a single place from which to plan an entire journey, involving various means of transport: a car, a tram or an electric scooter. For the user, this means improving travel comfort and reducing the time needed for commuting, and for the business, it creates ‘one stop’ for meeting the customer. In a world where technology has to be at our fingertips, because that’s where our smartphone is, access to these services is crucial. That’s why we are dynamically expanding our network of partners, giving them the tools to develop their businesses.”

Ilona Grzywińska-Lartigue

**Expert Comment**

“Sharing can certainly change the market by reducing transport costs. For example, Uber lowered the price of journeys, while at the same time activating users who did not use its services before. Sharing is therefore a factor that increases efficiency and generates demand among new user groups. In general cargo and full truck loads, following this model can reduce costs for carriers and increase margins.”

Maciej Wroński

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\(^4\)PwC “Sharing or paring? Growth of the sharing economy”.

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The third area of basic transport digitalization: the impact of digital giants

Digital giants are large companies that owe their emergence to digital technologies. Some of the digital giants in the logistics sector have grown thanks to online platforms, which are diverse in nature – some of them are intermediaries, while some are used to sell their own services or products. However, examples such as Amazon, Britain’s Ocado or Poland’s Frisco.pl indicate that large companies are also developing independently of transport and logistics platforms.

The best summary of the impact of digital giants on the market can be seen in the current activity of Amazon, a corporation built around a digital platform, which is now also expanding into the logistics market. In 2018, Amazon decided to stop using most of its external logistics services in favor of its own capabilities developed within the corporate group. Successive digital giants can also be expected to take such measures, posing a serious threat to the industry due to the outflow of turnover, while on the other hand creating a chance for those carriers who start doing business with digital giants.
6.2 Advanced technologies based on software and telematics

Advanced technologies based on software and telematics will be a natural development of solutions that are being implemented in the area of digitalization, but they may turn out to be inaccessible to smaller carriers.

Although the impact of new technologies is not yet fully visible and quantifiable, it can be assumed that these changes will have a particular impact on market design and business operations.

It can be expected that by 2022 technologies such as artificial intelligence, the Internet of Things, big data and block-chain/distributed ledger technology (DLT) will have reached maturity, allowing for wider use of software based on them.

Chart 20. Share of surveyed global T&L companies declaring they are currently investing in software tech [%]

In support of this thesis, we may cite the declarations made by global transport companies regarding their current investments in advanced technological solutions in the field of software and telematics. The results presented above show that telematics (akin to the solutions used in the Internet of Things) and artificial intelligence are of particular importance. There is as yet little interest in blockchain-based technologies. This may be related to the specific nature of these solutions – they are not indispensable, and they have the character of added value.

Among various software solutions, the 5 most important ones have been identified that will have the greatest impact on the market:

**A Robotic process automation (RPA)**

RPA technology involves process automation using software bots in lieu of operations performed by humans on computers. In transport, there is much room for automating administrative processes using such bots. Many tasks are repetitive, such as preparing transport documentation, and increasing costs are encouraging businesses entrepreneurs to look for cost-curbing measures. The potential of RPA technology is confirmed by forecasts – the turnover of companies providing RPA solutions is expected to grow at an average annual rate in excess of 50% in 2016-2022.49

**B Intelligent Transport Systems (ITS)**

ITS are systems built using telematics/Internet of Things solutions to support urban traffic management, public transport, the flow of passengers, goods, fleet and cargo, and the collecting and reporting of information on the road traffic of vehicles. From the standpoint of transport companies, they enable better remote vehicle management. According to forecasts, by 2022 the turnover of companies offering Intelligent Transport Systems (ITS) solutions in road transport is expected to reach over USD 72.3 billion globally, growing at a rate of 7.9% between 2016 and 2022.50

**C Predictive Maintenance**

Predictive Maintenance involves servicing equipment based on its current and historical operating parameters, as measured with sensors. Accessing datasets from various sensors installed on production or transport machinery makes it possible to continuously analyze the condition of that equipment. It also allows the data to be used to avoid failures or lapses. In transport, predictive repairs can play a key role in minimizing failures, which

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49 Statista.

50 BIS Research.
hugely influence the safe use of vehicles. Much like in
the case of RPA solutions, it is estimated that the turno-
ver of companies providing Predictive Maintenance solu-
tions will grow at an annual average rate of over 37%
between 2018 and 2022.51

**Blockchain solutions**

Blockchain-based software solutions operate by a dis-
tributed-ledger principle; multiple records stored across
different sites provide reliable reference points for the
collected data. For example, using this technology in
registration processes makes it impossible to conceal
illegal trading in goods. Blockchain technology (DLT)
solutions can benefit the transport and logistics industry
in many ways, such as by increasing:

- **security** – through product identification and the
  possibility of auditing while maintaining privacy by
  means of a hash key,
- **efficiency** – through reduced demand for document
  processing (thanks to automation),
- **transparency** – through easier and more reliable
  tracking and verification of sources,
- **reliability** – once information is entered into the net-
  work, it cannot be easily changed.

Over time, blockchain solutions can be expected to find
their way into the transport and logistics market, allowing
for increased transparency of transactions for customers.

**Artificial Intelligence solutions**

Transport, logistics and the automotive industry are two
out of four sectors which, according to research by
PwC,52 are poised to benefit the most from the imple-
mentation of AI solutions. For a company providing road

51 Statista.

52 PwC Report “What’s the real value of AI for your business?”. 
6.3 Autonomization of road transport

Full autonomy of trucks will undoubtedly fundamentally change the transport market, but this will not happen on a massive scale until the 10-year perspective. The first implementations of partial autonomy combined with platooning may, however, be expected within a period of 5 to 10 years.

The broad term "automation" refers to "devices, processes or systems (automatically controlled by mechanical or electronic devices) that replace human labor." It applies to both the use of robots (including industrial and service robots), and process automation using software. In the context of transport operations, automation refers to the autonomization of transport (to self-propelled vehicles, where the role of the driver is replaced by a machine).

In reference to autonomous vehicles, six levels of autonomy are distinguished:

A. The driver operates the vehicle with driver assistance functions activated, which must be continuously monitored:

- **Level 0** – no automation, driver assistance functions are limited to issuing warnings and temporary assistance.
- **Level 1** – functions for driving or assisting the driver with braking / accelerating (one function at a time).
- **Level 2 (signs of this already visible in Poland)** – functions for driving and assisting the driver with braking / accelerating (two functions at the same time).

B. The driver does not control the vehicle when the automated driving functions are activated:

- **Level 3** – the driver must operate the vehicle when the functions require it. The functions are able to drive only under restricted conditions and will not work until all the required conditions are met.
- **Level 4** – automated driving functions do not require the driver to take over control of the vehicle. The functions are able to drive only under restricted conditions and will not work until all the required conditions are met.
- **Level 5** – full vehicle autonomy, automated driving functions do not require the driver to take over control of the vehicle.

Autonomization in the form of fully autonomous vehicles is essential for filling the gap in the labor supply in the industry. As Figure 21 shows, autonomous transport will also enable a 28% reduction in transport costs after 2025 by replacing labor costs (of drivers) with the costs of software, telematics and a human monitor. This is particularly important because most of the economic, social, political and legal factors are likely to lead to an increase in the costs of the industry, so autonomization may therefore be one of the few ways this problem can be solved.

Chart 21. Cost structure of HGV operations in Europe across different years (in EUR thousands) and reduction of operating costs due to autonomous driving technologies in a global perspective [%].

As a result, the transport industry is beginning to recognize the importance of autonomy. Of the representatives of global transport and logistics companies we surveyed, no fewer than 78% are planning to take action to automate tasks and positions in order to ensure effective achievement of the company's objectives. At the same time, 31% of them plan to invest in automation within three years from the date of the survey.

In the broadly-understood field of process automation, we can distinguish three different waves:

1. **The algorithmic wave** (now and in the early 2020s) in transport is visible in its digitalization, automation of data flows and information exchange operations.

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53 Merriam-Webster Dictionary [20.03.2019].
54 International Federation of Robotics.
56 PwC Report “Will robots really steal our jobs?”.
2. **The extended wave** (late 2020s) will focus on automating repetitive tasks using advanced software solutions (analyzed in detail later in this chapter) and on partially autonomous vehicles – in this wave, we can expect platoons of vehicles to be controlled from a single vehicle being at the beginning of the convoy as well as semi-autonomous vehicles with a driver only supervising. The solution can lead to changes in how driving time is accounted for, thus freeing up the availability of drivers.

3. **The autonomy wave (2030s)** in transport will mean the complete replacement of physical labor by unmanned vehicles.

The noticeable start of the revolution in road transport will come with the extended wave of automation, in which a 1/3 reduction in demand for labor will make it possible to eliminate the employment gap by freeing up drivers’ working time. For this reason, manufacturers such as DAF, Iveco, Scania and Volvo are investing in technologies related to vehicle platooning.

It should be stressed that even in the autonomy wave a certain level of human supervision will remain necessary, meaning that labor costs will be significantly reduced but not eliminated completely.

Autonomization will require adjustments to the legal framework, which in turn will demand broadly understood societal consent to the use of autonomous vehicles in road traffic. This process will require active involvement not only on the part of the legislative and executive authorities of the countries implementing autonomous solutions, but also on the part of NGOs representing the interests of citizens and of the media, which play an important role in communicating modern solutions and the ways they can be applied in practice.

Unfortunately, it is currently difficult to speak about a healthy balance in how autonomous transport innovations are being communicated to society, as members of the public are most often informed only about accidents involving autonomous or semi-autonomous vehicles. Interestingly, the same mood prevailed back when cars started to appear. In 1865, for instance, the “Red Flag Act” was enacted in the UK, which required every motor vehicle (then known as a “locomotive”) to have a pedestrian guide walking in front of it, carrying a red flag and a lantern.

From the perspective of the road transport operator, autonomization will bring the possibility of reducing costs, but at the same time the necessity to learn how to use new technologies and to develop new business processes is essential for this. Entrepreneurs can use the next 5 years to perform tests and validate autonomous solutions in practice to gain a cost advantage the moment they become a new standard on the market. The first step will be the changes related to the algorithmic wave, mainly digitalization. Then they will be able to implement extended solutions increasing efficiency through automation of processes, until eventually (starting in the early 2030s) autonomous vehicles come to dominate the markets.

Autonomous vehicles represent another area – after advanced technologies based on software and telematics – which will be more difficult for small operators to enter. This is another reason why concentration in the industry may increase. Autonomization has a chance to start working firstly on motorways and expressways, as well as in the field of in-house transport.

### 6.4 Development of alternative drives and increased efficiency of conventional engines

Currently, there are several alternative drives being developed in parallel, but their popularization requires not only the appropriate technology, but also the availability of charging or refueling infrastructure. The lack of such technology, combined with the high cost of purchasing such vehicles, remains a significant limitation on them. In the coming years, alternative drives will first gain popularity in last-mile transport.

Fuel engines such as LPG and bioethanol are nothing new and their popularity is growing in some economies. Other propulsion technologies are also under development, such as LNG/CNG (put into production), electric and hydrogen engines. The steadily growing ecological requirements imposed on engines will lead to changes in the automotive industry in terms of the types of propulsion used and combustion efficiency. Urban logistics has to deal with the phenomenon of growing congestion and

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57 LNG and CNG are different states of the mixture of methane and ethane. Due to its higher compression / smaller volume, LNG is more often used in long-haul transport.

58 Recently, hydrogen buses have been implemented in Scotland and Germany (cities in these countries have ordered a total of 62 such vehicles).
its consequences, such as increased emissions of pollutants, CO₂ and noise. In addition, reducing fuel consumption translates directly into savings in transport. That is why engine designers are moving over to developing cost-efficient and quiet vehicles.

Given that 96%⁵⁹ of heavy goods vehicles in Europe were powered by diesel engines in 2016, there is huge potential for the use of alternative drives. Unfortunately, their actual use on a wider scale depends mainly on the availability of refueling and recharging infrastructure.

For example, it can be most certainly assumed that the low popularity of bioethanol in Poland in recent years is related to the practical lack of stations where it might be refueled. It is estimated that there are already 646 electric vehicle charging stations in Poland,⁶⁰ but this still does not guarantee convenient geographical coverage of the country for electric car drivers. In addition, many of the available chargers require a long stopover for charging, which is not practical for longer routes. Alternative drives also remain relatively expensive in terms of the investment capacity of small carriers.

There are also concerns about the tax policy of governments on various fuels. Although individual governments make declarations of support for new propulsion systems, entrepreneurs often remain suspicious. One example of a legislator's positive initiative is the announcement in 2018 by the German government of its readiness to support LNG and CNG drives. In 2019, a program of subsidies for trucks using both liquefied natural gas (LNG) and compressed natural gas (CNG) was launched in Wallonia, Belgium. In Poland, there was a decision in July 2018 to abolish excise duties on LNG and CNG fuels for propulsion purposes, and the European Commission agreed to do so on 16 December 2018. Given the much higher cost of purchasing vehicles with such propulsion, a clear and long-term policy is necessary for businesses to start using such vehicles.

Expert Comment

“The electric drives being promoted in passenger cars for long-distance transport face significant limitations. For this reason, they will be used first in warehouse vehicles and in the area of last-mile transport. This trend will be supported by planned creation of zero emission zones in the largest European cities. At the same time, fuels such as LNG stand a chance of achieving greater functionality over long distances. It is worth noting, however, that over the next decade the diesel engine will remain the dominant truck drive.”

Martyna Dziubak
Santander Bank Polska

Comment on passenger transport

The implementation of alternative fuel vehicles or electric vehicles is significantly simpler in the passenger transport sector. Cities choose to use innovative technologies in view of their advantages, such as in terms of environmental impact. In 2017, the mayors of the world’s 12 largest cities, with a total of almost 80 million inhabitants, announced a move to zero-emission fleets to improve the environment and the quality of life of citizens in metropolitan areas. The number of buses, coaches and trolleybuses powered by alternative energy sources is still relatively small, given the overall number of vehicles. They make up around 1% of the total, though that percentage is growing rapidly. Between 2013 and 2017, the number of electric buses, coaches and trolleybuses has almost quadrupled, while the number of hybrid vehicles has increased by more than 100%. Electric buses are about twice as expensive as conventionally powered buses, but many cities decide to subsidize the purchase of electric vehicles, which is also why their popularity is growing.

Estimates indicate that growth in the number of electric cars in the world between 2018 and 2030 will amount to 36% (annual average) of the total number of cars (including passenger cars). Such optimistic estimates are certainly related to numerous declarations of European governments regarding their support for the development of electromobility. Due to these declarations and the infrastructural limitations mentioned above, it can be expected that the share of electric cars in the total number of passenger cars in use in Europe will grow dynamically in the near future.

⁵⁹ ACEA.
⁶⁰ PSPA.
Technological revolution as factor of change in the road transport industry

Table 1. Summary of examples of transport vehicles using alternative drives, by manufacturer

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Techniques developed</th>
<th>Type of drive</th>
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<tbody>
<tr>
<td>DAF</td>
<td>CF Hybrid*</td>
<td>Hybrid</td>
</tr>
<tr>
<td></td>
<td>LF Electric*</td>
<td>Electric</td>
</tr>
<tr>
<td>Iveco</td>
<td>Stralis NP</td>
<td>LNG</td>
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<tr>
<td>MAN</td>
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<td>Mercedes</td>
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<tr>
<td>SCANIA</td>
<td>Euro 6 Hybrid Truck</td>
<td>Hybrid</td>
</tr>
<tr>
<td>Volvo</td>
<td>FL Electric</td>
<td>Electric</td>
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</tbody>
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* technologies in testing
Source: PwC analysis

Furthermore, no rapid popularization of electromobility solutions should be expected in the largest trucks due to their technological limitations. The examples of manufacturers' activities presented in Table 1 mainly involve medium-sized vehicles, because as weight and mileage increase (especially in international transport), the use of electric drives becomes more and more constrained by long charging intervals and huge batteries.

For these reasons, it can be expected that in the short term the automotive industry will continue looking for other (non-electric) alternative drives for the heaviest vehicles and that, in real terms, large-scale deployment of such drives will take place within 5 or more years.

Electric vehicles will emerge more quickly among vehicles for last-mile transport in cities, where they have more charging opportunities. One company that has implemented such solutions is IKEA, which works with carriers using electric vehicles. A factor contributing to the implementation of such vehicles in Poland could be the law on electromobility introduced on 11 January 2018, which imposes an obligation to outsource tasks to companies 30% of whose fleet consists of electric vehicles and that, in real terms, large-scale deployment of such drives will take place within 5 or more years.

Vehicles equipped with such engines are more cost-efficient, provided that the driver is able to drive economically on the road. Due to poorer driving dynamics, however, employees often push the limits of vehicles with such engines, which results in significantly higher fuel consumption. This is also important in the case of downsized engines, that is, engines replaced by smaller propulsion systems.

In order to guarantee real savings on the road, it is necessary to implement systems for reporting current vehicle performance and motivating employees to drive economically. A simple economical-driving system on the vehicle level is no longer sufficient, because drivers often switch such systems off. This calls for telematics and software solutions that enable vehicle efficiency to be tracked. That is why fuel savings in conventional engines can only be expected within the next 2-3 years. Changing engine performance parameters, improving aerodynamics and trucks being equipped with retractable and foldable tailgates are also contributing to fuel savings of around 7-10%, thus reducing CO₂ emissions. According to European Commission estimates, this will result in savings of about EUR 5,000 per year for a typical truck with an annual mileage of 100,000 km.

Similar effects should be achieved by reducing fuel consumption through the use of hybrid drive technology, with a recuperation mechanism that recovers energy during braking.
6.5 New solutions in freight transport

New transport solutions may reduce labor demand to some extent, but in the short term they are unlikely to be implemented in Poland due to lack of necessary infrastructure and regulations.

One example of a solution in this area involves LHV (Longer Heavier Vehicle) trucks. These technologies are based on the construction of vehicles larger than the currently approved HGV/LGV, with a maximum standard of 18.75 m in length and 40 tons of gross vehicle mass (GVM) in most countries. LHV technologies are currently being developed in Scandinavia, Germany and the Benelux. One example LHV solution is the Gigaliner, a vehicle combination with a length of up to 25.25 m approved for use in Germany.\(^{61}\)

The introduction of such vehicles makes it possible to increase the load carried in one journey – with two Gigaliners transporting the same amount of goods as three regular trucks. However, such solutions require tailored infrastructure and laws that do not currently exist in Poland, which effectively prevents the use of LHV solutions.

Another important change in transport technology is progressive containerization (the share of trade in containers is growing), although in the case of transport the share of containerization in the total weight of transported goods has decreased. In the case of maritime, rail and inland waterway transport, the trend was the reverse. The decrease in the share of containerized goods in the total mass of transported goods in road transport could be related to the increase in turnover of palletized goods. However, the development of intermodal transport in the coming years may reverse this trend, leading to greater containerization of road transport.

\(^{61}\) And even more in Finland (76 tons, 34.5 m), Spain (31.75 m – tests) and Sweden (74 tons).
Expected internal changes in the industry – competition, prices, organizations
Internal changes in the industry will mainly involve greater market concentration and a higher share of smaller-volume services.

Analysis of how the market functions leads us to the following conclusions:

1. **In the coming years one should expect greater concentration in the Polish road transport industry.** Although in recent years the concentration has increased slightly, expected legal and technological changes will probably accelerate the process of market consolidation.

2. **Carriers from Central and Eastern European countries of the EU-28 pose limited competition for Polish carriers** due to the fact that they come from small geographic markets with limited resources. However, carriers from outside the EU (in particular from Russia) are putting pressure on Polish transport companies due to lower costs, including regulatory ones. Regulations supporting the interests of entities within the Union are necessary for maintaining the competitiveness of domestic enterprises.

3. **In the short and medium run, an increase in the share of segments of smaller volumes (less-than-truckload) can be expected in comparison to full truck load transport.**

4. **Increased cost pressure in the industry is inevitable** – industry representatives who took part in our interviews predict an increase in the cost of transport services by 7-15% between 2018 and 2020.

### 7.1 Internal competition in the industry – concentration in the road freight transport services market in Poland

The Polish road freight transport sector is highly fragmented, but due to dynamic changes in regulations market concentration can be expected to increase in the coming years.

At the end of 2018, almost 239,000 entities were registered on the Polish transport market (under section 49 of the Polish Classification of Activities – land transport and pipeline transport). Almost 90% of them (over 210,000) were self-employed natural persons. What is more, as many as 98.1% (234,000) of enterprises registered under this section employed fewer than 10 people. Entities employing up to 50 people form another 1.6% of the market, and entities with over 50 employees accounted for only 0.3% of the overall registered number. It should be remembered that these data refer to all entities falling under this PCA chapter, so they also include a certain number of enterprises operating in urban, railway or pipeline transport. Moreover, some registered entities may not be active. However, these data clearly illustrate the high level of market fragmentation.

According to the data of the General Inspectorate of Road Transport (GITD), as of the end of 2018, there were almost 36,000 licenses issued for performing international road freight transport. In addition, there were nearly 20,000 permits for performing transport services, i.e. documents allowing for commercial transport in Poland. Assuming that one license is enough for a company, it can be deduced from the data presented that over 56,000 entities operate on the Polish road transport market (in total, on the commercial and non-commercial markets). Companies operating on the international market use a total of almost 235,000 trucks, which can be assessed on the basis of the number of certified true copies issued for EU licenses by the General Inspectorate of Road Transport (GITD).

As shown in Chart 24, the Polish road transport industry did not show a tendency to increase concentration in the past (the market shares of the 20 largest players have not risen significantly in recent years). Industry representatives also believe that Polish carriers do not have
a tendency to cooperate and instead opt to operate on their own, even if joining forces could be beneficial for them.

**Chart 24.** Market share held by the 20 largest players in the industry, over the past 3 years in Poland [%]

<table>
<thead>
<tr>
<th>Year</th>
<th>Other companies</th>
<th>Top 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>13%</td>
<td>87%</td>
</tr>
<tr>
<td>2016</td>
<td>13%</td>
<td>87%</td>
</tr>
<tr>
<td>2017</td>
<td>14%</td>
<td>86%</td>
</tr>
</tbody>
</table>

Source: Dziennik Gazeta Prawna T&L report, PwC analysis

As indicated in Chapter 4, political and legal factors will certainly hinder the operations of small carriers and, as a result, may even lead them to shut down. This will result in large players taking over a more sizeable part of the market and will lead to a gradual increase in market concentration in the long run. However, large carriers might encounter difficulties in operating in the absence of small carriers, who often provide services to them as subcontractors, dynamically adapting their capabilities to the needs of individual contracts. To fill the gap, they would have to build their own large fleets.

7.2 Competition of foreign entities

Competition of enterprises from outside the EU may intensify in the future, among other factors because of the new EU regulations that impose additional obligations on domestic carriers.

At the end of 2017, in the entire European Union there were almost 300,000 EU licenses issued for international commercial road freight transport. The number of licenses grew on average by 1% per annum from 2010. In this respect, our detailed analysis looked at Germany and France (due to their importance in the European transport market), the Baltic States (Lithuania, Latvia and Estonia), the Czech Republic and Slovakia (due to their location) and Romania and Bulgaria (due to the possibility of cost competition in the industry).

**Chart 25.** Number of EU licenses held by carriers from selected EU countries, 2010-2017 [k]

At the end of 2017, the largest number of licenses were held by German companies – over 41,000, which represents 14% of all licenses in the EU-28. Next came Poland and Romania, each holding 12%, or over 34,000 EU-28 Licenses. These shares have changed over the years. In 2010-2017, the number of licenses held by German carriers dropped on average by 3% per annum. The number of licensed carriers from countries such as Ireland, France, Italy and the United Kingdom decreased, as did those from some Central and Eastern European countries (the number of Hungarian and Slovenian carrier licenses decreased by 2% and 1%, respectively). In the same period, the position of Estonian and Bulgarian companies strengthened, with the number of licenses growing dynamically – on average by 18% and 10% per annum, respectively. The number of licenses of Polish

**Expert Comment**

“Consolidation in the road transport industry is inevitable. The position of large enterprises will strengthen, while small, less-efficient companies will have more and more difficulty staying on the market. That is why building the right scale of activity that will enable cost optimization is already a key success factor. Smaller enterprises may respond to the sectoral challenges by attempting to reduce costs, e.g. by joining together into group-purchasing organizations or specializing in niches, which will allow for the generation of higher margins.”

Bartosz Toczony
Santander Bank Polska
carriers also increased, but at a slower rate of 5% per annum in the years 2010-2017.

It is also worth noting the number of vehicles available to companies from individual countries, measured by the number of certified true copies issued for community licenses. In terms of fleet size, Polish entrepreneurs rank third after French and German companies, accounting for 11% of the whole licensed European fleet (almost 218,000 licenses at the end of 2017). The number of vehicles increased the fastest in Lithuania and Estonia, by 9% and 13%, respectively. The average number of vehicles owned by one company has also increased in the entire EU-28 group. In 2010, transport companies had an average of 13 vehicles at their disposal, while in 2017 they already had an average of 20.62

**Chart 26. Number of Community License certified true copies held by carriers from selected countries in the EU, 2010-2017 [k]**

Currently, carriers in such countries as Estonia, Lithuania and Bulgaria have much lower shares in the entire market as well as in the total number of issued licenses. For Estonian or Lithuanian enterprises to catch up with Polish carriers would require a significant increase in rolling stock, and even assuming the current dynamic average annual growth this would take about 20 years.

Enterprises from Eastern Europe, from outside the EU-28 – in particular Russian, Ukrainian and Belarussian carriers – can compete on the European market in terms of low prices. They are not obliged to comply with all EU rules, such as, for example, regulations on admission to the occupation, drivers’ qualifications, taxes on transport and excise duties, which are increasingly regulated in the EU-28.

International transport is based on permits from the ECMT (European Conference of Ministers of Transport), which allow for the international road freight for business purposes in the countries affiliated with ECMT. These transport operations may be carried out between member states of ECMT and in transit through the territory of one or more ECMT member states by vehicles registered in an ECMT member state. Apart from the EU-28 countries and the European Economic Area, ECMT also includes the Commonwealth of Independent States and countries in the Balkans. In 2019, Polish companies have a total of approximately 2.3k ECMT permits, Russian companies hold 160, Ukrainian ones hold 3.9k, and Belarussian ones 2.7k. Given that carriers from across the Eastern border have more ECMT permits than Polish ones, they can compete with Polish carriers on the European market.

**Chart 27. ECMT permits held by carriers from selected countries as on January 2019**

Another type of document enabling international transport of goods involves foreign permits negotiated directly between particular countries (bilateral). Among the countries whose carriers have permits for entering Poland, the largest contingent for 2019 is held by Russian companies, with 210,000 permits. This means that 210,000 Russian trucks will be able to enter Poland (directly, by transit or going to a third country), and the same number of Polish trucks will be able to enter Russia. This means a decrease in the number of permits by 11% compared to the previous year. The high number of last year’s (2018) permits may have been a result of the FIFA World Cup held in Russia and should therefore not be considered a sign of a long-term trend.

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62 European Commission, GITD.
The newly established quota of permits between Poland and Belarus will amount to 199,000 in 2019, which is 2% fewer permits than in the previous year. Poland did not agree to Belarus' request to increase the quota to 220,000. Previously, for transport carried out across Belarus there was an additional quota, issued only by Belarus and separately payable at the border, but since 2017 this practice has been abandoned. In the case of Ukraine, the number of permits was stable between 2010 and 2018, but in 2019 it fell by 20% to 160,000. This reduction in the number of permits is the result of a huge imbalance in the use of permits by the two countries and Poland's policy aimed at reducing permit quotas for countries outside the EU-28.

Moreover, due to the lack of internal borders within the EU, inspection of the correct use of foreign permits by non-EU carriers is haphazard and therefore inefficient. According to representatives of Polish carriers' organizations, this enables entrepreneurs from Russia and Ukraine to perform additional road transport outside the quota system of permits, both in bilateral relations, as well as in servicing so-called third countries.

Although Russian, Belarusian and Ukrainian companies can be strong competitors in handling imports and exports to the east from Europe, the EU-28 market is still less accessible to them due to the fact that they cannot carry out cabotage transport as well as the fact that cross-trade is limited by the low availability of third countries permits.

While similar data are not available for other countries, the example of Ukraine shows that the fleet of carriers from eastern non-EU-28 countries is much older. Only 35% of the ECMT permits for Ukrainian carriers are Euro 5 vehicle permits, the remaining vehicles meet much lower standards. With progressing legislative changes and environmental restrictions gradually being introduced in the EU, Ukrainian carriers might face growing difficulties meeting these requirements in the long term, which will result in a decreased ability to perform transport services to the west and restricted market access.

Although competition on the market is growing, as is the presence of vehicles from other countries on Polish roads, capital in Polish transport companies often remains local. A significant number of the analyzed transport enterprises operating in Poland are in the hands of Polish capital, and foreign capital comes mainly from Western European countries. There have been no factors identified that could suggest trends of eastern capital being invested in companies from transport sector or their acquisition by eastern capital. On such a fragmented market, however, among small carriers it is not possible to rule out the presence of firms with capital hailing from other Central and Eastern European countries.

It can be expected that in the short term, Polish carriers will maintain their leading position on the EU transport market and competition from the countries from the eastern border will not threaten their position. However, this situation may change in the long term. Unfavorable changes in the law will contribute to the weakening position of Polish carriers, and dynamically growing companies from the east might take advantage of this situation and gradually take over market share.
7.3 Changes in the share of specific service segments in the road transport industry

The development of e-commerce resulting in a dynamic growth in the courier services market and growth of LTL freight of palletized goods are resulting in an increased share of these services in total road transport.

Types of services in road transport market are distinguished by the size of transported goods. In particular, the following should be highlighted:

1. **FTL** (Full TruckLoad), where the handling unit is a whole vehicle (less frequently a part of the vehicle) travelling a certain distance,

2. **LTL** (Less than TruckLoad), where the handling unit is usually a pallet (often regardless of the distance of its delivery),

3. **CEP** (courier, express, and parcel), for which the handling unit is the parcel (usually regardless of the distance, if the transport is carried out in the country).

Customers are increasingly choosing smaller volume transport services because of a number of factors:

1. **Waiting time for the provision of service** – which provides an advantage to carriers providing transport of smaller volumes due to the fact that they have fixed supply networks and their transport does not require full freight,

2. **The set-up of the client’s supply chain** – transporting smaller volumes also helps in efforts to minimize inventory and deliver goods to customers faster,

3. **Prices** – as the efficiency of transport of smaller volumes increases, it can be expected that customers will use them more and more willingly.

Estimates suggest that in 2018 the share of LTL in the total value of road freight transport market in Poland was 41%, while that of FTL was 59%. In 2018-2022 the share of LTL will increase by 1.3 percentage points in relation to FTL. In the longer term, this trend is expected to continue, so by 2030 the changes will be even more visible.

A similar situation is observed in the case of the CEP services segment, for which one of the most important factors is the development of the e-commerce sector. In the years 2012-2017 the sector of sales online in Europe grew at an average annual rate of 10%, and in subsequent years the growth is forecast at 4% per annum.

However, the CEP sector does not affect the LTL to FTL services ratio, as CEP transport should be considered separately. It is carried out in line transports between points of the logistics network in the form of LTL or (usually) FTL journeys.

**Chart 28. Value of CEP market revenue in Europe [EUR bn]**

It is estimated that the revenues of companies providing CEP services in the EU in the years 2015-2025 will grow by 4% annually.

Changes in customer preferences generate new business models, by adapting services to the requirements of the e-commerce sector. Some examples of changes in this field include requiring a specific delivery time, being able to continually monitor delivery time, the possibility of dynamically changing the place of delivery, the option of integrated delivery of parcels from several locations, automated delivery of frequently purchased goods and automatic handling of returns.
7.4 Changes in transport service margins in the context of costs and cost-driving factors

The increased operating costs faced by transport entrepreneurs caused by wage increases, potential increases in fuel prices and rising fee levels will contribute to increased prices of services on the transport market. Transport entrepreneurs who participated in our interviews predict a cost increase of 7 to 15% in the period 2018-2020.

According to the industry representatives who took part in our interviews, rising costs over the last 10 years have contributed to a decline in margins in the road transport market. To assess the scale of the phenomenon in the last 4 years, margins of the 600 largest transport companies were analyzed. Over the last 4 years, the average EBIT margin (understood as operating profit) grew in 2015, but then began to decline again and in 2017 returned to a low level, slightly below that of 2014. The average EBIT margin in 2017 was 3.72%, but more than half of the analyzed companies recorded a result on the level of -4% to 1%, and only 4% of companies achieved EBIT margin higher than 15%. In contrast, the EBITDA margin (EBIT increased by depreciation and amortization) in the analyzed period decreased from 6.96% in 2014 to 6.65% in 2017. This decrease was more significant than in the case of EBIT. The decreased EBITDA margin in relation to EBIT may be a consequence of reduction of expenditures on roadway rolling stock.

Chart 29. EBIT and EBITDA profitability indicators of Polish transport companies in 2014-2017 [%]

Source: PwC analysis

Low margins make the transport industry sensitive to changes – the anticipated increased costs may result in an even more severe decline in margins. Additionally, dependence on such market factors as, for example, oil prices, or on legal regulations such as national and EU regulations, makes it difficult to accurately estimate the costs for a given period and plan a profitable business. It is also important to underscore that small entities in the industry are more susceptible to these factors and to shrinking margins as a result of them.

Variable costs, which include mainly fuel expenses, account for the largest share in total costs of transport entrepreneurs – their share was estimated at the level of 48% in 2016. In the second place there are labor costs of drivers – 35% and fixed costs – 17%.

Chart 30. Simplified breakdown of costs of freight carriers in Europe in 2016 [%]

Source: PwC analysis

In the coming years, the following factors will have the greatest impact on the increase in costs:

1. **Continued upward pressure on wages** – in the years 2010-2017, the average monthly salary in Poland in the transport and warehouse management sector (Polish Classification of Activities, section H) increased by almost 30% to over PLN 3,700 gross.\(^64\) However, due to numerous allowances additional to the base salary, the actual earnings of a professional driver are much higher. In 2018, the median, including all allowances, such as diets and bonuses, was estimated at over PLN 5,200 net\(^65\) for domestic transport, and even at over PLN 7,000 net for international transport.

Further wage increases can be expected in the following years due to forecast shortage of drivers on the Polish market (discussed above), combined with growing demand for transport services.

2. **Planned changes in the law described** in Chapter 4. Their introduction might increase payroll costs, but also administrative costs resulting from increasingly

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\(^{64}\) GUS.

\(^{65}\) Transjobs.eu.
complex procedures, such as accounting for drivers’ business trips as business expenses.

Another factor translating into higher costs is the expansion of toll road networks and rises in existing tolls.

- Since 1 January 2019, prices on most European roads have been updated.
- The largest increase was recorded in Germany – 39% for Euro VI vehicles and more than 20% for the other categories.66
- In other countries, toll hikes were less severe, proving to be comparable to inflation rates (e.g. in France).

Industry representatives who participated in our interviews predict that, depending on the increases affecting the individual elements of operating costs, the prices of services will increase.

One important factor contributing to price increases is the volatility of fuel prices, which is influenced by the fuel price in the local economy, changes in exchange rates and changes in the level of fuel surcharges. In 2018, there was an increase in diesel fuel prices. However, fuel price volatility is passed on customers, so it has an impact on price, but less so on carriers’ margins. After a high increase in fuel prices (petrol and diesel) during the recession in 2012, they started to decline; however, since 2016 an upward trend can again be observed.67

**Chart 31. Average diesel oil price in Poland, 2010-2017 [EUR]**

![Chart showing the average diesel oil price in Poland from 2010 to 2017. The price varied from 1.62 to 1.36 EUR, with peaks in 2011 and 2015 and a decline towards 2017. Source: Bankier.pl.](image)

66 DHL, Toll Collect.
67 Trading Economics.
Appendixes
### Appendix 1:
**Summary and assessment of the growth hypotheses – opportunities and threats for road transport industry**

Below we present an assessment of the individual hypotheses regarding market development factors in terms of their probability of occurrence and impact, their classification as opportunities or threats, and the estimated timing of their occurrence. On this basis, a comprehensive evaluation of the likely market development for the coming years was made and presented in the summary.

<table>
<thead>
<tr>
<th>Area</th>
<th>Probability</th>
<th>Impact</th>
<th>Factor type, time of impact</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Economic factors</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1 Growth in transport due to economic development in Poland</td>
<td>High – Poland’s GDP is estimated to grow by an average of 3% annually through 2023.</td>
<td>Very high – domestic transport constitutes over ¾ of total tonnage of transports handled by Polish entrepreneurs and almost 40% of total transport performance. The segment is driven by economic growth, whose forecasts are positive.</td>
<td>Opportunity, whole period of 10 years</td>
</tr>
<tr>
<td>1.2 Increased transport due to the development of Poland’s foreign trade</td>
<td>High – in the years 2018-2020 it is forecast that total trade exchange of Poland will increase by about 7% annually.</td>
<td>Medium – servicing of import-export trade constitutes about 40% of transport performance handled by Polish carriers.</td>
<td>Opportunity, whole period of 10 years</td>
</tr>
<tr>
<td>1.3 Increased demand in the field of exported transport services (EU-28 territory)</td>
<td>High – fluctuations in the market for export of services are strongly correlated with changes in intra-EU trade. Over the years 2008-2018, the value of intra-EU exports grew at an average annual rate of 3%.</td>
<td>Medium – Poland is a major player in EU-28 in terms of exported transport services (cross-trade and cabotage), handling over 30% of this type of transport measured by transport performance across the EU-28. With the growth of intra-EU trade, demand for these services is very likely to grow.</td>
<td>Opportunity, 2-4 years</td>
</tr>
<tr>
<td>1.4 Higher costs due to increased road tolls</td>
<td>High – an increase in costs is the result of both growing number of toll roads and a rise in existing tolls.</td>
<td>Medium – larger carriers will try to pass the increase in operating costs on to their customers by raising freight prices. However, this might not be possible for smaller carriers.</td>
<td>Threat, 1-3 years</td>
</tr>
<tr>
<td><strong>Political, legal and environmental factors</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Increased operating costs as a result of decreased network efficiency and increased labor costs caused by changes in law</td>
<td>High – the “Mobility Package” and its solutions have gained political acceptance in the EU Council and the European Parliament.</td>
<td>Very high – driver costs account for more than 30% of total transport costs (EU figures). New legal solutions will contribute to additional increases these costs, as well as to a decrease in network efficiency in the field of cross-trade and cabotage, which make up 23% of total transport performance handled by Polish carriers.</td>
<td>Threat, 2-5 years</td>
</tr>
<tr>
<td>2.2 Decreased revenue due to restricted access to the market</td>
<td>High – the “Mobility Package” and its solutions have gained political acceptance in the EU Council and the European Parliament.</td>
<td>Very high – limitation of access to cross-trade and cabotage, which form 23% of transport performance handled by Polish carriers.</td>
<td>Threat, 2-5 years</td>
</tr>
<tr>
<td>2.3 Need for internationalization of carriers as a result of changes in law</td>
<td>High – the “Mobility Package” and its solutions have gained political acceptance in the EU Council and the European Parliament.</td>
<td>Medium – creation of large, international groups that will be able to form more efficient logistics networks with more bargaining power at EU level.</td>
<td>Threat, 2-5 years</td>
</tr>
<tr>
<td>Area</td>
<td>Probability</td>
<td>Impact</td>
<td>Factor type, time of impact</td>
</tr>
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</tr>
<tr>
<td>2.4 Increased concentration level as a result of changes in law “Mobility Package”</td>
<td>High – the “Mobility Package” and its solutions have gained political acceptance in the EU Council and the European Parliament.</td>
<td>Very high – the possibility of a large number of small enterprises going out of business if large transport groups with necessary resources take over the business.</td>
<td>Threat, 2-5 years</td>
</tr>
<tr>
<td>2.5 Increased costs due to restrictions and environmental requirements</td>
<td>High – the EU sets targets for reducing CO₂ emissions generated by the transport sector. There is also an increase in restrictions on the movement of high-emission cars in cities and landscape parks.</td>
<td>Low – there may be restrictions on free choice of routes and additional costs associated with charging for high-emission vehicles or, in the long term, even replacing the fleet with more ecological vehicles.</td>
<td>Threat, 4+ years</td>
</tr>
<tr>
<td>Social factors</td>
<td></td>
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</tr>
<tr>
<td>3.1 Shortage of drivers with skills at the level expected by the industry</td>
<td>Very high – in 2015 it was estimated that there would be a shortage of drivers at the level of about 100,000 people. Due to increase in demand for transport services, by 2022 staff shortages may amount to 200,000. The shortage in the labor market is difficult to fill due to the age structure, low attractiveness of the driver's profession and low level of entries into the labor market.</td>
<td>Very high – the shortage of drivers may pose a barrier to the development of the sector, as well as generate additional costs. Autonomization solutions are not mature enough to bridge the gap between demand and supply of drivers.</td>
<td>Threat, whole period of 10 years</td>
</tr>
<tr>
<td>3.2 Higher wage costs in the industry as a result of shortage of employees</td>
<td>High – drivers are demanding not only higher wages, but also more frequent stays at home, shorter routes and better social conditions. Staff replenishment is not guaranteed because the profession is not considered attractive.</td>
<td>Medium – employers have to adapt to growing expectations of drivers, both in terms of financial requirements and working conditions. This leads to rising operating costs for the industry.</td>
<td>Threat, 1-3 years</td>
</tr>
<tr>
<td>Technological factors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 Digitalization – IT implementation of processes, platformization, digital giants</td>
<td>Very high – digitalization is already underway</td>
<td>Very high – digital giants (such as Amazon) influence the market, barriers to entry are growing for small carriers.</td>
<td>Opportunity, whole period of 10 years</td>
</tr>
<tr>
<td>4.2 Vehicle autonomy</td>
<td>Very high – driven by the need for optimization of driver's costs and shortage of employees in the market.</td>
<td>Very high – compared to 2018, it is possible to reduce transport costs by as much as 28% after 2025 in view of the expected increase in costs (according to market representatives) ranging from 7% to 15% by the end of 2020.</td>
<td>Opportunity, 4+ years</td>
</tr>
<tr>
<td>4.3 Development of advanced digital solutions – telematics, ITS, other</td>
<td>High – depends on the increasing maturity of these solutions.</td>
<td>Very high – allows for far-reaching business automation.</td>
<td>Opportunity, 3+ years</td>
</tr>
<tr>
<td>4.4 Development of alternative drives</td>
<td>Very high – alternative drives are already being tested.</td>
<td>High but delayed – currently not being implemented on a massive scale due to lack of infrastructure.</td>
<td>Opportunity, 4+ years</td>
</tr>
<tr>
<td>4.5 Increased efficiency of conventional drives</td>
<td>Medium – depends on the development of software technologies that will force a change in driving style.</td>
<td>Medium/Now – achievements thus far in the field of fuel consumption reduction will hinder further productivity growth.</td>
<td>Opportunity, 1-3 years</td>
</tr>
<tr>
<td>4.6 Development of new freight transport technologies</td>
<td>High – depends on the availability of new transport solutions.</td>
<td>Medium – reduces the share of driver's costs in total cost of connections thanks to larger vehicles.</td>
<td>Opportunity, 1-3 years</td>
</tr>
<tr>
<td>Area</td>
<td>Probability</td>
<td>Impact</td>
<td>Factor type, time of impact</td>
</tr>
<tr>
<td>---------------------------------------------------------------------</td>
<td>-------------------</td>
<td>------------------------------------------------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>5.1 Increased competition from non-EU companies</td>
<td>Medium – non-EU-28 carriers might compete for import and export services to the east of Europe, but face numerous barriers within the EU-28.</td>
<td>Medium – in the long run, growing position of companies from across the eastern border might reduce price competitiveness of Polish carriers and put pressure on reducing costs.</td>
<td>Threat, 2+ years</td>
</tr>
<tr>
<td>5.2 Change in the structure of demand from customers towards smaller volume services</td>
<td>Very high – there were faster increases in less-than-container transport than in full-truckload transport as well as shifts to the second aforementioned type of transport. This is caused, among other things, by attempts to respond to growing customer demands regarding delivery time and availability of goods. The sector of courier services is also growing thanks to the development of the e-commerce market.</td>
<td>Medium – by shifting some of the goods to less-than-container transport, carriers can expect an increase in revenue. Less-than-container transport is characterized by higher prices than full-truckload transport.</td>
<td>Opportunity, whole period of 10 years</td>
</tr>
</tbody>
</table>
**8.2 Appendix 2:**

**Investment in transport infrastructure and its impact on the road transport industry**

The development of road (and related) infrastructure in Poland will contribute to Poland’s increasing attractiveness as a transport route, but the lack of such development on the other hand will not pose a major barrier to the growth of the road transport sector. New motorways may entail additional costs related to their use.

Infrastructure investment markets in the road transport segment and related issues are multidimensional in nature. In this appendix, the following are analyzed:

1. Expenditures on infrastructural investments and their effects in Poland in comparison with Europe until 2018,
2. Funding programs planned in the near future,
3. European initiatives in the field of physical road infrastructure development,
4. Assessment of the opportunities and threats of the development of transport routes in Europe for the Polish industry,
5. Increased toll prices in connection with investments being financed through tolls,
6. Transcontinental initiatives related to the development of transport infrastructure,
7. The pace of development of warehouse and intermodal infrastructure.

### 8.2.1 Expenditures on infrastructural investments and their effects in Poland in comparison with Europe until 2018

Between 2010 and 2016, total road infrastructure investments in the EU-28 exceeded EUR 417 billion – although at a lower level, intensive investments were also undertaken in rail and air transport.

Road infrastructure in Poland is also being dynamically developed. The total value of investments in road infrastructure in Poland in the same years amounted to approximately EUR 28 billion, with domestic investments in railway and aviation infrastructure coming in at more than 10 times lower levels.68

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68 European Commission.
countries were not significantly dependent on the development of the motorway network, as exemplified by Romania, where despite the strong growth in motorways, transport performance did not significantly increase. In the case of Romania, there is also no significant medium-term convergence of motorway length increases with GDP growth, which may mean that this relationship occurs only in the long term.

### 8.2.2 Funding programs planned in the near future

Within the next decade, the Polish government is planning to continue infrastructure investments with partial support from EU financing. Road infrastructure development initiatives in Europe will have a positive impact on Poland's position in international trade. Important programs of development of the Polish transport infrastructure include:

- In accordance with the National Road Construction Program with a perspective until 2025, in the years 2014-2023 average annual expenditure on road infrastructure development is assumed at the level of approximately PLN 13.5 billion. This is less than in the period 2010-2016, when a total of EUR 28 billion was spent (on average over PLN 17 billion annually, in 2019 prices); however, it is necessary to bear in mind that these funds are intended for further development of road infrastructure, some of which has already been built.

- Railways are also important, to the expansion of which, under the National Railway Program, funds of total value of nearly PLN 70 billion are planned to be allocated in 2016-2023. The aim is to reverse the downward trend in the share of rail transport in hauling and to provide necessary funds for maintenance and repair work on the existing rail network. So far, the program has spent nearly PLN 10 billion.

- The Polish government's extensive plans for the development of inland waterway transport must not be forgotten, either. The Polish Ministry of Marine Economy and Inland Navigation is carrying out preparatory work and analysis aimed at developing the transport of goods and passengers by inland waterway. Strategic activities in this respect have been defined in the Transport Development Strategy through 2020, with a perspective through 2030. Nevertheless, due to the size of investments that would be necessary in Poland to unblock new waterways, the opening of new potentials in this respect cannot be expected until the perspective of 5 to 10 years. In the

### 8.2.3 European initiatives regarding tangible development of road infrastructure

Development of infrastructure related to the Belt and Road and TEN-T initiatives as well as under national infrastructure development programs will in all likelihood create opportunities for further growth of road transport performed by entities operating from Poland, considering the country's good location from the perspective of these initiatives, among other factors.

In the perspective of 2021-2027, Poland may count on the development of transport infrastructure with support of EU funds, which were also planned within the above-mentioned programs. They include various instruments. Basic financing under the cohesion policy will be smaller than before. In comparison to EUR 89.3 billion in the EU financial perspective of 2014-2020, in the next perspective Poland will receive 28% less funds – EUR 64.4 billion (in 2018 prices). Other instruments may provide additional sources of financing, such as the "Connecting Europe Facility" competition, which selects projects concerning transport infrastructure located within trans-European transport network TEN-T (infrastructure of international, European significance). From the instrument's budget for 2021-2027, EUR 21.7 billion was allocated to the transport sector (with remaining sectors being energy and telecommunications), an increase of 24% compared to the previous perspective.

Polish entrepreneurs compete with foreign carriers in cross-trade, cabotage and international trade. The development of new routes provides access to new flows of goods and can change cost relations between individual channels. For the development of road transport infrastructure, there are three key areas of activities coordinated in the EU:

- Construction of the trans-European transport network TEN-T and the Via Baltica route that forms part of it,
- Development of the north-south connection networks in Central and Eastern Europe under the Via Carpatia program,
- Local activities aimed at developing the capacity on east-west routes, including the ones under Belt and Road Initiative described in chapter 8.2.4.
Due to Poland's strategic location both in the central part of Europe and on the route of goods flow from Asia, Russia and a large share of other Eastern countries, new trade routes may contribute to increased access to the network of connections and to opening up new directions of transport for Polish carriers, which in turn will increase revenues for Polish transport companies.

The creation of the international logistics network TEN-T assumes the expansion and complete unblocking of nine new transport corridors by 2030. Two of them, the Baltic – Adriatic and the North Sea – Baltic routes, pass through Poland, which is related to the development of roads and railway lines. The Polish sections of the corridors on the Baltic – Adriatic route are already largely completed (in particular the section connecting Gdynia with Silesia). The western section, running from Szczecin to Silesia still requires investment.

Another part of the Baltic – Adriatic corridor is the Via Baltica network, of which 1/3 has already been completed, and the remaining part of the infrastructure is under construction. The North Sea – Baltic section is already completed on the section connecting Warsaw to the western border; work is still required on the section connecting Warsaw to Poland's border with Belarus. In the case of the North Sea – Baltic Sea corridor, it is assumed that roads in Poland will be put into service by 2020, while the Polish section of the Baltic – Adriatic corridor is to be completed by 2024.

Another important trans-European transport corridor is the Via Carpatia route, which is due to be ready by 2025 and will connect the south with the north of Central and Eastern Europe. The route is to integrate the transport systems of Lithuania, Poland, Slovakia, Ukraine, Hunga-
ry, Romania, Bulgaria, Greece and Turkey, eventually reaching the Romanian port of Constanţa on the Black Sea and Greece’s Thessaloniki at the Aegean Sea, among other destinations. Total length of the Via Carpathia route in Poland will be approx. 760 km.

The opening up of new trade routes may also be perceived as a threat to the Polish transport industry due to the increase in competitiveness of carriers from other countries. Especially in the south-eastern part of Europe, it will allow carriers to handle more volumes delivered from Asia, such as via the Suez Canal.

Due to Poland’s location in relation to the geographical center of gravity of the EU-28, however, investments in the development of other transport routes in Europe do not significantly threaten the position of the Polish road transport sector.

Table 2 shows examples of travel costs from selected locations to Westerngrund in Germany, which is the geographical center of gravity of the EU-28. The calculations are based on average fuel price of 5.60 PLN/liter and fuel consumption of a vehicle transporting goods of 30 l/100 km. The directions which can be considered competitive in relation to transport through the territory of Poland were analyzed.

Table 2. Distance to chosen places in Europe from the central point in UE

<table>
<thead>
<tr>
<th>Itinerary</th>
<th>Distance [km]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warsaw – Westerngrund, Germany</td>
<td>1,056</td>
</tr>
<tr>
<td>Kaunas, Lithuania – Westerngrund, Germany</td>
<td>1,459</td>
</tr>
<tr>
<td>Tallin, Estonia – Westerngrund, Germany</td>
<td>2,054</td>
</tr>
<tr>
<td>Thessaloniki, Greece – Westerngrund, Germany</td>
<td>1,971</td>
</tr>
<tr>
<td>Svilengrad, Bulgaria (border with Turkey) –</td>
<td>2,024</td>
</tr>
<tr>
<td>Westerngrund, Germany</td>
<td></td>
</tr>
<tr>
<td>Constanta, Romania – Westerngrund, Germany</td>
<td>1,997</td>
</tr>
<tr>
<td>Varna, Bulgaria – Westerngrund, Germany</td>
<td>2,005</td>
</tr>
<tr>
<td>Thessaloniki, Greece – Westerngrund, Germany</td>
<td>1,931</td>
</tr>
</tbody>
</table>

Source: PwC analysis

One TEN-T network corridor that can unblock transport channels for competitors in the Polish transport industry is the Rhine-Danube link running through two corridors from east to west – from Ukraine and Romania to Prague and Germany and further to western Europe. Although the southern section through Romania is largely finished, the section running through the Czech Republic and Slovakia is still not ready.

Poland’s central location, which significantly shortens the distance to be covered and consequently the costs, is a significant advantage for the Polish transport industry and will allow domestic carriers to remain competitive.

8.2.5 Increased toll prices in connection with investments being funded through tolls

Carriers have an increasingly extensive motorway network in the EU at their disposal, but using those motorways is subject to additional charges in still non-uniform systems. The EU directive on the interoperability of electronic road toll systems, aiming to introduce the EETS system, is a step towards the unification of systems, but in reality, in many countries the systems are still different due to high costs and technical difficulties related with the introduction of EETS, among other factors. Although the directive was supposed to be implemented by EU-28 countries by 2017, at present (as of June 2018) EETS system is only available in the following countries: Austria, Belgium, France, Spain, Poland (A4 motorway – Katowice – Cracow section), Portugal and Italy. More Polish routes, the first German routes, as well as Norway, Slovenia and Hungary are expected to join the international system in the coming years, followed by routes in the Czech Republic and Slovakia. Currently, there are systems in place in Europe based on time or distance travelled. Some countries, such as Finland and Sweden, do not charge carriers for using national roads at all.

Figure 13. Map of road tolls in Europe (as of March 2018)

Source: PwC analysis

Investments in toll roads in the European Union and measures to calculate tolls for kilometers travelled may result in increased transport costs for logistics service providers in the long term. On the other hand, however, they will improve the functioning of transport networks, which is why this factor may be regarded as having a positive impact on the industry.
8.2.6 Transcontinental initiatives related to the development of transport infrastructure

The developing transcontinental routes (including the New Silk Road) are also an opportunity for the Polish road transport industry.

Other important corridors include investments under the Belt and Road Initiative which aims to support the growth of trade between Asian and European countries. Between 2008 and 2018, the value of EU-28 trade in goods with China alone grew at an average annual rate of 6% and the volumes of transported goods also increased.69

Land roads built under the Belt and Road Initiative are an opportunity for Poland, but at the same time there are also sea routes being developed in which Poland may not be included. An example of an investment aiming at improving maritime routes is the acquisition of the Greek port of Piraeus by a Chinese company, which opens the way to Europe for Chinese companies.

Changes of trade routes will also impact existing connections. For example, the impending Brexit might affect inversely the initiatives mentioned above and close or restrict the flow of goods through certain trade routes and ultimately hinder the functioning of carriers. Statistics show that almost 19% of the 2.4 million trucks with a GVM > 3.5 t that enter the UK every year are owned by Polish carriers.70 Currently, the terms on which the UK will leave the EU are very uncertain, but with such a large volume of transport operated by Polish companies, regardless of the outcome of the negotiations, changes and uncertainty during the period even immediately after Brexit are inevitable. Potential problems may include the need to introduce customs and sanitary controls at the border, the requirement of additional permits, and the occurrence of problems with timely deliveries resulting from necessity of meeting those requirements.

8.2.7 Dynamics of warehouse and intermodal infrastructure development

Another important element of infrastructure involves intermodal terminals at the level of EU-28 and Poland indicated in Table 3.

Table 3. Number of intermodal terminals, by European country

<table>
<thead>
<tr>
<th>Country</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>177</td>
</tr>
<tr>
<td>France</td>
<td>84</td>
</tr>
<tr>
<td>Belgium</td>
<td>53</td>
</tr>
<tr>
<td>Italy</td>
<td>49</td>
</tr>
<tr>
<td>Sweden</td>
<td>48</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>47</td>
</tr>
<tr>
<td>Spain</td>
<td>40</td>
</tr>
<tr>
<td>Poland</td>
<td>38</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>35</td>
</tr>
<tr>
<td>Romania</td>
<td>24</td>
</tr>
<tr>
<td>Austria</td>
<td>22</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>21</td>
</tr>
<tr>
<td>Finland</td>
<td>18</td>
</tr>
<tr>
<td>Greece</td>
<td>15</td>
</tr>
<tr>
<td>Hungary</td>
<td>15</td>
</tr>
<tr>
<td>Slovakia</td>
<td>13</td>
</tr>
<tr>
<td>Denmark</td>
<td>12</td>
</tr>
<tr>
<td>Croatia</td>
<td>8</td>
</tr>
<tr>
<td>Estonia</td>
<td>8</td>
</tr>
<tr>
<td>Lithuania</td>
<td>7</td>
</tr>
<tr>
<td>Ireland</td>
<td>6</td>
</tr>
<tr>
<td>Latvia</td>
<td>6</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>5</td>
</tr>
<tr>
<td>Portugal</td>
<td>4</td>
</tr>
<tr>
<td>Luxemburg</td>
<td>3</td>
</tr>
<tr>
<td>Slovenia</td>
<td>2</td>
</tr>
<tr>
<td>Cyprus</td>
<td>0</td>
</tr>
<tr>
<td>Malta</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: PwC analysis

The number of intermodal terminals in Germany and France well exceeds the number of intermodal terminals in other countries, indicating the much greater popularity of intermodal transport in those two countries.

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69 Eurostat.
70 GOV.UK, Department for Transport.
Currently there are 38 intermodal terminals located in Poland, shown on the map in Figure 14. In connection with the TENT network project, there are also planned investments in 21 multimodal transshipment hubs in Poland by 2030, which can generate demand for intermodal services on north-south and east-west routes.

The pace of growth of commercial warehouse space in Poland is not a constraint for the road transport industry because of fast investment processes. Carriers do not have to be afraid of barriers to business development in this area, considering that (apart from the period of economic crisis) over the last years the total warehouse space in the country has been constantly growing, and in the fourth quarter of 2018 alone there were about 2 million sq. m of new warehouse space under construction. 75% of this space was being built for specific long-term orders. In mid-2019, nearly 2 million sq. m of new warehouse space should be available, of which approximately 500,000 sq. m should be available on the open market for tenants who did not sign up for the space earlier. While the vacancy rate at the end of 2018 was 5%, indicating a low level of vacant space, it should be kept in mind that the warehouse market is highly flexible and can quickly respond to growing demand, given that the average construction time of a new warehouse is between six and nine months.

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71 Polish Investment & Trade Agency.
72 CBRE
8.3 Appendix 3: Glossary of terms used in the report

- ACEA – European Automobile Manufacturers’ Association
- AI – Artificial Intelligence
- Cabotage – transport carried out within the national territory of one country, by an enterprise registered on the territory of another country
- CAGR – Compound Annual Growth Rate
- CEE – Central Eastern Europe
- CEP (Courier Express Parcel) – courier, express and parcel delivery services
- CNG – Compressed Natural Gas
- Cross-trade – transport carried out between two countries, by an entity registered in a third country
- DLT (Distributed Ledger Technology) – a system of replicated, shared and synchronized digital data geographically dispersed across multiple locations, countries or institutions
- EC – European Community (in this publication, the same as the European Union)
- ECMT – European Conference of Ministers of Transport
- EEC – European Economic Community
- EETS – European Electronic Toll Service
- EP – European Parliament
- ERP – Enterprise Resource Planning System
- EU/EU-28/EU-25 – European Union (in this publication the same as the European Community), considered as a given set of countries (in previous years including the member states appropriate for the given group)
- FTL – Full Truck Load
- GDP – Gross Domestic Product
- GHG – greenhouse gas
- GITD – Główny Inspektorat Transportu Drogowego, Poland’s General Inspectorate of Road Transport
- GUS – Główny Urząd Statystyczny, Poland’s Central Statistical Office
- GVM – gross vehicle mass
- HGV (Heavy Goods Vehicles) – an older type of a truck, still in use
- IEA – International Energy Agency
- IMF – International Monetary Fund
- IoT – Internet of Things
- ITS – Intelligent Transportation System, usually based on telematics
- Large carrier – operating 100 or more vehicles
- LGV (Large Goods Vehicles) – a truck, term introduced in 1992 replacing HGV categories
- LHV (Longer Heavier Vehicles) – a vehicle of a class higher than LGV
- LNG – Liquefied Natural Gas
- LPG – Liquefied Petroleum Gas
- LTL – Less Than Truck Load
- Medium carrier – operating between 50 and 99 vehicles
- MiloG – Germany’s minimum wage act
- Mode of transport – road, air, sea, river or rail
- OECD – Organization for Economic Co-operation and Development
- PAFA – Polish Alternative Fuels Association
- PCA – Polish Classification of Activities
- PEST (political, economic, sociocultural and technological) – trend areas used in analyzing the external environment
- RPA – Robotic Process Automation
- Small carrier – operating less than 50 vehicles
- SP – Statistics Poland
- Telematics – telecommunications, information and communication solutions and automatic control solutions tailored to the needs of physical systems operated – usually devices combining appropriate hardware and software for this purpose
- TEN-T – Trans-European Transport Networks
- TMS – Transport Management System
- T&L – Transport and Logistics
- WMS – Warehouse Management System
- ZUS – Zakład Ubezpieczeń Społecznych, Poland’s social security institution
Appendix 4: Key legislation in Poland and EU-28 with regards to road transport

8.4.1 Key legislation on admission to the occupation of road transport operator and market and to the occupation of driver:

Regulations at EU level:

- Regulation (EC) No 1071/2009 of the EP and of the Council of 21 October 2009 establishing common rules concerning the conditions to be complied with to pursue the occupation of road transport operator and repealing Council Directive 96/26/EC (which lays down a set of basic rules concerning pursuit of the occupation of road transport operator at EU level),
- Regulation (EC) No 1072/2009 of the EP and of the Council of 21 October 2009 on common rules for access to the international road haulage market (defines the issues of EU licenses, driver attestations, verification of conditions, rules for cabotage operations, entries in the registers),

Domestic regulations:

- Act of 6 March 2006 Entrepreneurial Law (a comprehensive act that regulates undertaking, pursuit and termination of business activity in the territory of Poland, rights and obligations of entrepreneurs and related tasks of public authorities),
- Act of 6 September 2001 on Road Transport (the most important regulation defining the requirements for carriers – key changes covered by the amendment concerned introducing a new fine classification for drivers, requirements for intermodal transport and implementation of so-called smart tachographs, including a ban on distribution and advertising of equipment used for counterfeiting tachographs, among other things),
- Act of 5 January 2011 on Drivers of Vehicles.

8.4.2 Key legislation on social issues (posting, labor of mobile workers, working time):

Regulations at EU level:


Domestic regulations:

- Act of 13 October 1998 on the Social Insurance System (determining functioning of social security in Poland),
- Act of 10 June 2016 on the posting of workers in the framework of the provisions of services,
- Act of 16 April 2004 on working time of drivers (introducing a model for remuneration through business travel),
- Labor Code of 26 June 1974 (in connection with section 16, paragraphs 1, 2 and 4 of the Regulation of the Minister of Labor and Social Policy of 29 January 2013 on amounts payable to an employee of a state or local governmental budgetary unit for official travel).
8.4.3  Key legislation on transport inspection and the powers of inspection bodies:

Regulations at EU level:

- Regulation (EC) No 715/2007 of the EP and of the Council of 20 June 2007 on type approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information,

Domestic regulations:

- Act of 6 September 2001 on Road Transport,

8.4.4  Key environmental legislation:

Regulations at EU level:

- Regulation (EC) No 715/2007 of the EP and of the Council of 20 June 2007 on type approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information.

Domestic regulations:

- Act of 27 April 2001. Environmental protection law and “separate provisions” referred to therein,
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