
Effect of Covid-19 Pandemic on the Safety of Transport Companies Operation

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Abstract:

Purpose: The aim of the article is to present the scale of the problem caused by the outbreak of the COVID-19 pandemic regarding road freight transport and ensuring continuity and security of the supply chain. It presents statistics on the dynamics of changes in demand for transport services in Poland and the break-up of international supply chains. The results of research concerning the activity of a transport company operating in the food industry and changes in its structure that occurred during the pandemic are presented.

Design/Methodology/Approach: The following research methods were used to achieve the aim of the article. The direct interview method was used to collect data on the current situation of the investigated transport company. The analysis of transport orders before the outbreak of the pandemic and since its announcement, comparison and conclusions were drawn. The deduction method was used to assess the impact of the decrease in demand for national and international transport services in specific industries. Statistical methods and methods of mathematical modelling were applied to analyze the research results. The induction method was used to formulate conclusions from the information collected in this area. The method of empirical observation was employed to formulate the main problems resulting from the impact of the COVID-19 pandemic on the activity of transport companies in Poland.

Findings: The conducted research was aimed at assessing the impact of the COVID pandemic on the activities of transport companies and ensuring continuity and security of the supply chain. The research has determined the impact of the COVID-19 pandemic on the transport services market, the industries affected, and the appropriate level of security needed.

Practical Implications: Transport stakeholders can find out about how to combat the negative impact of a pandemic on the road transport sector and how to increase the security of delivery and the operation of transport companies.

Originality/Value: The conducted research enables a comprehensive assessment of the impact of the change in the structure of demand for transport services caused by the COVID-19 pandemic on the activity of transport companies in Poland.

Keywords: Road transport, transport companies, supply chain security.

JEL codes: C23, C41, R12.

Paper type: An example case.

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1. Introduction

The TSL sector (Transport, Spedition, Logistics) is one of the most important areas having a direct impact on economic development. The road transport of food products, which will always constitute a group of essential articles is particularly dynamic. In the era of the coronavirus pandemic (Covid-19), the transport industry has to react efficiently to changes dictated by the logistics chain operators. Carriers are struggling with a decrease in the number of ordered transports, lower freight rates and a break in continuity of orders and permanent contracts are also a problem. At the same time, the situation is changing the face of trade, the crisis is conducive to innovative and alternative solutions, which directly affect the condition of transport companies.

The first case of coronavirus in Europe was diagnosed in mid-February in Italy, while the first infections in Poland were reported in early March. On March 13th WHO (World Health Organization) reported that the epicenter of the pandemic was in Europe (WHO, 2020). Since then, every area of the European economy has faced the crisis, which directly affects the financial condition of companies. The worldwide effects of the virus's expansion in the form of social isolation and the hindering of economic activity have contributed to the reduction of labour supply and the lack of resources and components for production because of the disruption of national and international supply chains. The decline in consumption and private investment has distorted the continuity of economic and financial processes, which has reinforced the sense of uncertainty and risk in relation to the security of transport companies. The impact of coronavirus on the road transport sector caused drivers to simply refuse to perform their business tasks for fear of their health, while at the same time employers tried to provide drivers with working conditions that would sufficiently reduce the risks resulting from the likelihood of Covid-19 infection. Despite the ad hoc measures taken, verification of strategies and efficient reorganization of company structures, many of them had to adapt to new conditions dictated by the rapid change in supply of transport services. These changes have impeded the stable and secure operating conditions of transport companies so far.

2. The Impact of Covid-19 Pandemic on the Safety of Freight Transport

The global slowdown in most industries and the social isolation caused by the outbreak of the pandemic has led to the need to speculate and forecast market behavior, which has been constantly changing since March and reinforces the feeling of uncertainty. The disruption of the global supply chain caused by the tightening of precautionary measures has contributed to rapid changes in the provision of goods transport services, especially food products.

Liberalization of access to the EU road transport market and high competitiveness of prices of services provided by Polish transport companies since Poland's accession to the EU has gradually increased their position in international transport.

According to Eurostat data, in 2018 Polish companies carried nearly 270 million tons of cargo, which accounted for 23% of EU road transport (Eurostat - Road freight transport measurement). This is confirmed by the fact that the international road freight transport of goods significantly shapes the economic and financial condition of the economy in Poland.

The outbreak of the pandemic, especially since March this year, disturbed the peace of the transport industry. Many European countries have limited or closed their borders, but not regarding the transport of goods, which is currently carried out under special conditions. More important changes introduced by European countries are listed below:

- In Italy, traffic is allowed only to load or unload goods,
- Most Polish border crossings are functioning, but many of them have queues of several hours causing delays in the supply chain (especially on the border with Germany and the Czech Republic),
- Spain, Belgium, Norway have decided that during the pandemic they will not punish drivers and entrepreneurs for violating drivers' working hours,
- In some countries, weekend traffic bans for trucks transporting food products are also suspended.

According to a survey conducted by Eurostat, the economic and social restrictions introduced in the first quarter caused the volume of trade between the EU and other countries to drop by over 10% in March this year. The reason for this situation lies in the closure of borders:

- Germany from April 15, 2020 - the state of emergency was extended by another 30 days,
- Russia from March 15, 2020 - borders closed,
- Belarus from March 19, 2020 - additional restrictions were introduced,
- Ukraine from April 6, 2020 - borders closed,
- Slovakia from 6 April 2020 - partial closure of borders and additional restrictions introduced.

The closure of factories all over the world, the suspension of assembly lines, mainly in the automotive industry, and a rapid change in demand for products, resulted in the severance of international supply chains, which had a direct impact on the condition of Polish transport companies.

The data of the GBOX telematics system, prepared by the INELO Group monitoring 30 thousand trucks, indicate that in the first week of April 2020 Polish trucks travelled over 80% of kilometers compared to the data from the beginning of March. Despite the fact that every day international transports are carried out; it is confirmed that the transports to Germany decreased by about 15%-20%. The

lowest downward dynamics is shown by domestic transport, which in the first quarter decreased by 10% in relation to the previous year.

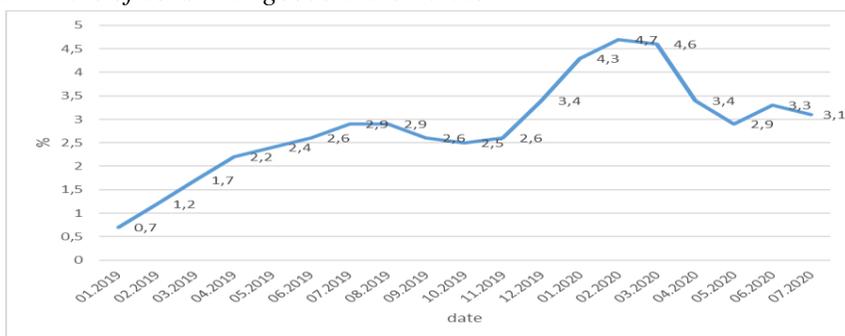
Results of research conducted by the INELO group on a group of 800 carriers providing national and international road transport services. The report on the impact of the pandemic on the transport industry indicates that:

- 81% of transport companies confirm a significant decrease in the number of transport orders;
- 64% of carriers confirm a decrease in freight rates;
- 58% of respondents confirm the loss of permanent contracts;
- 39% of transport companies indicate late payments;
- 40% of businesses confirm an increase in the number of kilometers with an empty cargo box.

The coronavirus epidemic, which has persisted in Poland since the beginning of March, has clearly influenced the economic results obtained in the first half of this year. The sold production of industry and retail sales were below the level from the year before.

In addition, the pursuit of the inflation target (2.5) and achieving it in October 2019 proved to be temporary. The outbreak of the pandemic resulted in significant deviations from the inflation target (Figure 1).

Figure 1. Prices of consumer goods and services



Source: Source of CSO (GUS) data, *Quick estimation of the consumer price index in July 2020.*

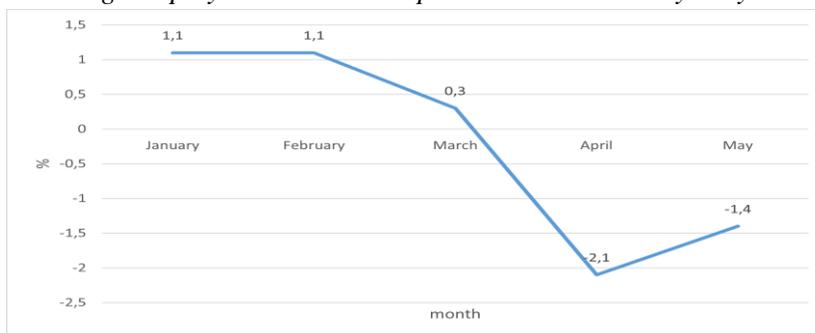
The analysis of the current situation shows that Polish entrepreneurs, despite the COVID-19 pandemic, feel moderate calm, monitor the market, and try to adapt to the current conditions of road transport. The reason is a strong increase in prices of some goods and high demand for food products. The Central Statistical Office (GUS) reported that retail sales in real terms (in constant prices) decreased by 1.3% in June 2020. On a monthly basis, it grew by 8.4%. In June 2020, a decrease in the

value of retail sales via the Internet in current prices (by 7.5%) was recorded in comparison with the previous month. The share of this sales fell from 9.1% in May to 7.7% in June 2020.

According to the data of the Central Statistical Office (GUS), transport companies in the pandemic period had a difficult situation resulting from reduced demand for their services. International transport was stopped in most cases due to closed borders. This situation lasted for about a month and significantly affected the condition of the companies.

There are many indicators (Figure 2 - Figure 6) that illustrate the impact of the pandemic on international transport. The period best reflecting the situation on the market is January - May 2020. Analyzing the data published by the Central Statistical Office (GUS), it is noted that the average employment in the enterprise sector (Fig. 2) in January 2020 compared to January 2019 increased by 1.1% and remained so until the end of February. March 2020 compared to March 2019 was an increase of only 0.3%, while the worst situation took place in April 2020, as it was 2.1% lower than in the same month of 2019. The index improved slightly in May 2020, but it is still negative.

Figure 2. Average employment in the enterprise sector in January-May 2020

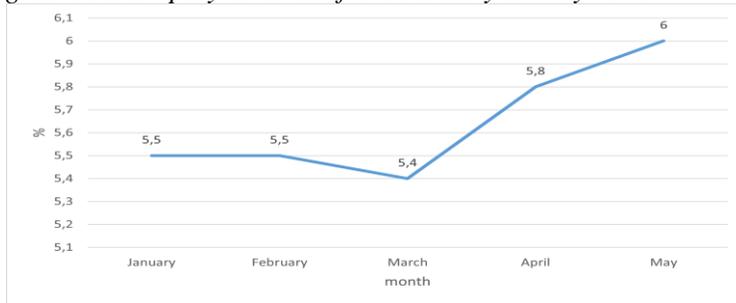


Source: Own study based on CSO (GUS).

Another indicator describing the impact of the COVID-19 pandemic on transport is the registered unemployment rate (Figure 3). In January 2020, it amounted to 5.5% and remained so until the end of February. In March 2020 there was a decrease in unemployment, while over the months of April and May 2020 it increased noticeably to 6%.

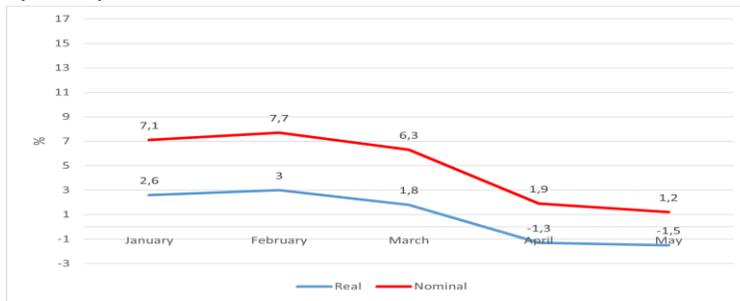
Analyzing the average gross monthly salary (Figure 4), a downward trend is observed. In February 2020, this value temporarily increased, followed by a large decrease reaching negative values. These data refer to the same months in 2019.

Figure 3. Registered unemployment rate from January to May 2020



Source: Own study based on CSO (GUS).

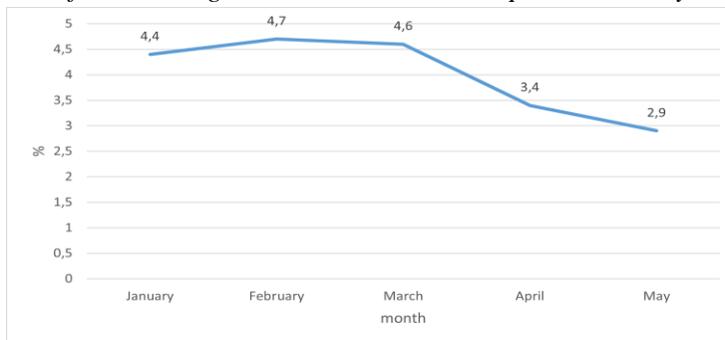
Figure 4. Average gross monthly wages and salaries in the enterprise sector in the period January - May 2020



Source: Own study based on CSO.

Prices of consumer goods and services (Figure 5) in the period from January to May 2020 in relation to the same period in 2019 showed an upward trend in the first three months, followed by a sharp decline. Despite the decline, however, these prices were higher than in 2019.

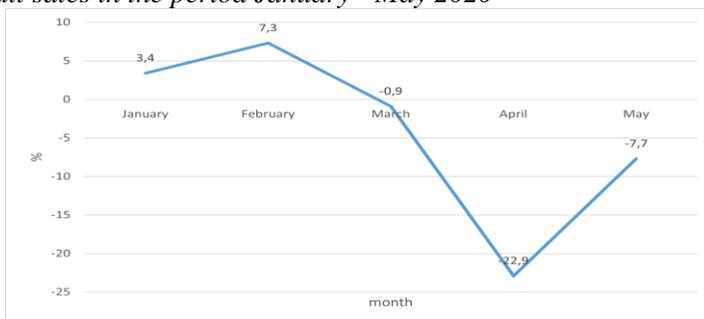
Figure 5. Prices of consumer goods and services in the period January - May 2020



Source: Own study based on CSO.

The retail sales index is the last indicator (Figure 6). Analyzing the data published by the Central Statistical Office (GUS), it can be noted that in April 2020 there was a very large decrease of -22.9% in relation to April 2019. In May, the sales are normalizing, but the value is still negative.

Figure 6. Retail sales in the period January - May 2020



Source: Own study based on CSO.

Additional indicators determining the effects of the COVID-19 pandemic are presented in Table 1.

Table 1. Indicators reflecting the situation of international transport in Poland in the period January-June 2020.

Month	January	February	March	April	May	June
Cargo transportation in million tons	42,5	45,6	47,8	43,4	43,1	45,3
Price index for transport services	101,4	100,5	103,6	104,4	105,2	105,5
Fuel price index	103,5	102,4	97,1	81,2	76,6	80,7
Cargo transportation by truck in thousands of tons	22449	23052	23753	22397	22277	23369

Source: Own study based on CSO.

The presented indicators are only a few that have been selected to illustrate the market situation of transport companies after the outbreak of the pandemic. As a result of closing borders and slowdown in international transport, many companies lost their financial liquidity and were forced to lay off employees or reduce jobs. The time from January to May 2020 is a period that reflects the situation very well. When the presence of the COVID-19 virus was announced in Poland in March 2020, it was not expected that it would have consequences not only for health, but also for economic purposes. An important indicator reflecting the impact of the pandemic on road transport is the development of foreign trade (in PLN) in the first quarter of 2020. For exports, there was a decrease of -5.3% (compared to the first quarter of 2019), and for imports --5.8% (based on data from the Central Statistical

Office). Trade with developed countries (including the EU) and imports from Central and Eastern Europe decreased. In the first quarter of 2020 exports and imports at constant prices increased slightly on an annual basis. In general, cargo transport in March 2020 amounted to -6.1%. Total cargo transport increased compared to the previous month more than in February 2020. The decline in annual freight transport observed since November 2019 has deepened. Total cargo transport in April 2020 amounted to -16.8%. Total cargo transport decreased on an annual scale to a greater extent than a month ago; the decline in passenger transport has clearly deepened. It can be noticed that in the period from January to April the rate of transport decreased drastically. This tendency resulted from the previously described reasons (based on data from the Central Statistical Office).

May was a salvation for the unfavorably started year 2020, many entrepreneurs hoped that the situation would improve from month to month. In order to prevent the further spread of the COVID-19 pandemic, in May 2020, many restrictions imposed in the first quarter were maintained, but this concerned largely passenger transport. Cargo transport in May 2020 amounted to 43.8 million tons, which meant an increase by 1.0% compared to the previous month. However, this value was still lower by 13.1% than the one obtained in the same month of the previous year. However, cargo transport increased compared to the previous month. For road transport in May there was an increase by 2.3% compared to the previous month. In June 2020, the general economic climate for transport was assessed not favorably, although clearly less pessimistic than in May. The indications in all surveyed size classes of enterprises improved. The sentiment in transport companies with 10-49 employees remains the most negative.

The forecasts for the next three months concerning the area of exports and imports are much less pessimistic than in the previous month. Unit managers are still planning job cuts, the scale of which may be lower than that forecasted in May 2020. A drop in prices is anticipated, but smaller than expected a month ago. Among the barriers to doing business, the uncertainty of the general economic situation remains the most felt, and its severity has slightly increased compared to the previous month. The significant difficulties also include employment costs, insufficient demand and high burdens for the state budget, the importance of which has been maintained since April 2020, as well as inconsistent and unstable legal regulations, the burden of which has increased compared to May 2020.

3. Study of the Dynamics of Changes in the Functioning of a Transport Company during Covid-19 Pandemic: An Example Case

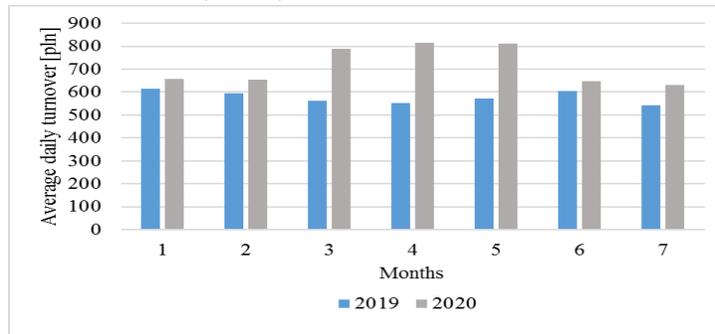
The scale of the problems that road transport companies suffered in the time of the pandemic undoubtedly influenced the reorganization of their structure and financial condition. Ensuring permanent contracts and maintaining continuity and security of the supply chain has become impossible for many companies.

The results of the research presented in the article concern the activity of a small transport company providing transport services in Poland. The analysis includes a set of data from 1.01.2019 to 31.07.2020. Detailed analysis was made of data from the period 1.01.2020 to 31.07.2020, which best reflects the dynamics of changes that occur since the pandemic onset. The characteristics of the transport company presented below define its organizational structure, the specificity of the transported goods, the characteristics of the means of transport and the characteristics of contractors to whom it provides transport orders:

1. Organizational structure. A transport company qualified as a small enterprise. It employs:
 - 6 drivers;
 - 2 logistics specialists;
 - 3 administrative persons;
 - 1 accountant;
 - 2 warehousemen.
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2. Specifics of the transported goods. Products are transported on EUR pallets. These are: apples, pears, cabbage, broccoli, carrots, dairy products: cheese, milk, eggs, healthy food.
3. Characteristics of means of transport. The company has 4 vehicles with a tarpaulin and a reefer:
 - Scania R420, tarpaulin, capacity 18 tons;
 - DAF XF105, tarpaulin, capacity 19 tons;
 - MAN TGX, reefer, capacity 18 tons;
 - Mercedes-Benz Atego, tarpaulin, capacity 5 tons.
4. Characteristics of contractors. The transport company provides transport services for distribution centers of the following networks: Tesco, Auchan, Biedronka, Lidl. The transports are carried out on 37 different routes. The conditions of a sample transport order are presented below:
 - Loading: 02.06.2020 at 7:00 a.m., Company Bio Planet S.A. 9B Fabryczna Street, 05-084 Leszno;
 - Unloading: 02.06.2020 at 13:00, Auchan Distribution Center, Gadki 1, 97-320 Wolbórz;
 - Specifics of the product: healthy food stacked on 28 EUR pallets, cargo weight 17200 kg;
 - Freight rate: 600 pln.

Basic data analysis presents comparison of dynamics of all executed transports in 2019 and 2020 in the period January-July (Figure 7 - Figure 9).

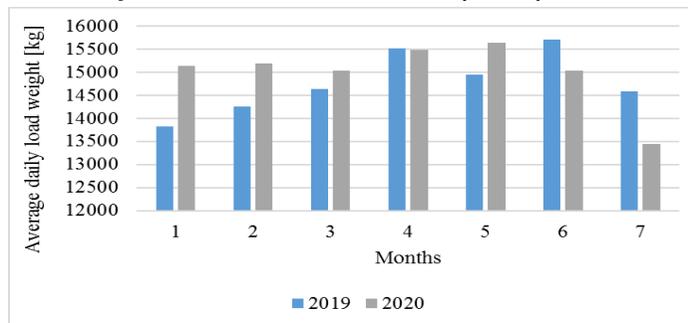
Figure 7. Comparative analysis of average daily turnover in 2019 and 2020 in relation to the months January - July



Source: Own study based on company data.

The data shows that the average daily turnover, which is all revenues from the sale of services (reduced by the amount of VAT) of all vehicles providing transport services in 2019 is PLN 577, and in 2020 - PLN 715. A particular increase in freight prices is observed in March-May. In 2020, they are on average 43% higher than in the previous year.

Figure 8. Comparative analysis of the average daily weight of cargo transported in 2019 and 2020 with reference to the months January - July



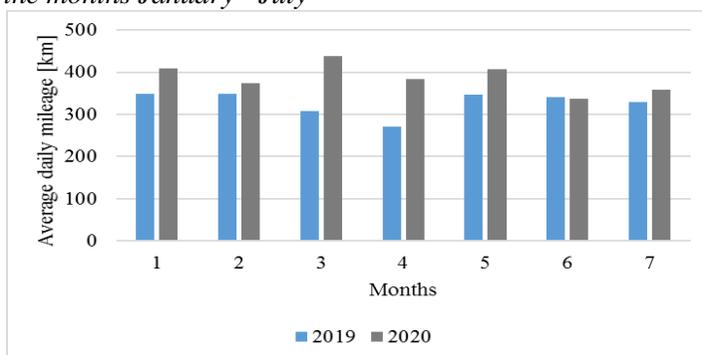
Source: Own study based on company data.

The analysis of the average daily weight of the transported cargo in 2019 and 2020 shows large discrepancies between months. In 2019, the upward trend continues from January to April, in May it drops by 4% compared to the previous month, then it increases and drops again in July. In 2020, from January to May, the weight of transported cargo is on average 5% higher than in 2019. From June 2020, a downward trend is also observed.

The average daily mileage of all vehicles is slightly higher in 2020 than in 2019. The highest increase is observed in March - by 42.38% compared to the previous year and in April - by 41.57%. Comparative analysis of dynamics of all transports carried out in 2019 and 2020 in the period January-July indicates a significant

increase of turnover in the company in the period March-May 2020. The value of turnover in this period indicates not only their increase in relation to the previous year, but also confirms the fluctuation in relation to the months January - February and June - July.

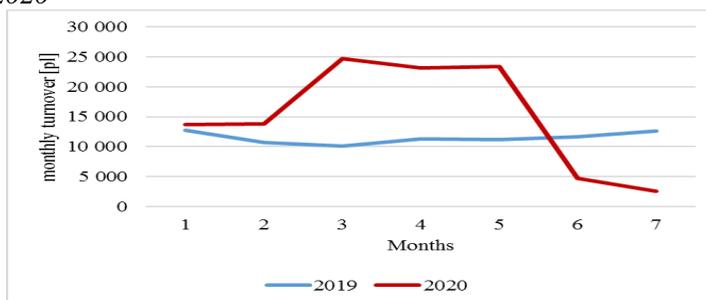
Figure 9. Comparative analysis of the average daily mileage in 2019 and 2020 in relation to the months January - July



Source: Own study based on company data.

In order to verify the rapid changes that occurred in 2020 in the period March-May in relation to the turnover value in the examined transport company, an additional analysis was conducted. Monthly turnover of each vehicle was verified in detail, minimum and maximum values were determined, and the number of journeys made by each vehicle was calculated and compared in 2019 and 2020. The analysis of transport dynamics in January - July for Scania R420 vehicle in 2019 and 2020 is shown in Figure 10.

Figure 10. Transport dynamics for Scania R420 in the period of January - July 2019 and 2020



Source: Own study based on company data.

The monthly turnover of the vehicle in March 2020 increased by 79% compared to February this year. This increase lasted until May, then in June it fell sharply and was five times lower than in May, in July the decrease deepened, and the vehicle's turnover was only 11% compared to the May turnover. The value of monthly turnover depends on the number of transport orders executed, which from January

to May this year was on average 25, so in June and July it amounted to 8 and 5 journeys, respectively. The subsequent analysis included DAF XF105 vehicle. Monthly turnover in the period from January to July 2019 and 2020 is shown in Figure 11.

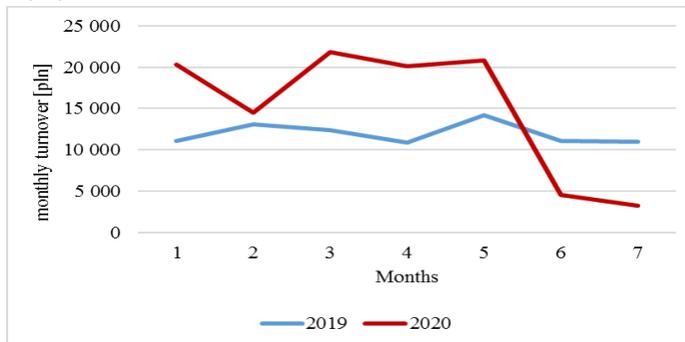
Figure 11. Transport dynamics for DAF XF105 vehicle in the period January - July 2019 and 2020



Source: Own study based on company data

The highest increase in monthly turnover for the DAF vehicle was recorded in May 2020, i.e., 50% compared to the beginning of this year. As with the Scania vehicle, the turnover fell sharply in June and July and the monthly number of transport orders for this year dropped from 25 executed in January to 4 in June and 7 in July. The analysis of the transport work carried out by another vehicle, i.e. MAN TGX, is shown in Figure 12.

Figure 12. Transportation dynamics for MAN TGX in the period January - July 2019 and 2020

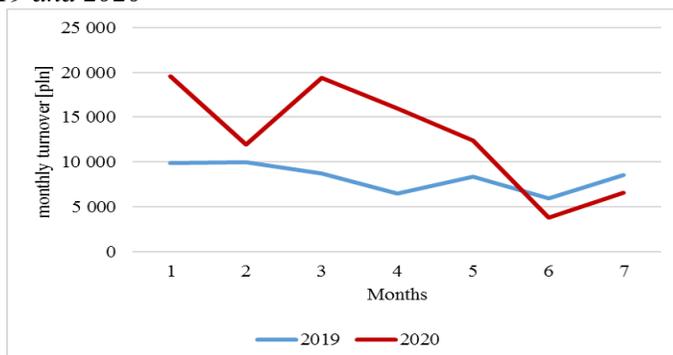


Source: Own study based on company data.

The fluctuation of changes in the period from January to July 2020 for the MAN TGX in relation to the monthly turnover is approximate to the changes observed for the Scania R420. The largest increase in turnover took place in March, i.e., by 51% compared to the previous month, and was maintained until May. Since June, the turnover was also five times lower than in May this year. The number of transport orders carried out on average at the level of 26 in the period January-May, fell to 7

in June and 5 in July. Mercedes-Benz, the lowest capacity vehicle, recorded the decrease in turnover already in May 2020. The analysis of the dynamics of transport is shown in Figure 13.

Figure 13. Transport dynamics for a Mercedes-Benz vehicle in the period January - July 2019 and 2020



Source: Own study based on company data.

As with all other vehicles, Mercedes-Benz's vehicle turnover rose sharply in March 2020, but started to fall in April. The average number of journeys between January and May was 23, while in June it fell to 7 and in July it rose to 10.

4. Conclusions

The results of the research carried out in the transport company confirm the occurrence of rapid changes in the provision of transport services between March and July 2020. Each of the examined vehicles in the period January - May recorded an increase in monthly turnover compared to the previous year, i.e., 43% increase in turnover compared to 2019 was recorded in the period March - May. Average number of commissioned transports to all vehicles in period January-May increased from 77 to 99. In the month of March 2020 alone, 25 more transports were commissioned than in 2019 in this month, and in April the increase was by 21 transports. For all the vehicles, there was a sharp decrease in turnover in June and July. This is confirmed by the decrease of all orders from 98 in May to 25 in June and 27 in July.

Presented results of the research indicate significant fluctuation of executed transports from the beginning of 2020. The conducted direct interview with managers and employees of the surveyed transport company confirms that from the beginning of March the demand for food transport services provided by the company has increased dramatically. Contractors reported almost twice as much demand for goods in March, April and May as opposed to January and February. The demand for transport services was growing, which at the same time posed an organizational problem for the manager, who hired 2 additional drivers for the

period March-May to meet the conditions of accepted transport orders. The situation posed a major challenge for the employer, who was forced to make structural and organizational changes, which he had to reintroduce in June. As the number of orders decreased, the employer was forced to dismiss two newly hired drivers and pay for the wait time to the 6 others, which provided safety for the drivers but at the same time exposed the employer to higher costs.

The explosion of the COVID-19 pandemic turned out to be a difficult time for transport companies providing international services. All the indicators presented showed that the unexpected closure of the borders was a situation that forced the company to introduce measures to save the company. These include sending employees on vacation, wage reductions, numerous layoffs, or company closures. As a result of such critical financial outcomes of transport companies, the authorities of Poland and the countries cooperating with it removed some of the restrictions that allowed for a slow recovery of liquidity. It can be clearly stated that the first quarter and even May were a difficult period not only for employers but also for employees of the transport industry. May was a breakthrough month in which optimism began to prevail over pessimism. The situation started to improve, the transport between the national states is slowly restored. However, there are countries which are still difficult or even impossible to enter. The transport industry, and especially the international one, has been very much affected by the COVID-19 pandemic.

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