
Security in Providing Processes and Logistics Services Under the Covid-19 Pandemic

Submitted 12/06/22, 1st revision 28/06/22, 2nd revision 12/07/22, accepted 30/07/22

Tomasz Smal¹, Bogusław Śliwczyński²

Abstract:

Purpose: The the main goal of the article is an attempt to systematize and interpret scientific and media reports in the context of changes affecting the security of the functioning of processes and the implementation of logistics services during the global crisis of the Covid-19 pandemic.

Design/Methodology/Approach: The analysis based on recent publications but due to the high dynamics of recent events, only the first scientific papers appeared. However, the problem is so complex that it should be constantly monitored and analysed, and then appropriate interpretations and conclusions should be carried out, using all the data, including those that appear the fastest. Therefore, the research based on accessible sources and own observations through contact with selected companies as well.

Findings: Logistics and its processes are currently undergoing large and dynamic transformations. On the one hand, the development of last mile logistics and all related elements is positively influenced by the intense growth of the e-commerce industry, on the other hand, it has to deal with high market instability caused by the Covid-19 crisis and shortage of personnel, as well as the rapidly advancing technological revolution.

Practical Implications: The author's research shows that after the initial panic - related to ever new restrictions due to the pandemic - logistics companies quickly moved to the action and created creative solutions to the new situation. In summary, new trends as a result of a pandemic are changing the landscape of the logistics market - more and more warehouses are created. Thus, the so far very popular approach to the approach to the view of enterprises is changing from "just in time" to "just in case".

Originality/Value: The article indicates changes in the functioning of logistics during a pandemic and indicates the need to consider security as a key factor in the implementation of logistics processes and services.

Keywords: Security, logistics, logistics services, crisis, Covid-19 pandemic.

JEL codes: F1, F50, F60.

Paper Type: Case study.

¹Associate Professor, The WSB University in Wrocław, ORCID 0000-0002-3237-5494, tomasz.smal@wsb.wroclaw.pl;

²Associate Professor, Poznan School of Logistics, ORCID 0000-0003-2702-4726, boguslaw.sliwczynski@wsl.com.pl;

1. Introduction

The functioning of logistics and the implementation of logistics processes and services has always been associated with following global economic changes, which seem to be intensifying from year to year (Jałowiec, 2020). While some of these changes and the resulting threats to the security of logistics systems have been well identified and classified, because they are evolutionary and have lasted for many years, others occurred only recently and resulted from the global crisis, commonly known as the Covid-19 pandemic (Bylen, 2020).

In this aspect, the key seems to be to ensure the security of the implementation of services and processes by logistics companies that faced even greater challenges and were forced to make additional efforts to meet these challenges. The safety and reliability of logistics systems is the subject of many studies and therefore it is known that it is one of the most important challenges in logistics management in the 21st century (Bielecki and Szymonik, 2015).

However, how to assess the functioning of the logistics system in terms of its security or reliability? It seems that the most accurate approach was presented in the monograph (Nowakowski, 2011), which emphasized that the functioning of logistics processes is currently focused on satisfying the needs of the final recipient of goods. This means assigning the recipient a new role, which is not only accepting the ordered goods, but also accepting them as meeting their expectations.

Thus, the assessment of the logistics system is based on the assessment of logistic customer service defined as the performance of mutually coordinated activities and logistics services that affect customer satisfaction when purchasing a product (the last stage of the process starting with placing an order and ending with the delivery of the product to the customer). The features to which customers attach the greatest importance are, among others: delivery time, product availability from stock, flexibility, frequency, punctuality, accuracy, completeness and reliability of delivery. All these features can be assessed quantitatively, so they can form the basis for standardization and comparison of the logistic system performance assessments. Thus, they allow their safety to be assessed.

Supply chain security was emphasized in the US Department of Homeland Security's strategy, which states: "Securing the global supply chain, while ensuring its smooth operation, is essential to our national security and economic prosperity" (Fischer and Halibozek, 2019).

This article is largely based on the recent publications, but due to the high dynamics of recent events, only the first scientific papers appear (Choi, 2021; Liu, Liang, Bao, Qin, and Lim, 2020) and reports (Eurologistics Media Group, 2020), which they try to systematize the phenomena that took place in the space under consideration.

However, the problem is so complex that it should be constantly monitored and analysed, and then appropriate interpretations and conclusions should be carried out, using all the data.

Thus, the main goal of the article is an attempt to systematize and interpret scientific and media reports in the context of changes affecting the security of the functioning of processes and the implementation of logistics services during the global crisis of the Covid-19 pandemic. Additionally, the research based on own observations through contact with selected companies.

2. Security of Logistics Processes During a Pandemic: The Scale of Threats

Meanwhile, the current crisis caused by the pandemic has turned out to be a "black swan" in the functioning of the logistics supply chain, a phenomenon that is unpredictable from the point of view of risk management. It led to many unpredictable changes in the functioning of processes and the implementation of logistics services, and in particular led to the resignation from the leading "just in time" supply strategy, and contributed to the rapid growth of the e-commerce industry.

All this is followed by huge changes in the functioning of supply chains, the increased storage of resources, previously considered an unnecessary cost, has returned to favor. Major changes are being made in the organization of transport, and shopping centers are being transformed into small city warehouses, because these are commonly lacking due to the increased demand of courier companies which are driven by changing purchasing habits of people (Bołtryk, 2021).

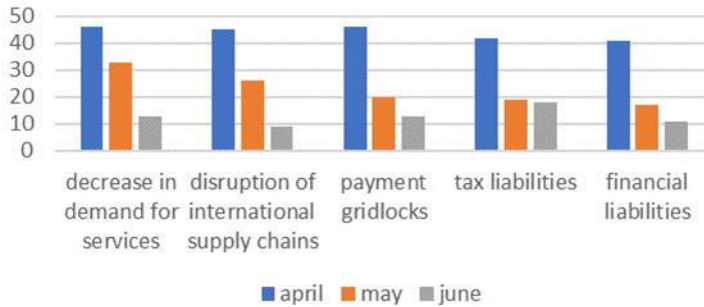
During a pandemic, the main concern of supply chain managers has become to ensure these chains are safe and efficient. A secure supply chain should ensure the integrity of the products and loads in this chain before they reach the end customer. Supply chain security experts try to ensure their integrity by identifying threats and proactive audits, but according to a DGC survey commissioned by Eurologistics (Eurologistics Media Group, 2020), the scale of the crisis affecting the logistics services market will be severe for most companies. At the same time, it will affect small and medium-sized enterprises more than large logistics companies.

In Poland, companies were most affected by the negative impact of the pandemic through the decline in demand for their services, the breakdown of international supply chains, payment bottlenecks, and the burden of taxes and other payment obligations. Therefore, in order to survive the crisis, logistics companies undertake a number of activities to ensure the continuity of operations (Figure 1). The most important ones include (Eurologistics Media Group, 2020):

- remote work and change of work organization;
- some employees are left on leave;

- restriction of use of third-party services;
- decommissioning of part of the fleet.

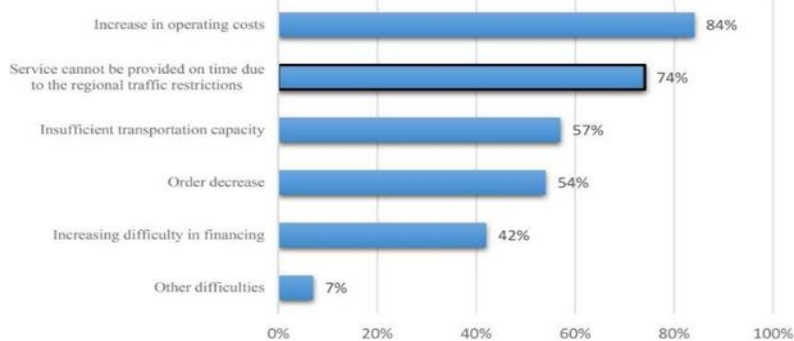
Figure 1. The impact of the Covid-19 crisis on the activities of logistics companies in Poland in the period April - June 2020



Source: Own elaboration on the base of (Eurologistics Media Group, 2020).

Also in world logistics, the scale of threats to the safe functioning of logistics processes was very large, and Figure 2 below shows the key difficulties faced by logistics companies (Liu *et al.*, 2020).

Figure 2. Key difficulties encountered by logistics enterprises during the outbreak



Source: CFLP, Report on the impact of COVID-19 on road transport enterprises.

3. Supply and Distribution Logistics

There are also quite a few publications on changes in logistics supply chains caused by the Covid-19 pandemic (Choi, 2021; Dorofeev *et al.*, 2020; Illahi, 2021]. In the author's opinion, the changes will be aimed at increasing the security of supply systems. And that will mean:

- shortening them, that is searching for local contractors;
- diversification, ie contracts with more suppliers;
- building larger buffer stocks.

Increased security must be followed by higher costs, that is obvious. And this will result in an increase in the prices of goods and services, and consequently their lower availability for the average person. As a society in general, we will become poorer and the gap between rich and poor will also increase. However, the advantage of such a trend will probably be greater care for what we already have, so it will probably have a positive impact on the natural environment.

Internet sales have been growing for years, but this year it is expected to approach PLN 100 billion in Poland, so the situation is developing faster than expected. Therefore, last mile logistics is experiencing a special technological development, supporting the e-commerce industry. In addition, the face of urban logistics and the image of supply chains are changed by the constantly growing number of city residents, and this cause an increase in warehouse space, also in cities. However, it will not change, and will even accelerate - due to the lack of people to work, the tendency to automate and computerize supply chains, which means a further loss of physical jobs, and thus, there will be an even greater need for continuous training and diversification employment (Kucharczyk, 2021).

An example of one of the greatest procurement challenges during a pandemic was the distribution of vaccines and the provision of appropriate transport conditions. It is mainly about ensuring a sufficiently low temperature, which is different for different vaccines, eg for Pfizer it is as much as -80 degrees Celsius. WHO estimates that as much as half of the vaccines could be wasted due to poor transport conditions. This challenge was dealt with using dry ice cooled tanks, which was, however, a complicated and costly undertaking that did not guarantee ideal conditions during transport. Therefore, interesting solutions have been developed to eliminate this difficulty, e.g., the Wrocław-based company CRYO Science has created a cryogenic system that no longer uses nitrogen. She has made a technological breakthrough by developing a system down to -140 ° C, based on electricity and a proprietary blend of refrigerants combined with compressors.

4. Transport

The current maritime transport situation is very complex. The situation is the worst in the USA, where queues of ships to unload are waiting to the ports of Los Angeles and Long Beach in the US, and about 40% of the containers are sent to this country through these ports. It is estimated that currently only 38% of sea transport arrives on time, which is half as much as a year ago, which is the worst result in history. In contrast, the price for sea freight is 6 to 10 times higher than before the pandemic and the highest in history.

The situation in Europe is slightly better, and in Poland there are no congestion at all. The main reasons for this are, of course, the Covid-19 pandemic and the consequent changes in consumer behavior, in particular the sharp increase in online trade. Local problems, such as typhoons and floods in Southeast Asia, are also important. As

already mentioned, everything that is happening now in the area of transport and supply prompts manufacturers to shorten supply chains and look for local suppliers and diversify supply sources (Kowalczyk, 2021).

The rapid spread of the COVID-19 coronavirus around the globe has almost completely paralyzed numerous industries in most nations. At the same time, even during lockdowns, many countries did practically no attempt to restrict road traffic, fearing that this would freeze the shipping of vital goods, primarily food (Dorofeev *et al.*, 2020). When it comes to road transport in Poland, in 2021 the number of trucks on the road increased by almost 20% compared to the corresponding period of 2020.

Road transport, which increased by 410 million tonnes in 2020 and accounted for 90% of all transport the same significant amount of rail transport, which accounts for 8.5% of the total freight weight and 9.6% for freight turnover. Thus, despite the pandemic, the demand for transport services is growing, and in some areas, it is even higher than before pandemic started. In 2010-19, the share of our carriers in the EU road transport market increased from 20 to 32% (Kapczyńska, 2021).

In connection with the above, Polish transport companies began to intensively buy new tractor units, the number of which (trucks weighing over 16 tons) increased by 127% year on year by the end of March 2021, which is 3 times more than the EU average. So now the biggest problem for transport companies, it turns out, is neither the pandemic, nor Brexit, nor the need to implement the EU mobility package. The most problematic for them is the lack of drivers, as well as new vehicles, the production of which was largely suspended during the period of restrictions (Woźniak, 2021).

Our transport companies are doing so well on the European market that it has alarmed competition from the old EU Member States. According to industry experts, the EU rules for remunerating drivers and the Mobility Package are nothing more than an ordinary competitive fight. As a result of the planned changes, the industry expects a large wave of bankruptcies among Polish companies, especially among smaller carriers. Some of them have already announced that with the introduction of the package and increased bureaucracy, they will stop serving European markets, stopping at the domestic one.

However, difficulties for transport companies may affect consumers in the old EU countries. On the example of the UK we had already experiences of what can happen when there is lack of transport service.

To sum up, the pandemic did not stop the Polish transport sector, although in 2020 the number of active carriers stabilized, there were many more trucks. In the fourth quarter of 2020, Polish trucks covered 190 million km more than in the corresponding period of the previous year (Bołtryk, 2021). And that is why the

Polish telematics services market is constantly growing, currently it is worth about PLN 1 billion and there are more and more companies offering telematics services. In Poland, every third commercial vehicle is subject to telematics monitoring, and in the EU, it is more than half of the commercial fleet (Przybylski, 2021), so there is still a lot of catching up to do.

When it comes to air transport, despite the fact that the number of passenger flights has clearly decreased, air couriers are recording an increase in their services and are optimistic about investing in their infrastructure. For example, DHL has expanded its global fleet by 20 planes, and is also building new facilities at airports, including in Warsaw. This phenomenon is favoured by the change in purchasing habits of young people, mentioned in the first chapter, and the pandemic situation in the world.

Interestingly, DHL representatives are not afraid of an economic downturn following changes in the functioning of supply chains, which was also mentioned earlier. According to them, the change of the location of factories from Asian destinations to those closer to Europe will have a positive impact on greater logistics traffic in our region. Therefore, Poland can only benefit economically (Zatoński, 2021).

5. Case Study - Supply Chain Security on the Example of Aircom Automotive

Aircom Automotive uses semiconductors to produce components for cars and machines. The research at the company was carried out in December 2021, but it concerned the company's operation in the second half of 2021. It was decided to analyse this particular company because it is a global company that produces components for the automotive industry. The automotive industry was one of the most affected branches by the global crisis related to the Covid-19 pandemic. In addition, the functioning of the researched company was disturbed with global problems in the production and supply of semiconductors, which made the selected case seem interesting and representative in the analysed period.

Several factors have caused interruptions and delays in the international supply chain of this company, including: monopolistic semiconductor production market, production stoppage due to COVID-19, the market trend towards Lean Management, Lean production without stockpiling, growing demand for semiconductors in the world, container ship Ever Given stuck in the Suez Canal and burning down of a semiconductor factory in Japan (Naka).

Thus, due to the extended delivery time by sea from China, in the current situation, which is an average of 60 days, and should be 37/40 days, the company found itself in a stalemate with no storage space for both production components and the finished product. Additional difficulties were caused by:

- suspension of customer orders,

- suspension of deliveries from suppliers,
- orders with long LT without the possibility of withdrawal, which resulted in the warehouse being full,
- inability to implement a new ERP system due to the complete lack of space.

In order to cope with the growing stocks (Figure 3), the company adopted several solutions that allowed to reduce the risk of losing financial liquidity. First, the company refrained from accepting any goods whose delivery could have been withdrawn with appropriate information for suppliers. Second, the company used the maximum time to hold the already ordered goods in containers at the ports of unloading, and then rented additional storage space for goods that had to be picked up from the ports. Third, the company reduced the factory's production capacity to 80%. In the next step, the company transformed its subsidiaries into distribution centres, and then transported finished products to these centres, and then directly to customers.

Another big challenge was for Aircom Automotive to go through customer audits. Due to pandemic restrictions, company was obliged to undergo remote audits. The company was required to fill out audit sheets in advance and create a presentation for each logistics sector, both inbound and outbound logistics, as well as in production planning and serial purchases. The presentations included screenshots from systems, files and films recorded in the plant. Summing up, it can be stated that the remote audit during the pandemic was much more demanding than in the stationary version.

Usually, such an audit lasts up to 2 days in the area of logistics, and in the case of remote control, due to the exclusion of hotel costs, diets, etc., the auditors had much more time and could thoroughly understand all the controlled processes. Such an audit also had to be associated with appropriate technical preparation, such as appropriate tools (video and audio), Wi-Fi preparation in every corner of the company, etc.

Figure 3. *Overloaded company warehouses due to bottlenecks in the supply chain*



Source: K. Cienciala – Aircome Automotive.

6. Conclusion

Logistics and its processes are currently undergoing large and dynamic transformations. On the one hand, last mile logistics and all related elements are developing intensively, on the other hand, logistics must face high market instability, shortage of staff and a rapidly advancing technological revolution, requiring enterprises to rapidly implement innovative solutions that improve the functioning of the organization and help maintain its competitiveness in the market.

The author's research shows that after the initial panic - related to ever new restrictions due to the pandemic - logistics companies quickly moved to the agenda and created creative solutions to the new situation. The greatest effect of the pandemic was the reduction in investment, which affected more than 50% of companies, and over 44% of enterprises decided to lower the salaries of board members and to temporarily lower the salaries of employees.

On the other hand, over 44% of logistics companies said that the pandemic had not had a negative impact on their operations. Last year, 50% of companies increased employment, 40% introduced new services, and 30% decided to expand their infrastructure.

According to the latest report (Łukasiewicz - Institute of Logistics and Warehousing 2021), one of the greatest threats and barriers to the development of logistics is the lack of logistics specialists and personnel. This situation can be at least partially eliminated by the rapidly progressing automation and the device operating autonomously. The most frequently automated processes include: warehousing, production, sales and transport.

Everything that is happening now in the area of transport and supply is driving manufacturers to shorten their supply chains, look for local suppliers and diversify their supply sources. Safety in the implementation of logistics processes is of key importance for companies, and costs are of secondary importance. Therefore, the logistics of the enterprise begins to resemble military logistics or other task forces.

In summary, new trends in logistics resulting from the pandemic are changing the landscape of the logistics market. The key change is that the hitherto very popular approach to the supply of enterprises changes from "just in time" to "just in case". This proves that the awareness of logistics managers, who focus more on the issue of ensuring security than costs in international supply chains, is changing.

Ultimately, it may turn out that for many logistic companies, the threat that looks threatening at the beginning will become an opportunity to stabilize and expand the scope of activities and improve the quality of services, and thus to raise their competences to a higher level of efficiency and safety.

References:

- Bielecki, M., Szymonik, A. 2015. Bezpieczeństwo systemu logistycznego w nowoczesnym zarządzaniu (Security of the logistics system in modern management). Difin, Warszawa.
- Boltryk, M. 2021. W logistyce nie będzie tak samo [It will not be the same in logistics]. Puls biznesu, URL: <https://www.pb.pl/w-logistyce-nie-bedzie-tak-samo-1128602>.
- Bylen, S. 2020. Market of Logistics Services During the Covid-19 Pandemic [Market of Logistics Services During the Covid-19 Pandemic]. European Research Studies Journal Volume 23, Special Issue 3. DOI: 10.35808/ersj/1852.
- Dorofeev, A., Kurganov, V., Fillipova, N., Pashkova, T. 2020. Ensuring the integrity of transportation and logistics during the COVID-19 pandemic. Transportation Research Procedia, 50, 96-105. <https://doi.org/10.1016/j.trpro.2020.10.012>.
- Fischer, R.J., Halibozek, E.P., Walters, D.C. 2019. Security: Today and Tomorrow. Editor(s): Robert J. Fischer, Edward P. Halibozek, David C. Walters, Introduction to Security (Tenth Edition), Butterworth-Heinemann, 507-522. ISBN 9780128053102.
- Illahi, U., Mir, M.S. 2021. Maintaining efficient logistics and supply chain management operations during and after coronavirus (COVID-19) pandemic: learning from the past experiences. Environ Dev Sustain, 23, 11157-11178. <https://doi.org/10.1007/s10668-020-01115-z>.
- Jałowiec, T. 2020. Paradygmaty logistyki wojskowej [Military logistics paradigms]. Difin, Warszawa.
- Kapczyńska, K. 2021. Kolej przegrywa z drogami [The railroad is losing out to the roads]. Puls Biznesu, URL: <https://www.pb.pl/kolej-przegrywa-z-drogami-1117624>.
- Kowalczyk, G. 2021. Zatory w transporcie kolejowym problemem firm [Congestion in rail transport - a problem for companies]. Rzeczpospolita, URL: <https://biznes.gazetaprawna.pl/artykuly/8275409,zatory-transport-kolejowy-problemem-dla-firm-biznes-dostawy.html>.
- Kucharczyk, K. 2021. Pandemia zmienia globalne szlaki handlowe i procesy produkcyjne. Czy Polska na tym skorzysta? [The pandemic is changing global trade routes and production processes. Will Poland benefit from this?]. Rzeczpospolita, URL: <https://www.rp.pl/najwazniejsze-firmy/art75611-ewolucja-w-lancuchach-dostaw>.
- Liu, W., Liang, Y., Bao, X., Qin, J., Lim, M. 2020. China's logistics development trends in the post COVID-19 era. International Journal of Logistics Research and Applications. <https://doi.org/10.1080/13675567.2020.1837760>.
- Łukasiewicz - Instytut Logistyki i Magazynowania. 2021. Raport Logistyka w Polsce [Report about Logistics in Poland], by ManpowerGroup, URL: <https://ilim.lukasiewicz.gov.pl/raport-logistyka-w-polsce-pobierz-nasz-najnowszy-raport-i-dowiedz-sie-wiecej-o-logistyce-w-polsce/>.
- Nowakowski, T. 2011. Niezawodność systemów logistycznych [Reliability of logistics systems]. Oficyna Wydawnicza Politechniki Wrocławskiej. ISBN 978-83-7493-594-4.
- Przybylski, R. 2021. Usługi i systemy telematyczne w transporcie [Transport telematics services and systems]. Rzeczpospolita, URL: <https://www.rp.pl/ekonomia/art8632491-uslugi-i-systemy-telematyczne-w-transporcie>.
- Raport Eurologistics Media Group. 2020. Rynek logistyczny w dobie pandemii COVID-19 [The logistics market in the time of the COVID-19 pandemic], no. 3/2020.
- Tsan-Ming, Ch. 2021. Risk analysis in logistics systems: A research agenda during and after the COVID-19 pandemic. Transportation Research Part E: Logistics and Transportation Review, 145. <https://doi.org/10.1016/j.tre.2020.102190>.

Woźniak, A. 2021. Firmy transportowe na wielkich zakupach [Transport companies on big purchases]. Rzeczpospolita, URL: <https://www.rp.pl/transport/art148541-firmy-transportowe-na-wielkich-zakupach>.

Zatońskit, M. 2021. Przez milenialsów przybędzie przesyłek [Over the millennials will arrive shipments]. Puls Biznesu. URL: <https://www.pb.pl/przez-milenialsow-przybedzie-przesylek-1114899>.