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The role of logistic platforms in supply chain continuity during the COVID-19 pandemic

Rola platform logistycznych w zapewnieniu ciągłości łańcuchów dostaw w czasie pandemii COVID-19

Abstract

The main goal of the study is to analyze and evaluate logistics platforms in terms of ensuring the continuity of supply chains during the global COVID-19 pandemic. The study was conducted based on a critical analysis of the literature on the subject, analysis of statistical data, and reports published by the CO3 platform and the DHL Resilience360 platform. The author of this study also assessed the platforms in terms of the usefulness of tools whose role is to inform platform customers about disruptions in the supply chains resulting directly from the COVID-19 pandemic. The role of logistics platforms is to monitor risks in global supply chains in real-time, which over the last two years have been mainly related to the global COVID-19 pandemic. The platforms are intuitive tools which — thanks to constant updates with the latest data and analyzes conducted by a team of analysts — allow them to provide their clients with tools related to, inter alia, risk monitoring, critical point mapping, and filtering, data collection and sharing, as well as alarm profile building. Great opportunities should be sought in such an innovative, constantly updated solution.

Keywords:
COVID-19 pandemic; DHL Resilience360; global supply chains

Streszczenie

Głównym celem opracowania jest analiza i ocena platform logistycznych pod kątem zapewnienia ciągłości łańcuchów dostaw podczas globalnej pandemii COVID-19. Badanie zostało przeprowadzone z zastosowaniem krytycznej analizy literatury przedmiotu, analizy danych statystycznych i raportów publikowanych przez platformę CO3 oraz platformę DHL Resilience360. Autorka niniejszego opracowania oceniła platformy również pod kątem użyteczności narzędzi, których rolą jest informowanie klientów platformy o zakłóceniach w łańcuchach dostaw wynikających bezpośrednio z pandemii COVID-19. Rolą platform logistycznych jest monitorowanie w czasie rzeczywistym ryzyka występującego w globalnych łańcuchach dostaw, które przez ostatnie dwa lata były głównie związane z globalną pandemią COVID-19. Platformy stanowią intuicyjne rozwiązania, które dzięki ciągłej aktualizacji o najnowsze dane i analizy prowadzone przez zespół analityków pozwalają udostępnić klientom narzędzia związane m.in. z monitorowaniem ryzyka, mapowaniem i filtrowaniem punktów krytycznych, gromadzeniem i udostępnianiem danych, a także budowaniem profilu alarmowego. W tak innowacyjnym, stale aktualizowanym rozwiązaniu należy szukać wielkich możliwości.

Słowa kluczowe:
pandemia COVID-19; DHL Resilience360; globalne łańcuchy dostaw

Introduction

The uncertainty surrounding the current global COVID-19 pandemic poses a considerable challenge to the global economy, including global supply chains, which form one of the key elements of the economy. Coronavirus has become a new factor causing some disruptions in the production and distribution process, which forced logistics managers to intensify research in building resilient

supply chains and minimizing the risk of interruptions in supply chains. The outbreak of the pandemic also resulted in total or partial constraints on transport as well as human, financial, and information flows in many countries, resulting in delays in freight and reduced efficiency. Enterprises from the T&L[1] industry have been forced to operate in the new reality, which means severe difficulties in cross-border transport, delays in the production process, increased costs related to downtime, and legal and regulatory ambiguity, concerning, e.g., drivers' work and product quarantine. The main purpose of this article is to assess logistics platforms to ensure the resilience of global supply chains during the global COVID-19 pandemic. The study conducted was based on a critical analysis of the literature on the subject, an analysis of statistical data, and reports published by the CO3 platform and the DHL Resilience360 platform. The author of this article also assessed selected platforms in terms of the usefulness of tools whose role is to inform platform customers about disruptions in the supply chains resulting directly from the COVID-19 pandemic.

Characteristics of resilient supply chains

In the face of the globally prevailing COVID-19[2] pandemic, the ability of supply chains to immediately return to the pre-pandemic state is of increasing importance. One of the key elements of the reconstruction of global supply chains will be eliminating difficulties related to the temporary suspension or complete stop of production, distribution, customer service, and the flow of human, financial, and information resources.

It should be emphasized that the modern supply chain should be focused primarily on meeting customer needs (Witkowski, 2010, p. 36), but unfortunately, the appearance of the COVID-19 has disrupted the efficient process of its implementation. Currently, companies in the T&L industry are in a situation where they should thoroughly review the needs and expectations of their customers regarding the implementation of orders that have significantly changed due to the functioning of entities in the sanitary regime.

The concept of 'resilience' has two primary meanings. The first one, which is defined as the ability of the substance/the subject to return to the shape and flexibility. The second meaning refers to a fast recovery after this inconvenience and strength (Oxfordlearnersdictionaries.com, 2020). The increase in the pace of globalization has

a significant impact on the intensification of cooperation between entities, while it also indirectly causes the distancing of sales and supply markets. This, in turn, results in the elongation and complexity of global supply chains while engaging more and more partners. Economic, political, technological, climate and social changes, which include increased population mobility, significantly affect the spread of the epidemic, causing the intensification of risk in the supply chain (Małyszek, 2015, p. 917–918).

Resilient supply chains are characterized by adapting both current operations and strategies to the broadly understood changes taking place in the economic environment. Their priority is to reduce the risk associated with the effects of breakdowns, perturbations, anomalies, as well as activities that disrupt the current conditions of their functioning (Boin et al., 2010, p. 1–6). Definitions of a resilient supply chain are shown in Table 1.

According to the author, a resilient supply chain should be defined by its ability to mitigate the negative effects of an event that caused a temporary disruption to the continuity of supply chain processes, as well as to take immediate action to return to the state prior to the period in which the entities in question encountered the disruptive factor. It should be emphasized that the COVID-19 pandemic caused the collapse of the global economy, which had an impact on shortening or even "breaking" global supply chains. The coronavirus has highlighted the need for constant monitoring and visualization of key processes for global supply chains along with the accompanying disruptions in individual geographic areas. During the pandemic, real-time monitoring and reporting of any disruptions, including, in particular, restrictions related to transport in individual regions of the world, turned out to be of key importance for the conduct of current operations.

Over the past decade, supply chains have grown steadily, making them increasingly vulnerable to short-life disruptions and natural and man-made disasters. Enterprises from the T&L industry are struggling with the lack of visualization of what is happening in real-time in their supply chains. To maintain cooperation with partners and suppliers, it is necessary to implement tools that will ensure monitoring, reporting, adapting to the environment, and analysing disruptions occurring at a given moment. In the face of disruptions, a vital role is played by the "sensitivity" of entities to factors that may lead to disruptions as well as the reaction time, which directly influences making key decisions within the entire supply chain (Banomyong, 2018, p. 4–5).

Contemporary managers are often faced with the dilemma of the influence of the disruptive

Table 1

Definitions of a resilient supply chain

Author	Definition
Barroso *et al*. (2015)	The ability to immediately react to the negative consequences of unexpected events and quickly return to the state before that event
Datta (2007)	Ability to continue meeting goals after a confounding factor has occurred; proactive search for supply chain features that will ensure the ability to deal with unforeseen events with a negative overtone
Falasca (2008)	Ability to reduce the negative effects of possible disruptions in the supply chain and the time needed to achieve the level of efficiency as before the disruptive factor occurred
Fiksel & Pettit (2010)	The ability of multidimensional industrial systems to be maintained, synchronized, and developed under conditions of a turbulent environment
Gaonkar (2007)	Ability to sustain and reactivate actions after the occurrence of a disruptive factor
Ponomarov & Holcomb (2009)	Supply chain resilience is now one of the critical components of risk management
Ponis &Koronis (2012)	Supply chain resilience is a relatively new and unexplored area of management research
Waters (2011)	Increase the supply chain's ability to withstand unexpected events

Source: Zaczyk, 2017, p. 559; Quabouch, 2015, p. 16.

factor on the internal and external aspects of the organization, which confirms that the holistic perspective of the supply chain has become even necessary for effective management in the contemporary business environment (Mentzer, 2001, p. 1–25).

According to G. Hamel and L. Välikangas, companies should face four challenges that will allow them to acquire the so-called resistance, namely (Hamel & Välikangas, 2003, p. 3):
- recognizing that past strategies and business models are exposed to environmental threats;
- risk-taking by innovating and experimenting (implementing alternatives);
- available resources should be used to implement new strategies (redirecting available resources to new innovative products);
- one should strive to optimize the business model to prevent problems for a given enterprise in the future.

It is impossible to disagree with J. S. Rha, who emphasizes that building resilient supply chains is entirely dependent on risk management within them. The very process of building them should include identifying the problem (the disturbing factor), developing a strategy that will ensure recovery and recovery, and then redesigning the entire supply chain to ensure its resilience (Rha, 2020, p. 3; Blackhurst *et al*., 2005, p. 4067–4081). According to the author, ensuring the continuity of global supply chains should consider minimizing the negative effects of the currently ongoing COVID-19 pandemic and implementing measures that will ensure relatively the highest safety standards for both employees and products.

It is also worth paying attention to the recommendations developed by Deloitte, which indicated key actions that allow mitigating the negative effects of the COVID-19 pandemic for the T&L industry. The group of recommendations includes mainly (Deloitte.com, 2020):
- conducting training for employees in recognizing symptoms and preventing the spread of the COVID-19;
- the enforcement of precautionary measures;
- application of screening tests among employees;
- limiting travel and introducing remote and flexible forms of work;
- adaptation of IT systems to dynamically changing working conditions (in particular, ensuring an appropriate level of data security);
- focusing on the risk of losing key suppliers by ensuring effective communication and possibly formulating alternative plans to acquire a new supplier and supply markets;
- ensuring "visibility" for the processes within the supply chains.

Relevant to the construction of resilient supply chains is the idea of Logistics 4.0, which allows the transformation of traditional logistics and its processes and transfers them to the intelligent level (Amr *et al*., 2019, p. 48), which means they use smart product technology and the provision of intelligent services. The new paradigm of Logistics 4.0 assumes efficient communication of IoT

(Internet of Things) systems with people in real-time, data processing in the so-called cloud, autonomous management and control of the flow of services and products, full automation, and digitization of business systems using applications and platforms. This is a whole new level of a supply chain that provides full real-time control (Barreto *et al.*, 2017, p. 1248; Radivojević & Milosavljević, 2019, p. 285).

As part of the response to the new disruptive factor, it becomes essential not only to build resilient supply chains but also to reconfigure and "shorten" them by selecting suppliers operating on local markets. This solution ensures business continuity in the event of closing individual administrative borders of given countries or introducing further restrictions related to the transport of people and cargo, as well as logistic services.

The emergence of the coronavirus as a completely new disruptive factor has undoubtedly led to disruptions in the current flows within global supply chains, causing the temporary suspension of production and distribution processes worldwide. However, according to the author, a positive aspect of the global pandemic should also be noticed, namely the acceleration of processes related to digitization and platformization of logistics services, which in turn may increase the flexibility of global supply chains along with the use of the Logistics 4.0 concept.

Factors causing disruptions to global supply chains in the face of the COVID-19 pandemic

Achieving efficiency by modern companies in the T&L industry, according to the author, is strongly correlated with changes in the physical flow of goods within global supply chains. Progressing globalization has led to the lengthening of processes in supply chains, which has exposed them to factors that cause increased vulnerability to risk and uncertainty. It should be emphasized that several factors that are potentially treated as a source of risk occur not only in the enterprise itself, which is a link in the supply chain but also in its closer and more distant surroundings.

According to J. M. Myszak and M. Sowa, among the risk categories, one should distinguish the risk specific to supply chains, which primarily considers the risk of inertia, the risk associated with the lack of coordination of individual processes, the lack of one owner, as well as the risk of delay in making

decisions (Myszak & Sowa, 2016, p. 187). S. M. Wagner and C. Bode, as the key risk categories in the supply chain, indicate demand and supply-side risk, bureaucratic risk, legal environment risk, risk related to locating infrastructure, and risk of disasters (Wagner & Bode, 2008, p. 307–325).

Because the currently prevailing coronavirus pandemic is a significant factor causing a threat to global supply chains, in the opinion of the author of this article, it is worth paying particular attention to the potential threats that appear in the environment of the T&L industry.

T. Jałowiec and E. Dębińska identified four key external threats in their research, which include (Jałowiec & Dębińska, 2017, p. 92–93): terrorism, weather conditions, threats resulting from legal and political instability. On the other hand, B. Bavarsad, M. Boshagh, and A. Kayedian, among external threats, strongly emphasize the role of the government and its fiscal reforms, the level of market competition, short product life cycles and the economic crisis (Bavarsad *et al.*, 2014, p. 204–205).

The occurrence of unplanned events, for which companies cannot prepare in advance, leads to many disruptions in supply chains. It should be emphasized that the more internationalized the supply chains are, the more frequently there is a risk of crises that disrupt not only production processes but also distribution and supply, which in turn may even lead to a "break" of the supply chain. In such a situation, the key role is played by the time in which a given company takes preventive and corrective actions to ensure appropriate procedures to continue operations. Therefore, according to the author, it is necessary to be very scrupulous in examining and updating the factors that may constitute risk areas under certain conditions.

At this point, the role of emergency logistics is worth emphasizing, which is perceived as logistic activities that should be undertaken in crisis and emergencies, e.g., those that appear unexpectedly, and the procedures known so far may turn out to be insufficient (Land.production-manager.pl, 2021). Undoubtedly, the very reaction to a critical event depends on many factors, including the scale and complexity of the problem, cooperation issues, time pressure and real-time decision making, limited resources, and the scale of damage (Jiang & Yuan, 2019, p. 4).

Table 2 presents the key factors that may influence the emergence of disruptions in global supply chains from the point of view of the immediate and distant environment of the enterprise constituting its link.

It should be emphasized that the risk categories are constantly expanding due to the emergence of

Table 2

Risk categories in global supply chains

Risk category	Subcategory	Description of the risk
Economic	▪ recession ▪ inflation ▪ change in exchange rates ▪ fluctuations in demand ▪ unemployment rate	The economic category is strongly correlated with the financial situation of a given economic system (based on the results from this category, decisions are made related to, for example, the location of production departments)
Political	▪ war ▪ terrorism ▪ unrest ▪ corruption	Problems in the national and transnational arena lead to integration problems within global supply chains
Legal	▪ economic espionage ▪ political instability ▪ new laws or regulations	The contradiction and the number of regulations lead to an imbalance in relations between the state and the economy
Cybernetic	▪ cybercrime ▪ computer viruses hackers ▪ failures of information system	Cybernetics incidents may lead to the loss of sensitive data (processes in the supply chain are extended)
Social and health	▪ workers' strikes ▪ outbreaks (epidemics and pandemics)	Workers are directly affected by both strikes and disease, which means supply chain processes stoppage or even complete shutdown of an enterprise in the supply chain
Transport	▪ cargo theft ▪ damage during transport	Increase in costs as a result of the extension of the transport process due to the complications
Natural disasters	▪ flood ▪ fire ▪ earthquake ▪ lightning discharges ▪ hurricane, tornado ▪ tsunami ▪ volcanic eruptions	Disruptions in the supply chain result from a natural disaster and the liquidation of its consequences

Source: own study based on: Singh et al., 2009, p. 326–331; Ho et al., 2015, p. 42–50; Olson & Wu, 2010, access: 10.10.202).

new unforeseen factors. Hence, the role of companies in the T&L industry is to monitor the processes in the supply chains constantly and take immediate reactions in the event of any disruption. On the one hand, a quick response will allow cost reduction resulting from delays and downtime, and on the other hand, make enterprises more sensitive to factors unknown so far, which can potentially become a threat to the entire supply chain.

Analysis and evaluation of selected logistics platforms in terms of ensuring the resilience of global supply chains during the COVID-19 pandemic

Globalization, the dynamics of socio-economic changes, and the appearance of the COVID-19 virus resulted in the intensive development of logistics, the role of which has significantly increased in connection with the e-commerce industry. New technologies, including digitization, digitization and the creation of mobile applications have become the basis for the harmonious development of logistics. The process of storing, processing and using data and information using mobile applications (e.g. logistic platforms) is to provide professional support for the T&L sector. Implementing the right digital tools will ensure flexibility and resistance in turbulent environments.

The role of logistics platforms is to provide a comprehensive package of services that, through integration with IT systems, can offer the user support in the implementation of logistics processes, thus contributing to building long-term relationships between entities in the supply chain (Witkowski, 2019, p. 206).

Digital technology platforms used in logistics are tools of specific content or services that enable

networking between different actors in the supply chain. It is a structure that coordinates the processes of the flow of goods and forms of interaction between the participants of the supply chain to achieve operational, tactical and strategic goals while minimizing costs (Karnaukhov, 2012, p. 48–54). Their role is limited to supporting and optimizing the implementation of individual processes (e.g. tracking goods in real-time) or investments by constantly expanding functionality and building new modules (Bartczak, 2019, p. 221).
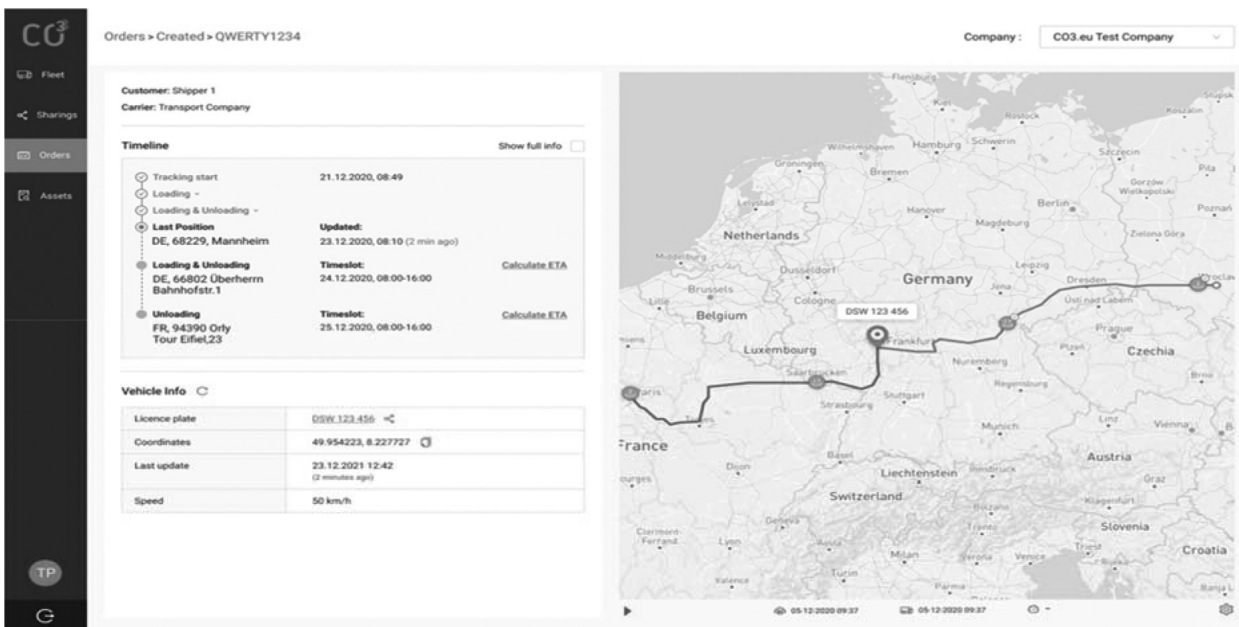
This article presents a critical analysis of the literature on resilient supply chains and risk management in contemporary supply chains. The second research method is the SWOT analysis, which was carried out based on the identification of internal factors relying on reports, in the form of strengths and weaknesses (resulting directly from the construction and operation of selected platforms), as well as external factors, i.e. potential opportunities and threats, which are located in the environment closer and further to the analyzed platforms. The use of SWOT analysis is to indicate the potential of logistics platforms, as well as areas to which platform analytical teams should pay special attention, based on a new and unpredictable threat to global supply chains.

The CO3 platform was founded in 2018 by a team of specialists with many years of experience in the logistics and IT industry as a startup in response to the digital transformation of logistics and transport companies. The very name of the "CO3" platform derives from the words "connect", "communicate" and "cooperation" (co3.eu, 2022). The company's mission is to facilitate communication and ensure connectivity and cooperation between the supply chain entities while ensuring data security. The platform is responsible for the real-time aggregation of detailed data from 25 European countries for over 50,000 vehicles, which allows for increasing the visibility of vehicles "on the road" and ensuring transparency of all processes. CO3 is responsible for the continuous collection and monitoring of HGV data, any vehicle-related events, remaining driving time, engine type and emission class, total weight of the combination, consumption and fuel level, braking status and door opening, temperature and weight, and axle loads (PB.pl, 2022). Access to such detailed data is the result of the cooperation established in 2021 by the creators of the CO3 platform with Sennder, the European leader in digital freight forwarding, and the Iveco brand, which deals, among others, with designing, producing and introducing light, medium and heavy commercial vehicles to the market (Sennder.com, 2022).
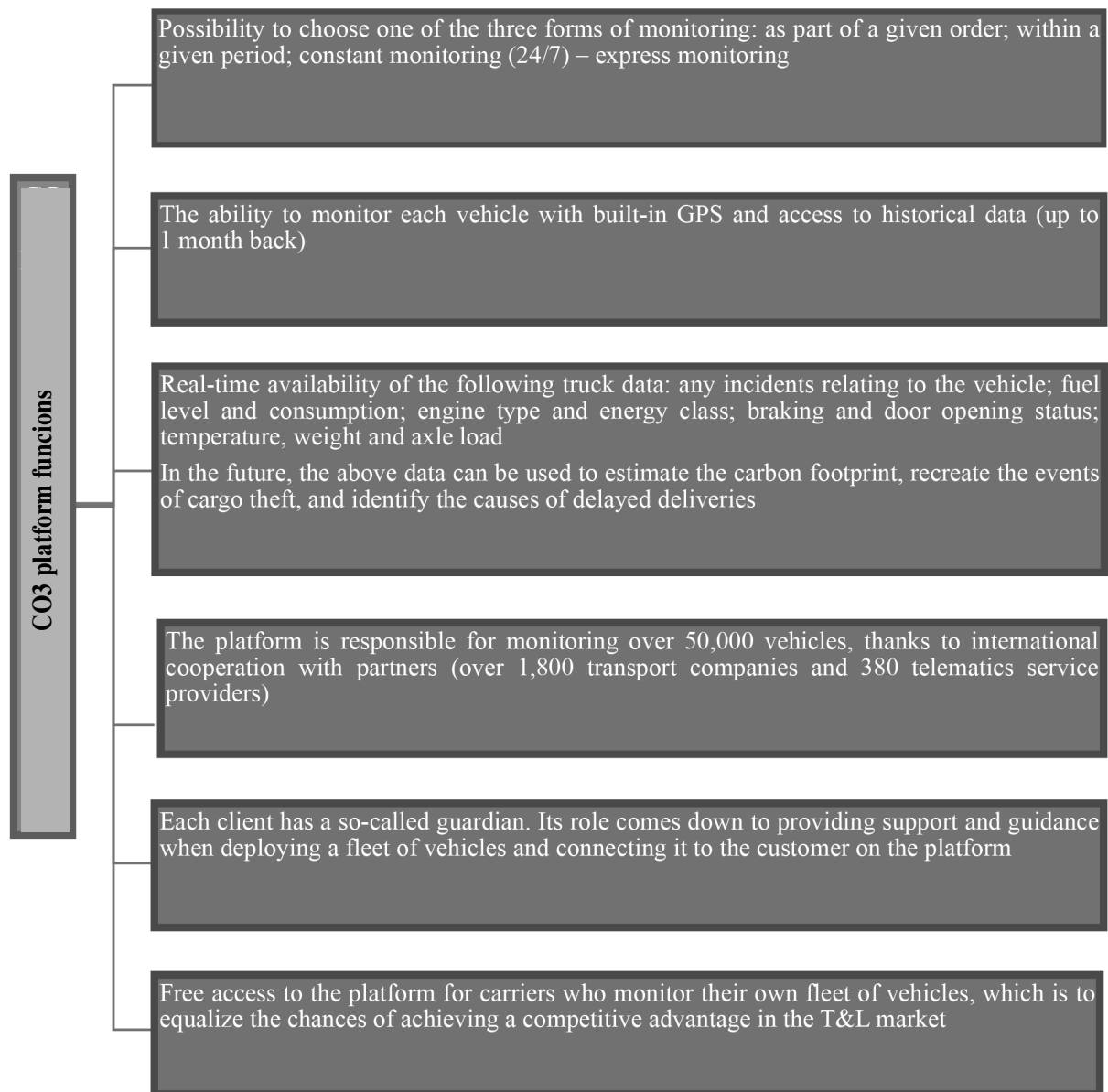
An exemplary dashboard of the CO3 platform, responsible for tracking the vehicle's route, is shown in Figure 1.

Figure 1

CO3 platform

Source: co3.eu, 2022.

Figure 2
CO3 platform functions

CO3 platform funcions

> Possibility to choose one of the three forms of monitoring: as part of a given order; within a given period; constant monitoring (24/7) – express monitoring

> The ability to monitor each vehicle with built-in GPS and access to historical data (up to 1 month back)

> Real-time availability of the following truck data: any incidents relating to the vehicle; fuel level and consumption; engine type and energy class; braking and door opening status; temperature, weight and axle load
>
> In the future, the above data can be used to estimate the carbon footprint, recreate the events of cargo theft, and identify the causes of delayed deliveries

> The platform is responsible for monitoring over 50,000 vehicles, thanks to international cooperation with partners (over 1,800 transport companies and 380 telematics service providers)

> Each client has a so-called guardian. Its role comes down to providing support and guidance when deploying a fleet of vehicles and connecting it to the customer on the platform

> Free access to the platform for carriers who monitor their own fleet of vehicles, which is to equalize the chances of achieving a competitive advantage in the T&L market

Source: own study based on: co3.eu, 2022; pb.pl, 2022; trans.info/pl, 2022.

The CO3 platform offers users full transparency of supply chains by means of real-time monitoring of vehicles and executed orders. According to the creators of the platform, monitoring the supply chain alone is not able to provide a company with a competitive advantage, which is based on the use of high-quality data in the context of making the right decisions. Hence, an interesting solution seems to be the so-called "open platform architecture" (logistics-manager.pl, 2022), which is constantly improved to the needs of users (changes introduced in the CO3 platform result from the demand that is reported by a specific customer). It should be emphasized that the CO3 platform, despite its short period of operation, has proved its worth during the crisis caused by the COVID-19 pandemic, providing logistic and IT support on an international scale. A simplified diagram of the CO3 platform functionality is presented in Figure 2.

The concept of launching the DHL Resilience360 platform was created in 2012 as a startup at the DHL Global Innovation Centre in response to global disasters in previous years (including the eruption of the Eyjafjoell volcano in Iceland, which paralyzed air traffic throughout Europe), while its final launch took place in 2014

(Everstream.it, 2021). It has been developed as a tool that supports enterprises that are individual links in global supply chains. Its primary role is to use permanent monitoring and mapping of all processes occurring in the entire supply chain, regardless of the geographical location. Thanks to the visualization, the creators of the platform can inform their customers about unintended incidents that may pose a threat to the demand for specific products/services, ensure an appropriate level of services, market share, and recommend appropriate actions that would allow the continuity of the operation of a given supply chain. It should be emphasized that the main purpose of the platform is to inform customers as early as possible and even in advance about the incidents affecting disruptions in the supply chain, which is to ensure the longest possible time to take preventive actions and implement emergency plans on the part of the customer.

Initially, the platform offered its clients the identification of critical points, their visualization on a map, and the implementation of some solutions whose role was limited to maintaining and ensuring the protection of flows within the supply chain. Risk management through an innovative platform in supply chains was then based on four basic risk categories, namely risk related to basic operations at the enterprise level, general threats (including failures), the risk caused by the socio-political situation, and the risk of natural disasters (Brzeziński & Ocicka, 2015, p. 5607).

The ability to visualize individual critical points on a map turned out to be particularly important (DHL.com, 2022), as it allowed customers to track

incidents in real-time along with notifications of alerts on key aspects of a given supply chain. An exemplary dashboard of the DHL Resilience360 platform, responsible for navigation, is shown in Figure 3.

The platform's innovation is related to its two basic features, namely risk assessment to ensure supply chain resilience in the long term and real-time registration and visualization of incidents threatening the entire supply chain (Dhl-freight-connections.com, 2016). It should be emphasized that the implementation of such solutions is primarily to serve the companies of the T&L industry in achieving a competitive advantage, thanks to the comprehensive visualization of each stage in the entire supply chain. The diagram of the operation of the DHL Resilience360 platform is presented in Figure 4.

In 2020, the DHL Resilience360 platform was officially merged with Riskpulse[3], which consequently led to the creation of Everstream Analytics in 2021. As a result of integrating two innovative tools, Everstream Analytics can offer its clients real-time risk management in supply chains and access to proprietary data, which is the basis for predicting and assessing the scale of possible future disruptors (Everstream.ai, 2021).

Undoubtedly, the current challenges faced by the analyzed logistics platforms include undertaking intensive activities related to ensuring the security of all transactions and data, and the constant expansion of the offer of services provided, with a particular focus on the creation of modules, supporting the management and monitoring of risk not only during a pandemic COVID-19, but also in
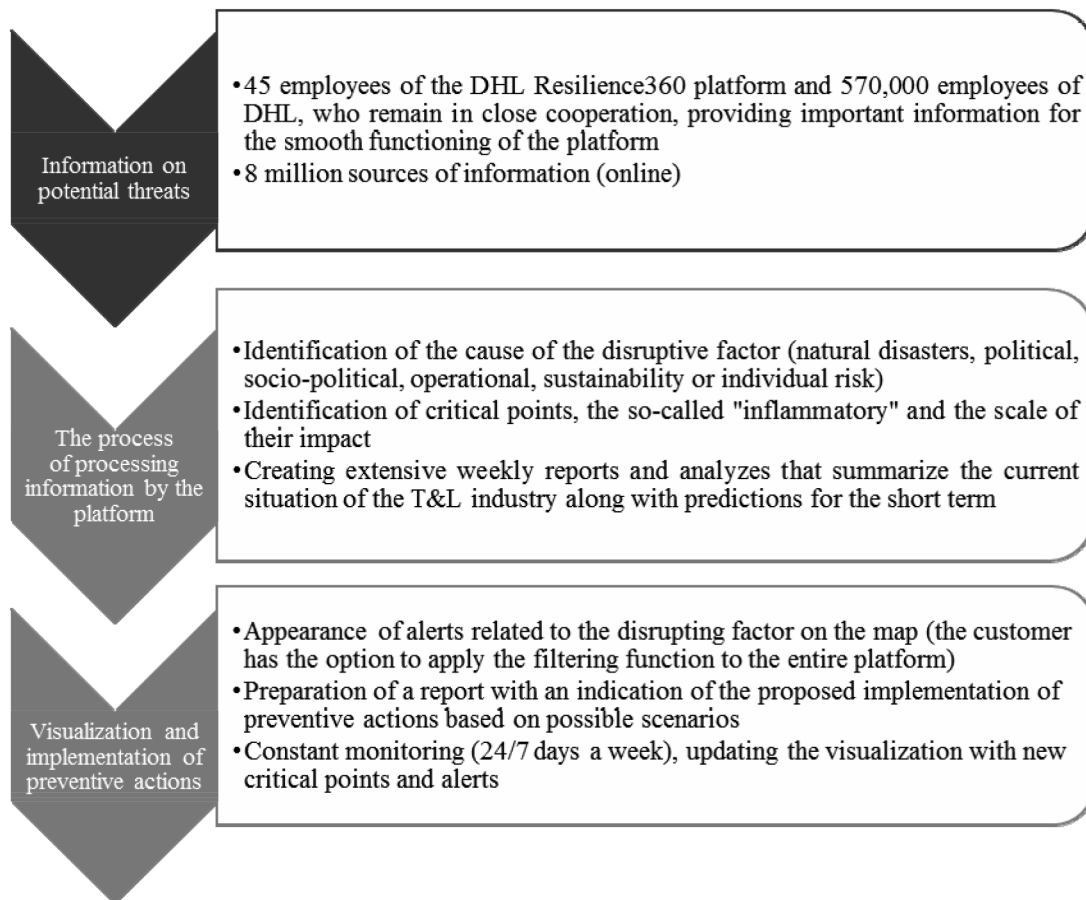
Figure 3

Dashboard of the DHL Resilience360 platform
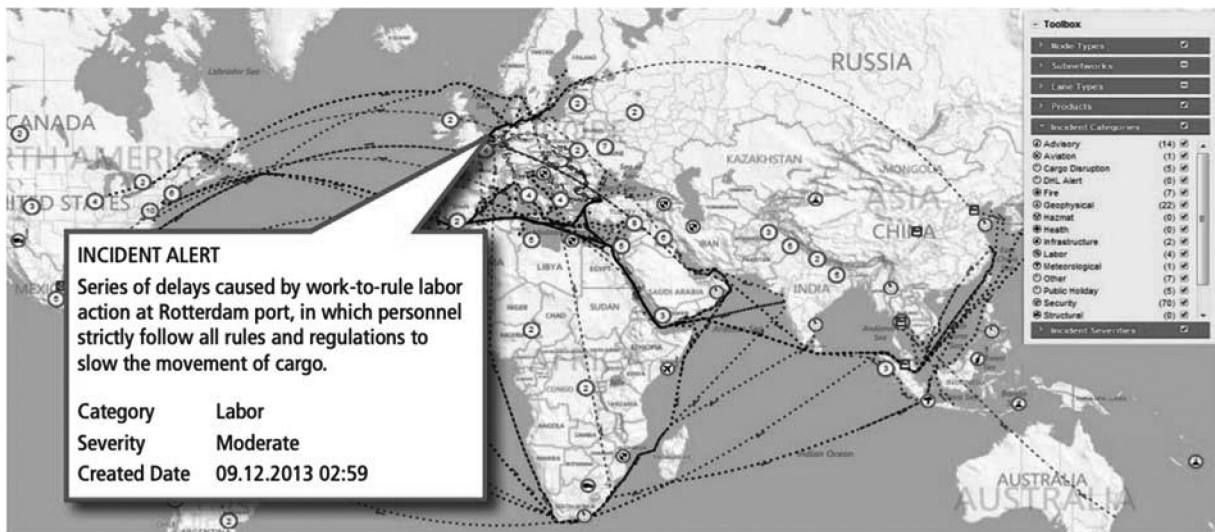
Source: DHL.com, 2020.

Figure 4

Functional diagram of the DHL Resilience360 platform

Information on potential threats
- 45 employees of the DHL Resilience360 platform and 570,000 employees of DHL, who remain in close cooperation, providing important information for the smooth functioning of the platform
- 8 million sources of information (online)

The process of processing information by the platform
- Identification of the cause of the disruptive factor (natural disasters, political, socio-political, operational, sustainability or individual risk)
- Identification of critical points, the so-called "inflammatory" and the scale of their impact
- Creating extensive weekly reports and analyzes that summarize the current situation of the T&L industry along with predictions for the short term

Visualization and implementation of preventive actions
- Appearance of alerts related to the disrupting factor on the map (the customer has the option to apply the filtering function to the entire platform)
- Preparation of a report with an indication of the proposed implementation of preventive actions based on possible scenarios
- Constant monitoring (24/7 days a week), updating the visualization with new critical points and alerts

Source: own study based on: Swissre.com, 2021; T. Larsson, 2015; DPDHL.com, 2021.

the event of a new factor disrupting the continuity of supply chains. The above analysis of the functionality of the CO3 platform and the DHL Resilience360 platform requires supplementing with a list of their characteristic features, which will allow for the identification of similarities and differences in the basic functions offered to customers and tools that support risk management and monitoring during the COVID-19 pandemic. The characteristics of selected logistics platforms are presented in Table 3.

Although both the CO3 platform and the DHL Resilience360 platform were created as startups, their basic range of services and tools supporting the management and monitoring of risk during the COVID-19 pandemic differs significantly. It should be emphasized that the establishment of the DHL Resilience360 platform took place in response to the events that led to disruptions in global supply chains, while the launch of the CO3 platform resulted from the digital transformation that companies from the T&L industry had undergone.

Undoubtedly, the global reach, the number of employees and partners involved, as well as the long-term operation made the DHL Resilience360 platform offer a wide range of tools during the COVID-19 pandemic to support risk monitoring and management within global supply chains. The platform's customers were able to constantly monitor and filter their preferred disruptors, build a personalized alert profile, and access special reports and analyses that presented possible scenarios for introducing further restrictions as part of a global pandemic. Despite the relatively short period of operation, the CO3 platform offered its customers visibility and transparency of European supply chains during the sanitary regime. Constant real-time monitoring and access to detailed information on the entire fleet of vehicles as well as the automation of transmitted transport orders turned out to be invaluable support. The platform's clients could also take advantage of the analyzes prepared by the analytical team and the support of the "supervisor".

Table 3

Characteristics of selected logistics platforms

Logistics platform description	CO3 Platform	DHL Resilience360 Platform (now Everstream Analytics)
Establishment	The concept of launching the platform appeared in 2018, while its final launch took place in 2019	The concept of launching the platform appeared in 2012, and its final launch took place in 2014
Form of establishment	startup	startup
Territorial range	25 European countries	220 countries
Cooperation	The platform has established cooperation with over 1,800 transport companies and 380 telematics service providers (including Sennder, Iveco, Futura Cargo, NexGen Logistics, Transsped and Zeto)	The combination of the DHL Resilience360 platform and Riskpulse led to the launch of the Everstream Analytics platform, which cooperates with over 570,000 DHL employees and incl. Tive, project44, FourKites and TransVoyant
Range of services	Ensuring communication and connectivity and flexible cooperation within European supply chains Visualization of routes and detailed data on a given fleet of trucks Constant expansion of the platform modules based on customer feedback A link to other telematics tools that give customers real-time access to all their preferred information on a single platform	Permanent monitoring and mapping of processes in global supply chains Identification of critical points and the scale of their impact The possibility of using the filtering function from the level of the entire platform, based on the individual needs of the user Access to special reports that contain proposals for the implementation of preventive and/or corrective actions based on possible scenarios
Specialization	The platform works on the European market	A global platform
Management support toolsrisk monitoring during the COVID-19 pandemic	Constant real-time monitoring of vehicles and orders Compilation of detailed data on the vehicle fleet, which allows for risk reduction Automation of transferred transport orders, which results in shorter waiting times for the carrier for loading and unloading Data collection and its exposure in the form of analyzes that companies can use in planning and setting short-term goals The possibility of using the support service (each client is assigned to the so-called "guardian" who provides assistance in operating the platform and in crises)	Permanent monitoring and mapping of all processes that may affect the emergence of disruptions in global supply chains The ability to personalize the platform's functions based on the use of the filtering function and the alert profile (the user decides which events he wants to be informed about to ensure the continuity of the supply chains) Access to special reports and analyses that present possible scenarios and recommendations about factors disrupting the continuity of supply chains Possibility of individual selection of risk categories depending on the business profile and geographic location (the user can choose from over 100 categories)

Source: co3.eu, 2022; Everstream.it, 2022.

According to the author, ensuring the continuity of supply chains should be treated through the prism of the Business Continuity Management (BCM) Concept, which is based on the perception of the impact of disruptions such as natural disasters, epidemics, or terrorism on the future creation of value and efficiency of the supply chain (Protiviti, 2013, p. 1).

The use of the BCM concept is used to identify potential threats, both internal and external, which affect the entire supply chain. Maintaining an appropriate level of continuity is considered the basis for effective risk management and maintaining a reliable supply chain (Blos *et al.*, 2015, p. 1160–1161).

In the context of the above concept and the features of modern supply chains; continuity for example, both the CO3 platform and DHL Resilience360 should undoubtedly be treated as tools to support the management and monitoring of risk during the COVID-19 pandemic and used to eliminate disruptions that occur throughout its duration.

Unquestionably, one of the strengths of the DHL Resilience360 platform is a strongly

developed network, made up primarily of both DHL employees and employees of companies which intensively cooperate with it. It should be emphasized that the company's employees are located in many countries, thanks to which there is a possibility of a global flow of information in almost real-time or with the minimum delay possible. All information confirmed by the company's employees is immediately placed on the platform in the form of notifications or alerts, to inform customers about disruptions or new regions subject to specific restrictions. It should be highlighted that DHL Resilience360, as a result of cooperation with global companies that provide a lot of important data, allows customers to monitor various risk categories that ultimately affect the continuity of individual supply chains. To illustrate the scale of incidents occurring during the COVID-19 pandemic, it is noteworthy that there are approximately 1,200–1,300 alerts daily, which are immediately visualized by the platform. However, the strengths of the platform include not only the visualization of the entire supply chain, but also e-mail notifications that are sent out to the entire customer base. Additionally, an advantage of the platform is the possibility of intensive filtering of all data contained within it, which constitutes the foundation for individual customer preferences concerning a given risk category and the building an alert profile (the platform offers its customers the ability to set filters based on a given geographical point and the distance in kilometers separating it from the "focus" of the disruptor). The strengths of the CO3 platform include constant communication and connectivity between carriers and drivers, which turned out to be extremely important during the COVID-19 pandemic, and the possibility of choosing a form of real-time monitoring, which, depending on the customer's preferences may take the form of constant monitoring or monitoring within one order. The visualization offered by the platform applies not only to the fleet of vehicles belonging to a given carrier, but also to all detailed data generated by the built-in GPS of a given vehicle, that means that during downtime the carrier can constantly control the temperature of the transported goods or even the braking frequency of the vehicle concerned. The undeniable advantage of the platform is the ability to generate reports on individual routes and collect archival data, which companies used during the pandemic to plan their current operations. An interesting solution is also the integration of the platform with other telematics tools, which allow the customer as part of the CO3 platform to gain access to data from various databases in one place, thus not wasting time logging in and controlling several services simultaneously.

According to the author, the potential weaknesses of the CO3 and DHL Resilience360 platforms is the extended data update time. It results mainly from the fact that platforms constantly, in real-time, introduce new data, which provide the basis for the current view of a given supply chain. In the case of the DHL Resilience360 platform, delays in the visualization of the supply chain result from the complex process of real-time notifications from DHL employees. Hence, there may be situations in which the platform will react with a minimal delay. Delays also appear in the case of the CO3 platform, where a team of employees constantly supervises the visibility of over 50,000 vehicles, and the update time is set between 2–3 minutes. According to the author, the weaknesses of both platforms include the risk related directly to the timeliness of the information, as a result of an intense inflow of information about new critical points and/or incidents that constitute a disruptive factor and the geographic location of a given vehicle, analytical teams may introduce incorrect data configuration. The direct result of such a situation may be the introduction of information noise among the platform's customers, which of course has an impact on taking immediate actions to eliminate disruptions in a given supply chain.

The outbreak of the COVID-19 pandemic caused global chaos among T&L companies, mainly due to ignorance of current and future constraints, unpreparedness for a new disruptor, and ignorance of the nature of risk management and the need for immediate response. However, for selected logistics platforms, all these factors created a great opportunity to support global and European companies in the event of a threat related to ensuring and maintaining the continuity of supply chains. Undoubtedly, the pandemic accelerated the processes related to digitization and digitization of data, which had an impact on the CO3 platform and DHL Resilience360. Certainly, the tools for the real-time visualization of the vehicle fleet and supply chain processes have allowed T&L companies to notice potential threats in good time, which appear both in the immediate and further environment. It is important to note that for both the CO3 platform and DHL Resilience360 it is also an opportunity to expand the customer base who, affected by the negative effects of the pandemic, will seek innovative and comprehensive solutions in the future, and to expand the platform based on the opinions of existing customers. Currently, the DHL Resilience360 platform is a key element of Everstream Analytics, which may additionally

affect further modifications of the tool in the future, thus offering customers the latest global solutions in the field of supply chain visualization and risk management. Opportunities should also be sought in the case of the CO3 platform, which, as a relatively young and developing enterprise, constantly expands and extends the functionality of individual modules of the platform, offering clients access to more and more detailed and relevant data from the point of view of ensuring ongoing operations.

The DHL Resilience360 platform is based on an extensive network of employees and cooperation with global companies specializing in the analysis of all risk categories. The CO3 platform visualizes the current location and other detailed data on over 50,000 vehicles located in European countries in real-time, which consequently leads to the existence of a certain group of threats. They mainly result from the deliberate use of the platform to steal data or damage its activity. The theft of data from global T&L companies and their illegal publication could reduce customer confidence in the innovative tool. Obtaining detailed data by unauthorized entities on the transported goods could increase the risk of their theft or deliberate damage. Among the potential threats, one can also see the uncertainty related to legislative changes, which, in the author's opinion, may effectively hinder the flow of information and disrupt the process of its reliable evaluation.

As a result of a critical analysis of the literature on the subject and SWOT analysis, the CO3 platform and the DHL Resilience360 platform should be perceived as innovative tools that allow monitoring of the fleet of vehicles and individual incidents in global supply chains during the COVID-19 pandemic. Until now, a large number of companies operating in international markets did not realize the importance of mapping and monitoring flows within supply chains, especially in real-time. The COVID-19 pandemic has exposed the weakness of enterprises in the use of tools that ensure transparency and constant monitoring of incidents that may pose a significant threat to a given supply chain. When the CO3 platform was launched in 2019, nothing indicated any impending crisis. The outbreak of the COVID-19 pandemic turned out to be a huge challenge not only for companies from the T&L industry, but also for the creators of the platform, who had to immediately undertake the creation of tools that would ensure the continuity of these enterprises. The involvement of specialists from the logistics and IT industry made the platform an excellent tool, providing help and support for European carriers, especially through constant monitoring of the vehicle fleet and automation of

transport orders during a pandemic and the prevailing restrictions. It seems that even though the DHL Resilience360 platform was created much earlier than the global economy faced the pandemic, this proved to be an excellent tool at a time when global supply chains suffered a shock and the platform's customers needed immediate assistance in implementing emergency actions. Thanks to the constant functioning and development of the platform, global supply chains are under constant control by the analytical team, which, based on reliable data, informs its customers as early as possible. According to the author, a great opportunity for the further operation of DHL Resilience360 should be seen from the point of view of the creation of the Everstream Analytics platform.

Conclusions

Undoubtedly, the current COVID-19 pandemic initially created uncertainty in the T&L industry related to the continued functioning of the sanitary regime. For many companies, the new pandemic has unexpectedly exposed many shortcomings and a lack of awareness that ensuring the continuity of global supply chains in such a short time could be disrupted. The lack of transparency in supply chains and the inefficient flow of information made enterprises aware of the need to visualize supply chains with simultaneous mapping of critical points. Logistics platforms seem to be excellent tools for responding to the challenges of today's global supply chains, which are affected by disruptive factors.

The author of this article analyzed and assessed the CO3 platform and the DHL Resilience360 platform in terms of ensuring the continuity of supply chains in the face of the COVID-19 pandemic which has been present for over 2 years. The analysis of the literature in the field of building resilient supply chains, the analysis of reports, currently made available by the Everstream Analytics and CO3 platforms shows that the role of the platforms is to monitor in real--time the risk occurring in global and European supply chains related to the effects of global COVID-19 pandemic. Platforms are intuitive tools that, as a result of constant updates with the latest data and analyzes conducted by teams of analysts, allow them to provide their clients with many important tools. In the case of the CO3 platform, it is the constant monitoring of the vehicle fleet and orders in real-time; automation of transferred transport orders, data collection and its exposure in the form of analyzes, and cooperation with the

so-called "Guardian". The DHL Resilience360 platform provides risk monitoring, mapping and filtering of critical points, as well as the building of an alert profile. According to the author, one should look for great opportunities in such innovative, constantly updated solutions using customer feedback. The potential threats are the risk of an attempt to extort or theft of confidential data, which today constitute the most valuable link of any enterprise, and legislative changes that could lead to the data flow limitation that is essential for the functioning of the platform.

It should be emphasized that building contemporary strategies for resilient supply chains should consider not only the previously specified potential risk factors but also conduct constant monitoring of incidents that may turn into a threat on a global scale. From this point of view, it seems reasonable to conduct simulations and constantly update the tools that will play a key role in crises, allowing for dynamic decision-making based on the set priorities and the need to ensure the continuity of global supply chains.

Notes/Przypisy

[1] T&L — Transport and Logistics.

[2] At the beginning of December 2019. The coronavirus only covered the area of the Chinese city of Wuhan in Hubei province, while on March 11, 2020, the World Health Organization (WHO) announced a pandemic caused by the SARS-CoV-2 virus.

[3] Riskupulse is a tool for mapping and assessing any part of the supply chain, offering its customers access to reports, alerts and notifications. The use of these tools is to ensure timely delivery with the ability to scan every step in the supply chain.

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