



# Covid-19's Impact on Supply Chain Practices in the Republic of Serbia

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**Abstract:** *This paper focuses on supply chain practices before and after the COVID-19 pandemic. Supply chain disruptions due to COVID-19 on the supply, demand, and logistical side are thoroughly explained and presented. The paper addresses how the pandemic exposed the vulnerabilities and deficiencies of the lean, JIT global supply chain model. This paper also presents short- and long-term strategies that companies have taken to mitigate supply chain disruptions. As a contribution to the paper, results from the research on COVID-19 impacts on the Serbian economy and business, that the Serbian Chamber of Commerce has conducted, are shown. The paper aims to highlight the most important supply chain measures and strategies needed to stay competitive during any pandemic.*

## 1. INTRODUCTION

The COVID-19 pandemic emerged at the beginning of 2020. It has disrupted global activities across all economic sectors and industries. The disruptions occurred as consequences of the global lockdown measures adopted and implemented by countries to mitigate the impact of the pandemic's spread on the human population. The COVID-19 lockdown measures, according to Erhi (2020), caused production halts, restrictions on people and goods movement, border closures, logistical constraints, and a slowdown in trade and business activities. All the above-mentioned factors have led to severe supply chain disruptions (SCDs), i.e., many supply chains (SCs) worldwide (86%) have been seriously impacted by the COVID-19 pandemic, stated Van Hoek (2020). In the pandemic conditions, demand became highly unpredictable, there was a supply shortage, and suppliers could not meet delivery agreements. Some sectors witnessed a decline in demand, while others saw a sudden spike in demand, found Raj (2022). Before COVID-19, many SCs were focused on JIT (Just-in-Time) and lean concepts. JIT may result in leaner SCs and lower inventory costs, but it has been shown to be ineffective during times of crisis, according to Belhadia (2021) and Zhu (2020). The way COVID-19 has impacted global SCs has increased the importance of risk management and mitigation strategies. SC strategies, designs, and dependencies across organizations need to be reevaluated to avoid improvised reactions to future natural disasters and create resilient SCs. Oldekop (2020) shown that work from home, i.e., online work, and digitally organized logistics have mitigated the negative impacts of COVID-19. The questions are 1) what strategies can deal most effectively with which impacts, and 2) what are the challenges and requirements associated with the implementation of resilience strategies?

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## 2. SUPPLY CHAIN DISRUPTIONS

**Craighead (2007)** defined SCDs as unplanned and unpredicted events that disturb the flow of goods and services across the SC. According to **Mishra and Sharma (2021)**, the effects of COVID-19 on global SCs have affected three different sides: supply, demand, and logistics.

### 2.1. Supply Shocks

According to **Panwar (2022)**, supply shortages during the pandemic have been both a cause and a manifestation of SCDs. Due to social distancing and global lockdowns, the movement of people and business operations were affected. This has led to an unexpected change in the supply of products. Many production facilities were closed because of the lockdown. As a consequence, manufacturers and retailers have not had access to enough raw materials and products for their businesses, or the lead times have become too long. Production and manufacturing capabilities decreased, so supply shocks occurred, found **Magableh (2021)**. Most companies were not prepared to meet new demands or to deliver at new demand points. Even worse, companies could not sustain their normal production levels. Many factory workers, especially those in developing countries, have returned to their hometowns. The factories became devoid of both raw materials and workers.

### 2.2. Demand Shocks

Demand shocks can be defined as sudden changes in demand. The COVID-19 pandemic has triggered the most dramatic consumer behavior and consumption patterns in recent history. Due to health reasons, demand for household cleaning products, disinfectants, vitamins, health supplements, and face masks spiked up, whereas demand for home hair colors and similar products increased due to closed businesses. Working from home became the norm, thus, demand for at-home caffeine products, and home-office equipment sharply increased. Even for products where demand has not changed drastically, points of demand have. Also, consumers tried to reduce the risk of exposure to the virus and decrease demand for products and services that involve close contact with others, claimed **Kiers (2022)**.

### 2.3. Logistical Side

The restrictions on the movement of people and goods have led to a decline in exports and imports. In some countries, vessels that were entering the country's waters were required to observe a mandatory 14-day quarantine period before clearing or discharging goods. This has impacted the shipment, and the arrival of goods found **Erhie (2020)**. Consumers were unaware of a supply shortage since information and data from partners were non-transparent. This has led to an increased volume of orders. Customers are usually not willing to wait for long deliveries, especially when substitute products are available. COVID-19 has led to restrictions on the transportation and movement of goods, especially through areas that are under restricted or containment categories. Since public transportation hasn't yet been reopened, there were problems with transporting people to work. Social distancing measures were the cause; available vehicles could not be utilized at full capacity. These transportation issues have led to unprecedented delays in the delivery of consignments to end customers and can disturb the smooth functioning of SC, found **Raj (2022)**. During the pandemic, consumer optimism has declined across the country, and it is expected that consumers will continue to reduce their spending, claimed **McKinsey (2020)**. This could result in

overstocking of materials at warehouses waiting for demand to pick up at a future date. Overstocking for indefinite periods will lead to potential damages, perishability issues, and working capital blockages, leading to liquidity issues across SCs. During the wake of the pandemic, most organizations have responded to customer requirements to minimize physical touchpoints and are seen to be redesigning their SCs. To attract customers, brands were either choosing to go with fully captive in-house delivery services or integrations with last-mile delivery partners. Even if products do make it to the point of delivery, the transporter may have to navigate through an affected zone and select an alternate route, leading to delivery delays.

### 3. MITIGATION STRATEGIES

To restore competitiveness, organizations must redesign their supply chain management (SCM) models. [Kiers \(2022\)](#) claimed that as of mid-October 2021, companies are focused on establishing more resilient SCs. Short-term and long-term strategies regarding supply, demand and logistical shocks are presented below.

#### 3.1. Supply Side

[Raj \(2022\)](#) identified inconsistency of supply as one of the most prominent challenges that is related to the uncertainty of supply from upstream vendors, irregular and indefinite lead times, and price volatility. For [Paul \(2020\)](#), a short-term strategy for mitigating supply disruption can be the identification of crucial components and raw materials, which carry a major interruption risk. Companies should explore alternate vendors to ramp up production in case of sudden surges in demand. Also, a retrospective analysis of the unpredictable demand and available supply can be used. That way, optimum manufacturing conditions for future batches or cycles can be reinstated. In the long-term, companies need to put together and periodically revisit their Business Continuity Plan (BCP) stated [Queiroz \(2020\)](#). According to [Belhadia \(2021\)](#), BCP includes strategies for risk mitigation that are aimed toward setting up alternate suppliers closer to the main manufacturing facility to prevent inconsistency in the supply of critical raw materials. Companies are moving from selecting the most cost-effective vendor to the most responsive vendor with the shortest lead times. Companies started engaging in value-sharing with their suppliers, allowing them to keep a portion of the profit. [Panwar \(2022\)](#) found that due to these benefits, suppliers are more inclined to prioritize the company's interests in times of crisis, thereby improving SC resilience. Resources, information, and technology sharing between different stakeholders, including firms, suppliers, and customers, is crucial for creating synergy and recovering from disruption to remain competitive. Diversification and dual sourcing are also possible strategies. Companies were warned not to rely too heavily on any single source, thereby diversifying their risks. Having multiple suppliers for a product reduces the supply risk, as stated by [Kiers \(2022\)](#). Another possible strategy is the vertical integration of SCs. "Vertical integration allows a company to streamline its operations by taking direct ownership of various stages of its production process instead of relying on external suppliers", said [Hayes \(2022\)](#).

#### 3.2. Demand Side

[Gartner \(2020\)](#) found that changing patterns in buying behavior combined with misinformation on goods have led to demand disruptions. An immediate measure would be to provide end-to-end transparency to customers. [Mishra \(2021\)](#) stated that during times like the COVID-19 pandemic, companies need to reassure their consumers that their products are being handled safely

and hygienically across the value chain. Companies should provide omni-channel options to customers who prefer online shopping by partnering with third-party delivery agents who can provide local last-mile deliveries, according to [Raj \(2022\)](#). In the long term, the main company would need to identify, partner, and collaborate with key customers. According to [Sodhi \(2021\)](#), a more robust and sustainable business model for last-mile delivery should be used as a long-term strategy by creating its own omnichannel distribution network to avoid future dependencies. This would ensure the existence of adequate channels for customers to order products, leading to stabilized demand, found [Raj \(2022\)](#). Through the vendor-managed inventory (VMI) model, inventory level and demand data are shared between the chain's members via electronic data interchange (EDI). [Sudan \(2021\)](#) found that this can help in understanding the transportation disruption for upstream and downstream partners in crisis, and can also help in analyzing demand and supply disruptions caused by transportation disruptions. Companies are planning to strengthen their demand forecasting capabilities. The role of machine learning tools, which can pick up changes in retail trends in a short time and swiftly adjust demand projections, is crucial.

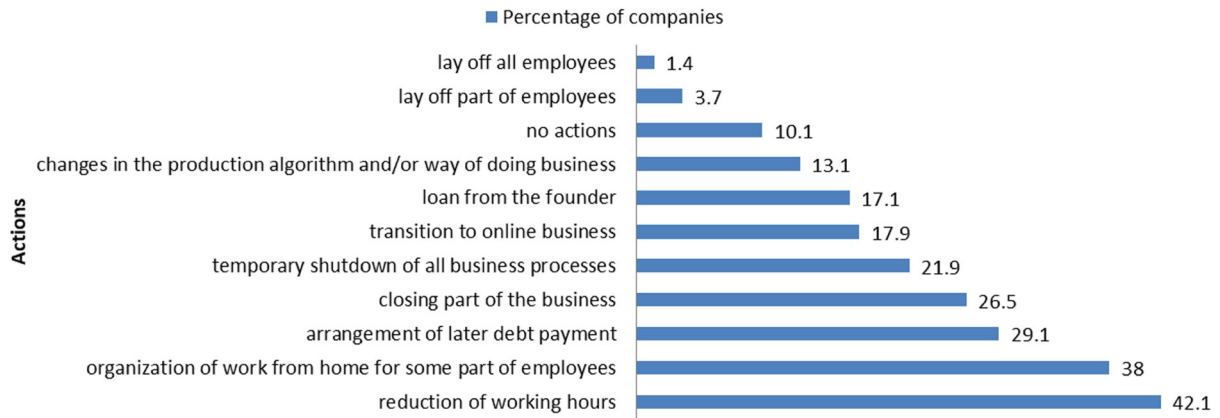
### 3.3. Logistical Side

Regarding the logistical side, vehicle unavailability and delays are the most important issues. As a short-term solution, companies should use vehicle tracking devices and promote greater transparency to maintain a healthy mix of a dedicated and market-owned fleet of vehicles. [Raj \(2022\)](#) found another solution in the creation of multiple channels to distribute products to customers, making the distribution network more resilient. In the long term, for larger companies that possess their own fleet, considering that transportation is the backbone of any SC, lifeline maintenance of the fleet should be done periodically. Companies should also consider using autonomous vehicles for fixed point-to-point movements that do not require human drivers, which is crucial during times like the COVID-19 pandemic. Companies should focus on implementing cutting-edge SC transparency solutions into their transportation system operations for quick response to change using real-time data during the crisis. [Sudan \(2021\)](#) found Internet of Things (IoT) sensors to have been a crucial asset for tracking shipments. Blockchain ensures transparency and trust in the SC. It solves the problem of counterfeit goods since products can be traced from the first to the last point of the SC. Smart contracts allow fast payments once the agreed terms are met, said [Erhie \(2020\)](#). Through the use of IoT sensors, information on the arrival of raw materials to production lines or of finished goods in warehouses is updated in real-time; therefore, companies can manage stock levels more precisely. Smart IoT sensors can be used to manage planned and predictive maintenance, which leads to reduced downtime and cost savings. Localizing SCs will lead to a reduction in the lead time. This leads to higher responsiveness to disruptions, according to [Kiers \(2022\)](#). It was shown that e-commerce increases the average firm's value in a short period. Opening online distribution channels would be valuable for firms even without pandemic issues. Companies are moving from traditional SCs toward digital supply networks (DSNs). DSNs include the free flow of information and end-to-end transparency, dexterity, and optimization of the SC. "Digitization ensures resilient global SCs," claimed [Kiers \(2022\)](#).

## 4. RESEARCH

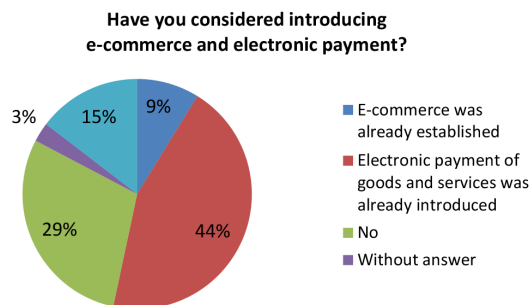
The Chamber of Commerce and Industry of Serbia researched COVID-19's impact on the economy and business. The research was conducted in three phases. The first phase took place between March 26 and March 31, 2020, at the beginning of the crisis in Serbia, while the third

phase was conducted between June 8 and June 15, after the quarantine. The number of business entities that participated in the first phase of the research was 806, while in the third phase, that number was 396. In this paper, the focus is on the actions and strategies that companies have taken or were planning to take to tackle the pandemic. Actions or strategies that companies took or were planning to take in the first phase of the research, i.e., at the beginning of the crisis, are shown in Figure 1. Regarding e-commerce, the results are presented in Figure 2.

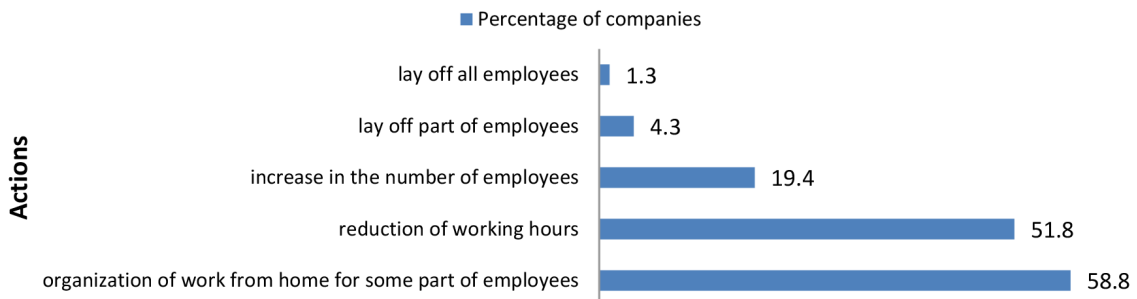


**Figure 1.** Share of companies that have taken certain actions (n=806) – phase 1

At the start of the pandemic, approximately 9% of companies studied had already established e-commerce. A large number of companies (around 44%) have already established electronic payment, while 29% were not planning to go digital. In Figure 3, strategies that companies have taken or were planning to take after the quarantine, in the third phase of the research, are shown.



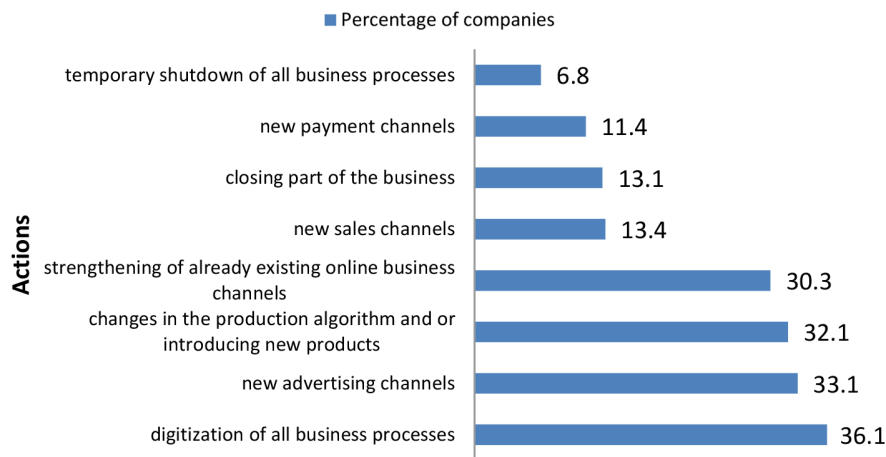
**Figure 2.** Results regarding e-commerce – phase 1



**Figure 3.** Share of companies that have taken certain actions (n=396) – phase 3

Even though the percentage of companies that are laying off part or all of their employees hasn't changed much, since the quarantine, some of the companies (19.4%) have hired new employees. The measures taken by the majority of the companies after the quarantine are a reduction of

working hours (51.8%), and work from home for some employees (58.8%). The same measures were also the most prominent at the beginning of the pandemic. Figure 4 depicts the measures taken or planned to be taken during the third phase.



**Figure 4.** Actions regarding business model – phase 3

About 30% of companies that are already digitized and are planning to strengthen their online business channels endured the pandemic more easily. The majority of the remaining companies emphasize the use of digital solutions as their recovery paths. A third of companies plan to open new advertising channels, digitize business processes, and/or adapt their product portfolios to the current demand situation. Around 13% of companies have opened a webshop in response to the crisis or plan to do so.

## 5. CONCLUSION

The COVID-19 pandemic has exposed the vulnerabilities and deficiencies of the lean, JIT global SC model. Even though COVID-19 has had a mostly negative impact on the global economy, it has also highlighted the importance of digitalization. “Go digital to survive” is one of the major lessons learned from the COVID-19 pandemic. Companies that were already digitized endured the pandemic more easily. The most reoccurring immediate measures that were taken at the beginning of the pandemic in the Republic of Serbia were the reduction of working hours and the organization of work from home for some employees. The same actions were the most frequent after the quarantine. The most frequent measures regarding the business model that were taken or were planned to be taken in the third phase are the digitization of all business processes, new advertising channels, and changes in the production algorithm and or introduction of new products.

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