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DISRUPTIONS IN MANUFACTURING AND ELECTRONICS SECTORS AMID GLOBAL CRISES: IMPLICATIONS FOR COMPETITIVENESS

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Global crises, including the COVID-19 pandemic, natural disasters, and geopolitical events, have profoundly affected the competitiveness of industrial enterprises worldwide. These events have exposed vulnerabilities in global supply chains, disrupted production, and influenced cost structures, ultimately challenging companies' resilience and strategic adaptability.

The COVID-19 pandemic highlighted long-standing weaknesses in global supply chains, particularly in manufacturing, electronics, medical supplies, food, and logistics. Production halts and supply shortages significantly affected major corporations such as Toyota and Apple, while the semiconductor shortage further delayed the delivery of electronic products. The medical sector faced critical shortages of personal protective equipment (PPE) and ventilators, and food supply chains were disrupted due to lockdowns and plant closures. Logistics bottlenecks, including reduced shipping and air transport capacity, increased delays and costs globally. These disruptions emphasized the fragility of highly integrated global value chains and highlighted the urgent need for more resilient production and distribution systems.

Natural disasters have similarly challenged industrial competitiveness. The 2011 Great East Japan Earthquake disrupted production in automotive and electronics industries, leading to increased costs and supply chain restructuring. Hurricane Maria in Puerto Rico severely affected pharmaceutical and medical device production, triggering global supply shortages and forcing companies like Pfizer to seek alternative production bases. The 2011 Thailand floods halted production in electronics and automotive sectors, causing supply delays, higher costs, and workforce challenges. Such events reveal the dependency of global industries on concentrated production locations and the need for diversified supply networks.

Geopolitical tensions, such as the Russia-Ukraine conflict and the US-China trade war, have further affected global industrial enterprises. The Russia-Ukraine conflict caused energy price surges and disrupted food and raw material supplies, impacting

energy-intensive and food-processing industries. Similarly, the US-China trade war prompted companies to relocate production to avoid tariffs, increasing operational costs and complicating market access. Security incidents in critical shipping routes, such as the Red Sea, have also contributed to rising transportation costs and global supply chain inefficiencies.

Table 1. Impact of Global Crises on Industrial Enterprises

Crisis Type	Key Examples	Impact on Industrial Enterprises	Severity
Pandemic	COVID-19 (2020–2021)	Production halts, supply chain disruptions, demand fluctuations	High
Natural Disasters	2011 Japan Earthquake, Hurricane Maria, 2011 Thailand Floods	Factory shutdowns, supply delays, workforce shortages	High
Geopolitical Events	Russia-Ukraine conflict (2022), US-China trade war, Red Sea security incidents	Rising production costs, trade restrictions, rerouting supply chains	Medium–High
Logistics Disruptions	Port blockages, air freight reductions	Cargo delays, inventory shortages, increased transportation costs	Medium

Source: completed by authors based on [1-3].

The global crises summarized in Table 1 have underscored the importance of resilience, diversification, and adaptive strategies in industrial enterprises. Companies must consider integrated approaches that combine risk mitigation, supply chain restructuring, and investment in innovation to maintain competitiveness in the face of pandemics, natural disasters, and geopolitical disruptions. The lessons learned highlight the need for both policy support and strategic enterprise-level interventions to ensure the stability and continuity of industrial production globally.

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