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IMPACT OF GLOBAL CONFLICTS AND POWER DYNAMICS ON TRADE AND COMMODITIES

Abstract

The paper "Impact of Global Conflicts and Power Dynamics on Trade and Commodities" examines the transformative effects of geopolitical tensions and global power shifts on international trade and commodity flows. It argues that long-standing supply chain models and traditional management practices are being upended by rapidly evolving global conditions — including conflicts such as the war in Ukraine and regional instabilities— - that are disrupting established trade routes and forcing industry to seek alternative sources of raw materials. The authors examine the evolution from Industry 4.0 to Industry 5.0, emphasizing the integration of digitalization, intelligent automation and improved human–machine collaboration to create more resilient and flexible production systems. The study highlights that the depletion of domestic resources in developed countries, combined with increasing reliance on distant supply chains, has increased vulnerability to geopolitical and economic shocks. In response, companies are urged to adopt flexible, digitally integrated management systems that enable real-time monitoring and adaptive decision-making. The paper proposes strategic measures such as the use of advanced logistics information systems, intelligent robotics, sustainable and circular economy practices, and modular organizational structures that can be reconfigured to mitigate risk. It also emphasizes the importance of investing in human capital and promoting global connectivity to ensure continuous and efficient flows of goods in the face of ongoing international challenges.

Keywords: global conflict, trade, digital inclusion, supply chain resilience, sustainability

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Introduction

The international landscape is in the midst of profound change. International events, accelerated globalization and a realignment of global power relations have redefined the way industry operates. Traditional manufacturing and service companies, once based on relatively stable supply chains, are now forced to continually adapt to dynamic market conditions and shifting geopolitical forces. The post–-19th century era, characterized by widespread economic and logistical disruption, has shown that the old status quo may never be restored (Zelenika and Pupovac 2008, 88–97). In recent years, nations have reassessed their economic, trade and military capabilities. The outbreak of war in Ukraine, the ongoing conflicts in Sudan and the tensions between Israel and Palestine have contributed to a significant realignment of international relations. These conflicts have not only strained relations between major global players such as the United States and China, but have also affected the alliances between NATO, the European Union and Russia (Wildemann 2009). At the same time, numerous other countries -including China, India and several smaller nations - are using control over raw materials, energy resources and labor to assert their economic and military strength. This emerging bipolarity is reflected in the fact that Eastern countries, with their wealth of natural resources, are gradually adapting their economic models to Western practices characterized by advanced technology and financial capital. Western nations such as Europe, the United States, Canada and Australia continue to promote democratic values and market-oriented reforms while developing strategic alliances that often place them in close proximity to opposing regions (Zelenika 2010, 227–247). This dynamic has a significant implications for global flow of goods and the overall management of industrial systems. A key consequence of these changes is the depletion of mineral and energy reserves in industrialized regions. Over decades of intensive production, European Union countries have consumed huge amounts of raw materials and energy, making them increasingly dependent on long-distance supply chains - from the Far East or other distant markets - to maintain production.

The disruption of traditional supply routes, such as via the Suez Canal, has exacerbated this dependency as raw materials have had to be rerouted around Africa, driving up the cost of materials, semi-finished goods and energy sources (Zelenika 2008). Against this turbulent backdrop, political, economic, trade and military dynamics are driving a rapid evolution of industrial working models. In Europe, for example, the "Green Europe" initiative has emerged as a comprehensive strategy that focuses on the integration of green energy and the efficient supply of raw materials. This initiative aims not only to enable more sustainable production processes, but also to bring high-quality products to market quickly. As the industry searches for innovative solutions—ranging from new models and energy sources to alternative forms of mobility- manufacturing and

service companies are forced to research and implement advanced management systems that can accommodate these rapid changes. Logistics has proven to be a crucial factor in this transformation. It now plays a central role in coordinating production, managing supply chains and ensuring that goods reach their destination markets efficiently and cost-effectively. The evolving global flow of goods requires logistics management to continuously look for innovative solutions, new ways and alternative strategies to reduce waste of time, space and labor. At its core, logistics management must remain adaptable to the changing dynamics of the manufacturing and service industries (Zelenika and Pupovac 2008). This paper examines these multifaceted changes in detail. It is organized as follows. Section 2 discusses the adaptability of management to rapid change and how geopolitical and technological forces have necessitated the evolution of production and logistics models. Section 3 proposes specific changes and improvements to modern management paradigms, including digital integration, intelligent automation and sustainable practices. Section 4 provides an overview of effective research methods for studying commodity flows and management systems. Section 5 examines the direct impact of wars and capital interests on commodity supply, while Section 6 explores broader implications for organizational management. Section 7 provides a detailed discussion and analysis of the findings, and Section 8 concludes with final recommendations for policy makers and industry leaders.

1. Adaptability of management to change production and supply chains and its reconfigurability

In today's interconnected world, management systems must be flexible enough to respond to both foreseeable trends and unforeseen disruptions. Rapid technological advances and evolving geopolitical relationships have necessitated a significant shift in traditional management practices. This section explains how management has adapted to these changes and identifies the new trends that are shaping modern manufacturing and logistics. In the past, production systems relied on stable supply chains with predictable flows of raw materials and finished goods. However, with increasing globalization, supply chains have become more complex, spanning multiple regions and involving a multitude of actors. Zelenika and Pupovac (2008, 88–97) argue that the integration of sophisticated informationand logistics systems has become essential for monitoring and adjusting these flows in real time. Modern management practices now incorporate digital tools that facilitate rapid reconfiguration of supply chains in response to disruptions, whether due to geopolitical tensions or natural disasters.

1.1. The Role of digitalization and information systems through emerging paradigms of industry 4.0 and 5.0

LIS) and logistics management systems (LMS) enable the tracking of goods flows in real time and provide managers with the data they need to make quick and informed decisions. These systems are the basis for developing flexible supply networks that can respond dynamically to global changes (Zelenika and Pupovac 2008). In addition, the integration of natural and artificial intelligence into these systems improves their ability to predict disruptions and optimize production schedules. The development from Industry 4.0 to Industry 5.0 represents a significant paradigm shift in production and logistics. While Industry 4.0 is characterized by digitalization, automation and cyber-physical systems, Industry 5.0 places greater emphasis on human–machine collaboration and sustainability. Westkämper et al. (2013) have shown that the convergence of digital technologies and intelligent systems creates production environments in which machines and people work together seamlessly. This new era is not only about technological progress, but also about developing management systems that can balance efficiency with environmental and social considerations.

1.2. Addressing global supply challenges in corelation of workforce and organizational adaptation

One of the most pressing challenges of modern management is the depletion of critical raw materials in developed economies. European industries, for example, have exhausted many of their domestic reserves and are forced to rely on external sources from distant regions. The disruption of traditional supply routes, such as the recent blockade of the Suez Canal, has further highlighted the vulnerability of these systems. As a result, management practices must now include contingency planning and diversification strategies to ensure a stable flow of materials (Zelenika 2008). Finally, the rapid pace of change requires companies to continuously invest in workforce development and organizational restructuring. Hartmann (2015) and Schäfers-Hansch (2015) emphasize that with increasing automation and digital technologies, traditional job roles are changing. Managers must now focus on developing new skills in employees to ensure that the workforce is able to work in a highly digitized environment. This includes not only technical training, but also fostering a culture of continuous learning and adaptation.

2. Proposals for changes, improvements and enhancements in digital integration

The unprecedented challenges of today's global marketplace require innovative solutions that go beyond conventional management practices. In this section, a number of strategic improvements are proposed to increase the resilience, efficiency and sustainability of production and logistics systems. One of the key recommendations is the comprehensive integration of digital technologies throughout the supply chain. Advanced digital platforms such as cloud-based LIS and LMS are critical for real-time monitoring, data analysis and decision-making (Zelenika and Pupovac 2008). Mayer et al. (2018) suggest that the integration of lean management principles with Industry 4.0 technologies can create a synergistic effect that minimizes waste and optimizes production processes. This integration enables companies to reduce operating costs while increasing responsiveness to market fluctuations.

2.1. Intelligent automation and robotics

Another important proposal is the introduction of intelligent automation. The use of robotic systems, automated guided vehicles (AGVs) and other intelligent machines has already shown significant benefits in increasing efficiency and reducing human error. Mehami et al. (2018) have shown that intelligent AGVs, when integrated into production lines, can optimize material handling and minimize downtime. Similarly, Črešnjak and Bašič (2017) emphasize the importance of lean production systems - such as Kanban which, when complemented with digital controls, can streamline operations and improve inventory management.

2.2. Sustainable and circular economy practices

Sustainability must be at the heart of modern management strategies. Uhernik and Murtič (2019) argue for the introduction of circular economy practices that emphasize recycling, resource efficiency and waste prevention. In a context where developed economies are facing resource depletion, sustainable practices not only mitigate environmental impacts but also reduce dependence on volatile global commodity markets. Initiatives such as the European "Green Europe" project serve as a benchmark for how industry can integrate renewable energy sources and sustainable production processes into their operations.

2.3. Modular and adaptive organizational structures with emphasis on strengthening cross-border connectivity

Given the volatility of global supply chains, companies need to develop modular management structures that can be quickly reconfigured in response to external shocks. Raspor (2021) recommends that companies invest in flexible supply networks that include diversified sourcing and contingency planning. Adaptable organizational structures facilitate rapid response to disruptions and allow companies to shift their production strategies as needed. Global challenges require global solutions. Improving digital connectivity and fostering international collaboration are essential for managing complex supply chains. Božičnik (2020) emphasizes that improved cross-border communication networks enable better coordination between international partners. This cooperation is crucial for sharing best practices, aligning production schedules and jointly managing disruptions in commodity flow of goods.

2.4. Investment in human potential

No technological progress can reach its full potential without a well-trained workforce. Continuous professional development and training are essential to equip employees with the skills needed to operate advanced digital systems and automated machines (Hartmann 2015). Investment in human capital not only supports the transition to Industry 5.0, but also ensures that companies can remain competitive in a rapidly evolving market.

3. Effective and mixed-methods research

Understanding and managing the rapid changes in commodity flows requires a robust research framework that combines qualitative and quantitative approaches. This section presents the effective research methods used to investigate the challenges of modern management. A mixed methods approach provides a comprehensive understanding by combining in-depth qualitative analysis with rigorous quantitative data. Qualitative methods - such as expert interviews, case studies and ethnographic research - provide valuable insights into the real-world challenges of managing complex supply chains (Raspor 2021; De Lestrange 2017). Quantitative methods, including statistical analysis of production data and cost metrics, allow researchers to model the impacts of different management strategies over time (Nyhuis and Wiendahl 2009).

3.1. Longitudinal studies, case study analysis and comparative analyses

Long-term data tracking is essential to identify trends and evaluate the effectiveness of new management models. Longitudinal studies, such as the one by Murtič and Jankovič (2019), provide insight into how commodity flows and production efficiency evolve over time. Such studies help to predict future challenges and develop predictive models that serve as a basis for adaptive management strategies. Detailed case studies are invaluable in demonstrating the practical application of theoretical models. Research on the introduction of digital automation and lean manufacturing techniques provides concrete examples of how companies can achieve significant cost reductions and efficiency gains. The research by Mehami et al. (2018) and Črešnjak and Bašič (2017) exemplifies how case studies can shed light on the benefits of integrating advanced technologies into traditional production systems. Comparative research that evaluates different management approaches in different industries provides crucial insights into the strengths and weaknesses of each model. Such analysis can highlight best practises and guide the development of more resilient and adaptable management approaches. The work of Stiglitz (2021) and Zelenika (2010) underscores the importance of comparative analysis in understanding the global economic landscape.

4. The Impact of wars and capital interests on commodity flows in connection to geopolitical realignment and supply disruptions

Geopolitical conflicts and the strategic maneuvering of global capital are among the most disruptive forces affecting commodity flows today. This section examines how wars, regional instabilities and capital shifts affect the supply and distribution of commodities and manufactured goods The war in Ukraine, along with other regional conflicts, has a significant impact on global commodity flows. Zelenika (2010, 227–247) describes in detail how geopolitical tensions can disrupt established supply routes and force industry to look for alternative sources of raw materials. For example, the disruption of maritime corridors - exacerbated by the rerouting around Africa - has led to increased transportation costs and logistical difficulties (Raspor 2021). These challenges underscore the need for management systems that are robust enough to adapt to such external shocks.

4.1. Capital interests, market volatility in relation to digital and robotic migration strategies

Capital flows and the strategic interests of multinational corporations also play a decisive role in shaping commodity markets. Stiglitz (2021) discusses how rapid shifts in global capital can lead to volatile commodity prices and unpredictable supply structures. Bergmann (2007) also emphasizes that management must keep an eye on the changing priorities of global capital, which often determine production investments and the configuration of supply chains. In the automotive industry, for example, significant production delays occur when capital shifts disrupt the continuous supply of critical components (Jankovič and Murtič 2019). To counteract these disruptions, many companies are increasingly turning to digital and robotic systems. Murtič and Uhernik (2018) show that the integration of intelligent robotic systems in logistics can improve operational efficiency and provide a buffer against the negative effects of geopolitical instability. Cyber-physical systems, as described by Seitza and Nyhuisa (2015), allow managers to monitor flows of goods in real time and proactively adapt strategies to mitigate the impact of sudden disruptions.

5. The impact of international changes on organizational management through reconfiguration of global supply chains

Global political, economic and military changes have far-reaching consequences for the way companies manage production and logistics. This section examines the ways in which international changes are forcing companies to rethink their management structures and operational strategies.The evolution of global supply chains requires that organizations adopt flexible, digitally integrated models capable of withstanding external shocks.As Zelenika (2008, 407–491) and Božičnik (2020) have noted, advanced technological infrastructures must now accommodate rapid changes in supplier networks and transportation routes. In response, many companies have turned to enterprise resource planning (ERP) and business intelligence (BI) systems that provide real-time insights into supply chain performance (Murtič and Jankovič 2018).

5.1. Digital transformation, cross-border connectivity, risk management and organizational resilience

The digitization of administrative systems has enabled unprecedented cross-border connectivity. De Lestrange (2017) emphasizes that overcoming traditional silos in information sharing is essential for effective global management. By using

digital platforms, companies can ensure seamless communication between international partners, improving their ability to coordinate complex logistics networks. Effective risk management has become a cornerstone of modern business strategy. Companies need to create robust contingency plans that include diversified sourcing strategies, scenario planning and agile production models. As Murtič and Jankovič (2019) show, companies with proactive risk management systems are better able to mitigate shocks and maintain continuity of production even in times of significant geopolitical or economic disruption.

6. Managing Processes in Evolving Logistics in connection to digitalization and information-logistics systems

The evolution of logistics is at the heart of adapting to global changes in manufacturing and supply chain management. In this section, you will learn how modern logistics processes have changed in response to digitalization, automation and the need for greater flexibility. Digitalization has fundamentally changed traditional logistics processes. Zelenika and Pupovac (2008, 88–97) describe how advanced informationand logistics systems enable continuous monitoring and real-time decision making, significantly reducing manual errors and inefficiencies. Modern warehouse management systems (WMS) now use cloud computing, sensor technology and mobile applications to track inventory and optimize distribution networks (European Commission 2020).

6.1. Autonomous systems, intelligent robotics, multimodal transport as important sustainability factors

The introduction of autonomous systems such as palletizing robots and intelligent AGVs has revolutionized material handling and transportation. Mehami et al. (2018) demonstrate that intelligent automated guided vehicles (AGVs) reduce downtime and labour costs while increasing overall production efficiency. When combined with lean manufacturing methods such as Kanban (Črešnjak and Bašič 2017), these technologies provide a robust framework for streamlining logistics operations. In today's global marketplace, the ability to efficiently manage multimodal transportation is critical. Flexible transportation models that integrate road, rail, sea, and air logistics are critical to mitigate the risks associated with geopolitical disruptions (Raspor 2021). In addition, sustainability considerations are increasingly influencing transportation decisions. Uhernik and Murtič (2019) argue that incorporating renewable energy sources and circular economy practices

into logistics not only reduces environmental impact but also increases supply chain resilience.

7. Managing change through intelligent systems and cyber-physical systems and digital twins

The rapid development of digital technologies has ushered in a new era of intelligent management systems that are redefining production and logistics processes. This section examines the role of cyber-physical systems, artificial intelligence, and human–machine collaboration in these changes. Cyber-physical systems integrate physical production processes with digital control and monitoring mechanisms, enabling the creation of digital twins that mirror real-world operations. Seitza and Nyhuisa (2015) argue that these systems allow companies to simulate production environments, predict potential disruptions and optimize workflows in real time. By using digital twins, managers can test and refine operational strategies without incurring the costs associated with physical experiments.

7.1. Artificial intelligence and lean manufacturing in relation to human-machine collaboration

Artificial intelligence (AI) is becoming increasingly central to modern management. Mayer et al. (2018) suggest that combining AI with the principles of lean manufacturing can lead to significant increases in efficiency and reductions in waste. AI-powered predictive analytics enable companies to forecast demand, optimize inventory levels and streamline production schedules. This not only improves overall productivity, but also enables a more agile response to market changes. The success of intelligent systems depends on effective collaboration between human operators and automated systems. Hartmann (2015) and Schäfers-Hansch (2015) emphasize that the changing nature of work in Industry 4.0 requires new forms of leadership and collaboration. By integrating human knowledge with the precision of automated systems, companies can optimize decision-making processes, improve product quality and promote innovation.

8. Management adaptation to changes in commodity flows and optimization of supply networks

The modern global economy is characterized by rapid shifts in commodity flows triggered by geopolitical disruptions, capital movements and technological

innovations. This section examines how management systems can adapt to these challenges and ensure a stable supply of raw materials and products. Companies need to design supply networks that are both flexible and resilient in the face of uncertainty. Zelenika (2010, 227–247) and Raspor (2021) emphasize that diversifying the supplier base and incorporating contingency plans are essential strategies. Digital platforms that provide real-time insights into supplier performance and inventory levels allow managers to quickly reconfigure supply chains in the event of disruptions.

8.1. Organizational innovation, risk mitigation in relation to sustainability as a strategic imperative

Proactive risk management is critical to minimizing the impact of external shocks. De Lestrange (2017) suggests that organizations adopt diversified sourcing strategies and comprehensive scenario planning to mitigate risks. In addition, continuous professional development ensures that employees are equipped to deal with new technologies and rapidly changing operational contexts. This holistic approach to risk management enables companies to maintain continuity of production even in times of significant volatility. Incorporating sustainable practices into management strategies not only addresses environmental concerns but also increases economic resilience. Uhernik and Murtič (2019) argue for the introduction of circular economy models that emphasize resource efficiency and waste avoidance. Such models reduce dependence on volatile commodity markets and create more robust supply chains that are less susceptible to external disruptions.

9. Discussion

The comprehensive overview in this paper shows that managing commodity flows in today's global economy is a multifaceted challenge. The convergence of rapid digitalization, geopolitical turbulence and changing capital dynamics requires companies to adopt integrated, adaptive management systems. Our synthesis of the literature - from the foundational insights of Zelenika and Pupovac (2008) to contemporary analysis by Murtič and Jankovič (2019, 2024) and others, shows that there is no single solution. Instead, successful management requires a holistic approach that includes the following

a) Advanced digital integration: using comprehensive digital platforms that enable real-time monitoring and adaptive decision making.

b) Intelligent automation: Leveraging robotics, AI and cyber-physical systems to streamline production and increase efficiency

c) Sustainable practices: Utilizing circular economy principles and renewable energy solutions to build resilient supply chains.

d) Modular organizational structures: Developing flexible, reconfigurable management systems that can quickly adapt to external disruptions.

e) Global connectivity: promoting cross-border collaboration and digital integration to ensure the continuity of goods flows.

For policy makers, these findings suggest that supportive regulatory frameworks and investment in digital infrastructure are essential for sustainable economic growth. For industry leaders, the challenge is to balance technological innovation with sustainable practices and proactive risk management.

New research directions include further empirical studies to quantify the long-term benefits of integrated digital and intelligent systems and comparative analysis of different management models in different industries. The evolving interplay between geopolitical shifts, capital dynamics and technological advances remains fertile ground for future research.

10. Concluding thoughts and author recommendations

In summary, the rapid evolution of management practices in production, logistics and service systems is driven by the complex interplay of globalization, technological innovation and geopolitical dynamics. As industry navigates the post–-19th century landscape, traditional models are giving way to integrated, agile and sustainable systems that can adapt to changing commodity flows and global disruptions.

The key conclusions of this study are as follows:

1. Enhanced Digital Integration:

Organizations need to invest in state-of-the-art digital platforms — such as LIS and LMS — to enable real-time monitoring and adaptive decision making. The work of Zelenika and Pupovac (2008) highlights the importance of such systems for effective supply chain management.

2. Introduction of intelligent automation:

The integration of robots, AGVs and AI-driven analytics can optimize production processes, reduce waste, and minimize the impact of external disruptions. Empirical evidence from Mehami et al. (2018) supports the benefits of these technologies.

3. **Focus on sustainability:**

Incorporating circular economy practices and renewable energy solutions into production and logistics not only addresses environmental concerns, but also increases supply chain resilience. Uhernik and Murtič (2019) make a strong case for sustainable management strategies.

4. **Modular and adaptable management structures:**

Flexible organizational structures and diversified sourcing strategies are crucial for coping with rapid changes in commodity flow of goods. Raspor (2021) and De Lestrange (2017) emphasize the need for a proactive risk management framework.

5. **Strengthening global connectivity:**

Improving cross-border communication and collaboration through digital technologies is essential for coordinating complex international supply chains. Božičnik (2020) highlights the importance of global connectivity in the modern transportation industry.

6. **Investment in human potential:**

Ongoing training and professional development are critical to ensure that the workforce can effectively manage and operate new digital and automated systems. As Hartmann (2015) and Schäfers-Hansch (2015) point out, human–machine collaboration is a cornerstone of Industry 4.0 and beyond.

In summary, the development of management practices in the face of a bipolar global economy requires a comprehensive approach that integrates technological innovation, sustainable practices, and adaptive organizational structures. These measures will help industries not only survive but thrive amid ongoing global disruptions. For researchers to quantitatively assess the impact of these integrated systems on the long-term resilience of supply chains and to develop predictive models that can guide management strategies. For policy makers and industry practitioners, fostering collaboration, investing in digital infrastructure, and promoting sustainable practices are important steps towards a resilient global economy. The research findings presented in this paper provide a solid foundation for understanding the dynamic challenges facing modern manufacturing and logistics. As global markets continue to evolve, the continuous adaptation and innovation of management practices will remain central to maintaining competitive advantage, ensuring the efficient flow of goods, and ultimately supporting economic progress and sustainability.

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