Chapter 3
Complexity and Coordination:
Managing Supply Chain Risks in Global Value Chains

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ABSTRACT

Global supply chains are increasingly intricate due to globalization, technological progress, geopolitical conflicts, and environmental unpredictability. Effectively managing risks in Global Value Chains (GVCs) necessitates a proactive strategy that incorporates resilience, digital transformation, collaboration, and sustainability. This book examines critical supply chain risks, encompassing geopolitical,

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economic, operational, environmental, and technological disruptions, and offers strategic solutions like blockchain for transparency, AI-enhanced decision-making, and circular economy frameworks. Case studies of significant disruptions, such as the COVID-19 pandemic and trade disputes, underscore valuable lessons for supply chain executives. Future trends, like smart contracts and decentralized supply networks, are also analyzed. Implementing sophisticated risk management solutions enables firms to improve supply chain agility, reduce uncertainties, and bolster long-term competitiveness in a dynamic global market.

INTRODUCTION

Comprehending Supply Chain Complexity in Global Value Chains

The Characteristics of Global Supply Chains

Recent research has redefined supply chain complexity by examining global interdependencies, regulatory fragmentation, and technology instability (Spieske et al., 2023; Ivanov, 2022). New frameworks highlight the strategic significance of multi-tier risk visibility, disruption orientation, and digital coordination in navigating uncertainty throughout global value chains (Govindan & Bouzon, 2020). Instead of perceiving complexity as simply an operational challenge, researchers advocate for proactive complexity absorption via modularity, agility, and data-driven foresight (Queiroz et al., 2021).

Global Value Chains (GVCs) denote the complex, international manufacturing and distribution networks that characterize contemporary supply chains (Chor et al., 2021). In contrast to conventional supply chains, which are typically localized and linear, global value chains (GVCs) encompass numerous manufacturing phases distributed across many nations, enabling enterprises to minimize costs, utilize regional expertise, and improve efficiency. This transition has been propelled by globalization, trade liberalization, and technological improvements, facilitating the integration of suppliers, manufacturers, and distributors across several continents (Piprani et al., 2022).

The essential framework of Global Value Chains (GVCs) is established on multi-tiered supplier networks, facilitating the movement of raw materials, semi-finished commodities, and final products between various production sites globally. In a conventional Global Value Chain (GVC), raw materials are procured from one place, components are produced in another, and final assembly occurs in a third location before goods are distributed to end markets. This worldwide distribution