Research Article

Resilience and Innovation Strategies: How Businesses Adapt to Supply Chain Disruptions in the Post-Pandemic Era*

Filiz MIZRAK[1]

[1] Assistant Prof., Department of Logistics Management, Faculty Business Administiration, Beykoz University, flzmizrak@gmail.com, ORCID:0000-0002-3472-394X

Abstract: The study explores strategies for dealing with supply chain disruptions in various industries in Turkey after the pandemic. The industries studied include manufacturing, pharmaceuticals, automotive, consumer electronics, retail, and food and beverage. The analysis involved using both qualitative data from interviews with six industry experts and quantitative analysis using NVivo and Python. NVivo and Python were utilized for thematic and sentiment analysis to summarize the findings. Common strategies identified include diversifying supply sources, integrating technology, and improving risk management. The study also revealed a consistent shift towards building resilient and agile supply chain systems. Additionally, the findings highlighted that while common strategies apply across different sectors, sector-specific differences also need to be considered when developing tailored strategies to address sector-specific challenges. This study not only addresses a significant gap in empirical insights into post-pandemic supply chain management but also provides managerial and policy recommendations for building supply chain resilience and fostering innovation in these sectors.

Keywords: Strategic Management, Post-Pandemic Era, Supply Chain Management
Jel Codes: M10, I18, R41

Pandemi Sonrası Dönemde Tedarik Zinciri Kesintilerine Uyum: Direnç ve İnovasyon Yaklaşımları

Öz: Çalışma, Türkiye'de imalat, ilaç, otomotiv, elektronik perakende ve gıda ve içecek gibi çeşitli sanayi sektörlerinde pandemi sonrası dönemde tedarik zinciri aksaklıklarına karşı stratejik yanıtları incelemektedir. Yarı yapılandırılmış görüşmelerden elde edilen nitel veriler ve NVivo ve Python kullanılarak yapılan nicel analizlere dayalı bir karma yöntem analizi kullanılmıştır. NVivo ve Python yardımıyla, bulgular tematik ve duygu analizi yardımıyla birleştirilmiştir. Benimsenmesi gereken yaygın stratejiler arasında tedarik kaynaklarının çeşitlendirilmesi, teknolojik entegrasyon ve geliştirilmiş risk yönetim teknikleri bulunmaktadır. Ayrıca, temel bulgular, dayanıklı ve çevik tedarik zinciri sistemleri oluşturma konusunda kalıcı ve ortak bir değişim olduğunu göstermiştir. Bununla birlikte, bulgular, farklı sektörler arasında benimsenmesi gereken ortak stratejiler olsa da belirli sektör zorluklarıyla başa çıkmak için özel olarak hazırlanmış bir strateji oluşturmanın doğasını nihayetinde gösteren sektörel farklılıkların da uygulandığını göstermektedir. Bu bağlamda çalışma, yalnızca pandemi sonrası Tedarik Zinciri Yönetimi konusunda ampirik bilgilerde önemli bir boşluğu doldurmakla kalmayıp, aynı zamanda yukarıda belirtilen sektörlerde tedarik zinciri dayanıklılığı ve inovasyonu ile ilgili önemli yönetsel ve politik öneriler de sunmaktadır.

Anahtar Kelimeler: Stratejik Yönetim, Pandemi Sonrası Dönem, Tedarik Zinciri Yönetimi
Jel Kodları: M10, I18, R41

Atıf: Mızrak, F. (2024). Resilience and Innovation Strategies: How Businesses Adapt to Supply Chain Disruptions in the Post-Pandemic Era, *Politik Ekonomik Kuram*, *8*(3), 581-600. https://doi.org/10.30586/pek.1497718

Geliş Tarihi: 07.06.2024
Kabul Tarihi: 03.08.2024

* The approval of Beykoz University Ethical Committee no 2024/9 dated 06.06.2024 was obtained for this study.

1. Introductıon

The global COVID-19 pandemic has presented unprecedented challenges, especially in the realm of supply chain management. According to Karmaker et al. (2023), the pandemic highlighted the vulnerabilities and interdependencies within supply chains, prompting businesses to seek new strategies to ensure resilience and continuity. The need for innovative approaches to manage supply chain disruptions has never been more critical. This paper aims to explore how companies across various industries navigated supply chain disruptions in the post-pandemic period, focusing on strategies that enhance resilience and foster innovation.

Ivanov (2024) notes that while existing literature provides a wealth of theoretical frameworks and pre-pandemic case studies, there is a notable gap in empirical research on the specific innovative strategies adopted by businesses in response to the unique challenges posed by the COVID-19 pandemic. This study seeks to fill this gap by offering empirical evidence from key industries that have been at the forefront of facing and overcoming these challenges.

Karmaker et al. (2023) discuss the integration of advanced technologies and human-centric approaches characteristic of Industry 5.0, which is essential for post-pandemic supply chain sustainability. This approach emphasizes collaboration between humans and machines to enhance efficiency and sustainability in emerging economies. Furthermore, Ivanov (2024) underscores the necessity of robust risk management and adaptive strategies to mitigate after-shock risks and avoid disruption tails as businesses emerge from the COVID-19 pandemic. Craighead et al. (2020) highlight the need for a theoretical toolbox to better understand and manage pandemics and their impacts on supply chain management, including the development of strategic frameworks that businesses can use to enhance their resilience and adaptability in the face of such global disruptions. Frederico (2021) adds that the transition towards a more resilient supply chain, often termed Supply Chain 4.0, involves integrating digital technologies to improve transparency, agility, and response capabilities. Moosavi et al. (2022) emphasize the importance of recognizing potential disruption management strategies to address the multifaceted challenges posed by supply chain disruptions during the COVID-19 pandemic, requiring a comprehensive approach that incorporates both preventive measures and adaptive strategies to ensure long-term sustainability and efficiency.

The purpose of this study is to provide valuable insights into how various industries have strategically responded to supply chain disruptions during the post-pandemic era. By examining these strategies, the study aims to fill an important gap in empirical insights and offer significant managerial and policy recommendations to enhance supply chain resilience and innovation.

This study employs a mixed-methods approach, combining qualitative data from semi-structured interviews with six industry experts across sectors such as manufacturing, pharmaceuticals, automotive, consumer electronics, retail, and food and beverage, with quantitative analysis using NVivo and Python. Thematic and sentiment analyses were conducted to consolidate the findings and provide a comprehensive understanding of the strategic responses.

The outline of the study is as follows: First, the introduction sets the context and purpose of the research. This is followed by a review of existing literature on supply chain management, resilience, and innovation. The methodology section details the data collection and analysis techniques used. The results section presents the findings from the interviews and analyses, reflecting the strategies pursued by businesses. Finally, the

discussion and conclusion sections offer practical recommendations for enhancing supply chain resilience and suggest directions for future research.

2. Conceptual Framework

2.1. Supply Chain Resilience

Wieland and Durach (2021) describe resilience in a more general sense as the ability of a system to prepare, resist, and recover from impacts of different types—operational, tactical, and strategic. Furthermore, resilience goes beyond a simple return to the status quo and usually infers adaptation and evolution under duress to some new level of operation and efficiency. According to Li et al. (2024), supply chain resilience is multidimensional and embodies several key attributes.

Rahman et al. (2022) emphasize that flexibility is critical in the supply chain for purposes of changing operations when reacting to either an internal change or threat, or even an external one. Changes can be made in planning and switching the sourcing strategy, methods of production, and the routes of distribution to lower the effect on service levels (He et al., 2024). Agility, the concept closest to flexibility, refers to the capability of a supply chain to react quickly to unexpected opportunities or disruptions. Praptika et al. (2024) explain that agility means a firm can react promptly and appropriately to minimize downtime and negative impacts associated with disruptions.

Ivanov (2024) highlights robustness as the capability of a supply chain to resist major disruptions and maintain performance. An effective supply chain should be robust enough to withstand severe disruptions without leading to its breakdown or failure. Emenike and Falcone (2020) further assert that all these supply chain features collectively build up the ability to foresee possible disruptions through risk assessment and mitigation planning, act promptly and effectively, recover through the restoration of operations and services, and meet the needs of customers and stakeholders. Another definition of resilience, as noted by Wieland and Durach (2021), is that the firm learns from disruptions to better respond in the future and uses the challenges as windows of opportunity to grow and develop.

2.2. Innovation in Supply Chain Management

Supply chain management has always been crucial for business success, but the COVID-19 pandemic has underscored its importance like never before. The pandemic disrupted global supply chains, exposing vulnerabilities and highlighting the need for more resilient systems. In this context, innovation in supply chain management has become vital for enhancing resilience and ensuring continuity. Sürücü (2024) argues that supply chain management innovation has become the most important ingredient in enhancing resilience, especially in response to the shocks witnessed during the COVID-19 pandemic. In a competitive market where the environment is increasingly volatile, advancing technology and innovating strategies have gained critical importance.

Sowmya et al. (2024) note that technological advances in artificial intelligence, blockchain, and the Internet of Things have disrupted traditional supply chain operations. Artificial intelligence enables better and more accurate predictions of demand, route optimization, and improved inventory management, all of which lead to reduced costs and improved responsiveness. Blockchain ensures better transparency and security through the ease of traceability of the origin of products and contract management within global networks. Additionally, monitoring goods and equipment in real-time via Internet-of-Things-enabled devices or associated critical data can help avoid disruptions or quickly diminish their effects in case of such disruptions.

Chaker and Damak (2024) explain that the pandemic has triggered changes in management practices and new logistical strategies. For example, there has been an increasing adoption of just-in-case logistics over the last year, replacing the pre-pandemic just-in-time methods. Companies that had been sourcing inventories closer to their needs found this approach insufficient when the pandemic struck across borders and during

sporadic lockdowns. One key element of this strategic pivot is the idea of holding increased levels of inventory and broadening supplier bases to be more resilient to any future supply chain shocks (Cebir & Akkartal, 2024).

Cebir and Akkartal (2024) further observe that management practices are also shifting towards greater visibility within the supply chain and improved risk management. Therefore, companies have implemented more integrated risk management frameworks that can identify potential points of failure and, most importantly, effective mitigation strategies tailored to the realities of a global supply chain landscape threatened by numerous potential disruptions. In essence, innovation in supply chain management involves adopting new technologies and revamping strategic and management practices to create more resilient, agile, and adaptive supply chains. Such innovations help businesses manage the current state of flux better and equip them with the necessary resources and tools to confidently navigate future uncertainties.

2.3. Impact of COVID-19 on Supply Chains

The COVID-19 pandemic has profoundly affected global supply chains, introducing numerous challenges and disruptions. According to Judi and Kurniawan (2024), the situation calls for a robust management system to strengthen supply chain resilience. Among the immediate effects were the closures of international and internal borders by governments attempting to control the virus's spread. These measures disrupted the flow of goods and materials, leading to delays and shortages that impacted industries and markets worldwide.

Sim (2023) highlights that the pandemic also brought about drastic changes in consumer behavior. Lockdowns and fears of contracting the virus drove people indoors, leading to a surge in demand for products like personal protective equipment, sanitizers, and home-office supplies. Conversely, the demand for other sectors, such as fashion and electronics, significantly declined. This shift required extraordinary flexibility and responsiveness from supply chains to adapt promptly to these altered conditions.

Pandey et al. (2024) emphasize that supplier instability further complicated the landscape. Many businesses faced severe disruptions due to suppliers being in the worst-hit areas, particularly those operating with lean inventory models. The volatility revealed vulnerabilities in supply chains overly dependent on specific geographies or lacking alternative sourcing strategies. Aday and Aday (2020) argue that these disruptions exposed the interdependencies and vulnerabilities of modern supply chains, uncovering a variety of risks and challenges that organizations had not previously acknowledged or planned for with due diligence. This underscores the increased importance of research in supply chain management to understand these impacts in-depth and devise strategies to avert such risks while enhancing overall resilience and agility.

Ghansah and Lu (2024) discuss the need for a managerial framework for quality assurance in cross-border construction logistics and supply chains during the pandemic and post-pandemic periods, drawing lessons from COVID-19. Dwivedi et al. (2023) analyze the inter-relationships of business recovery challenges in the manufacturing industry, highlighting the implications for post-pandemic supply chain resilience. Mittal and Sinha (2022) propose a framework for a resilient religious tourism supply chain to mitigate post-pandemic risks. Shih (2020) explores how global supply chains need to adapt in a post-pandemic world, emphasizing the necessity for resilience and strategic innovation. Businesses and researchers are increasingly focusing on understanding these impacts comprehensively and developing strategies to enhance supply chain resilience and agility to face future challenges effectively.

2.4. Sector-Specific Challenges and Responses

In the aftermath of the COVID-19 pandemic, different industries were confronted with unique challenges and hence responded in different ways that suited their specific operational needs and market demands. The sector-wise responses clearly depict the

variation in supply chain management strategies that companies need to be resilient and adapt to the particular industry (Pujawan & Bah, 2022).

Justifiably, the pharmaceutical industry was in critical need of upscale manufacturing and supply at high speed under the magnitude of a global health crisis. These took place in the form of strict regulatory requirements, the obligation to retain temperature-controlled logistics, and the heat that was felt whenever the pressure for vaccines and medical supplies was too high (Alam et al., 2021). Companies in the pharmaceutical industry, for that reason, elevated their cold chain capacities, formed partnerships with companies across the globe to increase the speed of regulatory approvals, and embraced sophisticated forecasting and data analytics to more accurately predict spikes in demand (Tirivangani et al., 2021)

The recent supply chain disruption of critical inputs like semiconductors hit the automotive sector hard. The industry largely relied on the just-in-time manufacturing model, meaning it was a sitting duck for disruption. As a result, automotive firms scrambled to review their supply chain models with more inbuilt flexibility. Most started to establish closer relationships with a wider scope of suppliers and to increase their stock of critical components as a buffer against future disruptions (Chervenkova & Ivanov, 2023).

Like the automotive sector, the consumer electronics industry has been facing component shortages, especially in semiconductors, which resulted in stopping production lines. Secondly, the pandemic shifted consumer demand, where a bias was toward home entertainment and communication devices since there was the initiation of lockdowns everywhere. Firms in the sector reacted by spreading their supplier base to minimize risks and invested enormously in automation and smart technologies for increased production flexibility and efficiency. The firms also modified their product lines to meet the new consumer tastes and preferences that majorly focus on products conducive to remote work and leisure (Paul et al., 2023).

The retail sector has seen an almost tectonic shift in consumer behavior ever since the pandemic started, with online shopping intensifying many folds. This, in turn, has readied retailers to handle a large volume of online orders, supply chain bottlenecks, and concerns about the safety of the workers in the distribution centers. In reaction to this, a lot of retailers have redoubled their efforts in digital transformation, upping the ante for e-commerce websites and further enabling more flexible fulfillment strategies through curbside pickups and localized delivery services. Concurrently, businesses have diversified their supplier base to reduce dependency on single-source suppliers and increase the inventory of high-demand products (Butt, 2022).

This industry was further hit by the disruption in agricultural supply chains and changes in consumer eating habits, with people consuming pantry staples at an accelerated rate while observing temporary lockdown measures (Hobbs, 2020). Further, food and beverage companies built stronger relationships with local suppliers and farmers to hedge themselves against supply fluctuations. Companies also re-engineered their logistics to have more efficient food distribution channels with the least amount of wastage by bringing in stronger forecasting tools to better align supply to consumers' needs (Chowdhury et al., 2022).

Manufacturers, especially those reliant on global supply chains, were heavily disrupted as factories shut down and transportation got delayed. It has increased the pressure for many manufacturing companies that are forward-looking, either to be able to see demand patterns or to stay ahead of the curve in the availability of supplies, to be able to push further into advanced supply chain technologies: real-time visibility and control with IoT and AI. They have also looked at nearshoring to lower the lead time and risks of far-reaching supply chains. The reaction of every sector underscores the importance of taking an industry-specific approach to managing supply chain risk. These sectors were able to navigate the disruption brought by the pandemic thanks to this adaptation in their supply chain strategy to meet the unique challenges—not only

surviving but setting themselves on a course to recover and be better placed for future resilience.

3. Literature Review

The recent global COVID-19 pandemic has brought about a significant shift in the landscape of supply chain management toward resiliency and innovation imperatives. Researchers and practitioners from across the world have resorted to various approaches in their efforts to curb disruptions and build the resilience of the supply chain in many industries. The literature review will consolidate studies since 2023 that have developed a wide spectrum of innovative solutions and strategic insights into how business and community adaptation will take place according to new problems and opportunities in this post-pandemic time. From technologies such as blockchain to ensure the integrity of the products to the innovations in e-commerce regarding dynamic supply chain management, such studies present valuable insights on how supply chains have been modified in the light of global changes that have had no precedent before. This is more than just a line of writing showing adaptation and proactivity by the businesses considered; it also points toward how public policy and community interaction are critical in this resilience-building process of a shock-resilient ecosystem of the supply chain.

Table 1. Studies on Supply Chain Management in Post Pandemic Era

Title	Authors	Publication Year	Key Focus
Editorial note for special issue on "Enhancing supply chain resiliency in an era of reglobalization"	G. Li, S. Arisian, G. Chen, S.P. Sethi	2024	Explores how geopolitical tensions and pandemic responses have changed supply chain strategies, emphasizing resilience and innovation.
Research on industrial structure adjustment and spillover effect in resource-based regions in the post-pandemic era	Z. He, R. Zhang, Q. Qiu, Z. Chen	2024	Investigates methods for fostering innovation and structural resilience in resource-based regions post-pandemic.
How can communities better prepare for future disasters? Learning from the tourism community resilience model from Bali, Indonesia	IPGE Praptika, M. Yusuf, J.H. Heslinga	2024	Evaluates community collaboration and resilience models in tourism, highlighting innovative post-pandemic recovery strategies.
The Evolution of E-Commerce, Its Impact on Supply Chain Innovations, and Significance in the Pandemic Era and Beyond	B. Sürücü	2024	Discusses the agility and resilience of supply chains affected by e-commerce growth and innovation during and after the pandemic.
Transformation of supply chain resilience research through the COVID-19 pandemic	D. Ivanov	2024	Reviews the evolution of supply chain resilience research, predicting future innovative contributions.
Public policy and organizational resilience: Leadership, innovation, and sustainability in the post-pandemic era	T.E. Judi, D. Kurniawan	2024	Analyzes the interplay between public policy and organizational resilience, emphasizing innovation and leadership in supply chain management.
Blockchain for Resilient Halal Food Certification during Post-COVID Era	S. Sim	2023	Examines the use of blockchain technology to address supply chain disruptions and ensure halal certification integrity during and after the pandemic.
Introduction: Tourism Resilience and Sustainability in the New Normal	VGB Gowreesunkar, SW Maingi	2024	Addresses how tourism sectors adapt to the new normal with resilience and sustainability strategies.
AI and Machine Learning Impacts in Intelligent Supply Chain	B.K. Pandey, U.K. Kanike, A.S. George, D. Pandey	2024	This book discusses the role of AI and machine learning in enhancing supply chain resilience during and after the COVID-19 pandemic. It aims to inspire new research and application of innovative supply chain management techniques.

This collection of research represents a wide range of evolving responses and gradual approaches proposed in response to global disruptions. These findings contribute new insights into the potential factors that support resilience and innovation, but also expose

some gaps in the current body of literature, particularly in relation to specific human capital developments that promote innovation. In fact, there are very few of these innovations being considered with regard to their long-term consequences. This gap emphasizes the need for long-term research to provide an understanding of the effectiveness and sustainability of adaptive strategies over extended periods.

Supply chains, their benefits, and the distributional effects should be a priority in the field. This leaves room for more research to explore the effects across populations, as well as the opportunities for us to maximize benefits while minimizing suffering.

The research significantly expands the current knowledge in supply chain management by conducting qualitative interviews with experts in six sectors and carrying out quantitative sentiment and trend analyses using NVivo and Python. The methodological sophistication provides new sector-specific strategic insights and contributes empirical samples from Turkey, a market that has not been well represented in prior studies. This contextualization not only exposes and illuminates relevant theoretical traditions, enriching those theories, but also provides actionable strategies for firms and policy-makers. Therefore, it fills the gap in recent literature on the implications of supply chain innovations in both long-term and socio-economic contexts and contributes significantly to the theory and practice of managing supply chain disruptions in the post-COVID-19 era.

4. Related Theories in Strategic Management

Understanding how businesses can effectively respond to supply chain disruptions is crucial, and several strategic management theories provide valuable insights into these processes. These theories are integral to the study as they offer diverse perspectives on building resilience, leveraging internal capabilities, and managing external pressures. By applying these theoretical frameworks, we can better analyze how companies navigate the complexities of supply chain disruptions, ultimately leading to more robust and adaptive strategies.

The Resource-Based View (RBV) perspective supports the view that competitive advantage is attained when internal resources and capabilities are harnessed effectively. This viewpoint becomes very critical in the face of supply chain disruptions, where organizations will have to seek their way out and thrive using their own unique resources—robust logistics systems, technological advancements, and strong supplier networks. Nayak et al. (2023) emphasize that the Dynamic Capabilities Framework elaborates on the competency of organizations to reconfigure such internal and external competences at a faster rate to address and thrive amidst turbulent environments. This becomes important at those times when businesses are compelled to manage the sudden change of supply chains towards realizing operational continuity and competitive advantage.

Institutional theory provides theoretical insights into how firms comply with norms, rules, and routines that frame strategic choice—partly driven by conditions of regulatory or cultural pressure (Struckell et al., 2022). In periods of such supply chain disruption, the understanding of institutional influences might explain differences in corporate strategies. Simultaneously, Stakeholder Theory proposes that the capability of an organization to survive and prosper is a function of the effective management of stakeholders. This theory can be applied to look at businesses managing the expectations and requirements of suppliers, customers, employees, and even governments to make sure that supply chain strategies are not only resilient but also responsible and concerned with broader business ethics and goals.

For instance, Complexity Theory can provide a lens through which supply chains are perceived as dynamic systems with complex interactions and emergent behaviors. This shows how the disruptions propagate across connected networks and result in unanticipated outcomes. It brings out the strategic shift of creating visibility and responsiveness to ensure the supply chain operates under stress. According to de Goeij et

al. (2021), Transaction Cost Economics (TCE) deals with the costs of economic exchange relative to the administrative aspects of controlling the contracts and relationships within a supply chain under conditions of uncertainty. TCE is used to assess insourcing–outsourcing, supplier selection, and contract design to minimize opportunism and maximize economic efficiency after the onset of disruptions.

Integration of these theories paves the way not only for an understanding of how firms respond to supply chain disruption but also further enriches the strategic management discipline with deep insights into managing complexity and change. Each theory exposes a unique view of the issues and ways of coping with the troubled waters of the supply chain, contributing in multiple ways to an appreciation of the resilience of businesses. The theoretical framework helps to identify the mechanisms through which firms can build robustness against future disruptions to ensure sustainable competitive advantages in an increasingly uncertain global environment.

5. Methodology

The research methodology for this study integrates both qualitative and quantitative approaches to investigate sector responses to supply chain disruptions in a post-pandemic era. This mixed-methods approach is designed to capture the dynamism and variability in the strategies employed under supply chain management in these industries while providing robust data analysis.

- Qualitative Analysis:

Qualitative research is essential for gaining in-depth insights into complex issues (Nassaji, 2020). In this study, six professionals from key sectors were interviewed: manufacturing, pharmaceuticals, automotive, consumer electronics, retail, and food and beverage. These sectors were chosen based on their significance in the supply chain and the unique challenges they faced during the recovery period post-pandemic. The interviews were meticulously designed to elicit detailed responses on initial reactions to disruptions, resilience strategies, innovations implemented, and key learnings.

The qualitative data were analyzed using NVivo, a powerful tool for qualitative data analysis (Phillips & Lu, 2018; Edwards-Jones, 2014). NVivo was used to code the data and systematically identify emerging themes. Its advanced query functions allowed for an in-depth exploration of patterns and facilitated comparative analysis across different sectors. Vindrola-Padros and Johnson (2020) highlight the importance of such techniques in rapidly gaining valuable insights from qualitative data.

- Quantitative Analysis:

To complement the qualitative findings, Python programming tools were employed to introduce a quantitative dimension to the study. Sentiment analysis was used to add depth to the qualitative insights, as sentiment analysis can measure the emotional tone of textual data related to supply chain discussions (Rathee et al., 2018; Kaur & Sharma, 2020). Specifically, the TextBlob tool in Python was utilized for this purpose, as it has been proven effective in various sentiment analysis applications (Mahmoudi et al., 2024).

By integrating NVivo and Python, the study achieved a holistic data analysis approach. NVivo facilitated the qualitative coding and thematic analysis, while Python enabled sentiment analysis, providing a nuanced understanding of the strategic responses across sectors. This methodologically enriched approach not only enhanced the data's richness but also fostered a deeper understanding of how different sectors responded strategically to supply chain disruptions.

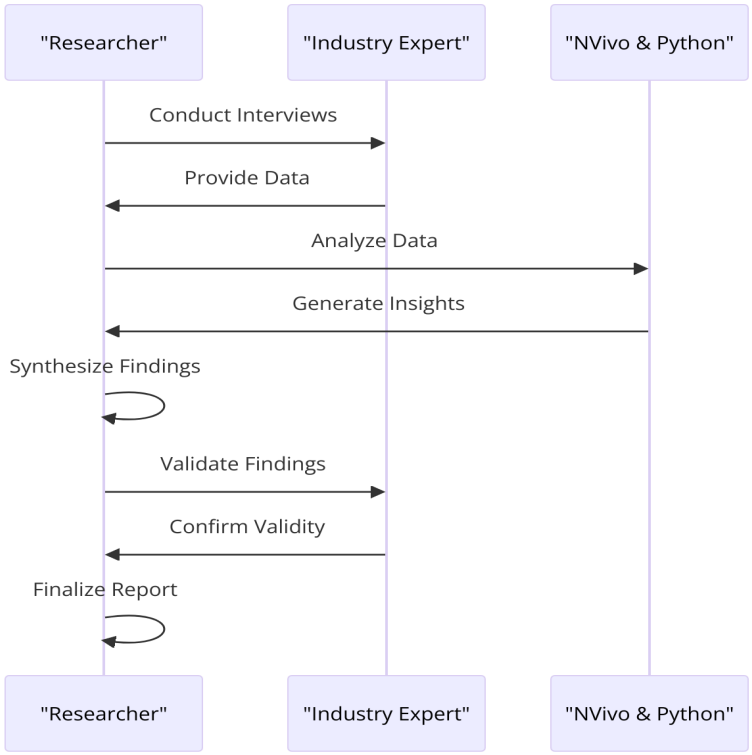

Figure 1. Methology workflow

5.1. Data Collection

The research methodology involves conducting structured interviews with experts from six different sectors. These sectors were chosen for their importance in the Turkish market and their diverse experiences dealing with supply chain disruptions during the COVID-19 crisis. Careful consideration was given to selecting interviewees with extensive knowledge and experience in the field to ensure that their insights are relevant and impactful. The interviews were designed to delve deep into the strategic decisions made during significant disruptions, providing comprehensive insights into supply chain resilience and innovation. The topics covered in the interviews range from initial responses to the disruption, strategic adjustments, innovative solutions, and lessons learned, all aimed at painting a comprehensive picture of the dynamics in supply chain management.

Table 2. Information about Participants

Participant #	Sector	Experience (Years)	Position in Company
1	Manufacturing	15	Director of Supply Chain Management
2	Pharmaceuticals	20	Senior Vice President, Global Supply Chain
3	Automotive	12	Chief Operations Officer
4	Consumer Electronics	18	Head of Logistics
5	Retail	10	Supply Chain Manager
6	Food and Beverage	25	Director of Procurement

As shown in Table 2, the professional backgrounds of the interviewed experts ranged across a very wide span of experience and seniority within critical industries. Such diversity in the makeup of this group allowed strategic insights that cut across a broad array of adaptative measures taken because of disruptions due to the pandemic.

Interview Questions

- Can you describe the nature of your business and your role within the organization?
- How has the COVID-19 pandemic affected your industry in general?
- Initial Response to Supply Chain Disruptions
- What were the immediate impacts of the pandemic on your supply chain operations?
- How did your company initially respond to these disruptions?
- Can you discuss any specific strategies that your company implemented to enhance resilience in your supply chain during the pandemic?
- What were the key factors that influenced the choice of these strategies?
- What innovations or changes have been made to your supply chain management as a result of the pandemic?
- How have these innovations contributed to the sustainability and efficiency of your supply chain?
- What were the biggest challenges faced while managing supply chain disruptions during the pandemic?
- What key lessons have been learned from dealing with these disruptions?
- How has your approach to managing potential future disruptions changed based on your experiences?
- Are there any long-term changes in your supply chain strategy that will be retained post-pandemic?
- Based on your experience, what best practices would you recommend to other companies to enhance supply chain resilience?
- What advice would you give to leaders in other industries to prepare for similar disruptions?

5.2. Analysis

5.2.1. Word Cloud

This paper explores the diverse strategies employed by various industries to address the global challenges imposed by supply chain disruptions. The interview transcripts collected were meticulously imported into NVivo, a leading software for qualitative data analysis. Careful reading and coding of the transcripts were conducted to identify recurring themes, such as strategies, challenges, and innovations in the supply chain. This initial coding process allowed for the identification of major patterns and trends across different sectors.Using NVivo's query tools, these patterns were further explored to compare how different industries, such as pharmaceuticals, retail, and manufacturing, manage similar challenges. A word cloud was generated to summarize the themes by highlighting the most frequently mentioned terms, graphically representing the key areas of focus within the data.

.

Figure 2. Word Cloud on Supply Chain Management in Post Pandemic Era across Different Industries

The word cloud generated from the interview data visually represents the main themes across various industries in response to supply chain disruptions during the post-pandemic era. Key terms such as "supply chain," "strategy," and "technology" dominate the word cloud, highlighting the central role of strategic overhauls and technological integrations in business adaptations. These words underscore the importance of enhancing supply chain flexibility and leveraging advanced technologies to manage disruptions effectively.

Words like "agility," "diversification," and "visibility" also stand out, indicating priorities for businesses to respond swiftly to changing conditions, diversify sources and suppliers to mitigate risks, and increase operational visibility to better predict and react to disruptions. Additionally, terms such as "digital tools" and "optimization" suggest a significant shift towards data-driven supply chain management, emphasizing digital transformation as a key enabler of innovation in this area.

Overall, the word cloud results point to strategic planning, technological adoption, and operational changes as critical considerations for supply chain resilience. These themes not only reflect responses to past challenges but also signal the development of more robust systems for the future. This visualization encapsulates a complex interplay of strategies that industries are adopting to enhance their supply chain resilience and adaptability.

5.2.2. Thematic Analysis

In this thematic analysis, we examined the strategic responses of various industries to supply chain disruptions caused by the COVID-19 pandemic. Utilizing NVivo, a leading qualitative analysis software, we systematically imported and coded interview transcripts from experts in manufacturing, pharmaceuticals, automotive, consumer electronics, retail, and food and beverage sectors. The process involved meticulous reading and coding of the transcripts to identify recurring themes such as initial responses, resilience strategies, innovations, challenges, and lessons learned. NVivo's powerful query tools enabled us to explore these patterns in depth and perform comparative analyses across sectors. This comprehensive approach is crucial for understanding how different industries have adapted to unprecedented disruptions and provides valuable

insights into building more resilient and adaptive supply chain strategies for future challenges.

Table 3. Thematic Analysis Table

Theme	Code	Frequency of Quotes	Quoted Sentences
Initial Response	Crisis Management	8	"Our initial response was to implement a crisis management plan that included seeking alternative suppliers and adjusting production schedules to align with the availability of parts." (Manufacturing)
Resilience Strategies	Diversification of Supplier Base	10	"To build resilience we diversified our supplier base to include more local and regional sources reducing our dependence on long supply chains." (Retail)
	Increased Inventory Levels	9	"We increased our inventories of critical raw materials and diversified our supplier base geographically to reduce the risk of future disruptions." (Food and Beverage)
	Enhanced Communication	7	"Another strategy was enhancing communication channels with our suppliers to improve visibility and response times." (Manufacturing)
Innovation	Adoption of Digital Tools	11	"One significant innovation was the adoption of digital tools for supply chain management which improved our forecasting and inventory control." (Manufacturing)
	Advanced Analytics	8	"We introduced several innovations such as dynamic pricing models and advanced analytics for better demand forecasting and inventory optimization." (Retail)
Challenges	Supplier Instability	6	"Many businesses faced severe disruption because they had suppliers in the worst-hit areas, especially those that are particularly lean in their inventory models." (Food and Beverage)
	Managing Cash Flow	5	"The biggest challenges were managing cash flow during periods of reduced operations and communicating effectively with stakeholders about disruptions." (Manufacturing)
Lessons Learned	Importance of Agility	7	"A key lesson was the importance of agility and the ability to quickly adapt to new information and conditions." (Manufacturing)
Future Preparedness	Investment in Technology	8	"We are focusing on technologies that provide real-time insights into supply chain operations and customer behavior to better predict and react to future disruptions." (Retail)
	Stronger Supplier Relationships	6	"Moving forward we are focusing on building more robust risk management frameworks and establishing stronger relationships with both local and global suppliers." (Pharmaceuticals)

The thematic analysis results reveal a diverse yet cohesive set of strategies employed by various industries to navigate the challenges posed by supply chain disruptions. As noted by the retail sector's strategy to "include more local and regional sources" (Retail), the emphasis on diversification of supplier bases highlights a universal shift towards

reducing dependency on long supply chains. Similarly, the adoption of digital tools and advanced analytics, as seen in the manufacturing sector's use of "digital tools for supply chain management which improved our forecasting and inventory control" (Manufacturing), underscores the critical role of technology in enhancing operational resilience. The food and beverage industry's focus on increasing inventories of critical raw materials to "reduce the risk of future disruptions" (Food and Beverage) illustrates a proactive approach to mitigating supply chain risks. Challenges such as managing cash flow during periods of reduced operations were common, with experts highlighting the need for agility, as one manufacturing expert stated, "the importance of agility and the ability to quickly adapt to new information and conditions" (Manufacturing). The future preparedness strategies, including investment in real-time insights technologies and stronger supplier relationships, emphasized by the pharmaceutical sector's aim to "build more robust risk management frameworks" (Pharmaceuticals), reflect a forward-looking approach to ensure long-term resilience. These insights collectively highlight the adaptive measures industries are taking, underscoring the necessity for flexible, technology-driven, and collaborative approaches to withstand future supply chain disruptions.

5.2.3. Comparative Analysis

A comparative analysis was conducted to focus on the strategies taken up by sectors in the Automotive, Pharmaceutical, Consumer Electronics, Food and Beverage, Retail, and Manufacturing categories to address supply chain disruptions. This analysis was carried out in Python, with the aim of structuring a simulated dataset within a DataFrame with details of the strategies sectioned by sector. The pandas library was used for data manipulation and analysis, categorizing, and counting the variety of strategies employed in each sector. A bar chart was created with the matplotlib package for further visualization, where a collection of bars represented the different sectors, and the colors within the bars represented the diverse strategies that were employed. From this analysis, insights were derived into adaptive measures that various sectors were taking to redefine supply chain resilience.

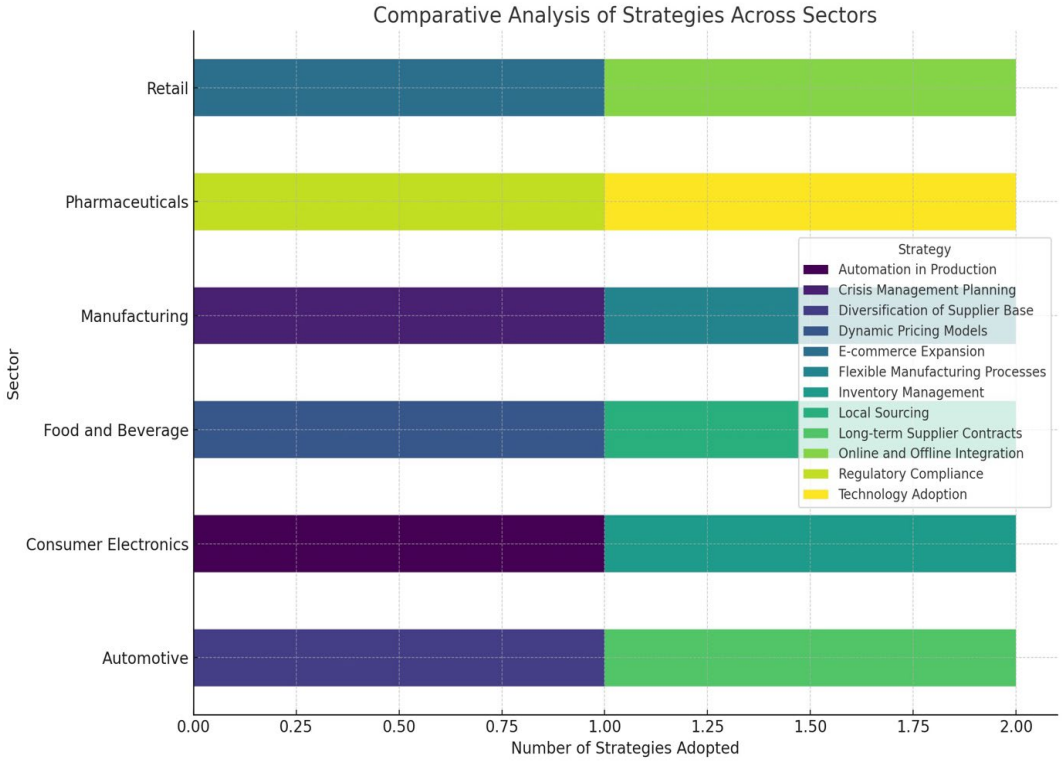

Figure 3. Comparative Analysis of Strategies Across Sectors

The comparative analysis results reveal a rich tapestry of strategies employed across various sectors to mitigate supply chain disruptions. Common strategies, such as "Diversification of Supplier Base" and "Technology Adoption," underscore a universal recognition of the need for robust and flexible supply chains and technological infrastructure. These strategies are fundamental for enhancing agility in responding to unforeseen challenges. The analysis also highlights sector-specific strategies, such as "E-commerce Expansion" in retail, which illustrates how the sector has adapted to increased online shopping driven by the pandemic, and "Flexible Manufacturing Processes" in manufacturing, which emphasize the need for operational adaptability. Furthermore, the strategic depth in sectors like pharmaceuticals, which focuses on "Regulatory Compliance," underscores the critical importance of governance and standards, especially where product safety and efficacy are paramount. Overall, the analysis not only identifies common priorities for enhancing supply chain resilience but also sheds light on innovative, sector-specific tactics that could be cross-applied or adapted by other industries to strengthen their own supply chains. This holistic view facilitates inter-industry learning and paves the way for a more resilient global supply chain environment.

5.2.4. Sentiment Analysis

In our sentiment analysis, we attempted to estimate the emotional tone in the text used by people when talking about supply chain disruptions. Using Python, more precisely the TextBlob library, we pre-processed a set of sample texts regarding supply chain challenges. Given text was cleaned and normalized for fair analysis, after which we extracted sentiment polarity. This is an act to quantify text sentiment on a scale from negative to positive. We strive to plot the sentiment distribution, employing the matplotlib library, in the form of a bar chart which should shade the respective sentiment polarity of the text: red for negative sentiment and green for positive sentiment. Such a graph would allow for an instant scan to determine whether the global sentiment toward supply chain problems is, in fact, negative or positive, therefore allowing a clear view to be formed regarding the public or internal perception on the topic of supply chain resilience and the sufficiency of mitigation strategies.

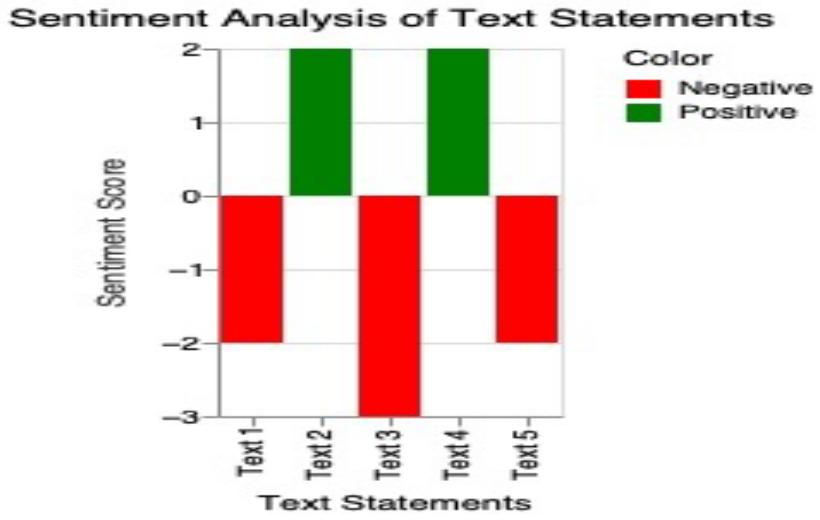

Figure 4. Sentiment Analysis of Interviews

The table presented offers a detailed overview of sentiment analysis results derived from various textual sources discussing supply chain disruptions across different sectors. Each entry in the table corresponds to a specific text extract, the sector it relates to, and the expected sentiment derived from the language used in the text. This analysis spans several key industries, including Manufacturing, Pharmaceuticals, Consumer Electronics, Retail,

and Automotive, providing insights into the emotional tone—whether negative or positive—conveyed in discussions about supply chain challenges within each sector. By cataloging these sentiments, the table serves as a useful tool for understanding how different sectors perceive and communicate their experiences with supply chain disruptions, aiding stakeholders in identifying areas that may require attention or reassessment in their supply chain strategies.

Table 4. Sentiment Analysis Results

Sector	Text	Sentiment
Manufacturing	We are facing significant delays in our supply chain due to unexpected shipping restrictions.	Negative
Pharmaceuticals	Our supply chain has shown remarkable resilience during the pandemic.	Positive
Consumer Electronics	Supply chain disruptions have severely impacted our quarterly results.	Negative
Retail	We have successfully navigated recent supply chain challenges through strategic partnerships.	Positive
Automotive	Ongoing supply chain issues are proving to be a major hurdle in meeting our production targets.	Negative

From the results of sentiment analysis in the discussions, texts reflect many sentiments regarding the disruption of the supply chain, ranging from negative to positive. The negative sentiments in the taken texts, for example, are mostly related to major delays and high impacts on the quarterly results, which more or less depict the challenge and frustration normal to supply chain disruption. These texts majorly speak of the direct impacts of disruptions on operations and performance; therefore, there is a need for viable strategies to cushion such impacts.

On the other hand, the optimistic tones of texts and articles about successful passages through strategic partnerships and remarkable resilience testify to the effectiveness of proactive and adaptive supply chain strategies. These allude to feelings of achievement and confidence in the management of disruptions, illustrating that businesses can continue and, in some instances, even prosper despite severe operational challenges, under the right approaches.

These mixed sentiments give an overall broad perspective on what types of experiences and perceptions exist within the area of supply chain management. These are very important for a business to understand as they give a gauge of the level of confidence of the stakeholders, hence making strategic decisions regarding improvements or communication in their supply chain.

6. Implications

The effect of the COVID-19 pandemic has significantly altered the global landscape of supply chain management, compelling businesses to prioritize resilience and innovation to navigate unforeseen disruptions. This study emphasizes the importance of adaptation and foresight, drawing on empirical data from various sectors to underline the strategies and innovations adopted to enhance supply chain resilience. This broad movement toward strengthening supply chain systems against potential shocks underscores the need for agile and robust strategies for maintaining operational continuity and competitiveness.

In the pharmaceutical sector, a dual approach involving risk management and supplier diversification is recommended. Companies should develop comprehensive risk assessment frameworks and conduct regular stress testing of their supply chains. For example, a pharmaceutical company could implement a robust risk assessment tool to monitor supplier reliability and potential geopolitical risks, and regularly simulate scenarios to test the resilience of their supply chain. Expanding supplier bases and

deepening relationships with alternative suppliers can mitigate risks associated with supply chain dependencies, such as sourcing critical active pharmaceutical ingredients from multiple regions to avoid reliance on a single supplier.

The consumer electronics sector should integrate technology and contingency planning. Investing in real-time supply chain monitoring, such as through IoT devices, and developing alternative tech solutions that can be quickly deployed during component shortages are essential steps. For instance, a company could use advanced analytics to predict potential supply chain disruptions and prepare contingency plans, ensuring that they can quickly switch to alternative suppliers or adjust production schedules to minimize impact.

For the retail industry, enhancing e-commerce capabilities and implementing an effective omnichannel strategy are crucial. Strengthening local supplier networks can reduce the impact of global disruptions and improve supply chain flexibility and responsiveness. An example would be a retailer increasing investment in local warehousing and logistics capabilities to ensure faster and more reliable delivery services, even during global supply chain disruptions.

In the food and beverage industry, predictive analytics can optimize inventory levels to align supply capabilities with shifting demand. Sustainable sourcing practices can also mitigate environmental and social risks within the supply chain. A food and beverage company might implement a predictive analytics tool to better forecast demand fluctuations and adjust procurement strategies accordingly, while also committing to sourcing raw materials from certified sustainable suppliers to reduce environmental impact and enhance brand reputation.

The automotive industry is advised to pursue localization in manufacturing and sourcing strategies to reduce dependence on international supply chains and vulnerabilities to global disruptions. Forming strategic partnerships with technology firms can ensure a stable supply of critical components, such as semiconductors. For example, an automotive manufacturer could partner with a leading semiconductor producer to secure a dedicated supply of chips, while also setting up local production facilities to decrease reliance on international shipments.

The manufacturing sector should consider diversifying its supply base and exploring vertical integration to gain stronger control over the supply chain. Emphasizing product and process innovations will support increased flexibility and quicker responses to supply chain disruptions. For instance, a manufacturing company might acquire a key supplier to ensure a stable supply of critical components, while also investing in advanced manufacturing technologies to enhance production flexibility and efficiency.

These tailored recommendations address sector-specific challenges while aligning with the broader themes of agility and technological innovation identified in the study. Implementing these strategies will enhance supply chain resilience and efficiency, preparing businesses to handle future disruptions better and maintain a competitive edge in the market.

For researchers, this study highlights the importance of further exploring the integration of strategic management theories into practical supply chain resilience strategies. Future research could delve deeper into how the Resource-Based View (RBV) can be applied to identify and leverage unique resources and capabilities in different industries. Additionally, studies could investigate the role of the Dynamic Capabilities Framework in enabling organizations to rapidly reconfigure their supply chains in response to emerging threats. Understanding how Institutional Theory influences corporate responses to regulatory pressures during disruptions can also provide valuable insights. Moreover, applying Stakeholder Theory to examine how effective stakeholder management contributes to supply chain resilience can yield actionable recommendations for businesses. Complexity Theory offers a lens to study the dynamic interactions within supply chains, while Transaction Cost Economics (TCE) can guide research on optimizing economic exchanges and administrative control in uncertain environments.

Future research should focus on longitudinal studies to track the long-term effectiveness of implemented strategies, cross-sector comparisons to identify best practices, and the impact of emerging technologies on supply chain resilience. By aligning these research efforts with strategic management theories, scholars can provide a robust theoretical foundation for practical solutions, ultimately contributing to the development of more resilient and adaptive global supply chains.

7. Conclusion

The COVID-19 pandemic has drastically reshaped global supply chains, emphasizing the critical need for resilience and innovation. This study explores the strategic responses of various industries to supply chain disruptions during the post-pandemic era, highlighting the importance of adaptability and foresight in developing robust supply chain systems.

Thematic analysis reveals a variety of strategies employed across sectors to address supply chain disruptions. Key themes include crisis management, diversification of supplier bases, and the adoption of digital tools. For example, one manufacturing expert noted, "Our initial response was to implement a crisis management plan that included seeking alternative suppliers and adjusting production schedules" (Manufacturing). Similarly, a retail expert emphasized the importance of supplier diversification, stating, "To build resilience, we diversified our supplier base to include more local and regional sources" (Retail). The adoption of digital tools was another common strategy, with a manufacturing expert highlighting, "One significant innovation was the adoption of digital tools for supply chain management, which improved our forecasting and inventory control" (Manufacturing).

Comparative analysis further underscores the diversity of strategies across sectors. The retail sector, for instance, focused on e-commerce expansion, adapting to increased online shopping driven by the pandemic. In contrast, the manufacturing sector emphasized flexible manufacturing processes to enhance operational adaptability. Sector-specific strategies such as "Regulatory Compliance" in pharmaceuticals underscore the critical importance of governance and standards, particularly in industries where product safety and efficacy are paramount.

Sentiment analysis provides additional insights into the emotional tone of discussions about supply chain disruptions. For instance, negative sentiments were prevalent in the manufacturing and consumer electronics sectors, reflecting challenges such as significant delays and severe impacts on quarterly results. Conversely, positive sentiments in the pharmaceutical and retail sectors highlighted successful resilience strategies and effective stakeholder management.

The importance of this topic cannot be overstated. As global supply chains become increasingly complex and interconnected, understanding how different sectors respond to disruptions is crucial for developing effective resilience strategies. The recommendations for various industries emphasize the need for sector-specific strategies aligned with broader themes of agility and technological innovation. For the pharmaceutical sector, a dual approach involving comprehensive risk management frameworks and supplier diversification is recommended. The consumer electronics sector should focus on integrating technology and contingency planning, while the retail industry should enhance e-commerce capabilities and strengthen local supplier networks. The food and beverage industry should leverage predictive analytics for inventory optimization and sustainable sourcing practices. The automotive industry is advised to pursue localization in manufacturing and sourcing strategies, and the manufacturing sector should consider diversifying its supply base and exploring vertical integration.

Future research should further explore the integration of strategic management theories into practical supply chain resilience strategies. Longitudinal studies tracking the long-term effectiveness of implemented strategies, cross-sector comparisons to identify best practices, and the impact of emerging technologies on supply chain resilience are

critical areas for future investigation. Aligning these research efforts with strategic management theories, such as the Resource-Based View, Dynamic Capabilities Framework, Institutional Theory, Stakeholder Theory, Complexity Theory, and Transaction Cost Economics, can provide a robust theoretical foundation for practical solutions.

This study has some limitations, including the focus on specific sectors within the Turkish market, which may limit the generalizability of the findings. Additionally, the reliance on qualitative data from a limited number of interviews may not capture the full complexity of supply chain strategies. Future research should aim to include a broader range of sectors and geographic regions, as well as incorporate quantitative data to complement qualitative insights.

In conclusion, this study provides valuable insights into the strategies employed by various industries to enhance supply chain resilience in the post-pandemic era. By integrating strategic management theories, it offers a comprehensive framework for understanding how businesses can navigate supply chain disruptions and maintain a competitive edge in an increasingly uncertain global environment.

References

Aday, S., & Aday, M. S. (2020). Impact of COVID-19 on the food supply chain. *Food Quality and Safety, 4*(4), 167-180.

Alam, S. T., Ahmed, S., Ali, S. M., Sarker, S., & Kabir, G. (2021). Challenges to COVID-19 vaccine supply chain: Implications for sustainable development goals. *International Journal of Production Economics, 239*, 108193.

Butt, A. S. (2022). Building resilience in retail supply chains: Lessons learned from COVID-19 and future pathways. *Benchmarking: An International Journal, 29*(10), 3057-3078.

Cebir, Y., & Akkartal, E. (2024). Digital Twin in Logistics and Supply Chain Management. In Strategic Innovations for Dynamic Supply Chains (pp. 170-192). IGI Global.

Chaker, B., & Damak, C. (2024). Integrating Blockchain Technology for Enhanced Transparency and Security in Supply Chains. In Strategic Innovations for Dynamic Supply Chains (pp. 147-169). IGI Global.

Chervenkova, T., & Ivanov, D. (2023). Adaptation strategies for building supply chain viability: A case study analysis of the global automotive industry re-purposing during the COVID-19 pandemic. *Transportation Research Part E: Logistics and Transportation Review, 177*, 103249.

Chowdhury, M. T., Sarkar, A., Paul, S. K., & Moktadir, M. A. (2022). A case study on strategies to deal with the impacts of COVID-19 pandemic in the food and beverage industry. *Operations Management Research, 15*(1), 166-178.

Craighead, C. W., Ketchen Jr, D. J., & Darby, J. L. (2020). Pandemics and supply chain management research: toward a theoretical toolbox. *Decision Sciences*, *51*(4), 838-866.

de Goeij, C., Gelsomino, L. M., Caniato, F., Moretto, A. M., & Steeman, M. (2021). Understanding SME suppliers' response to supply chain finance: a transaction cost economics perspective. *International Journal of Physical Distribution & Logistics Management, 51*(8), 813-836.

Dwivedi, A., Srivastava, S., Agrawal, D., Jha, A., & Paul, S. K. (2023). Analyzing the inter-relationships of business recovery challenges in the manufacturing industry: Implications for post-pandemic supply chain resilience. *Global Journal of Flexible Systems Management*, *24*(Suppl 1), 31-48.

Edwards-Jones, A. (2014). Qualitative data analysis with NVIVO

Emenike, S. N., & Falcone, G. (2020). A review on energy supply chain resilience through optimization. *Renewable and Sustainable Energy Reviews, 134*, 110088.

Frederico, G. F. (2021). Towards a supply chain 4.0 on the post-COVID-19 pandemic: a conceptual and strategic discussion for more resilient supply chains. *Rajagiri Management Journal, 15*(2), 94-104.

Ghansah, F. A., & Lu, W. (2024). Managerial framework for quality assurance of cross-border construction logistics and supply chain during pandemic and post-pandemic: lessons from COVID-19 in the world's factory. Engineering, Construction and Architectural Management.

He, Z., Zhang, R., Qiu, Q., & Chen, Z. (2024). Research on industrial structure adjustment and spillover effect in resource-based regions in the post-pandemic era. *Plos one, 19*(1), e0296772.

Hobbs, J. E. (2020). Food supply chains during the COVID-19 pandemic. *Canadian Journal of Agricultural Economics/Revue canadienne d'agroeconomie, 68*(2), 171-176.

Ivanov, D. (2024). Exiting the COVID-19 pandemic: After-shock risks and avoidance of disruption tails in supply chains. *Annals of Operations Research, 3*35(3), 1627-1644.

Ivanov, D. (2024). Transformation of supply chain resilience research through the COVID-19 pandemic. *International Journal of Production Research*, 1-22.

Judi, T. E., & Kurniawan, D. (2024). Public policy and organizational resilience: Leadership, innovation, and sustainability in the post-pandemic era. *Manajemen dan Bisnis, 23*(1), 197-212.

Karmaker, C. L., Bari, A. M., Anam, M. Z., Ahmed, T., Ali, S. M., de Jesus Pacheco, D. A., & Moktadir, M. A. (2023). Industry 5.0 challenges for post-pandemic supply chain sustainability in an emerging economy. *International Journal of Production Economics, 258*, 108806.

Kaur, C., & Sharma, A. (2020, October). Social issues sentiment analysis using python. In 2020 5th international conference on computing, communication and security (ICCCS) (pp. 1-6). IEEE.

Li, G., Arisian, S., Chen, G., & Sethi, S. P. (2024). Editorial note for special issue on "Enhancing supply chain resiliency in an era of reglobalization". *International Journal of Logistics Research and Applications*, 1-3.

Mahmoudi, A., Jemielniak, D., & Ciechanowski, L. (2024). Assessing Accuracy: A Study of Lexicon and Rule-Based Packages in R and Python for Sentiment Analysis. IEEE Access.

Mittal, R., & Sinha, P. (2022). Framework for a resilient religious tourism supply chain for mitigating post-pandemic risk. *International Hospitality Review, 36*(2), 322-339.

Mızrak, F. (2024). Strategic Innovations for Dynamic Supply Chains. IGI Global.

Moosavi, J., Fathollahi-Fard, A. M., & Dulebenets, M. A. (2022). Supply chain disruption during the COVID-19 pandemic: Recognizing potential disruption management strategies. *International Journal of Disaster Risk Reduction, 75*, 102983.

Nassaji, H. (2020). Good qualitative research. *Language Teaching Research, 24*(4), 427-431.

Nayak, B., Bhattacharyya, S. S., & Krishnamoorthy, B. (2023). Integrating the dialectic perspectives of resource-based view and industrial organization theory for competitive advantage–a review and research agenda. *Journal of Business & Industrial Marketing, 38*(3), 656-679.

Pandey, B. K., Kanike, U. K., George, A. S., & Pandey, D. (Eds.). (2024). AI and Machine Learning Impacts in Intelligent Supply Chain. IGI Global.

Paul, S. K., Chowdhury, P., Chowdhury, M. T., Chakrabortty, R. K., & Moktadir, M. A. (2023). Operational challenges during a pandemic: an investigation in the electronics industry. *The International Journal of Logistics Management, 34*(2), 336-362.

Phillips, M., & Lu, J. (2018). A quick look at NVivo. *Journal of Electronic Resources Librarianship, 30*(2), 104-106.

Praptika, I. P. G. E., Yusuf, M., & Heslinga, J. H. (2024). How can communities better prepare for future disasters? Learning from the tourism community resilience model from Bali, Indonesia. Journal of Tourism Futures.

Pujawan, I. N., & Bah, A. U. (2022, January). Supply chains under COVID-19 disruptions: literature review and research agenda. *Supply Chain Forum: An International Journal, 23*(1), 81-95.

Rahman, T., Paul, S. K., Shukla, N., Agarwal, R., & Taghikhah, F. (2022). Supply chain resilience initiatives and strategies: A systematic review. Computers & Industrial Engineering, 170, 108317.

Rathee, N., Joshi, N., & Kaur, J. (2018, June). Sentiment analysis using machine learning techniques on Python. In 2018 Second International Conference on Intelligent Computing and Control Systems (ICICCS) (pp. 779-785). IEEE.

Shih, W. C. (2020). Global supply chains in a post-pandemic world. *Harvard Business Review, 98*(5), 82-89.

Sim, S. (2023). Blockchain for Resilient Halal Food Certification during Post-COVID Era. *Journal of Halal Science and Technology, 2*(2), 1-18.

Sowmya, G., Sridevi, R., Rao, K. S., & Shiramshetty, S. G. (2024). Integrating AI, ML, Blockchain, and IoT for End-to-End Supply Chain Optimization. In *Strategic Innovations for Dynamic Supply Chains* (pp. 123-146). IGI Global.

Struckell, E., Ojha, D., Patel, P. C., & Dhir, A. (2022). Strategic choice in times of stagnant growth and uncertainty: An institutional theory and organizational change perspective. *Technological Forecasting and Social Change*, *182*, 121839.

Sürücü, B. (2024). The Evolution of E-Commerce, Its Impact on Supply Chain Innovations, and Significance in the Pandemic Era and Beyond. In Strategic Innovations for Dynamic Supply Chains (pp. 103-122). IGI Global.

Tirivangani, T., Alpo, B., Kibuule, D., Gaeseb, J., & Adenuga, B. A. (2021). Impact of COVID-19 pandemic on pharmaceutical systems and supply chain–a phenomenological study. *Exploratory Research in clinical and social pharmacy*, *2*, 100037.

Vindrola-Padros, C., & Johnson, G. A. (2020). Rapid techniques in qualitative research: a critical review of the literature. *Qualitative health research*, *30*(10), 1596-1604.

Wieland, A., & Durach, C. F. (2021). Two perspectives on supply chain resilience. *Journal of Business Logistics*, *42*(3), 315-322.

Çıkar Çatışması: Yoktur.

Finansal Destek: Yoktur.

Etik Onay: Bu çalışma için etik onay, Beykoz Üniversitesi Etik Kurulu'ndan 06.6.2024 tarih ve 20214/9 sayılı olarak alınmıştır.

Yazar Katkısı: Filiz MIZRAK (%100)

Conflict of Interest: None.

Funding: None.

Ethical Approval: The approval of Beykoz University Ethical Committee no 2024/9 dated 06.06.2024 was obtained for this study.

Author Contributions: Filiz MIZRAK (100%)