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Graduation Project



The Impact of the Pandemic on Global Supply Chains: A Case Study on ROSHN Real Estate

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Table of contents:

Abstract:	6
Introduction	9
Study Problem	11
Research Importance	12
Study Objectives	14
Research Questions	15
Hypotheses	15
Theoretical premises of the study	16
Introduction	20
Previous studies	21
Theoretical framework	27
.1 COVID-19 Pandemic	27
1.1. Impact of COVID-19 on Global Supply Chains	29
1.2. Global Supply Chain Pre-COVID-19 Era	31
1.3. Global Supply Chain Post-COVID-19 Era	33
2. The global supply chain	35
.2.1 Elements of the Supply Chain	36
2.2. Real Estate Supply Chains	37
Introduction	41
Study Methodology:	41
Research Methods:	42
Study tool	42
Study population and sample:	43

Research Tools:	48
The validity of the study tool:	49
Statistical processing used:	54
Limitations of the study	55
Findings of the Study	57
Results	70
Conclusions	73
Recommendations	74
References	78
Survey Questionnaire	87
الملخص العربي	93

List of tables:

Table 1: Distribution of the study sample according to (Gender).....	43
Table 2: Distribution of the study sample according to (Years of experience)	47
Table 3: Correlation coefficient of paragraphs of the first item (Effects of the Pandemic)	50
Table 4: Correlation coefficient of paragraphs of the second item (Mitigation Strategies).....	51
Table 5: Correlation coefficient of paragraphs of the third item (Effectiveness of Strategies Pre the Pandemic)	52
Table 6: Correlation coefficient of paragraphs of the fourth item (Effectiveness of Strategies During the Pandemic).....	53
Table 7: Values of Internal Consistency Coefficients Using Cronbach Alpha Test	54
Table 8: The arithmetic means and standard deviations of the responses of the study sample members for the paragraphs of the axis (Effects of the Pandemic) are arranged in descending order.	58
Table 9: The arithmetic means and standard deviations of the responses of the study sample members for the paragraphs of the axis (Mitigation Strategies) are arranged in descending order.	60
Table 10: The arithmetic means and standard deviations of the responses of the study sample members for the paragraphs of the axis (Effectiveness of Strategies During the Pandemic) are arranged in descending order. ..	63
Table 11: Correlation Coefficients Between Mitigation strategies and The pandemic's impacts on ROSHN's supply chains.	66
Table 12: Results of the Wilcoxon Signed-Rank Test analysis to calculate the difference between the means of each of the two variables to test the third hypothesis.....	67

Index of shapes:

Figure 1 Distribution of the study sample according to gender	44
Figure 2 : Distribution of the study sample according to department	45
Figure3 : Distribution of the study sample according to job title	47
Figure 4: Distribution of the study sample according to (Years of experience).....	48

Abstract:

The COVID-19 pandemic has led to supply chain disruptions of an unprecedented scale. These disruptions are due to a unique combination of factors: a sudden increase in demand for specific products, unexpected changes in demand locations, shortages in supply, a crisis in logistics, and an extraordinarily rapid recovery in major economies. This confluence of circumstances has created challenges never encountered, highlighting the vulnerabilities and complexities within global supply chains.

This study aimed to investigate the impact of the pandemic on global supply chains: a case study on ROSHN Real Estate to achieve the study's objectives, the researchers designed a questionnaire consisting of 19 statement to collect primary data from a sample of 61 respondents. Data were collected, analyzed, and hypotheses tested using the Statistical Package for Social Sciences (SPSS), employing statistical methods such as spearman correlation coefficient analysis.

The analysis led to several key findings:

- There is a significant statistical correlation between the COVID-19 pandemic and increased disruptions in ROSHN's global supply chains.
- There is a statistically significant correlation between the application of mitigation strategies and the reduction of the pandemic's impacts on ROSHN's supply chains.

- There are significant differences in the effectiveness of ROSHN's mitigation strategies in maintaining operational continuity and financial stability before and during the pandemic.

Recommendations:

1. Develop and implement comprehensive risk management plans that include scenarios for pandemics and other global disruptions.
2. Foster stronger communication channels and partnerships with suppliers, customers, and other stakeholders to ensure timely information sharing and coordinated responses during disruptions.
3. Establish a dedicated crisis management team to quickly respond to supply chain disruptions.

Chapter One

Introduction

At the end of 2019, the COVID-19 pandemic began to spread rapidly across the globe, creating profound and unprecedented disruptions in global supply chains. The heavy reliance on complex global networks revealed significant vulnerabilities in supply chains, making them susceptible to major crises like the pandemic. Within a short period, movement restrictions and complete border closures disrupted logistical and production operations, leading to shortages of many basic commodities and increased operational costs (Ivanov & Dolgui, 2020).

ROSHN Real Estate, a prominent Saudi company, faced significant challenges in securing raw materials and essential components, affecting its capacity for construction and housing development. The pandemic underscored vulnerabilities within the real estate sector's supply chains, impacting project timelines and budget allocations. For instance, the sudden halt in international shipping and transportation severely delayed the delivery of construction materials, leading to project delays and cost overruns (Sharma, et al., 2020).

The pandemic has highlighted the importance of sustainability and resilience in supply chains, forcing companies like ROSHN Real Estate to rethink their strategies to ensure business continuity under unforeseen circumstances. To adapt to these challenges, ROSHN has had to explore new strategies such as digital transformation, diversifying their supplier base, and

increasing investment in risk management and transparency technologies (Queiroz, et al., 2020). For example, the adoption of digital tools for supply chain management has enabled ROSHN to enhance real-time tracking and improve decision-making processes, thereby mitigating some of the disruptions caused by the pandemic (Xu, et al., 2021).

Moreover, the crisis has accelerated the need for sustainable supply chain practices. Companies are now more focused on creating resilient supply chains that can withstand future disruptions. ROSHN's efforts to diversify its supplier base have not only reduced dependence on single-source suppliers but also improved supply chain agility and responsiveness (Chowdhury, et al., 2021). Additionally, investment in transparency technologies, such as blockchain, has enhanced the traceability and accountability of supply chain operations, further contributing to resilience (Saber, et al., 2019).

In this context, the importance of research into supply chain resilience and sustainability becomes evident. Such research provides in-depth insights into the challenges faced by companies like ROSHN and strives to find sustainable solutions to enhance supply chain resilience. By addressing these issues, the expected outcomes contribute to improving the ability to face future crises and ensure business continuity effectively and efficiently (Ivanov, 2021). This study aims to explore the strategies that ROSHN Real Estate has implemented in

response to the COVID-19 pandemic and to evaluate their effectiveness in enhancing supply chain resilience and sustainability.

Study Problem

ROSHN Real Estate, a prominent Saudi company, faced significant challenges in securing raw materials and essential components, greatly impacting its ability to develop construction and housing projects. This problem highlights several critical points, including supply shortages due to the pandemic, where companies struggled to obtain necessary inputs for production, leading to delays and halts in manufacturing processes. Additionally, supply chain disruptions forced companies to seek alternative suppliers, often at higher costs, significantly increasing operational expenses and straining financial resources. Furthermore, movement restrictions and border closures affected transportation networks, causing shipping and delivery delays, further exacerbating supply chain efficiency. The pandemic also altered consumer behavior and demand patterns, with companies experiencing sudden spikes or drops in demand for various products, challenging their ability to adjust supply chain operations accordingly. Finally, health concerns and lockdown measures impacted workforce availability and productivity, adding another layer of complexity to supply chain management.

Research Importance

Theoretical Importance:

1. Understanding Supply Chain Vulnerabilities:

- **Theoretical Basis:** Analyzing the impact of the COVID-19 pandemic on supply chains provides insights into their vulnerabilities, based on supply chain resilience theory.
- **Expected Impact:** Contributes to developing theoretical models that explain how supply chains can be more resilient to unexpected crises and disruptions.

2. Enhancing Crisis Management Models:

- **Theoretical Basis:** Studying the effects of the pandemic on supply chains helps in refining risk management and crisis response strategies, grounded in risk management theory.
- **Expected Impact:** Helps in formulating theoretical models for managing supply chain risks effectively during global crises, enhancing the academic discourse on crisis management.

3. Promoting Sustainable Practices:

- **Theoretical Basis:** Examining the need for sustainability in supply chains during the pandemic is linked to sustainability theory.

- **Expected Impact:** Aids in developing theories that balance economic, social, and environmental factors, providing a framework for sustainable supply chain management.

Practical Importance

1. Improving Supply Chain Resilience:

- **Practical Basis:** Implementing strategies such as digital transformation, diversifying suppliers, and investing in transparency technologies can enhance supply chain resilience.
- **Expected Impact:** Increases the ability of companies like ROSHN to withstand future crises, ensuring business continuity and operational efficiency.

2. Enhancing Operational Efficiency:

- **Practical Basis:** Using digital tools and advanced technologies (e.g., AI, blockchain) to manage supply chains can streamline operations and improve efficiency.
- **Expected Impact:** Reduces delays, minimizes costs, and improves the accuracy and reliability of supply chain operations, benefiting both companies and their customers.

3. Developing Strategic Adaptability:

- **Practical Basis:** Adapting to challenges by exploring new strategies and technologies helps companies to remain competitive in the market.

- **Expected Impact:** Enables companies to quickly adjust to market changes and disruptions, maintaining their competitive edge and market presence.

Through this division, ROSHN and similar companies can achieve valuable theoretical and practical benefits that enhance their position in the market, enabling them to meet customer expectations and adapt to modern technological transformations effectively.

Study Objectives

- Analyze the specific impacts of the COVID-19 pandemic on ROSHN Real Estate's global supply chains.
- Investigate the strategies implemented by ROSHN Real Estate to navigate and mitigate disruptions caused by the pandemic.
- Evaluate the effectiveness of these strategies in maintaining operational continuity and financial stability.
- Formulate actionable recommendations to enhance ROSHN Real Estate's supply chain resilience and sustainability in preparation for future global crises.

Research Questions

1. What were the specific disruptions experienced by ROSHN Real Estate's global supply chains due to the COVID-19 pandemic?
2. How did ROSHN Real Estate respond to these disruptions, and what strategies did they employ to mitigate the challenges?
3. To what extent were ROSHN Real Estate's adaptation strategies successful in maintaining operational continuity and financial stability during the pandemic?
4. Based on ROSHN Real Estate's experience, what actionable recommendations can be proposed to improve the resilience and sustainability of their supply chains for future global crises?

Hypotheses

1. There is a significant statistical correlation between the COVID-19 pandemic and increased disruptions in ROSHN's global supply chains.
2. There is a statistically significant correlation between the application of mitigation strategies and the reduction of the pandemic's impacts on ROSHN's supply chains.
3. There are significant differences in the effectiveness of ROSHN's mitigation strategies in maintaining operational continuity and financial stability before and during the pandemic.

Theoretical premises of the study

1. Supply Chain Resilience Theory:

- **Overview:** Supply Chain Resilience Theory emphasizes the capacity of supply chains to adapt and recover from unexpected disruptions. This theory has gained prominence particularly in light of crises such as the COVID-19 pandemic.
- **Application:** The focus is on developing supply chains that are not only robust but also flexible enough to withstand shocks and continue operating under adverse conditions. Techniques include diversifying supply sources, enhancing transparency, and leveraging technology for real-time monitoring and response.
- **Key Insights:** According to Christopher and Peck (2004), resilient supply chains are those that can anticipate potential disruptions and rapidly adjust to minimize their impact, ensuring continuity and reliability in the supply chain operations.

2. Risk Management Theory:

- **Overview:** Risk Management Theory involves the systematic process of identifying, evaluating, and mitigating risks that could negatively impact the supply chain.
- **Application:** In the context of the COVID-19 pandemic, this theory is applied to assess the vulnerabilities within logistics operations and implement

strategies to manage these risks effectively. This might include creating contingency plans, diversifying logistics routes, and adopting flexible inventory management practices.

- **Key Insights:** Jüttner, *et al.* (2003) highlight that effective risk management can significantly reduce the adverse impacts of disruptions by proactively addressing potential issues before they escalate, thereby maintaining the stability and efficiency of the supply chain.

3. Sustainability Theory:

- **Overview:** Sustainability Theory seeks to balance the economic, social, and environmental dimensions of organizational performance. It advocates for sustainable practices that ensure long-term viability and minimal negative impact on society and the environment.
- **Application:** During the pandemic, sustainability in supply chain management becomes crucial as organizations strive to maintain operations without compromising on social responsibilities or environmental standards. This involves adopting eco-friendly logistics solutions, ensuring fair labor practices, and promoting resource efficiency.
- **Key Insights:** Elkington (1998) introduced the triple bottom line concept, which emphasizes that companies should commit to sustainable development by equally valuing people, planet, and profit. This approach helps organizations remain resilient and responsible even in challenging times like a global pandemic.

4. Strategic Management Theory:

- **Overview:** Strategic Management Theory focuses on the formulation and implementation of strategies that enable organizations to achieve their objectives and maintain a competitive edge.
- **Application:** In response to the COVID-19 pandemic, strategic management involves developing adaptive strategies that mitigate the impact of the crisis on logistics operations. This includes re-evaluating supply chain strategies, enhancing digital capabilities, and fostering innovation.
- **Key Insights:** Porter (1980) suggests that strategic planning is critical for navigating turbulent environments. By employing strategic management principles, organizations can devise comprehensive plans that enhance their resilience, optimize logistics efficiency, and ensure sustainable growth despite external disruptions.

Chapter Two

Previous studies

Introduction

Previous studies are essential in scientific inquiries as they provide the theoretical framework and foundational knowledge necessary for understanding the research topic. This chapter will examine the literature on the impact of the pandemic on global supply chains, focusing specifically on ROSHN Real Estate.

The pandemic has profoundly affected various sectors, including supply chains, by altering how businesses interact with consumers and how products are delivered. It is crucial to understand how these changes have influenced supply chain operations and consumer behavior for companies like ROSHN. In this chapter, we will review existing studies on the pandemic's effects on supply chains and consumer behavior, evaluating the methodologies and results of these studies and their relevance to our research goals.

Furthermore, we will identify gaps in the current literature and discuss how our study aims to address these gaps. This review will provide a detailed and scientifically grounded understanding of the pandemic's impact on supply chain operations at ROSHN and the broader supply chain sector.

Previous studies

Baldwin, R., & Tomiura, E. (2020) conducted a study titled "**Thinking ahead about the trade impact of COVID-19**" discussing potential disruptions in global value chains due to the COVID-19 pandemic and proposing strategies to enhance resilience. The study focuses on the diversification of supply sources and the strengthening of digital infrastructure to mitigate the risks associated with supply chain disruptions. Baldwin and Tomiura anticipate significant challenges in global trade post-pandemic and suggest proactive measures for businesses, emphasizing the importance of strategic planning and adaptability to ensure continuity and stability in global value chains.

Mudambi, R., & Puck, J. (2020) conducted research titled "**Global value chain reconfiguration in the post-COVID-19 era: Implications for global business research**" examining how the COVID-19 pandemic prompted reconfiguration in global value chains. The study explores strategic adjustments and resilience-building measures adopted by businesses in response to the pandemic. Mudambi and Puck analyze the structural changes in global value chains post-pandemic, emphasizing the need for innovation and strategic realignment to mitigate future disruptions. The study underscores the importance of adapting to new market dynamics and enhancing supply chain resilience. It found that businesses that innovated and realigned their strategies were more resilient in facing the disruptions.

(Uchehara *et al.*, 2020) conducted a study titled "**Understanding the impact of COVID-19 on the real estate sector in the United Kingdom.**" The study aimed to assess the pandemic's impact and mitigation strategies within the real estate sector, focusing on tenants and the supply chain. Using a qualitative descriptive research design, data was gathered primarily from secondary sources, including the Occupiers' Sentiment Index and past recessionary financial performance. The study analyzed various economic recovery scenarios (V, U, W, L shapes) and legal frameworks to mitigate pandemic risks across the sector. Findings highlighted emerging trends such as contract clause revisions as industry mitigation strategies. This study provides insights crucial for developing long-term responses to future pandemics within the real estate sector, emphasizing resilience and preparedness strategies.

Acharya, & Bengui, (2021) conducted a study titled "**Global supply chains and export dynamics in developing countries: The role of COVID-19 shocks**" examining the impact of COVID-19 disruptions on global supply chains and export dynamics in developing countries. The study highlights the vulnerabilities of firms in these countries to disruptions in global value chains, resulting in significant declines in export sales and increased likelihood of market exit, especially for those reliant on specific supply chains. To address these challenges, the study emphasizes the importance of resilience-building strategies, such as diversifying supply sources and adopting digital

technologies. Firms that diversified their key inputs by sourcing from multiple countries were better able to withstand the shocks, while digital tools improved transparency and efficiency in managing supply chain operations. The study suggests that firms should adopt strategies to improve their resilience and rapid response capabilities, focusing on supply diversification, transparency, and collaboration across global value chains. These findings underscore the need for firms in developing countries to strengthen their supply chain strategies to better handle unforeseen events and prepare for future challenges in global trade dynamics.

Javorcik, B. S. (2021) carried out a study titled "**Global supply chains during the COVID-19 pandemic: Retrospect and prospects**" reviewing the disruptions caused by the pandemic on global supply chains and assessing the implications for future strategies. The study explores the role of diversification and digital technologies in enhancing resilience, providing a retrospective analysis of how global supply chains were affected by the pandemic. Javorcik highlights the lessons learned and proposes forward-looking strategies for businesses to strengthen their resilience and adaptability to future disruptions, focusing on the importance of robust supply chain management practices. The study found that companies that diversified their supply chains and adopted digital technologies were better able to cope with the disruptions.

OECD (2021) published a report titled "**The impact of the COVID-19 pandemic on global value chains and policy responses**" providing an overview of the disruptions caused by COVID-19 on global value chains and analyzing policy responses aimed at enhancing resilience. The report discusses strategies related to supply chain diversification and collaboration, assessing the economic and policy implications of the pandemic disruptions. The OECD offers recommendations for governments and businesses to strengthen the resilience and sustainability of global value chains, highlighting the need for coordinated efforts and strategic planning to address future challenges effectively. The report found that policy responses that promoted diversification and collaboration were effective in enhancing supply chain resilience.

(Sun *et al.*, 2022) conducted a study entitled "**Evaluating COVID-19 Impact on the Future of the Electric Vehicles Supply Chain**". In this study, the aim was to explore the effects of the COVID-19 pandemic on the stability of the global electric vehicles (EVs) supply chain and the subsequent impact on climate ambitions. Using an integrated model framework, the research assessed supply risks of 17 selected core commodities throughout the EV supply chain, applying supply constraints to project future EV sales until 2030. The study, which analyzed three pandemic development scenarios, revealed that if the pandemic is effectively contained before 2024, the global EV industry will recover without fundamental damage and can maintain the same growth trend

as in the no-pandemic scenario by 2030. The findings underscore the importance of fiscal stimulus in the post-pandemic era, suggesting that it should be directed more toward upgrading the quality of battery products rather than expanding production capacity. Based on these findings, it is recommended that stakeholders focus on improving the resilience of the EV supply chain and ensure robust strategies for rapid response to unforeseen events, which includes prioritizing quality enhancements over mere capacity expansion.

(Lebastard & Serafini, 2023) conducted a study entitled "**Understanding the impact of COVID-19 supply disruptions on exporters in global value chains**" in this study, where the impact of the COVID-19 pandemic on exporting companies was assessed by analyzing disruptions in global value chains (GVCs), using a comprehensive dataset that includes company information, products and partner countries in international trade. The study, conducted from January 2020 to December 2021, revealed that participation in global value chains increased firms' vulnerability to the shock of the pandemic, as evidenced by the negative effects on export sales and the likelihood of remaining in export markets, especially amid supply bottlenecks. Moreover, it turned out that companies with a relatively final position in global value chains were more negatively affected by supply disruptions, underscoring the importance of enhancing supply chain resilience. Conversely, the results indicated that exporting firms benefited from diversifying their key inputs by

sourcing from multiple countries, supporting the hypothesis that diversifying global value chains enhances supply chain resilience in the face of global challenges. Based on these findings, it is critical that companies strengthen their strategies to improve resilience and rapid response capabilities in dealing with unforeseen events. This included a focus on diversifying sources of supply, enhancing transparency, and enhancing collaboration across global value chains.

Comment on previous literature

My study on "**The Impact of the Pandemic on Global Supply Chains: A Case Study on ROSHN Real Estate**" is unique in its specific focus on the real estate sector in Saudi Arabia, a field that has received limited attention compared to other industries affected by the COVID-19 pandemic. By concentrating on ROSHN Real Estate, this research provides invaluable insights into the local dynamics and challenges faced by the real estate market during this unprecedented time.

This study distinguishes itself by examining the adaptive strategies employed by ROSHN in response to pandemic-related disruptions, such as contract adjustments and innovative approaches to project management. These insights not only highlight the resilience of the company but also serve as a roadmap for other businesses in the sector looking to navigate similar challenges.

Furthermore, the research employs a comprehensive analytical framework to assess the long-term implications of the pandemic on supply chain practices within the real estate industry. By focusing on a localized case study, the findings offer practical recommendations for enhancing agility and sustainability in future operations.

In essence, this study contributes to a deeper understanding of the pandemic's localized effects on supply chains, particularly within the Saudi real estate sector, helping stakeholders prepare for future uncertainties while fostering a culture of innovation and adaptability.

Theoretical framework

1. COVID-19 Pandemic

A pandemic is an outbreak of a widespread infectious disease, spreading across several countries or continents, affecting a large proportion of the population. A pandemic is defined as an outbreak of a new disease that people do not have immunity to, and that is easily transmitted from person to person, leading to a significant increase in the number of cases and deaths within a short period. [WHO - Pandemic Definition](#)

Millions of deaths, massive job losses, and a multi-trillion dollar decline in global economic output. Since its outbreak, the COVID-19 pandemic has inflicted an unprecedented and profound shock on our social and economic

systems, leading to widespread impacts not seen in modern history. The global research community and media have been deeply engaged in analyzing what life will be like in the so-called post-COVID world. Many argue that we will live in a markedly different society; others believe it is just a temporary disruption; and some hold a middle-ground view, suggesting that only marginal changes will occur.

Management thinkers have particularly focused on anticipating and analyzing the impact of COVID-19-induced disruptions on organizations, especially on the global supply chains they are part of. Studies have shown that supply chains have faced immense pressures due to unexpected changes in supply and demand, resource shortages, logistical disruptions, and rapid recovery in some major economies (KPMG, 2021).

According to a study by KPMG, the COVID-19 pandemic has highlighted vulnerabilities in global supply chains and underscored the need to enhance their resilience through advanced technologies and more sophisticated strategic planning. The report indicates that companies investing in technology and collaboration with partners along the supply chain have been better able to adapt to these unprecedented challenges.

Long-entrenched practices such as just-in-time delivery and lean manufacturing have undoubtedly led to highly efficient supply chains. However, disruptions in these chains have been a major source of supply

shortages for a wide array of products, including electronics, clothes, and toys, which experienced a huge surge in demand due to lockdowns. Although some elements of the supply chains ceased functioning only briefly, significant spikes in demand, driven by media-induced buying frenzies, led to ongoing shortages for many products. Moreover, as the pandemic unfolded, remote production facilities closed, and the movement of goods virtually came to a standstill.

The average consumer, particularly in Western countries, realized that their essential supplies—such as protective equipment and medicines—were sourced from other parts of the world. The immediate reaction, largely stemming from daily frustrations, was the recognition that such heavy reliance on foreign suppliers for basic daily needs was imprudent. This led to a growing sentiment that a shift to local production and supply networks was necessary (Smith, 2021, p; 123-145).

1.1. Impact of COVID-19 on Global Supply Chains

The COVID-19 pandemic of 2020 is considered one of the most severe crises affecting businesses and workers, paralyzing both domestic and international transportation. The pandemic exposed vulnerabilities in global supply chains, highlighting the risks of over-reliance on a single manufacturing hub, such as China, known as the "world's factory" due to its cost advantages and cheap labor. Anna Nagurney, an expert in supply chain models and Professor of Operations and Information Management at the University of

Massachusetts, stated that "the impact of the COVID-19 pandemic on global supply chains is unprecedented" (Wetsman, 2020).

Jack Kleinhenz, Chief Economist at the largest retail trade association in the world, noted that "record declines in employment, GDP, retail sales, and other indicators have led to unparalleled figures that cannot be compared to anything in economic history. It is still challenging to grasp the full extent of the damage or predict the future given such significant disruptions" (Burnson, 2020).

The lockdowns implemented by countries led to a reduction in imports, which, in turn, caused a significant shift in overall demand for local products. If local companies can effectively produce substitutes for imports, the lockdown may have a positive impact. However, if local producers are unable to replace imports, particularly in cases where certain manufactured components are imported, countries may face a crisis due to disruptions in global supply chains. It has become evident that global trade has become more complex since the mid-1980s, with international supply chains expanding and complicating (Baldwin & Freeman, 2020).

The cascading effects on manufacturing in certain countries, such as China, have disrupted supply chains in other countries, either directly or indirectly. For example, if a company manufacturing Mini Coopers in the UK sources tires from China and engines from Japan, this is a direct exposure.

However, the Japanese engine may contain parts sourced from China, making the Mini Cooper manufacturer indirectly vulnerable to any disruptions in Chinese supply chains through Japanese imports. This illustrates the complexity and interconnection of global supply chains.

1.2. Global Supply Chain Pre-COVID-19 Era

Before the COVID-19 pandemic, countries had increasingly outsourced various activities to enhance and maintain efficiency while managing the global configuration of operations. In the era of globalization, firms optimized their value-added activities and restructured their operations to better align with global markets (Kano, *et al.*, 2020). Value-creating activities, including manufacturing, branding, product or service design, distribution, and after-sales services, became geographically dispersed and fragmented (Clarke & Boersma, 2017). This fragmentation led to heightened competition between supply chains in both local and international markets, driving firms to operate more efficiently.

The global competition among supply chains highlighted the importance of integrating value-creation activities with the global economy (Gereffi & Lee, 2016). This competition underscored the need for collaboration beyond a single firm and the expansion of networks to access necessary resources (Golgeci, *et al.*, 2020). Global supply chains were viewed as "strategic assets" that provided a competitive edge (Min, *et al.*, 2019).

As a result, supply managers had to continuously review, reconfigure, and optimize supply chain activities to measure and enhance efficiency. Each firm positioned itself strategically to address challenges and maximize profits while maintaining cost efficiency (Clarke & Boersma, 2017). The rise of digitalization and sustainability issues prompted supply chains to adapt by leveraging advanced technologies to achieve sustainability.

Technologies such as Artificial Intelligence (AI), Blockchain, Big Data, Machine Learning, Data Analytics, Mobile Analytics, Distributed Manufacturing, and Embedded Devices played a crucial role in maximizing profits and reducing waste (Hagberg, *et al.*, 2016; Frazzon, *et al.*, 2018). Data-driven technologies and software-led supply chains improved efficiency in global value-creation activities (Dubey, *et al.*, 2018; Sanders, *et al.*, 2019). The growth of the Internet and digital platforms facilitated better communication between suppliers and firms, leading to a shift from a delivery-focused approach to a more customer-centric model (Min, *et al.*, 2019).

Countries that outsourced activities, rather than internalizing functions into vertically integrated structures, effectively met global demand (Golgeci, *et al.*, 2020). The integration of digitalization and sustainability with supply chains not only improved effectiveness but also efficiency. Digitalization of supply chains proved efficient for three main reasons: the availability of large customer datasets providing new insights, the opportunity for exploration and

experimentation, and the capability to solve large-scale problems efficiently (Sanders, *et al.*, 2019). These technological advancements made global supply chains more efficient and transparent. However, this focus on efficiency sometimes led to an underestimation of the potential of domestic and regional resources.

1.3. Global Supply Chain Post-COVID-19 Era

The COVID-19 pandemic, which originated in Wuhan, China, and spread rapidly across the globe, was declared by the World Health Organization (WHO) as the most severe pandemic in human history (Ivanov, 2020). In response, governments worldwide imposed lockdowns and travel restrictions, which had a profound adverse impact on the global supply chain (Xu *et al.*, 2020).

China, as the world's manufacturing hub, was central to the global supply chain, providing not only a wide range of products but also critical health-related items such as masks, medicines, and Personal Protective Equipment (PPE) kits. The lockdown led to a severe mismatch between the soaring global demand for these health products and the limited supply from China. Additionally, several countries, including the USA, India, and various European nations, reported receiving defective PPE kits and testing equipment from China, exacerbating the crisis (Jha & Sharma, 2020). Consequently, supply chain management experienced significant setbacks.

The pandemic caused massive disruptions in the global supply chain, impacting supply, demand, and logistics. The unpredictability of the pandemic created substantial ripple effects throughout supply chains (Li & Zobel, 2020). Many companies, particularly those with direct or indirect suppliers from Wuhan, faced severe losses. According to a report, 94 percent of Fortune 1000 companies encountered significant disruptions due to COVID-19 (Fortune, 2020). Dun & Bradstreet reported that 51,000 companies worldwide had one or more direct suppliers in Wuhan, and at least 5 million companies had tier-two suppliers in the region. Furthermore, 938 of the Fortune 1000 companies had tier-one or tier-two suppliers in Wuhan (Dun & Bradstreet, 2020). This widespread disruption affected both supply and demand across global supply chains.

Even after lockdowns were lifted and restrictions eased, the manufacturing sector struggled to regain reliability and efficiency. Challenges such as reduced workforce capacity, shortages of raw materials, and delays in supply chains persisted, leading to extended lead times and delayed deliveries (Kissler *et al.*, 2020). The pandemic also led to disruptions in international trade practices, human rights concerns, and low political coordination among countries (Jha & Sharma, 2020).

2. The global supply chain

The global supply chain involves the distribution of products and services across countries through a structured network. While this process may seem straightforward and lucrative, managing it is complex and challenging.

Supply chain management is crucial for creating value and enhancing global connectivity, which in turn boosts the efficiency of the global supply chain (Dong, *et al.*, 2017).

The supply chain is defined as an organized manufacturing process that starts with the preparation of raw materials, transforms them into finished products, and then delivers them to the end customers (James, 2011).

It is also described as a network of interconnected and collaborating companies that add value to the flow of inputs, from their original source to the final products or services demanded by end consumers.

Efficiency, defined as the "ratio of outputs to inputs in a value-creation system," is a key focus for improvement. To enhance efficiency, there has been an emphasis on outsourcing activities to better coordinate operations between countries (Golgeci, *et al.*, 2020).

2.1. Elements of the Supply Chain

The supply chain consists of five key elements:

A. Planning: Planning is one of the core functions of management, focusing on setting company objectives and methods for achieving them. It is defined as the process of designing the desired future and preparing effective ways to achieve it, coordinating goals and strategies to make informed decisions. The primary purpose of planning is to solve and prevent problems through evaluating different scenarios (Klemencic, 2006).

B. Sourcing: This involves selecting the necessary suppliers to ship or deliver goods and services required by the company. It aims to enhance the relationship with suppliers to ensure the provision of high-quality goods at low costs (Al-Barazi, 2015).

C. Manufacturing: This refers to the process of producing goods at a cost, quality, and quantity that meet consumer needs (Assaf, 2015).

D. Delivery: Also known as logistics, this element involves coordinating the receipt of materials, managing inventory, and organizing transportation fleets to deliver final products to customers. It includes attention to time, service, cost, and integration both internally within the company's systems and externally among the companies involved in the supply chain (Al-Barazi, 2012).

E. Finance: This involves managing costs and cash flow. Effective financial management is crucial for setting product prices, combating inflation, and maintaining financial resources (Quayle, 2006).

2.2. Real Estate Supply Chains

Real estate supply chains refer to the processes and networks involved in the development, construction, and management of real estate projects. These chains encompass various stages from initial planning to final delivery and maintenance of properties (Miller & McMahon. 2020, p; 24-34). Key elements of real estate supply chains include:

1. Planning and Design: This stage involves defining the project's scope, objectives, and design specifications. It includes market research, feasibility studies, architectural design, and obtaining necessary permits. Effective planning ensures that the project meets market demands and regulatory requirements.

2. Procurement: This phase focuses on sourcing and acquiring the necessary materials, equipment, and services for construction. It involves selecting suppliers and subcontractors, negotiating contracts, and managing procurement logistics. Efficient procurement is crucial for ensuring the availability of quality materials and timely delivery.

3. Construction: The construction phase involves the actual building of the project, including site preparation, foundation work, structural construction, and finishing. It requires coordination among various stakeholders, including contractors, engineers, and project managers, to ensure that the project is completed on time and within budget.

4. Marketing and Sales: Once construction is complete, the focus shifts to marketing and selling the property. This includes promoting the property, attracting potential buyers or tenants, and managing sales transactions. Effective marketing strategies and sales processes are essential for achieving successful property occupancy and revenue generation.

5. Property Management: After the property is sold or leased, property management involves maintaining and operating the property. This includes handling tenant requests, managing maintenance and repairs, ensuring compliance with regulations, and overseeing day-to-day operations. Good property management enhances tenant satisfaction and preserves property value.

6. Disposal or Redevelopment: In some cases, properties may be sold, redeveloped, or repurposed. This phase involves evaluating the property's lifecycle, determining the best course of action for disposal or redevelopment, and managing the associated processes.

7. Technology Integration: Modern real estate supply chains increasingly rely on technology for various functions, including project management, procurement, and property management. Tools such as Building Information Modeling (BIM), Geographic Information Systems (GIS), and property management software play a critical role in optimizing supply chain efficiency and decision-making.

Effective management of real estate supply chains is essential for ensuring project success, cost control, and timely delivery. It requires coordination among multiple stakeholders and the use of technology to streamline processes and enhance overall performance.

Chapter Three

Study Methodology

Introduction

The study uses a descriptive-analytical approach to examine the impact of the COVID-19 pandemic on global supply chains, focusing on ROSHN Real Estate. This method enables a detailed description and analysis of how the pandemic affects logistics operations and supply chains.

We will outline the research design, sampling techniques, data collection tools, and analysis methods used in the study. Additionally, we will explain the rationale behind choosing these methods and how they contribute to the validity and reliability of the study's results.

Study Methodology:

The study employs a descriptive-analytical approach to describe and analyze the impact of the pandemic on global supply chains, with a particular focus on ROSHN Real Estate. This approach facilitates understanding the relationship between various factors influenced by the pandemic and evaluates how these factors affect supply chain operations and business performance. The descriptive-analytical approach helps in examining how the pandemic has reshaped supply chain dynamics and operational strategies within ROSHN Real Estate.

Research Methods:

1. Data Sources:

- **Primary Data:** Collected through surveys and interviews with ROSHN Real Estate employees, managers, suppliers, and partners in the supply chains.
- **Secondary Data:** Includes annual reports, internal documents, academic studies, and news articles related to the pandemic's impact on supply chains.

2. Research Instruments:

- **Survey:** Divided into sections to cover the pandemic's impact, mitigation strategies, and their effectiveness.
- **Personal Interviews:** Conducted with ROSHN Real Estate employees, managers, suppliers, and partners for in-depth insights.

3. Statistical Analysis:

- **Descriptive Analysis:** Used to describe demographic data and survey responses.
- **Inferential Analysis:** correlation to test hypotheses and analyze relationships between pandemic impacts and mitigation strategies.

Study tool

The questionnaire will be the main tool for data collection, as it will be distributed to ROSHN employees, suppliers and key partners in the supply chain.

Study population and sample:

The study population consists of all employees of ROSHN Real Estate in Saudi Arabia.

As for the study sample, 61 employees were selected, and (70) electronic forms were sent via e-mails for all company employees, and (61) responses were obtained and analyzed statistically, and the following table shows the demographic distribution of the study sample according to their demographic characteristics:

Analysis of the characteristics of the sample members:

1. Gender

Table 1: Distribution of the study sample according to (Gender)

Variables	Categories	Number of Respondents	Percentage %
1. Gender	Male	33	54.1
	Female	28	45.9

Table data (1) indicates that most of the study sample members were males, reaching (33) (54.1%), while females (45.9%).

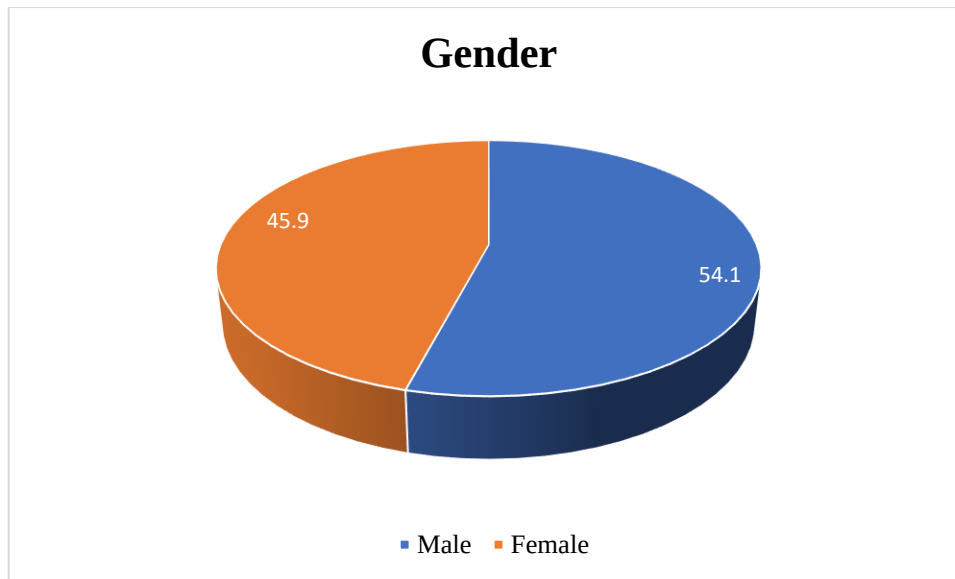


Figure 1 Distribution of the study sample according to gender

2. Department

As for the department in which the study sample works, there was a great diversity in the departments (23) sections, and the percentage of employees in the (Human Resources) department was the highest, reaching (14.8%), followed by the two sections (Marketing, Supply Chain) and their percentage was respectively (9.8%), (9.8%) for each department, followed by workers in the following sections:

(Contracts Department, Sales, Finance, Information Technology) The percentage of employees in each department was (6.6%), then employees in (Commercial Affairs Department)

Operations management) by (4.9%) for each department separately, followed by the following departments: (Logistics, Governance, Corporate

Governance, Voltage Regulation Department (VRM), Legal Affairs) and the percentage of employees in each department reached (3.3%), and finally the lowest percentages were for the following departments: (Governance, Board Affairs and Affiliated Committees, Procurement, Development, EPMO, Stakeholders, Outdoor Event Marketing, Local Content, Cybersecurity, Procurement, Project Management

Where the percentage of employees in each department separately (1.6%) of the total percentage.

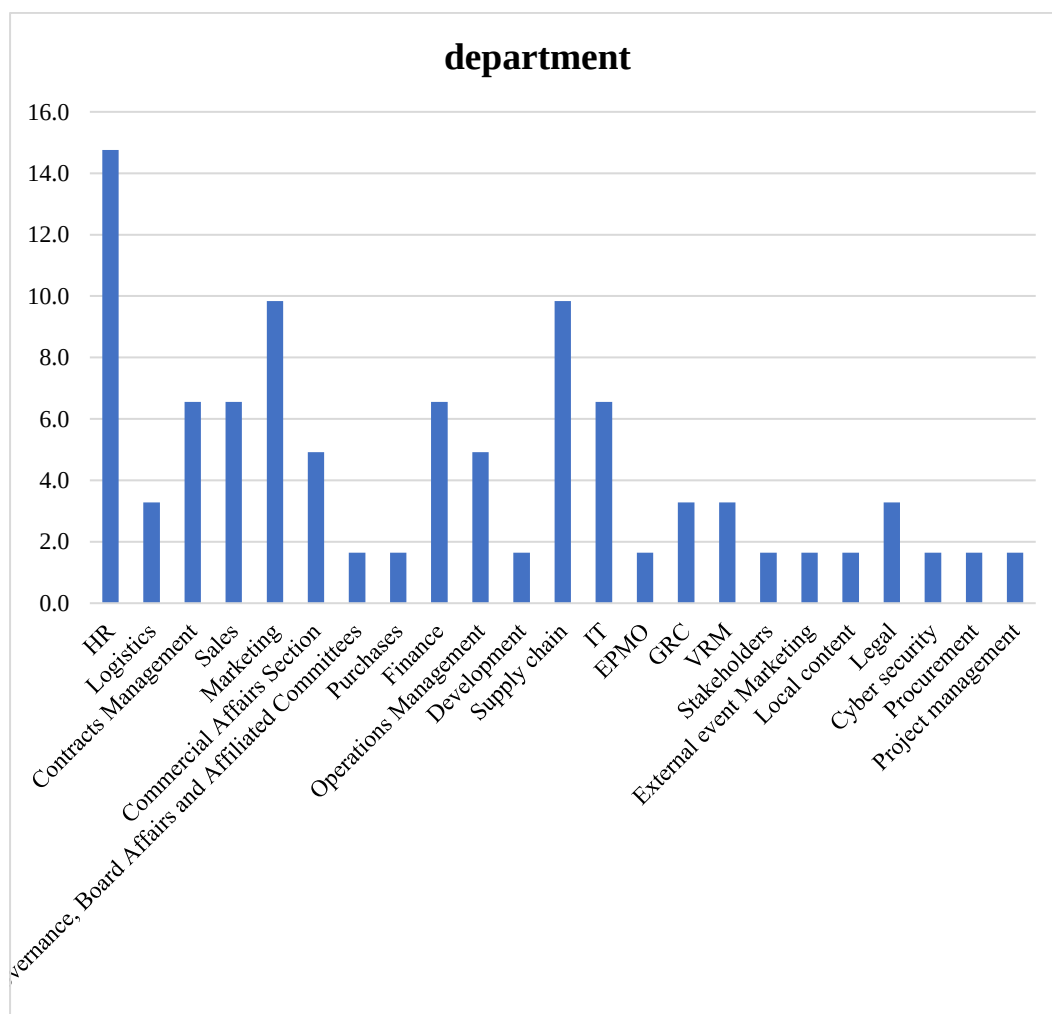


Figure 2 : Distribution of the study sample according to department

3. Job title

In terms of job title, the respondents answered it and the following was counted: the most percentage was for the job (Manager) (16.4%), then the job (Senior manager) was (11.5%), then the job (Analysis) (8.2%), then the function (Analysis) and (Officer) and the percentage of each one (6.6%), followed by the job (Seniors specialist) and (Senior analyst) by (4.9%) for each job, and then (Director), (Cfo), (Senior Human Resources) and (Coordinator) and the percentage of each job separately (3.3%) of the total percentage (100%), and the lowest percentages were for the following jobs: (Operations Director, Sales manager, Sr. Supply chain officer, Chief Governance Officer, Project engineer, Purchasing Analyst, Supervisor , Development manager, Procurement manager, IT SPECIALIST, Compliance specialists, Talent care, Property advisor, Operation manager, Associate director, Procurement specialist, and Project manager) with 1.6% per job title.

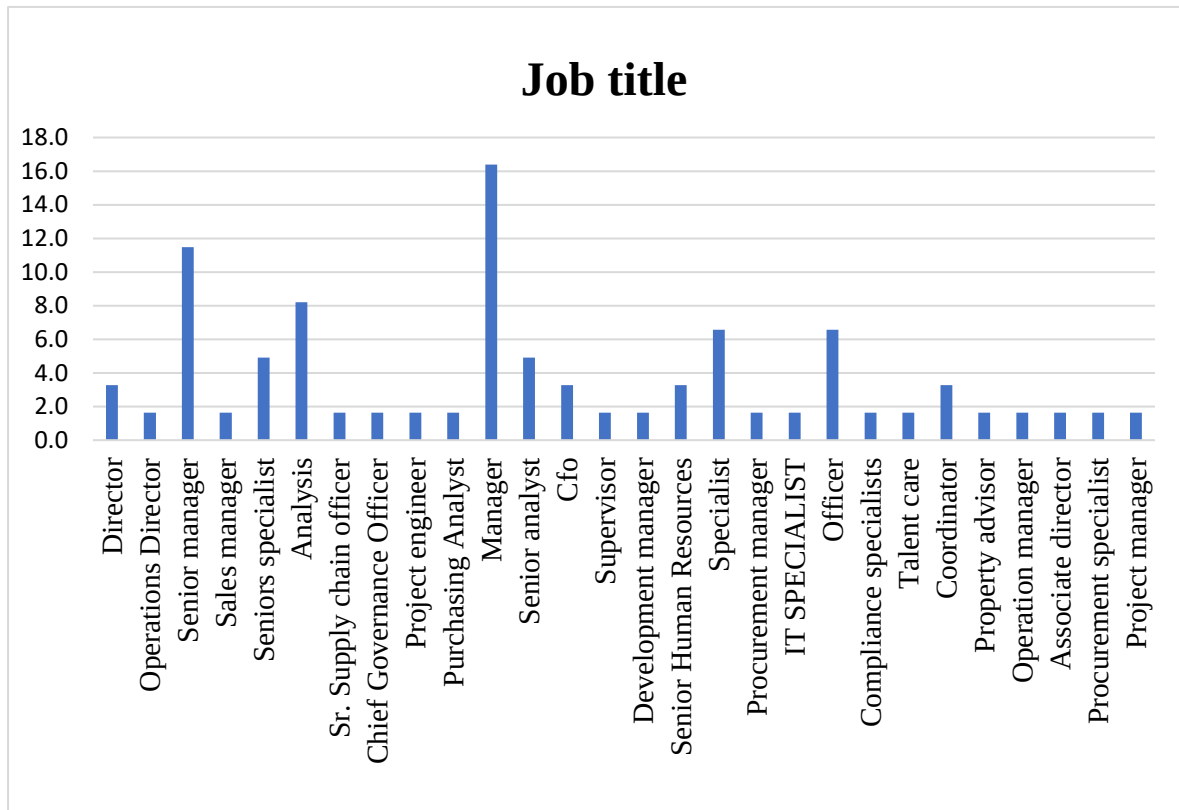


Figure3 : Distribution of the study sample according to job title

4. Years of experience

Table 2: Distribution of the study sample according to (Years of experience)

Variables	Categories	Number of Respondents	Percentage %
Years of experience	least of 1 year	14	23
	1-3 years	12	19.7
	4-6 years	12	19.7
	More than 6 years	23	37.7

With regard to the number of years in the company for the members of the study sample, the results showed that the highest percentage in the sample was (More than 6 years) by (37.7%), then those who worked in the company for (least of 1 year) and their percentage was (23%), followed by employees for (1-3 years) and (3-4 years) by (19.7%) per one.



Figure 4: Distribution of the study sample according to (Years of experience)

Research Tools:

Questionnaire:

To achieve the objectives of the study, a questionnaire was developed to measure the impact of the COVID-19 pandemic on global supply chains, focusing on ROSHN Real Estate based on what was reviewed from previous studies and the theoretical framework, as follows:

- **Part I:** demographic data, including (gender, department, job title, and Years of experience).
- **The second part:** It is related to the independent variable (Effects of the Pandemic) and includes a set of paragraphs that measure the extent of its use within the company.
- **The third part:** related to the dependent variable (Mitigation Strategies).
- **Part IV:** related to the (Effectiveness of strategies), which is divided into the pre-pandemic period and the other during the pandemic.

Each paragraph of the questionnaire was given a score to identify the extent to which the study sample agrees with the paragraphs related to the variables of the study model, as follows:

Answer	Strongly agree	agree	neutral	Disagree	Strongly disagree
Value	5	4	3	2	1

The validity of the study tool:

1- Face Validity

The questionnaire was reviewed by a panel of faculty members to ensure the validity of its items. Their feedback was incorporated, with some items being revised and necessary adjustments made to achieve a balanced and accurate content across the questionnaire. Additionally, a pilot test was

conducted with a sample of 15 employees from ROSHN Real Estate Company, the subject of the current study. This pilot test aimed to gauge the respondents' engagement with the questionnaire items. The participants showed a willingness to interact with the questionnaire, confirming the tool's validity.

2- Validity

This validity means the extent to which the paragraphs of each of the variables of the study express the variable to which they belong, and attention was focused on ensuring that each variable of the study is accurately linked to a set of paragraphs and that these paragraphs actually measure this variable, and the validity of the content of the questionnaire was measured by measuring the relationship between each paragraph and the items to which it belongs. Its statistical significance at a level below 0.05, as follows:

2-1- Effects of the Pandemic

Table 3: Correlation coefficient of paragraphs of the first item (Effects of the Pandemic)

N	Pearson Correlation	Sig.
1	**0.841	0.000
2	**0.817	0.000
3	**0.754	0.000
4	**0.858	0.000
5	**0.819	0.000

****.** Correlation is significant at the 0.01 level.

It is clear from the previous table that the correlation coefficients for the paragraphs of the dimensions of the first item (Effects of the Pandemic) ranged between (0.754) and (0.858), which is statistically significant at the level (0.01), and this indicates that there is internal consistency between the paragraphs of this variable.

2-2- Mitigation Strategies

Table 4: Correlation coefficient of paragraphs of the second item (Mitigation Strategies)

N	Pearson Correlation	Sig.
6	**0.828	0.000
7	**0.497	0.000
8	**0.681	0.000
9	**0.751	0.000

It is clear from the previous table that the correlation coefficients for the paragraphs of the dimensions of the second item (Mitigation Strategies) ranged between (0.497) and (0.828), which is statistically significant at the level (0.01), and this indicates that there is internal consistency between the paragraphs of this variable.

2-3- Effectiveness of Strategies Pre the Pandemic

Table 5: Correlation coefficient of paragraphs of the third item (Effectiveness of Strategies Pre the Pandemic)

N	Pearson Correlation	Sig.
10	**0.442	0.000
11	**0.666	0.000
12	**0.725	0.000
13	**0.705	0.000

It is clear from the previous table that the correlation coefficients for the paragraphs of the dimensions of the third item (Effectiveness of Strategies Pre the Pandemic) ranged between (0.442) and (0.725), which is statistically significant at the level (0.01), and this indicates that there is internal consistency between the paragraphs of this variable.

2-4- Effectiveness of Strategies During the Pandemic

Table 6: Correlation coefficient of paragraphs of the fourth item (Effectiveness of Strategies During the Pandemic)

N	Pearson Correlation	Sig.
14	**0.755	0.000
15	**0.662	0.000
16	**0.797	0.000
17	**0.821	0.000
18	**0.797	0.000
19	**0.835	0.000

It is clear from the previous table that the correlation coefficients for the paragraphs of the dimensions of the fourth item (Effectiveness of Strategies During the Pandemic) ranged between (0.662) and (0.835), which is statistically significant at the level (0.01), and this indicates that there is internal consistency between the paragraphs of this variable.

Reliability of the study tool:

To ensure the stability of the study tool, internal consistency was calculated according to Cronbach's alpha equation for all study variables, as follows:

Table 7: Values of Internal Consistency Coefficients Using Cronbach Alpha Test

Study variables	Statements	Alpha value
Effects of the Pandemic	1-5	0.876
Mitigation Strategies	6-9	0.650
Effectiveness of Strategies Pre the Pandemic	10-13	0.730
Effectiveness of Strategies During the Pandemic	14-19	0.909
Total	1-19	0.694

The values of Cronbach alpha for all study variables and for the questionnaire in general were higher than (60%), which is a very good percentage in research and studies, which indicates its high reliability, and the following table illustrates this.

Statistical processing used:

To answer the study questions and test its hypotheses, the researcher used the Statistical Package for Social Sciences - SPSS as follows:

1. First: Descriptive Statistic Measures

To describing the demographic and functional characteristics of the sample of study individuals, which include:

- Frequencies and percentages to describe the characteristics of the study sample and measure the relative frequency distributions for them.
- Arithmetic mean to measure the average of the respondents' answers to the questionnaire items.
- Standard deviation to measure the extent of dispersion of answers from their arithmetic mean.

2. Second: Analytical statistics

- Spearman correlation coefficient to verify the validity of the paragraphs' construction dimensions of the study variables, and to verify the absence of a complete correlation between the study variables.
- Cronbach's Alpha reliability coefficient to identify the stability of the study scales.

Limitations of the study

- **Time limits:** The study runs from the beginning of the COVID-19 pandemic in 2020 until the end of 2023.
- **Spatial boundaries:** The study focuses on ROSHN's global operations and supply chains.
- **Objective limits:** The study includes the effects of the pandemic, strategies used to mitigate disruptions, and evaluation of the effectiveness of these strategies.

Chapter Four

Results and Hypothesis Testing

Findings of the Study

This chapter presents the results of the study that the researcher reached through analyzing the data he obtained from the answers of the study sample, according to the study questions that aimed to identify the impact of the COVID-19 pandemic on global supply chains, focusing on ROSHN Real Estate. The following is a presentation of these results:

- **The questions of the study**

To answer the questions of the study, the answers of the study sample were analyzed on the axes of the questionnaire, by obtaining the arithmetic means, standard deviations, and the following table shows this:

- **The first question: What were the specific disruptions experienced by ROSHN Real Estate's global supply chains due to the COVID-19 pandemic?**

- 1. Effects of the Pandemic**

The arithmetic means and standard deviations of the responses of the study sample individuals on the axis of (Effects of the Pandemic) were extracted, and table (8) shows these results.

Table 8: The arithmetic means and standard deviations of the responses of the study sample members for the paragraphs of the axis (Effects of the Pandemic) are arranged in descending order.

N	Statement	N	Mean	St.d	Level	Rank
1	The COVID-19 pandemic has had a very significant impact on our company's supply chains.	61	4.39	0.758	High	2
2	The company faced challenges such as shortages of raw materials, delays in shipments, increased costs and declining demand during the pandemic.	61	4.29	0.803	High	3
3	Supply chain costs have increased dramatically during the pandemic.	61	4.45	0.672	High	1
4	The quality of the products received during the pandemic has been significantly affected.	61	4.18	0.885	High	5
5	Delays in supply chains have had a very significant impact on the company's day-to-day operations.	61	4.22	0.783	High	4
Overall Mean		61	4.31	0.640	High	

Based on the mentioned table, it is clear that the arithmetic means of the items ranged between (4.18 and 4.45), and the items obtained an overall arithmetic mean of (4.31), which is at a high level.

- **First place:** Paragraph (3) received the highest arithmetic mean (4.45), which is at a high level, stating: "Supply chain costs have increased dramatically during the pandemic."
- **Second place:** Paragraph (1) with an arithmetic mean of (4.39), which is at a high level, stating: "The COVID-19 pandemic has had a very significant impact on our company's supply chains."
- **Third place:** Paragraph (2) with an arithmetic mean of (4.29), which is at a high level, stating: "The company faced challenges such as shortages of raw materials, delays in shipments, increased costs, and declining demand during the pandemic."
- **Fourth place:** Paragraph (5) with an arithmetic mean of (4.22), which is at a high level, stating: "Delays in supply chains have had a very significant impact on the company's day-to-day operations."
- **Fifth place:** Paragraph (4) with an arithmetic mean of (4.18), which is at a high level, stating: "The quality of the products received during the pandemic has been significantly affected."

These results indicate that all paragraphs reflect high-level negative impacts of the COVID-19 pandemic on the company's supply chains, demonstrating the significant challenges the company faced in managing supply chains during the pandemic.

- **The second question: How did ROSHN Real Estate respond to these disruptions, and what strategies did they employ to mitigate the challenges?**

2. Mitigation Strategies

The arithmetic means and standard deviations of the responses of the study sample members on the sales axis were extracted, and table (9) shows these results.

Table 9: The arithmetic means and standard deviations of the responses of the study sample members for the paragraphs of the axis (Mitigation Strategies) are arranged in descending order.

N	Statement	N	Mean	St.d	Level	Rank
1	The company has implemented strategies such as diversifying suppliers, increasing reserve inventory, improving logistics operations, and reducing costs to mitigate the effects of the pandemic.	61	4.24	0.829	High	4
2	These strategies have been very effective in minimizing the effects of the pandemic.	61	4.60	0.525	High	1
3	The company changed purchasing policies during the pandemic, such as hiring new suppliers, signing long-term contracts, and reviewing payment terms.	61	4.40	0.588	High	3

4	The company has made significant use of technology to improve supply chain resilience during the pandemic.	61	4.45	0.696	High	2
Overall Mean		61	4.43	0.468	High	

Based on the mentioned table, it is clear that the arithmetic means of the items ranged between (4.24 and 4.60), and the items obtained an overall arithmetic mean of (4.43), which is at a high level.

First place: Paragraph (2) received the highest arithmetic mean (4.60) with a standard deviation of (0.525), which is at a high level, stating: "These strategies have been very effective in minimizing the effects of the pandemic."

Second place: Paragraph (4) with an arithmetic mean of (4.45) and a standard deviation of (0.696), which is at a high level, stating: "The company has made significant use of technology to improve supply chain resilience during the pandemic."

Third place: Paragraph (3) with an arithmetic mean of (4.40) and a standard deviation of (0.588), which is at a high level, stating: "The company changed purchasing policies during the pandemic, such as hiring new suppliers, signing long-term contracts, and reviewing payment terms."

Fourth place: Paragraph (1) with an arithmetic mean of (4.24) and a standard deviation of (0.829), which is at a high level, stating: "The company has

implemented strategies such as diversifying suppliers, increasing reserve inventory, improving logistics operations, and reducing costs to mitigate the effects of the pandemic."

These results indicate that all paragraphs reflect high-level effectiveness and resilience of the company's strategies during the COVID-19 pandemic, demonstrating significant efforts in mitigating the pandemic's effects on supply chain management.

- **The third question: To what extent were ROSHN Real Estate's adaptation strategies successful in maintaining operational continuity and financial stability during the pandemic?**

3. Effectiveness of Strategies During the Pandemic

The arithmetic means and standard deviations of the responses of the study sample members on the (Effectiveness of Strategies During the Pandemic) axis were extracted, and table (10) shows these results.

Table 10: The arithmetic means and standard deviations of the responses of the study sample members for the paragraphs of the axis (Effectiveness of Strategies During the Pandemic) are arranged in descending order.

N	Statement	N	Mean	St.d	Level	Rank
1	The mitigation strategies were very effective in maintaining the company's operational continuity during the pandemic.	61	4.21	0.782	High	3
2	The mitigation strategies were very effective in maintaining the company's financial stability during the pandemic.	61	4.19	0.792	High	4
3	The COVID-19 pandemic caused significant disruptions in the supply chains.	61	4.31	0.807	High	1
4	Logistics costs increased significantly during the COVID-19 pandemic.	61	4.18	0.788	High	5
5	I observed a significant improvement in the company's crisis response after implementing mitigation strategies during the pandemic.	61	4.30	0.806	High	2
6	Comprehensive training sessions were organized for company employees to enhance crisis management skills.	61	4.15	0.782	High	6
Overall Mean		61	4.22	0.792	High	

Based on the mentioned table, it is clear that the arithmetic means of the items ranged between (4.15 and 4.31), and the items obtained an overall arithmetic mean of (4.22), which is at a high level.

- **First Place:** Statement (3) received the highest arithmetic mean (4.31) with a standard deviation of (0.807), which is at a high level, stating: "The COVID-19 pandemic caused significant disruptions in the supply chains."
- **Second Place:** Statement (5) with an arithmetic mean of (4.30) and a standard deviation of (0.806), which is at a high level, stating: "I observed a significant improvement in the company's crisis response after implementing mitigation strategies during the pandemic."
- **Third Place:** Statement (1) with an arithmetic mean of (4.21) and a standard deviation of (0.782), which is at a high level, stating: "The mitigation strategies were very effective in maintaining the company's operational continuity during the pandemic."
- **Fourth Place:** Statement (2) with an arithmetic mean of (4.19) and a standard deviation of (0.792), which is at a high level, stating: "The mitigation strategies were very effective in maintaining the company's financial stability during the pandemic."

These results indicate that all statements reflect a high level of effectiveness and resilience of the company's strategies during the COVID-19 pandemic, demonstrating significant efforts in mitigating the pandemic's effects on operational and financial stability.

- **Testing the hypotheses of the study**

This section deals with testing the hypotheses of the study through the use of a simple regression analysis test, as follows.

First hypothesis H0₁:

1. **There is a significant statistical correlation between the COVID-19 pandemic and increased disruptions in ROSHN's global supply chains.**

The results from the (Table 8: The arithmetic means and standard deviations of the responses of the study sample members for the paragraphs of the axis (Effects of the Pandemic) are arranged in descending order. support the hypothesis that there is a significant statistical correlation between the COVID-19 pandemic and increased disruptions in ROSHN's global supply chains. All items related to the impact of the pandemic on supply chains received high mean scores, indicating a strong consensus among respondents that the pandemic caused significant disruptions.

The highest mean score was for the increase in supply chain costs, which underscores the severe financial impact.

Other high-scoring statements confirm that challenges such as raw material shortages, shipment delays, and quality issues were significant.

Overall, these findings validate the hypothesis by demonstrating that the COVID-19 pandemic had a notable and measurable effect on the supply chain disruptions experienced by ROSHN.

Second hypothesis H0₂:

- 2. There is a statistically significant correlation between the application of mitigation strategies and the reduction of the pandemic's impacts on ROSHN's supply chains.**

Table 11: Correlation Coefficients Between Mitigation strategies and The pandemic's impacts on ROSHN's supply chains.

Variables	R	p-value	Sig
Mitigation strategies	0.520	0.402	0.000
The pandemic's impacts			

* Statistically significant at the level of ($\alpha \leq 0.05$)

The correlation coefficient of 0.520 indicates a moderate positive relationship between the application of mitigation strategies (mean1) and the reduction of the pandemic's impacts on ROSHN's supply chains (mean2). This suggests that as the application of mitigation strategies improves, the negative impacts of the pandemic on supply chains tend to decrease moderately.

The p-value of 0.000 is less than the significance level of 0.01. This means that the observed correlation is statistically significant, indicating that the relationship between the application of mitigation strategies and the reduction of the pandemic's impacts is unlikely to be due to chance.

The results support the hypothesis that there is a statistically significant correlation between the application of mitigation strategies and the reduction of the pandemic's impacts on ROSHN's supply chains. The moderate positive correlation (0.520) indicates that effective implementation of mitigation strategies is associated with a noticeable reduction in the adverse effects of the pandemic on the company's supply chains. The significance level further confirms that this relationship is statistically robust and not likely due to random variation.

Third hypothesis H0₃:

2. There are significant differences in the effectiveness of ROSHN's mitigation strategies in maintaining operational continuity and financial stability before and during the pandemic.

Table 12: Results of the Wilcoxon Signed-Rank Test analysis to calculate the difference between the means of each of the two variables to test the third hypothesis

Group	N	Mean	Mean Rank	z-vaue	sig-value
The effectiveness of ROSHN's mitigation strategies pre- the pandemic	61	4.04	0.982	-4.476	0.00
The effectiveness of ROSHN's mitigation strategies durement the pandemic	61	4.50	1.029		

Based on the results of the Wilcoxon Signed-Rank Test, there is a significant difference in the effectiveness of mitigation strategies before and during the pandemic. The descriptive statistics show that the mean effectiveness of mitigation strategies was 4.04 before the pandemic, whereas it increased to 4.50 during the pandemic. The Wilcoxon test results reveal a Z-value of -4.476, indicating a substantial improvement in the effectiveness of strategies during the pandemic. Additionally, the significance value (p-value) is 0.000, which is below the conventional threshold of 0.05, confirming that the difference in effectiveness between the two periods is statistically significant. These results support the hypothesis that there are significant differences in the effectiveness of mitigation strategies, demonstrating a notable enhancement in the strategies' effectiveness in addressing the challenges posed by the pandemic.

Chapter five

Conclusions and recommendations

Results

The results from the study provide a comprehensive understanding of the impact of the COVID-19 pandemic on ROSHN's supply chains and the effectiveness of its mitigation strategies.

1. Impact of the COVID-19 Pandemic on Supply Chains:

- The arithmetic means for the items related to the impact of the pandemic on supply chains ranged between 4.18 and 4.45, with an overall mean of 4.31, indicating a high level of perceived impact.
- The highest mean score was for the statement, "Supply chain costs have increased dramatically during the pandemic" (4.45), followed by "The COVID-19 pandemic has had a very significant impact on our company's supply chains" (4.39).
- Other high-scoring items included challenges such as shortages of raw materials, delays in shipments, and increased costs, demonstrating significant disruptions and challenges faced by the company.

2. Effectiveness of Mitigation Strategies:

- The arithmetic means for the effectiveness of mitigation strategies during the pandemic ranged from 4.24 to 4.60, with an overall mean of 4.43, reflecting high effectiveness.

- The highest mean score was for the statement, "These strategies have been very effective in minimizing the effects of the pandemic" (4.60), indicating that the strategies were perceived as highly effective.
- Other notable statements include the effective use of technology to improve supply chain resilience and changes in purchasing policies, further showcasing the significant efforts made to mitigate the pandemic's effects.

3. Correlation Between Mitigation Strategies and Pandemic Impacts:

- The Spearman's correlation coefficient of 0.520 indicates a moderate positive relationship between the application of mitigation strategies and the reduction of the pandemic's impacts on ROSHN's supply chains.
- The p-value of 0.000, which is less than the significance level of 0.01, confirms that this correlation is statistically significant, suggesting that better implementation of mitigation strategies is associated with a reduction in the negative impacts of the pandemic.

4. Differences in Mitigation Strategies' Effectiveness:

- Results from the Wilcoxon Signed-Rank Test reveal a significant difference in the effectiveness of mitigation strategies before and during the pandemic.

- The mean effectiveness was 4.04 before the pandemic and increased to 4.50 during the pandemic. The Z-value of -4.476 and a p-value of 0.000 indicate a substantial and statistically significant improvement in the effectiveness of the strategies during the pandemic.

In summary, the study highlights the significant challenges faced by ROSHN's supply chains due to the pandemic and the successful implementation of mitigation strategies that improved operational continuity and financial stability. The data supports the hypotheses that there were significant disruptions in the supply chains and that the application of effective strategies played a crucial role in reducing the pandemic's impacts.

Conclusions

We conclude from the analysis of the global supply chain that it has always served as a means of connecting different countries in the era of globalization, facilitating market expansion and fostering mutual benefits. Prior to the COVID-19 pandemic, the digitalization of the global supply chain had significantly enhanced its efficiency, often leading to heavy reliance on one or two countries for manufacturing. However, the pandemic caused major disruptions, halting global supply chains and reducing their efficiency (Xu et al., 2020). The subsequent lockdowns forced countries to rely on domestic resources for production. This experience highlighted that focusing solely on efficiency is insufficient. While post-pandemic self-reliance has gained importance, resilience has become crucial for effective crisis management. Consequently, there is now a greater emphasis on balancing efficiency with resilience in the global supply chain (Golgeci et al., 2020).

In this context, the example of Roshen Real Estate in Saudi Arabia illustrates how challenges and disruptions in the global supply chain can be addressed. As a leading real estate developer, Roshen faced significant challenges during the pandemic due to supply delays and travel restrictions. The company adapted its strategies by increasing reliance on local suppliers and developing a more flexible supply network. Additionally, it invested in digitalization to improve operational efficiency and project management.

Through these strategies, Roshen managed to strike a balance between efficiency and resilience, enabling it to sustain its operations and adapt to changing conditions.

Recommendations

1. Enhance Supply Chain Resilience:

- Develop and implement comprehensive risk management plans that include scenarios for pandemics and other global disruptions.
- Diversify supply sources to avoid over-reliance on a single supplier or geographic region.
- Invest in advanced technologies such as AI and machine learning for better prediction and management of supply chain disruptions.

2. Strengthen Communication and Collaboration:

- Foster stronger communication channels and partnerships with suppliers, customers, and other stakeholders to ensure timely information sharing and coordinated responses during disruptions.
- Engage in collaborative planning with suppliers to better align supply and demand forecasts.

3. Implement Robust Mitigation Strategies:

- Establish a dedicated crisis management team to quickly respond to supply chain disruptions.
- Develop flexible and adaptive logistics strategies that can be adjusted rapidly in response to changing conditions.
- Increase inventory levels of critical materials and products to buffer against supply chain shocks.

4. Leverage Technology and Data Analytics:

- Invest in supply chain visibility tools to track and monitor supply chain activities in real-time.
- Utilize data analytics to identify potential vulnerabilities and optimize supply chain operations.

5. Continuous Improvement and Training:

- Conduct regular training sessions for employees on crisis management and supply chain risk mitigation.
- Continuously review and update supply chain strategies based on lessons learned from the pandemic and other disruptions.

6. Financial Stability and Flexibility:

- Maintain financial reserves specifically for managing unexpected supply chain disruptions.
- Explore alternative financing options to ensure liquidity during periods of operational stress.

7. Regulatory Compliance and Advocacy:

- Stay updated on regulatory changes that impact supply chain operations and ensure compliance.
- Advocate for government support and policies that enhance supply chain resilience and support industry-wide mitigation efforts.

8. Sustainability and Ethical Practices:

- Incorporate sustainability and ethical considerations into supply chain management to build long-term resilience.
- Engage in responsible sourcing practices to mitigate risks associated with supply chain disruptions.

By implementing these recommendations, ROSHN Real Estate can strengthen its supply chain resilience, enhance operational continuity, and ensure financial stability in the face of future disruptions.

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Appendices

Midocean University

College of Management

Graduation Project



Survey Questionnaire

This questionnaire is designed to gather essential data for examining "The Impact of the Pandemic on Global Supply Chains: A Case Study on ROSHN Real Estate" as part of a business administration graduation project. You have been selected to provide your responses to the questions included.

Please read each section carefully and answer the questions objectively, as this will significantly affect the accuracy of the study's findings. Rest assured, all information collected will be kept confidential and used solely for research purposes.

Thank you for your cooperation.

Part I: Personal Data

1- Gender

- male
- female

2- Department

.....

3- Job Title

.....

4- Years of experience in the company

- least of 1 year
- 1-3 years
- 4-6 years
- More than 6 years

Part Two: Questionnaire Questions

Please answer each of the following statements by placing an (x) in the box representing your opinion:

N	Statements	Answer alternatives				
		Strongly agree	Agree	neutral	Disagree	Strongly disagree
Effects of the Pandemic						
1.	The COVID-19 pandemic has had a very significant impact on our company's supply chains.					
2.	The company faced challenges such as shortages of raw materials, delays in shipments, increased costs and declining demand during the pandemic.					
3.	Supply chain costs have increased dramatically during the pandemic.					
4.	The quality of the products received during the pandemic has been significantly affected.					

5.	Delays in supply chains have had a very significant impact on the company's day-to-day operations.					
Mitigation Strategies						
6.	The company has implemented strategies such as diversifying suppliers, increasing reserve inventory, improving logistics operations, and reducing costs to mitigate the effects of the pandemic.					
7.	These strategies have been very effective in minimizing the effects of the pandemic.					
8.	The company changed purchasing policies during the pandemic, such as hiring new suppliers, signing long-term contracts, and reviewing payment terms.					
9.	The company has made significant use of technology to improve supply chain resilience during the pandemic.					

Effectiveness of strategies (Pre the pandemic)						
10.	The mitigation strategies were very effective in maintaining the company's operational continuity before the pandemic.					
11.	The mitigation strategies were very effective in maintaining the company's financial stability before the pandemic.					
12.	The supply chains were operating efficiently before the COVID-19 pandemic.					
13.	Logistics costs were stable before the COVID-19 pandemic.					
Effectiveness of strategies (Dure the pandemic)						
14.	The mitigation strategies were very effective in maintaining the company's operational continuity during the pandemic.					
15.	The mitigation strategies were very effective in maintaining the company's					

	financial stability during the pandemic.					
16.	The COVID-19 pandemic caused significant disruptions in the supply chains.					
17.	Logistics costs increased significantly during the COVID-19 pandemic.					
18.	I observed a significant improvement in the company's crisis response after implementing mitigation strategies during the pandemic.					
19.	Comprehensive training sessions were organized for company employees to enhance crisis management skills.					

الملخص العربي

جائحة COVID-19 أدت إلى تعطيلات غير مسبقة في سلاسل التوريد على نطاق واسع. تأتي هذه التعطيلات نتيجة لتجمع فريد من العوامل: زيادة مفاجئة في الطلب على منتجات معينة، تغييرات غير متوقعة في مواقع الطلب، نقص في العرض، أزمة في اللوجستيات، وتعافي سريع بشكل غير عادي في الاقتصادات الكبرى. هذا التداخل بين الظروف خلق تحديات لم يتم مواجهتها من قبل، مما أبرز نقاط الضعف والتعقيدات داخل سلاسل التوريد العالمية.

هدفت هذه الدراسة إلى التحقيق في تأثير الجائحة على سلاسل التوريد العالمية من خلال دراسة حالة لشركة روشن العقارية. لتحقيق أهداف الدراسة، قام الباحثون بتصميم استبانة مكون من 19 فقرة لجمع البيانات الأولية من عينة مكونة من 61 مستجيبًا. تم جمع البيانات وتحليلها واختبار الفرضيات باستخدام برنامج التحليل الإحصائي للعلوم الاجتماعية (SPSS) ، باستخدام طرق إحصائية مثل تحليل معامل ارتباط سبيرمان.

أسفرت التحليلات عن النتائج الرئيسية التالية:

1. يوجد ارتباط إحصائي كبير بين جائحة COVID-19 وزيادة التعطيلات في سلاسل التوريد

العالمية لشركة روشن.

2. يوجد ارتباط إحصائي كبير بين تطبيق استراتيجيات التخفيف وتقليل تأثيرات الجائحة على

سلاسل التوريد في شركة روشن.

3. توجد اختلافات كبيرة في فعالية استراتيجيات التخفيف لدى شركة روشن في الحفاظ على

استمرارية العمليات والاستقرار المالي قبل وأثناء الجائحة.

التوصيات:

1. تطوير وتنفيذ خطط إدارة أخطار شاملة تشمل سيناريوهات للجائحات والأزمات العالمية الأخرى.

2. تعزيز قنوات الاتصال والشراكات مع الموردين والعملاء وأصحاب المصلحة الآخرين لضمان

تبادل المعلومات في الوقت المناسب والاستجابة المنسقة خلال الأزمات.

3. إنشاء فريق مخصص لإدارة الأزمات للاستجابة السريعة لتعطيلات سلاسل التوريد.

تأثير الوباء على سلاسل التوريد العالمية:
دراسة حالة روشن العقارية

إعداد الطالب/

مهند حمزة أحمد

إشراف/

د. الفيصل عبد الحميد محمد

د. فايز علي جراد

2024 -2023