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Balancing Resilience and Sustainability in Agrifood Supply Chains: Evidence from Moroccan Exporting SMEs in the Marrakech-Safi Region

Abstract: This research paper explores the delicate balance between resilience and sustainability in the supply chains of Moroccan agrifood exporting SMEs within the Marrakech Safi region. Using a qualitative case study approach that involves semi-structured interviews, reports, and analysis of publications, we investigate how these SMEs incorporate environmental considerations into their decision-making processes to strengthen supply chain resilience. The findings reveal that while these SMEs primarily adopt a reactive approach to resilience, they also actively embrace environmentally friendly practices, thus fostering green and sustainable supply chains. In particular, these practices demonstrate an interdependent relationship with resilience strategies, with one indirectly influencing the other. Key organizations like ONSSA, FENAGRI, and Morocco Foodex collaborate closely with the SMEs, endorsing green measures and exemplifying the dedication of local authorities to environmental preservation, sustainable development, and enhancing SME resilience. However, despite these positive efforts, further initiatives are needed to seamlessly integrate sustainability practices and resilience strategies among agrifood SMEs and thus achieve the desired balance.

Keywords: Agrifood Supply Chains, Supply chain resilience, Sustainable development, Biodiversity preservation, Moroccan exporting SMEs, Qualitative case study.

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1. Introduction

The resilience of the agrifood supply chain (SC) has recently gained considerable interest among scholars. This is mainly due to the increasing number of disruptions that have hit the global economy in recent years and caused more complexity. In this sense, SC resilience is one of the most crucial strategies that an organization can develop today.

Resilience refers to the process by which an organization recovers from disruptions and rebound resourceful while adapting to new environments (Vogus and Sutcliffe 2007, 3418-3422). Developing resilient SC infers having a robust SC capable of facing the myriad of risks in the end-to-end SC while efficiently meeting the organization and its environmental goals. Therefore, it requires constant innovation and recently developed tools to overcome the fast-changing realities.

However, with the global urge to include sustainable and environmentally friendly decisions in business as a step toward preserving biodiversity, pairing SC resilience strategies and green supply chain practices remains challenging, especially in Small and Medium Enterprises (SMEs), as this category of organizations is more vulnerable to SC disruptions. The literature on SC risk and disruption management in SMEs clearly demonstrates that it is less developed in this type of organization due to their lack of resources, which subsequently induces shortages in management tools and skills (Aureli and Salvatori 2013, 15-36).

Considering the crucial role biodiversity plays in maintaining life on earth, promoting biodiversity preservation actions and engaging in sustainable development are no longer a choice but a necessity. Biodiversity refers to the variety of life on Earth, the genes, species, ecosystems, and ecological processes that sustain them. This includes everything from microorganisms to plants, animals, and humans. Biodiversity is extremely important, as it provides vital ecosystem services, such as pollination, climate regulation, water and air purification, as well as natural resources such as food, timber, medicines, and building materials. It is therefore our wealth according to the World Bank Group (WBG 2022). In a step towards biodiversity conservation, SC managers can turn their processes greener by participating in what are called 'green supply chains'.

Green SCs are often used by companies looking to reduce their environmental footprint and meet the rising consumer expectations for sustainability. They are processes that take into account the environmental impact of products and services throughout their life cycle, from production to delivery. This includes all phases, including raw material extraction, manufacturing, transportation, delivery, sales, and waste management.

Although agrifood SC can be complex and involve several actors throughout their entire process, adopting green strategies is indeed challenging, yet it is still possible. Actions such as sustainable sourcing, the use of renewable energy sources, the reduction of greenhouse gas emissions, the reduction of waste, the use of recycled and recyclable materials, the reduction of the use of hazardous chemicals, the promotion of sustainable agricultural practices, the adherence to certifications and standards, and many others are highly encouraged among agrifood companies. In addition, they can be significantly impactful in the long run.

However, the question that needs to be raised here is: **How can agrifood supply chains be designed and managed to be resilient while minimizing their impact on biodiversity and supporting sustainable development?**

To bring elements of response to this central question, we will use a qualitative study based on a case study from the Moroccan agrifood business context in the Marrakech-Safi Region. We will draw conclusions later by confronting our findings with the existing body of literature.

The text's contributions to the conference are related to the theme "Technology and Innovation - Links to Biodiversity and Ecosystem Preservation". In fact, the article highlights the importance of adopting new green practices and innovations to develop resilient and green agrifood supply chains that can minimize their impact on biodiversity and support sustainable development. Additionally, policymakers can use the insights of the findings of the papers to develop regulations that motivate companies to engage in sustainable and environmentally friendly practices.

This article continues as follows: in Section 2, a review on agrifood supply chains, supply chain resilience, and green sustainable supply chains was conducted; in Section 3, the research methodology was explained; in Section 4, findings and discussion were displayed; and in Section 5, conclusions are discussed.

2. Literature Review

- **Agrifood Supply Chains**

In Porter's approach (1985, 214), primary and support activities are associated. From a supply chain perspective, the focus is primarily on physical and informational flows, with financial flows taking a secondary role. Logistics, which can be seen as a support activity, plays a crucial role in the procurement of logistic services and involves multiple levels of decision-making within the organization.

Methodologically, the supply chain focuses on interactions among stakeholders, such as manufacturers, distributors, and logistics service providers. Therefore, the supply chain approach aims to offer directly operational solutions to private and/or public management issues, enhancing the product delivery system to retail outlets in the distribution sector.

This approach places the customer, either intermediary or end-user, at the center of the analysis with the goal of increasing their satisfaction in terms of cost, service, and responsiveness. By prioritizing customer needs, the supply chain approach seeks to optimize supply chain efficiency, reduce delivery lead times, and improve product quality.

The agri-food supply chains play a critical role in the efficient management and distribution of food products from farm to consumer. These supply chains are complex and interconnected, involving multiple stakeholders, such as farmers, processors, distributors, wholesalers, retailers, and consumers. The efficient management of these supply chains is essential to ensure a steady and reliable flow of food products to meet the demands of a growing global population (Giovannucci 2012).

The global nature of agri-food supply chains presents both opportunities and challenges. On one hand, globalization allows access to a wide variety of food products from different regions, enabling better resource allocation and market diversification. However, it also exposes supply chains to geopolitical risks, trade disruptions, and transportation complexities (Sawhney and Sandeep 2019, 238-252). Supply chain managers must proactively address these challenges to ensure resilience and continuity in the face of disruptions.

- **Supply Chain Resilience**

Before delving into supply chain resilience, it is crucial to initially explore existing literature on resilience from an organizational standpoint. Subsequently, extending this concept to the supply chain level becomes pertinent.

Resilience refers to a system's inherent ability to adjust its functioning before or after changes and disruptions, enabling it to continue functioning effectively even amid major incidents or ongoing stress (Hollnagel et al.

2006). Vogus and Sutcliffe (2003; 2007, 3418-3422) define it as maintaining positive adaptation under challenging conditions, resulting in an organization emerging from such circumstances strengthened and more resourceful. This definition encapsulates both the resilience process and its primary objective.

In addition, resilient organizations require resilient individuals, groups, and processes. The level of resilience exhibited by individuals and systems significantly influences the overall resilience of the organization, firmly rooted within its organizational culture.

In times of disruption, sustainability and resilience are becoming vital prerequisites for every trade and investment decision. This requires an improved approach to risk monitoring and management. Therefore, addressing the concept of resilience invariably involves invoking the concept of risk. Organizational resilience is viewed as a risk management tool that incorporates both reactivity through adaptation and proactivity through anticipation and prevention. Although it cannot entirely eliminate risk, it aims to mitigate it through innovative methods (Dauphiné and Provitolo 2007, 115-125), making innovation essential for achieving resilience.

From a supply chain perspective, resilience is the supply chain's ability to recover from failures and thrive. Macdonald et al. (2018, 4337-4355) describe it as a two-phase process: resistance capacity and recovery capacity. Resistance capacity involves responding to expected or unexpected shocks, while recovery capacity focuses on restoring normalcy or strongly rebounding.

Kamalahmadi and Parast (2016, 116-133) have developed a framework of three fundamental steps in the supply chain resilience process: Anticipation, resistance, and recovery and responses. Anticipation involves proactive planning and preventive measures. Resistance entails controlling the organization's processes during disruptions to ensure operational continuity and shock absorption. Recovery and responses encompass the measures implemented to respond promptly to disruptions and restore a higher position. Leveraging available resources often generates a competitive advantage for the organization.

However, the increasing number of activities, flows, and actors within supply chains leads to increased risks. From meeting customer requirements to reducing costs and lead times, organizations face pressure to manage supply chain flows and the accompanying risks. Research has shed light on the risks incurred during different stages of the supply chain, prompting the need to address and improve each process. The risk spreads across the entire chain and its impact typically affects the chain as a whole.

Tang and Nurmaya (2011, 25-34) define supply chain risk as any unpredictable event or disturbance negatively impacting one or more components of the supply chain, affecting its ability to achieve performance objectives for the involved companies and the service provided. The main risks in supply chains relate to procurement, manufacturing, warehousing, and shipping, often arising from the lack of information sharing among the chain actors. This emphasizes the importance of effectively managing and controlling information flows in supply chains.

Modern supply chain management emphasizes maximizing the value of members for their companies and clients through continuous cooperation and external integration (Balan 2008, 26-40). To ensure resilience in supply chains, organizations are advised to invest in supply chain management, risk prevention, and response practices that enhance preparedness, vigilance, and agility in the face of disruptions (Li et al. 2017, 254-269). This process encapsulates the essence of supply chain resilience.

- **Need for Green Sustainable Agrifood Supply Chains**

The need for sustainable green agrifood supply chains has become increasingly evident due to growing concerns about environmental degradation, climate change, and the depletion of natural resources. Therefore, one of the primary challenges facing agri-food supply chains is to ensure sustainability. This includes managing resources responsibly, minimizing waste, and reducing the environmental impact of production and distribution processes (Kumar et al. 2020, 1003-1041). As a result, there is a growing focus on adopting innovative technologies and sustainable practices within the supply chain to enhance overall efficiency and reduce ecological footprint.

Supply chain managers need to navigate through stringent regulations and compliance requirements related to food safety, labeling, and traceability. Adherence to these regulations is crucial to maintain consumer trust and mitigate risks related to health and safety (Joo and Han 2021, 10980). Advanced technologies such as blockchain and IoT are increasingly being explored as solutions to improve traceability and transparency throughout the supply chain (Difrancesco et al. 2022, 1-22).

Besides, consumer preferences and demands are evolving, with a growing emphasis on sustainability, ethical sourcing, and transparent supply chains. Supply chain managers must align their strategies with changing consumer expectations and adopt sustainable practices to maintain a competitive edge in the market (McDougall et al. 2022, 12-29).

In addition, agri-food supply chains are encouraged to adopt more green and sustainable practices to address environmental and social challenges. This includes using organic farming methods, sourcing locally to reduce carbon footprint, minimizing food waste, and implementing social responsibility practices. Companies should also seek environmental certifications and use water responsibly. By incorporating green sustainable practices in agrifood supply chains, companies can not only preserve biodiversity, reduce environmental impact, improve the livelihoods of agricultural workers, and ensure a resilient and ethical agri-food supply chain, but also enhance their brand reputation, appeal to environmentally conscious consumers, and ensure the long-term viability of the food production system.

3. Research Methodology

The use of multiple case studies aligns with our research objective as it offers a comprehensive and insightful approach. Case studies are particularly valuable for exploratory research, allowing researchers to gather a wealth of information and observations on one or a few specific units of analysis. This methodology is especially useful when exploring new phenomena that challenge existing theoretical assumptions (Miles and Huberman 1994).

In our study, we focus on five exporting agro-food firms operating in the Marrakech-Safi region. Our selection criteria took into account factors such as accessibility, the willingness of managers to participate, and the fact that firms are active small and medium-sized enterprises (SMEs) in the agro-food industry. By choosing exporters within this specific region, our goal was to gain insights into their supply chain practices and their resilience experiences.

To gather data, we proceeded first by examining secondary data collected from reports and publications from some private and public organizations such as the websites of the SMEs interviewed, the National Office of Food Safety (ONSSA), Morocco Foodex, and the Federation of the Food Industry in Morocco (Fenagri). Then, we adopted a qualitative approach with an emphasis on semi-structured interviews. This interview format allowed us to delve into the topics of interest and obtain rich and nuanced insights. The semi-structured nature of the interviews allowed flexibility in exploring emergent themes and encouraged open-ended discussions.

To identify suitable participants, we initially obtained a non-exhaustive list of exporting SMEs from the local Chamber of Commerce responsible for the Marrakech-Safi region. We then approached agro-food companies based on convenience, considering factors such as their availability and willingness to participate. Although most of the interviews were conducted face to face, some were conducted by telephone due to logistical constraints. However, we prioritized in-person interviews whenever possible to foster a more personal and interactive environment. The interviews lasted between 25 and 45 minutes each and they all followed the same pattern.

During the interviews, we engaged with key individuals within the SMEs who had relevant knowledge and experiences related to our research objectives. To guide our discussions, we developed a semi-structured interview guide that covered various themes, including resilience to agrifood supply chains and sustainable green supply chains. More details on the semi-structured guide are given in Appendix 1.

Through this research methodology, our aim is to gain a comprehensive understanding of how agrifood supply chains can be designed and managed to be resilient while minimizing their impact on biodiversity and supporting sustainable development. The insights obtained from this study will contribute to the existing literature on supply chain resilience and sustainability in the agro-food sector, providing valuable implications for both academia and industry.

Taking into account the context of our study, our objective was to minimize any potential obstacles that could impede data collection. We designed the interview process to ensure that respondents could freely express themselves without feeling burdened by an excessive number of questions. This approach allowed us to gather ample evidence on agrifood supply chain management approaches while keeping the interview concise to facilitate continued information exchange.

During the course of our research, we adhered to the concept of the "saturation point." This means that once the data collection reached a point where additional information did not contribute significantly to the study, we concluded the empirical exploration. Our sample consisted of five exporting small and medium-sized enterprises (SMEs) in the agribusiness industry, specifically located in the Marrakech-Safi region. Sample details are given in Appendix 2.

Regarding data analysis, we chose content analysis as our method. This approach enabled us to objectively identify and analyze emerging themes from the participants' statements, which were extracted from the interview transcripts.

4. Findings and Discussion

4.1 Resilience Design and Risk Management Strategies in Agrifood Supply Chains

Our interview respondents acknowledged the uncertainty of the future, especially when it comes to potential crises, and highlighted the need for managing risks and disruptions as they arise. While taking proactive steps toward the unexpected may not be easy, most of the respondents claimed to be prepared for the known risks facing their companies. For example, a small enterprise management control manager explained how his team conducts yearly assessments to identify and evaluate disruptive risks, allowing them to devise preventive measures for the future: “My team and I meet every end of the year to talk about the challenges we faced throughout the year and come up with new ideas to reduce those challenges in the future. We also think about how it might affect our profits”.

However, it was evident that these companies primarily focused on building operational resilience, which is essentially a reactive approach. They tend to rely on short-term strategies and decisions to weather major risks rather than adopting proactive measures for preparedness. This reactive resilience (Conz and Magnani 2020, 400-412), also known as survival resilience, is characterized by post-traumatic responses aimed at restoring the initial equilibrium (Bhamra et al. 2011, 5375-5393). One respondent explained: “Certain risks and disruptions cannot be predictable and are beyond our anticipation. As a result, our approach involves maintaining flexibility and responding adaptively when they occur. Although this approach may be considered costly and risky, it eventually remains the only viable solution.” For example, when transportation costs surged due to various factors like the fuel crisis, ship delays, and security checks, SMEs relied on their ability to respond and recover from disruptions. Unfortunately, this often results in additional costs that could have been mitigated by anticipating.

When asked about long-term action plans and anticipatory strategies, many respondents emphasized ad hoc management due to resource constraints. SMEs, in particular, face challenges with implementing long-term strategies, that primarily promote resilience (Pal et al., 2014), due to their short-term focus. The lack of financial capacity and various other factors, such as dependence on domestic demand, insufficient export facilities, and limited skilled labor, contribute to their vulnerability to disruptions.

For example, during the Russian war in February 2022, some respondents faced significant disruptions in their supply chains. Rising transport prices, delays, and exchange rate fluctuations created a complicated situation. Despite quickly reacting by reaching out to clients and diversifying their customer base, these small businesses faced losses due to delivery delays and perishable products: “Despite our best efforts to find new clients and sell our products, it cost us a lot. Additionally, diversifying our product portfolio is typically a time-consuming process. Nevertheless, we remained committed to maintaining the trust of our suppliers.”

The reactive approach to resilience adopted by these SMEs can be attributed to their vulnerability. Depending on their size, sector, management style, and stakeholder relations, companies face varying degrees of vulnerability (Chawki and Aitelmeqeddem 2020, 240-260). The primary driver of vulnerability for these SMEs is their limited financial capacity. Additionally, they face challenges related to funding, domestic demand dependence, insufficient export facilities, and a shortage of skilled labor (Bouanani El Idrissi, Ladraa, 2020).

4.2 Minimizing Biodiversity Impact and Supporting Sustainable Development, while Building Resilience

Reducing negative impacts on biodiversity and promoting sustainable development are becoming imperative objectives for companies in the agrifood industry. These objectives are interconnected and share the common goal of safeguarding the natural environment, conserving biodiversity, and promoting the social and economic prosperity of surrounding communities.

Our respondents express their commitment to environmental practices by implementing various approaches, with four being the most frequently mentioned. Firstly, they place great importance on respecting biological and geological rest. This involves taking measures to protect natural ecosystems by avoiding overexploitation of resources, including leaving certain areas unexploited during specific periods to allow soil regeneration and biodiversity preservation. “We are not allowed to source as we wish; there are specific rules we need to respect which are determined by local authorities and instances as a measure to preserve the environment." explained one of our respondents.

Second, they emphasize the assurance of product quality by minimizing the use of harmful and toxic chemical components. To achieve this, they comply with standards set by organizations such as the National Office of

Food Safety (ONSSA) and Morocco Foodex. These organizations conduct rigorous inbound and outbound checks to ensure that products meet safety and environmental standards even before exportation.

Additionally, they aim to obtain various certifications like ISO 9001, Food Safety System Certification (FSSC) 22000, and organic, as well as recognized labels such as the Ecolabel, promoted jointly by Morocco Foodex and the Food and Agriculture Organization of the United Nations (FAO) for Moroccan agri-food exporters. These certifications and labels aim to enhance the value of Morocco's exportable offerings in the face of future environmental challenges. In addition, they implement methods such as Hazard Analysis Critical Control Points (HACCP) to ensure product safety.

“These certifications can significantly enhance our clients' trust, enable us to expand our market, and help us maintain our reputation in the industry.” In fact, these certifications attest that our products comply with environmental standards and sustainable practices.

Lastly, they strive to comply with current regulations concerning the environment and sustainability. Authorities and local bodies establish rules and regulations in collaboration with various international organizations to encourage companies to adopt more environmentally friendly practices. As a result, companies make efforts to adhere to these rules and play a responsible role in protecting the environment and preserving natural resources.

For their part, organizations such as the Moroccan Agrifood Federation (Fenagri) and Morocco Foodex have embarked on projects to promote green and sustainable practices. On the one hand, as part of its 'Easy Food Export' project for the digitalization of technical control activities, Morocco Foodex has introduced a new information system, one of whose main objectives is to adopt a zero-paper approach, eliminating all documents produced in the course of export technical control procedures.

On the other hand, the Commission on Environment, Sustainable Development, and Climate Finance plays a vital role as a driving force and cohesive entity within the Moroccan Agrifood Federation (Fenagri), uniting members around shared interests. Its actions encompass several important areas. First, it actively advocates for critical issues such as the environment, sustainable development, and climate finance. Additionally, it keeps businesses informed about current international and national standards, regulatory updates, and available support mechanisms. Moreover, it keeps FENAGRI's Board of Directors informed about opportunities for funding from climate finance providers. Furthermore, the commission represents FENAGRI in relevant bodies such as the General Confederation of Moroccan Enterprises (CGEM) and other national and international entities. Notable contacts include pertinent ministerial departments like the Ministry of Energy, Mines, and the Environment, and the CGEM's New Economy and Climate Commission. By bringing together these stakeholders and promoting environmentally conscious initiatives, the Commission plays a pivotal role in advancing sustainable and responsible practices within the Moroccan agri-food sector.

These practices, aimed at minimizing biodiversity impact and supporting sustainable development, play at the same time a vital role in enhancing the resilience of corporate supply chains. They are closely interconnected and interact in multiple ways to bolster companies' capacity to cope with disruptions and crises.

First, by adopting environmentally-friendly practices and preserving biodiversity, agrifood SMEs reduce their reliance on non-renewable natural resources. This mitigates their vulnerability to supply fluctuations and resource shortages, which can occur during environmental, climatic, or economic crises. For example, by promoting sustainable agricultural practices and reducing chemical inputs, companies can better withstand variations in weather conditions and raw material costs.

Second, quality and environmental certifications, along with recognized labels, reinforce stakeholders' confidence in the resilience of these companies' supply chain. Customers, suppliers, business partners, and investors are more inclined to collaborate with firms committed to sustainable and responsible practices, fostering stronger partnerships and long-term relationships that contribute to supply chain stability.

Third, compliance with current environmental and sustainability regulations helps companies avoid legal risks and potential sanctions that could negatively impact their operations. Being compliant with environmental laws and standards strengthens their position against external disruptions, ensuring better operational continuity.

These sustainable practices can also enhance a company's reputation and build consumer trust. Customers are increasingly sensitive to environmental and social issues, and are more likely to support responsible companies. A positive brand image can result in greater customer loyalty and increased resilience to fluctuations in demand.

5. Conclusion

This study investigates how Moroccan exporting agrifood SMEs attepmt to achieve a balance between resilience strategies, biodiversity conservation, and sustainability in their supply chains. The findings reveal that these SMEs adopt a reactive approach to supply chain resilience, focusing on operational resilience while neglecting proactive strategies. However, some SMEs incorporate environmentally friendly practices for establishing green and sustainable supply chains, which have shown an interdependent relationship with resilience strategies.

Furthermore, key organizations like ONSSA, FENAGRI, and Morocco Foodex collaborate closely with the studied SMEs, promoting green and sustainable measures for the agrifood sector. This shows the commitment of local authorities and public organizations to preserve the environment, foster sustainable development, and improve the resilience of small businesses.

However, more initiatives are needed to further integrate sustainability practices and resilience strategies among agrifood SMEs. During crises and supply chain disruptions, SMEs tend to prioritize building resilience through risk management strategies to ensure operational efficiency and business continuity. However, it is essential for SMEs to strike a balance between immediate risk management and long-term sustainability. Integrating sustainable practices throughout the supply chain will allow SMEs to withstand future disruptions while contributing to the preservation of biodiversity and sustainable development. By aligning environmental responsibility with proactive resilience, these SMEs can improve competitiveness, protect the environment, and promote sustainable development in the region.

References

Aureli, Selena, and Federica Salvatori. "The current state of risk management in Italian small and medium-sized enterprises." (2013): 15-36.

Balan, Carmen. "The effects of the lack of coordination within the supply chain." The Amfiteatru Economic Journal 10, no. 24 (2008): 26-40.

Bhamra, Ran, Samir Dani, and Kevin Burnard. "Resilience: the concept, a literature review and future directions." International journal of production research 49, no. 18 (2011): 5375-5393.

Chawki, Assiya, and Hamid Aitelmeqeddem. "Efficacité de la gestion des parties prenantes dans les PME au Maroc." Alternatives Managériales Economiques 2, no. 2 (May 6, 2020): 240-260. https://doi.org/10.48374/IMIST.PRSM/ame-v2i2.20812.

Conz, Elisa, and Giovanna Magnani. "A dynamic perspective on the resilience of firms: A systematic literature review and a framework for future research." European Management Journal 38, no. 3 (2020): 400-412.

Dauphiné, André, and Damienne Provitolo. "La résilience: un concept pour la gestion des risques." In Annales de géographie, vol. 654, no. 2, pp. 115-125. Armand Colin, 2007.

Difrancesco, Rita Maria, Purushottam Meena, and Gopal Kumar. "How blockchain technology improves sustainable supply chain processes: a practical guide." Operations Management Research (2022): 1-22.

Food and Agriculture Organization of the United Nations (FAO)

Giovannucci, Daniele, Sara J. Scherr, Danielle Nierenberg, Charlotte Hebebrand, Julie Shapiro, Jeffrey Milder, and Keith Wheeler. "Food and Agriculture: the future of sustainability." The sustainable development in the 21st century (SD21) Report for Rio 20 (2012).

Hollnagel, Erik, David D. Woods, and Nancy Leveson, eds. Resilience engineering: Concepts and precepts. Ashgate Publishing, Ltd., 2006.

Jalila, BOUANANI EL IDRISSI, and LADRAA. Salwa. "Relance économique pendant l'état de crise sanitaire COVID 19: Etude d'impact sur l'activité des entreprises industrielles au Maroc." Revue Française d'Economie et de Gestion 1, no. 2 (2020).

Joo, Jaehun, and Yuming Han. "An evidence of distributed trust in blockchain-based sustainable food supply chain." Sustainability 13, no. 19 (2021): 10980.

Kamalahmadi, Masoud, and Mahour Mellat Parast. "A review of the literature on the principles of enterprise and supply chain resilience: Major findings and directions for future research." International journal of production economics 171 (2016): 116-133.

Kumar, Anil, Rohit Kr Singh, and Sachin Modgil. "Exploring the relationship between ICT, SCM practices and organizational performance in agri-food supply chain." Benchmarking: An International Journal 27, no. 3 (2020): 1003-1041.

Li, Xun, Qun Wu, Clyde W. Holsapple, and Thomas Goldsby. "An empirical examination of firm financial performance along dimensions of supply chain resilience." Management research review 40, no. 3 (2017): 254-269.

Macdonald, John R., Christopher W. Zobel, Steven A. Melnyk, and Stanley E. Griffis. "Supply chain risk and resilience: theory building through structured experiments and simulation." International Journal of Production Research 56, no. 12 (2018): 4337-4355.

McDougall, Natalie, Beverly Wagner, and Jill MacBryde. "Leveraging competitiveness from sustainable operations: frameworks to understand the dynamic capabilities needed to realize NRBV supply chain strategies." Supply Chain Management: An International Journal 27, no. 1 (2022): 12-29.

Miles, Matthew B., and A. Michael Huberman. Qualitative data analysis: An expanded sourcebook. sage, 1994.

Morocco Foodex. "Déploiement du système d'information des activités de contrôle technique « Easy Food Export ». " Note de service n°1/20 (2020).

Pal, Rudrajeet, Håkan Torstensson, and Heikki Mattila. "Antecedents of organizational resilience in economic crises—an empirical study of Swedish textile and clothing SMEs." International Journal of Production Economics 147 (2014): 410-428.

Porter, Michael E. "Competitive advantage: creating and sustaining superior performance. 1985." New York: FreePress 43 (1985): 214.

Sawhney, R., & Sandeep, K. (2019). "Globalization and Agri-Food Supply Chains: Assessing the Challenges and Opportunities." Journal of International Food & Agribusiness Marketing, 31(3), 238-252.

Tang, Ou, and S. Nurmaya Musa. "Identifying risk issues and research advancements in supply chain risk management." International journal of production economics 133, no. 1 (2011): 25-34.

Vogus, Timothy J., and Kathleen M. Sutcliffe. "Organizational Resilience: Towards a Theory and Research Agenda." In 2007 IEEE International Conference on Systems, Man and Cybernetics, 3418-3422. Montreal, QC, Canada: IEEE, 2007. https://doi.org/10.1109/ICSMC.2007.4414160.

World Bank Group. "World Bank Group Climate Change Action Plan 2021–2025: Supporting Green, Resilient, and Inclusive Development." Strategy Document. Washington, DC: World Bank, June 22, 2021. https://openknowledge.worldbank.org/handle/10986/35799.

Appendices

- **Appendix 1: The Semi-Structured Interview Guide**

Themes	**Questions**
Presentation	• Would you please introduce yourself and your business?
Supply chain resilience	• How do you perceive supply chain resilience? • What specific measures have you put in place to strengthen the resilience of your supply chain in the face of disruptions and crises?
Green Sustainable Supply Chain	• How do you integrate environmental sustainability principles into your supply chain, from production to distribution? • What specific initiatives have you adopted to minimize the environmental impact of your operations and promote a sustainable approach throughout the chain? • How do you work with your suppliers, partners, and other stakeholders to promote resilience and sustainability throughout the supply chain?

- **Appendix 2: Sample Details**

Companies	Industry	Age	Nb of Employees	Turnover	The respondent
1	Agribusiness	16 yo	Between 10 and 20	From 1,000,000 to 5,000,000 MAD	Quality Manager
2	Agribusiness	19 yo	Between 50 and 100	From 10,000,000 to 50,000,000 MAD	Management Control Manager
3	Agribusiness	36 yo	Between 10 and 20	From 10,000,000 to 50,000,000 MAD	Sales Manager
4	Agribusiness	23 yo	Between 50 and 100	From 5,000,000 to 10,000,000 MAD	Management Control Manager
5	Agribusiness	22 yo	Between 20 and 50	From 10,000,000 to 50,000,000 MAD	Quality Manager