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**Panamericana**

GUADALAJARA CAMPUS

Faculty of Economics and Business Sciences

**Resilience of the retail food supply chain and adaptability of  
customer delivery amid disruptions due to health  
contingency.**

THESIS

To obtain the degree of:  
DOCTOR IN BUSINESS SCIENCES

Presented by:  
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With Official Validity Recognition of Studies by the SEP (Secretariat of Public Education) according to agreement 20200055, dated 01-VII-2019, in on-site modality.

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To God, for the gift of life, spirit, and the seed of curiosity.

## **Dedication**

To my daughter Frida, the greatest gift from God in my life. She has filled my life with love, smiles, hugs, stories, antics, art, and satisfaction for sixteen years.

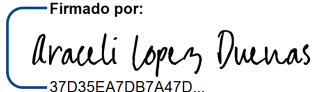
To whom I have always taught to finish what is started. When she needs a push to complete something, I hope she returns to this page and takes what it gave me. The value of reaching the end, despite all the difficulties.

I love you eternally, my little daughter.

## Authorship Declaration

The undersigned hereby declares that the material in this document, which I now present, is the result of my own work. The ideas and works of third parties included in the main text have been appropriately cited. I make this declaration in the knowledge that failure to comply with the rules relating to the submission of work may lead to serious consequences. I am aware that the document will not be accepted unless this declaration has been submitted alongside it.

Except where referenced in the thesis text, this thesis contains no material published elsewhere or extracted in whole or in part from a thesis submitted for the award of any other degree or diploma. The work of any other person has not been used without due acknowledgment in the main text of the thesis. This thesis has not been submitted for the award of any other degree or diploma at any other tertiary institution.

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## **Abstract**

This thesis has been developed with a central focus on the food retail industry. Three main chapters are presented, each corresponding to research in the field of business sciences. These articles have been individually published in different journals.

In light of some structural changes in companies during COVID-19, the starting point for the first chapter is the analysis of home delivery systems to reach end customers. The results showed how advancements in home delivery systems can be made by focusing on two fundamental factors: technology and personnel management. The second chapter presents a qualitative investigation using structured interviews focused on five entrepreneurs in Puerto Vallarta who operated home delivery systems during COVID-19 in 2020 from April to June. Findings show that one's own systems and those through technological platforms generate positive externalities and, instead of being exclusive, can be complementary. The third chapter addresses how organizational factors and supply chain configuration can help medium-sized companies to be resilient in turbulent operating environments. This chapter aims to analyze the resilience of the company's supply chain under study and, through the application of system dynamics methodology, explain how organizational variables should be related to increasing organizational adaptation capacity. This final chapter is a case study of a company composed of several butcher shops in Puerto Vallarta, Mexico, with an analysis of weekly sales information over a five-year period corresponding to 2018-2022.

This doctoral thesis is framed within applied business sciences, where various disciplines converge to address business management in dynamic and complex environments. Building upon the foundations laid by Michael Porter in his conceptualization of the value chain (1985) and Dixon's contributions (1994) to understand improvement trajectories when developing and utilizing

home delivery systems in response to the pandemic, this study delves into the intersection between theory and business practice.

An essential component of this research is using time series analysis techniques through descriptive statistics, which facilitate a detailed visualization of sequential information in the presented case study. Subsequently, with the application of system dynamics models based on the Jay Forrester's contributions (1990), a model is developed to demonstrate resilience capacity to face the unexpected event of COVID-19.

The importance of multi-criteria decision-making supported by Bayesian optimization models is highlighted. This serves as a starting point for the model presented in identifying effective strategies in business management.

This study addresses the inherent complexity of business management in a changing context, adopting an interdisciplinary approach that merges consolidated theories with advanced methodologies of analysis and modeling. It provides a comprehensive framework that offers models to organizations to enhance their responsiveness to unexpected events and changing markets, in line with the principles of engaged management scholarship.



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# CHAPTER 1 : INTRODUCTION

## ***1.1 Introduction***

This thesis is firmly rooted in the conceptual framework of applied business science within the retail food sector. It draws upon many academic disciplines, ranging from the value chain, improvement trajectories, and supply chains to statistical time series analysis and systems dynamics inherent in engineering and social sciences. Through this interdisciplinary lens, the thesis adopts an integrated approach, as evidenced by three research-derived products that converge in the same sector and region, addressing organizational aspects to propose actionable insights for decision-makers.

This interdisciplinary foundation set the stage for our initial investigation, which centered on analyzing primary and secondary activities. Focused on Porter's value chain (1985), our objective was to establish an effective home delivery system as a response to the restrictions that companies faced during the COVID-19 contingency. We initiated this by evaluating the level of technological development and staff competencies, which are crucial for advancing improvement trajectories. Our study compared two home delivery systems: own developed systems that are controlled by companies and technology platform systems. Through this preliminary inquiry, we underscored home delivery as a viable option for retail companies to reach end consumers. However, not all companies use technological platforms or have their own developed systems. Consequently, our research advocates for developing or enhancing the company's own delivery system, in conjunction with the utilization of technological platforms, to ensure sustained customer engagement, particularly amidst the challenges posed by the COVID-19 pandemic and associated social distancing measures.

Building upon this interdisciplinary foundation, the second part sought to understand entrepreneurs' experiences with home delivery systems during COVID-19. Employing discretionary sampling through focused interviews, we identified the elements involved in home delivery systems developed by companies compared to technology platform systems and their relevance during the COVID-19 lockdown from April to June 2020. The findings of this qualitative research offer retail companies in the food sector insights into using one system over the other or both as complementary. While its own system offered enhanced communication with customers and direct feedback, it also presented challenges, such as a limited number of delivery drivers and technology requirements. Conversely, deliveries made by platforms, especially UberEats, provided specialized service but raised concerns about information ownership and customer loyalty. Hence, a mix of these systems is suggested to leverage their positive externalities while addressing their limitations.

Finally, the third part delves into how organizational factors and supply chain configuration can bolster the resilience of medium-sized companies operating in turbulent environments. This study serves as a case analysis of a company comprising multiple butcher shops catering to end consumers with a local/regional supply chain in the Mexican meat industry. Local and regional food systems (LRSm) emerged as agile and interconnected. Descriptive statistics were employed to analyze the economic outcomes spanning five years (2018 to 2022), encompassing two pre-pandemic years, two pandemic years, and one post-pandemic year. This article aims to assess the resilience of the company's supply chain under examination and, utilizing the system dynamics methodology, elucidate how organizational variables should interact to enhance organizational adaptability. Despite the widespread disruptions in global supply chains precipitated by the pandemic, this case study showcases how a Mexican company, capitalizing on its regional supply chains and adept management of various factors such as inventory and personnel, achieved heightened sales and overall positive performance.

This thesis begins by explaining the conceptual framework, paying special attention to the value chain, improvement trajectories, distribution channels, supply chains, and system dynamics. Once the state of the art is described, the methodological part helps to establish the working hypotheses. Each of the papers presented in chapters 2, 3, and 4 poses its own research questions, hypotheses, and conclusions. The results of these studies were published in various outlets, which are described below:

- The first conference article written by the author supporting this doctoral thesis, along with co-authorship from Dr. Adrián Ramírez Nafarrate, co-director of this doctoral thesis, was published on the Social Science Research Network (SSRN) in October 2021. The article's title is "Improving Model of Home Delivery in the Face of COVID-19 for Small Retail Companies", and it was presented at the Proceedings of the Eleventh International Conference on Engaged Management Scholarship - EMS 2021. The article is available at: <https://ssrn.com/abstract=3944726>.
- The second product is a book chapter written by the author in collaboration with Dr. Adrián Ramírez Nafarrate, co-director of this doctoral thesis, and it was published in the book "New Expressions of Business Organization," Chapter 2.4, page 201, in September 2023. The chapter is entitled "Adaptation of SMEs to Perform Direct Deliveries to Customers: A Qualitative Study on Home Deliveries During the COVID-19 Pandemic." The DOI link for the article is: <https://doi.org/10.61865/neose2024zsvv-yeex>.
- The third article, authored by the author in collaboration with Dr. Adrián Ramírez Nafarrate, and Dr. Juan Enrique Nuñez Ríos, co-directors of this thesis, was published in the journal International Journal of Business Innovation and Research. The article is titled "Supply Chain Resilience in the

COVID-19 Pandemic: Case Study of a Mexican Butcher's Shop Chain." The DOI link for the article is: <http://doi.org/10.1504/IJBIR.2024.10063246>.

## **1.2 Literature Review**

COVID-19 pandemic presented global challenges across various spheres, including social, political, and economic domains. Originating in the Chinese city of Wuhan in December 2019 (Lai, Shih, Ko et al., 2020), the virus swiftly spread worldwide, reaching Mexico by late February 2020 (Suárez, Suarez Quezada, Oros Ruiz et al., 2020). This rapid expansion led the World Health Organization (WHO) to declare the situation as a pandemic in March 2020 (WHO, 2020), marking a pivotal event that triggered a cascade of challenges at both international and national levels.

At the international political level, this crisis tested cooperation and coordinated action across various domains to address the negative impacts, including the necessity for stronger cooperation in managing global health crises (Gostin and Wiley, 2020). The logistics for product trade also faced new challenges (Ivanov and Dolgui, 2020). Despite supermarkets experiencing high demand for food products (Nicola, Alsafi, Sohrabi et al., 2020), restaurants and cafés were forced to close, leading these companies to change their business models, primarily focusing on takeaway sales. This shift in consumer behavior and consumption patterns significantly impacted supply chains and the distribution and marketing of products.

The implications of COVID-19 deeply affected various aspects of society, according to the report by the United Nations Organization. According to CEPAL and UNESCO (2020), the COVID-19 pandemic caused an unprecedented crisis across all sectors, including education. Economically, the pandemic exacerbated existing inequalities and severely impacted tourism, manufacturing, and retail industries. In Mexico, the COVID-19 pandemic

presented a significant challenge, affecting public health, the economy, society, and the daily lives of millions of people and companies.

Donthu and Gustafsson (2020), Richards and Rickard (2020), Hashem (2020), and Sheth (2020) addressed the impacts that industries faced during the COVID-19 pandemic. In their analysis, these authors examine the effects on the population and industries, focusing on the paralysis of the economy rather than on the efficient management of companies and the organizational adjustments made to continue their operations despite government restrictions.

Other aspects of the problem have also been studied, such as product scarcity from the perspective of supply chains with an international focus (Hobbs (2020, 2021), Domnina, Sakulyeva, Solovev et al. (2022), Thilmany, Canales, Low et al. (2021), Marusak, Sadeghiamirshahidi, Krejci et al. (2021) and Orlando, Tortora, Pezzi et al. (2022), among others). These studies address the globally manifested problem. Considering the above, this doctoral thesis is based on the retail food sector in the Puerto Vallarta, Jalisco area as the application context. It focuses on the last link of the value chain according to Porter's analysis (Porter, 1985).

Over time, consumers have gradually adopted new technologies, such as online shopping and home delivery. However, the onset of COVID-19 forced companies and consumers to implement these adaptations more quickly.

Among the effects of the pandemic, changes in consumption habits were studied (Hassen, Bilali, and Allahyari, 2020). Particular emphasis was placed on food purchasing through electronic means (Ozuem, Ranfagni, Willis et al., 2021).



### **1.3 Contribution to literature**

This research significantly contributes to the literature on the retail food industry and its responses to the COVID-19 pandemic. By offering a comprehensive analysis of the crisis's impact on business operations and strategies, this study deepens our understanding of the challenges faced by companies and the adaptive measures they implemented. Specifically, it evaluates home delivery strategies employed by businesses, assessing their effectiveness and role in ensuring continuity during periods of confinement.

The findings align with previous studies, such as those by Thilmany, Canales and Low, 2021; Wided, 2023, which identified the importance of agile operational strategies in crises. However, this research also challenges the notion that some companies inherently possess an advantage in crisis adaptation, showcasing a case study of a Mexican firm that successfully navigated the pandemic through innovative practices and strategic agility. This contrasts with Almeida and Oliveira's (2023) recommendations that emphasize cost-cutting and personnel reduction, suggesting instead that a focus on human resource management and local supply chain integration can yield better outcomes.

The COVID-19 pandemic presented global challenges across various social, political, and economic domains (Lai, Shih, Ko et al., 2020; Suárez, Suarez Quezada, Oros Ruiz et al., 2020; WHO, 2020). The logistics for product trade faced new challenges (Ivanov and Dolgui, 2020), while supermarkets experienced high demand for food products (Nicola, Alsafi, Sohrabi et al., 2020). This crisis led to significant changes in consumer behavior, particularly a shift toward online purchasing and home delivery (Hashem 2020; Ozuem, Ranfagni, Willis et al., 2021). Companies adapted by strengthening new distribution channels to meet these demands, emphasizing the necessity for agility in response to unexpected conditions (Lin, Li, Luo et al., 2020).

Additionally, the resilience of supply chains has become increasingly relevant, as highlighted by Ponomarov and Holcomb (2009), who note that adaptation is crucial for responding to disruptive events. This study illustrates how local and regional food supply chains (LRFSC) leveraged their connectivity and flexibility to respond rapidly to changing consumer demands during the pandemic (Glock and Grosse, 2021; Thilmany, Canales, Low et al., 2021).

In summary, this study contributes to understanding the retail food sector's adaptations during the pandemic. It highlights the importance of innovative operational strategies and consumer behavior shifts, which have lasting implications for the industry. By integrating insights on supply chain resilience and the role of local structures, the findings emphasize the need for firms to cultivate adaptive capabilities to navigate future disruptions effectively.

#### ***1.4 Research objectives and hypotheses***

The main objective of this thesis is to highlight the implications of the COVID-19 pandemic on the retail food industry and examine the strategies companies adopt to address the challenges posed by this health contingency. This thesis aims to understand how the retail food industry has navigated the pandemic's complexities and identify valuable insights for future resilience and adaptation strategies.

Based on these objectives, the following hypotheses are formulated, which correspond to the research presented in chapters two, three, and four. In chapter five, which contains the conclusions, these hypotheses will be addressed.

H1: The development and implementation of home delivery systems can be analyzed through the primary and secondary functions of the value chain to identify the technology development and human resources management

elements necessary to traverse improvement trajectories and significantly increase companies' adaptability to new market conditions.

H2: In the context of the COVID-19 pandemic, some companies in the food sector in Puerto Vallarta faced the challenge of actively managing their own delivery systems and/or using third-party platforms to continue operating amid social distancing restrictions. These two delivery systems emerged as distribution alternatives during the pandemic, each facing different operational challenges.

H3: Organizational adaptability, grounded in a deep analysis of market fluctuations and effective supply chain management, has been essential for the sales growth presented by Sierra Costa during the crisis caused by the COVID-19 pandemic.

## **CHAPTER 2 : IMPROVING MODEL OF HOME DELIVERY IN THE FACE OF COVID-19 FOR SMALL RETAIL COMPANIES**

### ***2.1 Abstract***

COVID-19 has taken most companies by surprise, forcing many of them to suspend activities. Grocery retail companies have had the option to continue since they are considered an essential activity. However, they were conditioned to new operating guidelines during the pandemic. A home delivery system represents a real alternative to adapt to new government's guidelines and natural changes in society's consumption habits. Before the pandemic, some companies had already been operating a home delivery system with online applications, while others did not have any experience with it. This article is a research proposal to analyze strategies and a model for improving a home delivery system considering the primary and secondary activities of the corresponding value chain. Identifying the level of development regarding technology and staff skills will be the starting point to move through the improvement trajectories. Future qualitative research with small retail companies is necessary to collect data and validate the model.

### ***2.2 Introduction***

The challenges posed by the coronavirus (SARS-COV2), which produces the disease COVID-19, have made companies look for new ways to deliver their products, trying to survive the consequences of this pandemic. Adapting to new ways of operation involves resources and innovation. In this scenario, the critical factor is time because how quickly and efficiently companies adjust to the new conditions determines the performance and permanence of the company. Business agility, which is the capacity and ability of the company to respond to unexpected and continuous changes in the market (Lin, Li, Luo et

al., 2020), is a characteristic that could help companies cope with the drastic changes caused by the pandemic.

Government orders on social distancing have made the retail industry, from small corner stores to department stores, seek different methods to reach customers through home delivery services. Since the 1980s, home delivery has been an important distribution channel, mainly for restaurants. It became popular through pizza deliveries. Under this contingency of the pandemic, home delivery has become an interesting possibility to increase sales in the retail industry. In the United States, the usual market share of online retailers is about 3–4%, but it has risen to 10–15% during the COVID-19 pandemic (Grashuis, Skevas, and Segovia 2020). Through this situation, retail companies will be looking for a way to comply with the regulations regarding schedule restrictions, social distance between customers, and other mandatory constraints. Still, it will also be essential to look for different distribution channels to get closer to their customers. According to Chenarides, Grebitus, Lusk et al. (2021), the number of houses that use grocery delivery services increased 158% in May 2020 in two major cities in the United States due to the pandemic lockdown.

While the pandemic has forced many industries to suspend their activities, it was not the case for the food and grocery retail sector because it is considered a basic need. Despite this, individuals' consumption habits have begun to take new forms, such as Buy-Online-Deliver to Home (BODH) (Song, Fan, Tang et al., 2021), also referred to as Online to Offline (O2O) (Li, Miroso, and Bremer, 2020), or, similarly, Online Food Delivery (OFD) (Ali, Khalid, Javed et al., 2021).

Not all companies' home delivery systems are at the same level of development, which is an important aspect to define and improve. This article

uses a value chain perspective (Porter, 1985) to examine a home delivery system through primary and secondary functions.

Furthermore, it is understood that companies are not static, and they will be able to enhance these functions throughout the improvement trajectories (Dixon, Arnold, Heineke et al., 1994).

Depending on the development level of the home delivery system, from the most basic to the most competitive, while facing the fight against the COVID-19 crisis, this distribution channel plays a crucial role. “It seems likely that e-shopping for food will continue to gain traction as store shutdowns and social-distancing rules push more digital shopping to online channels” (Hassen, Bilali, and Allahyari, 2020).

From a practical standpoint, this paper serves as a guide to understand a home delivery system and identify a competitive system's characteristics. The analysis presented in this paper may help companies overcome the challenges posed by COVID-19 in product delivery.

### ***2.3 Research methodology***

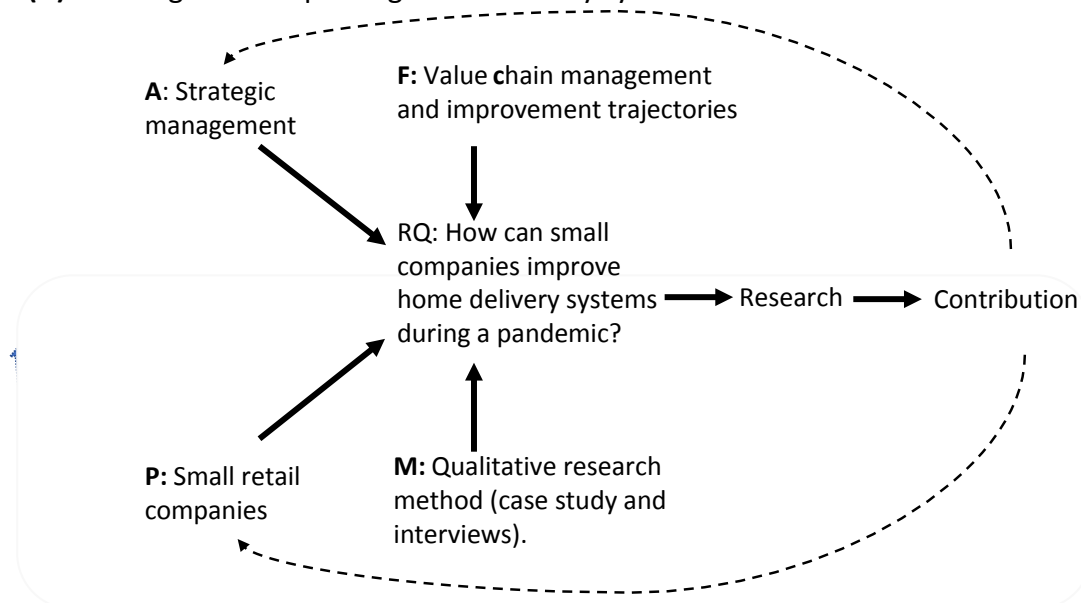
“Engaged scholarship is a participatory form of research for studying complex realworld problems based on the different perspectives and understandings of key stakeholders” (Mathiassen, 2017). This paper uses the Generic Structure of Engaged Scholarship Study proposed by Mathiassen (2017) as a guideline for a research proposal.

The framework proposed by Mathiassen defines the research question (RQ), the problem (P), the area of concern in the literature (A), the research methods (M), and the conceptual framework (F). In this proposal, we identify RQ as: How can small companies improve home delivery systems during the pandemic? (P) the problematic situation is found in small retail companies that

must adopt a home delivery system due to the pandemic. (A) the area of concern is strategic management. (M) involves collecting empirical data on a method of inquiry, which we suggest a qualitative method through case study and interviews. (F) a conceptual framework is value chain management and improvement trajectories. Moving through the components of this research design, it reveals as a critical factor the contribution (C). The contribution can be related and interdependent with the components (A), (P), (F) and, (M). In this future research, we intend to relate (C) with (A) and (P). We must collect and validate data from small retail companies to make a contribution to the area of concern C(A) and the problematic situation C(P). C(A) will be creating strategies for improving home delivery systems and C(P) will be improving these systems for small retail companies during a pandemic. We present the model applied to our proposal in Fig.1.

**Figure 1** Structure of Engaged Scholarship Study applied to Home Delivery by Small Companies

**C(A):** Strategies for improving home delivery systems



**C(P):** Improving home delivery systems for small retail companies during a pandemic.

Source: Own elaboration (2020) adapted from Mathiassen (2017).

## **2.4 Home delivery and its value chain**

Focusing on the home delivery system and the sanitary contingency of COVID-19, we built a conceptual analysis for the development of the system using value chain analysis and improvement trajectories.

### **2.4.1 Home deliveries**

The online business is a marketing method based on information and communication technologies. The technological capacity of the company's e-commerce plays an important role. The most known terminology is O2O; consumers order their products online and receive the products or services offline (Li, Miroso, and Bremer, 2020).

This O2O business model has increased its popularity in recent years. We can find a variety of these technological platforms. In the restaurant and grocery store sector, these are known as food delivery platforms. The platforms represent a quick solution due to their technological development of online orders and deliveries through the digital sharing economy. The sharing economy is growing mainly in popularity since it enables individuals to connect and develop peer networks. The digital sharing economy is defined as "Platforms that endorse sharing practices with digital technologies." (Pouri and Hilty, 2021).

Food delivery platforms have a well-established system, providing a series of services such as: presenting options to consumers, taking orders from consumers, delivering the orders, and registering the online payments. Although this new business model has become more popular, not all companies have access to it. Depending on the city, sector, field, sales volumes, and food delivery platform's fees, businesses will have the possibility of receiving services from the platforms and joining them. Therefore, when



food delivery platforms are not an achievable solution for companies, developing or improving their own home delivery system becomes a possible alternative in the face of COVID-19 restrictions. To achieve a more competitive home delivery system, businesses must incorporate or improve certain activities into their current process.

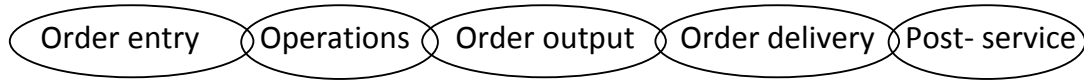
#### ***2.4.2 Home delivery value chain***

The generic value chain model, developed by Porter, shows how a product adds value while it moves along the production process disaggregating its activities to deliver a valuable product or a service to the end-user (Porter 1985). The value chain perspective can help companies analyze the processes and activities associated with home delivery.

Based on Porter's generic value model, these activities can be classified into two categories as primary functions and secondary functions. The primary functions are those activities that are directly linked to the final output of the firm; on the other hand, secondary functions facilitate the company to perform its primary activities (Perera and Gunatilake, 2018). We propose that a retail company has five primary functions: order entry, operations, order output, order delivery, and post-service, as presented in Fig.2. Even if a company has not yet implemented a home delivery mode, all the functions are performed. We suggest reviewing order entry and order delivery functions to tailor them to a home delivery system.

**Figure 2**

Primary Functions of Retail Company



Source: Own elaboration (2020) adapted from Porter (1985).

Continuing with the value chain approach, we will focus on the secondary functions. In their research for contractor organizations, Perera and Gunatilake (2018) classified six secondary functions: finance and auditing, human resource management, legal division, procurement division, technology and development, and others (Perera and Gunatilake, 2018). Although these secondary functions were identified for a particular firm in an industry, we will take two secondary functions to present our model: technology and development and human resource management. As long as companies have higher expertise in these two secondary functions, they will better adapt to the sanitary contingency.

Changes required by companies to adapt to new government guidelines during the pandemic should not be thought of as a total reengineering. We propose to distinguish these changes as incremental improvements and innovations. These changes can pass through an improvement trajectory, defined as “a knowledge accumulation that translates into superior performance and effective shield against existing competitors” (Dixon, Arnold, Heineke et al., 1994). An improvement approach does not change culture, policies, and strategy.

With the value chain approach, identifying the five primary functions, and focusing on two main secondary functions, the question is: what technology and staff skills are required to have a home delivery system and increase the chances for success during the pandemic?

## **2.5 Discussion**

Companies with no experience in home delivery should consider reviewing the value chain approach. The challenges that arise are linked between these two secondary functions: Technology and development and human resource management. In our research, we propose four levels to classify the development of a home delivery system based on these secondary functions.

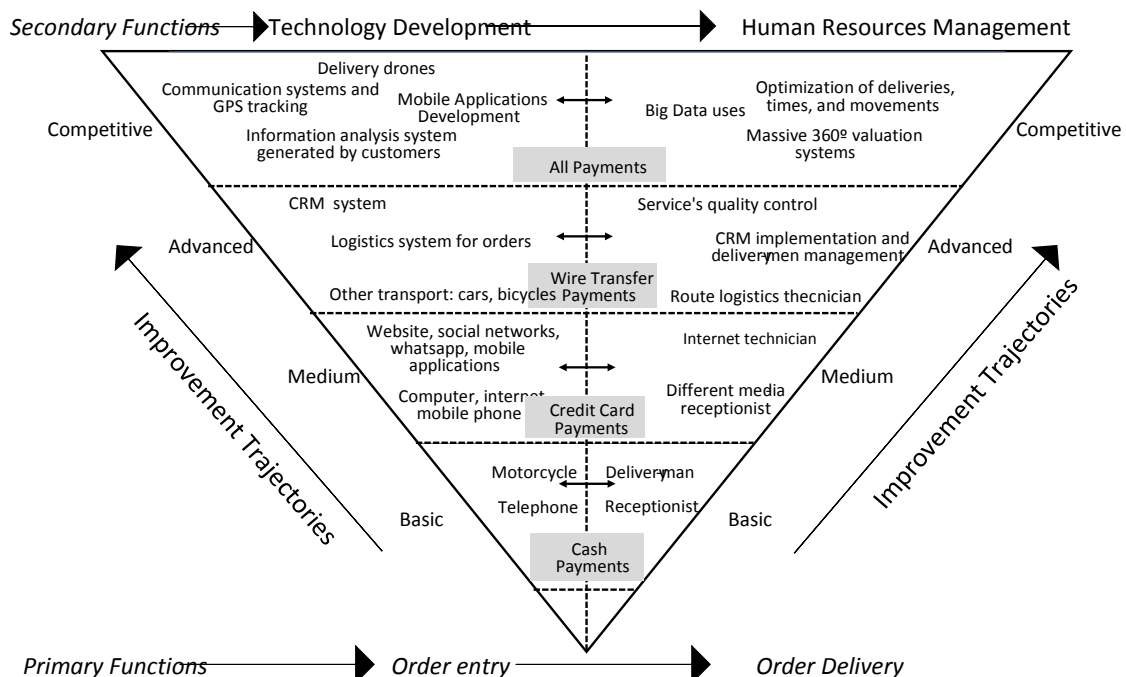
The levels are not exclusive to each other, and they pass through improvement trajectories. From the bottom up, there is the basic, medium, advanced, and competitive level. The "Development Level and Improvement Trajectories of a Home Delivery System" is presented as an inverted pyramid in Fig. 3.

The purpose of this pyramid is to visually structure the information. When the most significant benefits are present, they will be at the most competitive level. However, this inverted pyramid must be read from the bottom up to understand the system's improvement trajectory fully. The starting point is the vertex, which is a "Null" home delivery system. Elements connected by a horizontal arrow advance together along the path. As each level is raised, the elements continue to improve or add new components to the higher levels. At the bottom of the pyramid, we are focusing on two main primary functions: order entry and order delivery. The basic and medium levels provide examples of different technologies and staff skills, and they pass from cash to card payments. There is a Customer Relationship Management system (CRM) at the advanced level where customer information accumulates. At the advance level, the system can operate an O2O model, where a company's decision-making is supported by the additional information on their customers and their products (Lin, Li, Luo et al., 2020). Also, it is required that the system management has the best delivery routes laid out under certain parameters.

However, it is not so automated since specialized personnel is needed to arrange deliveries and routes. On the top is the competitive level, which includes a communication system and GPS tracking for the delivery vehicle and mobile applications. "Mobile platforms are more accessible and affordable than internet access on desktop computers, especially in the developing countries" (Chen, Dai, Korpeoglu et al., 2018). At this level, a systems analysis of all the information generated by customers requires specialized personnel or intelligent systems to handle it. They oversee Big Data, make orders forecasts, 360-degree evaluations of the entire service and deliveries.

**Figure 3**

Development Level and Improvement Trajectories of a Home Delivery System



Source: Own elaboration, 2020.

## 2.6 Conclusions

The trend of consumers turning to home delivery cannot be denied. It is a constantly growing market, which COVID-19 has accelerated. Some

companies had already developed their home delivery systems before the pandemic, and they were not surprised. On the other hand, other companies had not used these models of home deliveries, despite it being a possible solution to overcome the COVID-19 consequences. Social distancing is a new reality, and the coronavirus pandemic has changed how consumers get their food, groceries, and other products.

Although there is a growing market for food platform deliveries, it might not be the best solution, nor a candidate solution, for many companies. Depending on the sector and sales volume of business, they may have access to these platforms. Using Porter's value chain approach, we defined five primary functions for a retail company: order entry, operations, order output, order delivery, and post-service. From these primary functions, we focused on order entry and order delivery. As well, we established two secondary activities: technology and development and human resource management. Using these activities from the value chain, we presented the model "Development Level and Improvement Trajectories of a Home Delivery System." We showed some requirements for these functions at different levels of the system. We proposed to move through the improvement trajectories to reach a competitive level.

This proposed research can be used as a starting point for retail companies to tailor the requirements of a home delivery system face to the unexpected sanitary contingency. We must validate this model by recollecting data from small retail companies through qualitative methods regarding making a unique contribution to the area of concern and the problematic situation.

## **CHAPTER 3 : ADAPTATION OF SMEs TO DIRECT CUSTOMER DELIVERIES: A QUALITATIVE STUDY ON HOME DELIVERIES DURING COVID-19**

### ***3.1 Abstract***

Home deliveries have generated substantial consumer interest over the last decade. Initially, these deliveries were part of a direct service, where individuals who took the orders, such as delivery personnel, were the company's employees providing the product. Alongside this, the emergence of technological delivery platforms represented another option for delivering products to the end consumer. The presence of COVID-19 further popularized home deliveries. This research aims to identify the elements involved in home delivery systems developed by companies compared to technological platform systems and their relevance during COVID-19 confinement. It also aims to explain the challenges and skills companies need when using each of these systems. To understand the challenges brought by the COVID-19 pandemic in direct customer delivery, interviews were conducted during the COVID-19 pandemic period from September to December 2020. Through a qualitative exercise, a discretionary sampling was conducted with four entrepreneurs, who collectively had thirty-six points of sale, whether retail stores or restaurants in the Puerto Vallarta, Jalisco area. These stores used these systems before and during the pandemic. The results suggest the need for companies to develop different skills for each system, with the latter being complementary.

### ***3.2 Introduction***

In December 2019, a new virus causing respiratory syndromes was detected in Wuhan, China, initially and temporarily called 2019-nCoV. This virus spread from China to other countries (Lai, Shih, Ko et al., 2020). On February 11, 2020, the World Health Organization (WHO) announced a definitive name for

this disease: COVID-19. In Mexico, the first case was detected on February 27, 2020, in Mexico City (Suárez, Suarez Quezada, Oros Ruiz et al., 2020). A few days later, on March 11, 2020, this disease was declared a pandemic (WHO, 2020). Given the evolution of the disease, which grew exponentially and was fatal in many cases, on March 30 of the same year, the Mexican government declared a national emergency. Consequently, the general population was advised to stay at home as much as possible to contain the spread of the virus.

On one hand, the food retail sector was depressed due to the closure of restaurants, cafés, bars, hotels, among others, as people stayed at home (Hobbs, 2020). However, on the other hand, there was a surge in hoarding behavior and an increase in the purchase of food, beverages, hygiene items, and medicine, which occurred suddenly as people feared not being able to obtain them later (Cruz-Cárdenas, Zabelina, Guadalupe-Lanas et al., 2021). Companies tried to protect themselves from the havoc caused by the pandemic. New distribution channels were strengthened to adapt to this new situation, including online or remote purchasing and home deliveries. Under this scenario, one of the key factors was time, as the speed and efficiency of response to new conditions determined the performance and permanence of the company (Lin, Li, Luo et al., 2020). The agility of businesses to respond to unexpected conditions helped to cope with these drastic changes.

According to Grashuis, Skevas, and Segovia (2020), in the United States, online market share was estimated to be between 3% and 4%. Still, during the pandemic, it increased from 10% to 15%, most of which included home delivery. While other types of businesses experienced decreases in sales, expenses in food stores and home deliveries increased in early 2020. For example, household product spending increased by 40% between February 26 and March 10, 2020, compared to previous weeks (Baker, Farrokhnia, Meyer et al., 2020).

Companies sought to comply with regulations regarding opening hours, social distancing, and other mandatory restrictions. Many industries were forced to suspend their activities. Therefore, home deliveries allowed them to stay closer to customers. Alongside this, consumer habits changed. A study conducted in the USA in May 2020 concluded that nearly half of the participants during the pandemic were buying more food than usual. However, consumers avoided shopping in stores and preferred home deliveries or pickup services. The results showed that the number of families using the pickup method increased by 255%, and 158% used different delivery services (Chenarides, Grebitus, Lusk et al., 2021).

Another research focused on generational differences regarding food purchasing during the pandemic, akin to what was experienced in the wartime generation of the First and Second World Wars. People at that time generally had a "stock up" mentality that Millennials and Centennials considered "outdated," as they tended to believe that essential foods would always be available (Zwanka and Buff, 2021). However, after this pandemic, these generations are modifying their habits. According to Nielsen, the shift to food purchasing is likely to remain at a higher percentage of the population than before the pandemic (Vestergaard, Nielsen, Richter et al., 2020).

Since the 1980s, home delivery has been an important distribution channel, primarily for restaurants. This model began to popularize with pizza deliveries, where companies developed their own delivery systems. However, the first third-party food delivery service, now better known as technology platforms, emerged in 1999 with Seamless, followed by Grubhub, but initially limited to the Chicago market in 2004 (Williams, Tushev, Ebrahimi et al., 2020).

Home delivery services for restaurants and food stores have become popular internationally with the development of technology platforms. As smartphones advanced, menus became more attractive, and online payments became



easier, with the most well-known platforms now being UberEats, Deliveroo, Swiggy, Rappi, and Zomato. In Mexico, the platforms in this category that have been present in the last two years include Didi Food, UberEats, Cornershop, Mercadoni, Rappi, and Justo. These platforms offer various services, such as presenting options from different stores and restaurants, taking orders, delivering orders, and processing online payments primarily. However, these platforms are not available in all countries or cities.

In Table I, the presence of the main technology platforms as of 2020 is shown, where we can observe in chronological order the year of foundation, place of origin, website, whether they offered service to restaurants and retail stores, presence in major regions and continents, as well as availability in Mexico and specifically in Puerto Vallarta, where at the time of this study only three were found: Didi Food, UberEats, and Rappi.

Table I. Presence of main technology platforms

| Platform      | Website                                                  | Place of Origin | Service to Restaurants /Retailers | Year Founded | Presence in Regions/Continents                                      | Service to Restaurants /Retailers |
|---------------|----------------------------------------------------------|-----------------|-----------------------------------|--------------|---------------------------------------------------------------------|-----------------------------------|
| Just Eat      | <a href="http://www.just-eat.com">www.just-eat.com</a>   | Denmark         | No                                | 2001         | Europe, Asia, Oceania, and the American Continent.                  | No                                |
| Grubhub       | <a href="http://grubhub.com">grubhub.com</a>             | USA             | No                                | 2004         | USA.                                                                | No                                |
| Zomato        | <a href="http://zomato.com">zomato.com</a>               | New Zealand     | No                                | 2008         | USA, India, New Zealand, Australia, Brazil, and South Africa.       | No                                |
| EatStreet     | <a href="http://eatstreet.com">eatstreet.com</a>         | USA             | No                                | 2010         | USA.                                                                | No                                |
| Postmates     | <a href="http://postmates.com">postmates.com</a>         | USA             | Yes                               | 2011         | USA.                                                                | No                                |
| Delivery Hero | <a href="http://deliveryhero.com">deliveryhero.com</a>   | Germany         | Yes                               | 2011         | USA, Central and South America, Northeast Africa, Europe, and Asia. | No                                |
| FoodPanda     | <a href="http://foodpanda.com">foodpanda.com</a>         | Germany         | No                                | 2012         | Asia, Bulgaria, and Romania.                                        | No                                |
| Deliveroo     | <a href="http://deliveroo.co.uk">deliveroo.co.uk</a>     | England         | No                                | 2013         | Europe, Asia, Arabia, and Kuwait.                                   | No                                |
| DoorDash      | <a href="http://doordash.com">doordash.com</a>           | USA             | No                                | 2013         | Australia, Canada, and USA.                                         | No                                |
| Swiggy        | <a href="http://swiggy.com">swiggy.com</a>               | India           | Yes                               | 2014         | India.                                                              | No                                |
| Glovo         | <a href="http://glovoapp.com">glovoapp.com</a>           | Spain           | Yes                               | 2015         | Europe and África.                                                  | No                                |
| Didi Food     | <a href="http://www.didi-food.com">www.didi-food.com</a> | China           | Yes                               | 2012         | China, Japan, Russia, Australia, New Zealand, and Latin America.    | Yes/Yes                           |
| UberEats      | <a href="http://ubereats.com">ubereats.com</a>           | USA             | Yes                               | 2014         | USA, Latin America, Europe, and Asia.                               | Yes/Yes                           |
| Cornershop    | <a href="http://cornershopapp.com">cornershopapp.com</a> | Chile           | Yes                               | 2015         | USA, Canada, and Latin America.                                     | Yes/No                            |
| Mercadoni     | <a href="http://mercadoni.com.mx">mercadoni.com.mx</a>   | Colombia        | Yes                               | 2015         | Colombia and Mexico.                                                | Yes/No                            |
| Rappi         | <a href="http://rappi.com">rappi.com</a>                 | Colombia        | Yes                               | 2015         | Latin America.                                                      | Yes/Yes                           |
| Justo         | <a href="http://getjusto.com">getjusto.com</a>           | Chile           | No                                | 2018         | Chile, Mexico, Peru , and Colombia.                                 | Yes/No                            |

Source: Own elaboration, 2020.

It has been shown that the pandemic increasingly prompted consumers to undertake behavioral changes towards online environments under mandatory home conditions (Ozuem, Ranfagni, Willis et al., 2021). Preferences for

curbside pickup, home delivery, and in-store shopping differed significantly according to the rates of new COVID-19 cases in the United States. (Grashuis et al., 2020).

While platforms represent a quick solution because technological developments are proven and deliveries are made under the successful model of the Sharing Economy, this solution may have some considerations, such as advantages and disadvantages for the companies that hire these services. According to Akhmedova, A., Mas-Machuca, M., and Marimon, F. (2020), the sharing economy allows, through the Internet and a platform, an interaction between individuals or entities to exchange a product or service for monetary compensation. Under this model, the delivery person and the platform maintain an independent relationship and are never employee-employer. The company providing the product only has physical contact with the platform's delivery person but not with the end customer.

The home delivery market has grown due to the benefits it offers to the end consumer, such as doorstep delivery, which allows consumers to search for preferred restaurants, select available products, save time, provide convenience, access ratings and reviews (Ali, Khalid, Javed et al., 2021). On the other hand, it allows food retailers to improve the accuracy of their orders, enhance productivity, and find new customers.

Much has been written about platforms from the perspective of users, who represent an easy solution by having the app in their hand, where several options compete against each other, such as well-presented menus, promotions, discounts, product evaluations, and recommendations. However, little has been studied from the perspective of the companies that use these platforms.

During the pandemic, not only did consumers experience changes, but retail stores also had to hire temporary employees to handle these peaks in online food shopping and home delivery demand. Likewise, these companies developed contactless deliveries and payments. While a signature was previously required for delivery, packages were simply left in front of consumers' doors during the pandemic, and a photo was taken with the door open (Pantano, Pizzi, Scarpi et al., 2020). However, it has not all been easy for companies that have had to adapt to these new forms of online sales and home delivery, as they represent additional costs for retailers and restaurants, such as equipment and labor for the new operating style (Chen, 2019).

Faced with the pandemic, companies began or strengthened this home delivery modality. From the company's perspective, the question is: What was the best solution to address the challenge of home delivery? Through a third party? Or with one of the available platforms? Or developing a solution from within the business? Or a combination of both. Using a qualitative approach, this study investigated the experience that business owners in Puerto Vallarta, Jalisco had in making home deliveries through their own means and/or delivery platforms present in Puerto Vallarta.

### **3.3 Methodology**

A qualitative research was conducted with entrepreneurs in the food retail and restaurant sector to understand their experiences with home deliveries during the onset of the COVID-19 pandemic. The methodology is based on "In-depth and semi-structured interviews," the most commonly used interview format for qualitative research. These interviews are organized around predetermined open-ended questions and other questions arising from the dialogue between the interviewer and the interviewee (DiCicco-Bloom and Crabtree, 2006).

In a targeted manner, successive thematic blocks were clearly selected: company background, effects due to COVID-19, remote sales through own

means, use of home delivery platforms, logistics and product transportation, payment methods, and handling and ownership of information, 28 questions were asked within the aforementioned blocks to learn about their experiences.

A process was initiated to select participants for the sample, starting with an understanding of the business sectors: exclusively food retail and restaurant businesses. The second criterion considered was that the companies offered home delivery services, which could be through their own means, third-party platforms, or both. Companies with just one branch were sought; however, it was also important to interview companies with multiple branches to explore the transportation and logistics of deliveries, as this seemed to be managed differently when there were multiple branches.

Once the selection of companies was made, owners or general managers were sought to request the interview. Finally, three interviews were conducted with the owners, and a fourth, where due to the size of the company and the division of activities, the owner considered that their operations manager and marketing manager were the appropriate persons to be interviewed due to their knowledge of the subject. Only one interview was conducted with these two managers, who decided to accompany each other to feel more comfortable. However, it was considered a single interview because they only complemented each other's responses, it was the same company, and there were no differences in the information provided.

The interviews took place at their companies, except for one who preferred to go to a different office to be more focused and without interruptions from their phones and colleagues. These interviews were conducted in a friendly and cordial atmosphere since the four companies' interviewees were individuals from Puerto Vallarta. These four companies have a long tradition and market participation. Together, they have 36 stores and 386 employees located in different areas within the Puerto Vallarta area, all with more than ten years of experience in the market.

Table II shows some characteristics of the interviewees, their sectors, whether retail stores or restaurants, the means through which they make their home deliveries, and the number of branches and employees.

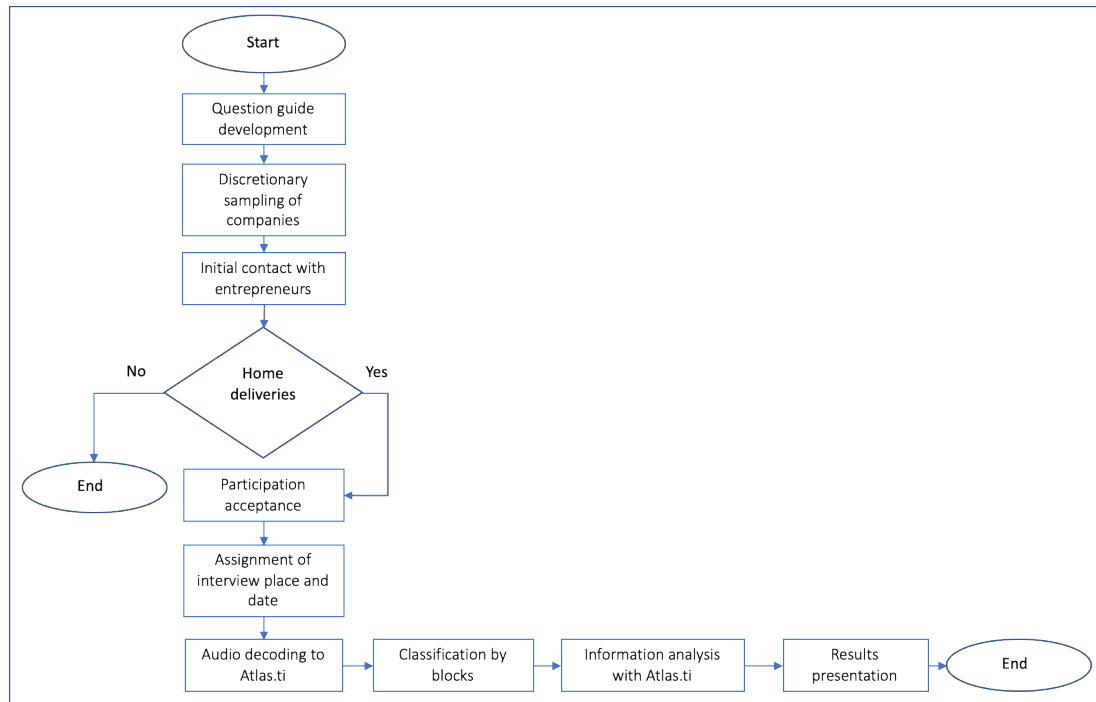
Table II. Characteristics of Interviewees

|               |                            |               |            | Home deliveries through |             |          |           |
|---------------|----------------------------|---------------|------------|-------------------------|-------------|----------|-----------|
|               | Sector                     | Retail Stores | Restaurant | Own Means               | Platatforms | Branches | Employees |
| Interviewee 1 | Pizzeria                   |               | X          | X                       | X           | 3        | 24        |
| Interviewee 2 | Bakery                     | X             |            | X                       | X           | 5        | 150       |
| Interviewee 3 | Butcher Shop               | X             |            | X                       |             | 27       | 270       |
| Interviewee 4 | Juice Bar and Healthy Food |               | X          | X                       | X           | 1        | 10        |

Source: Own elaboration, 2020.

The interviews were in-depth and recorded with prior signed consent from each interviewee; subsequently, all the information obtained was decoded using the ATLAS.ti software. This software is designed for qualitative research, allowing the classification, linking, summarizing, and grouping of the extensive interview data. Figure 1 illustrates the methodological phases of the fieldwork exercise.

Figure 1. Methodological phases in the fieldwork exercise



Source: Own elaboration, 2020.

### 3.4 Results

Once the interviews, which were recorded in audio, were conducted, a decoding process of the information took place, where it was manually transcribed into text. Once this task was completed, all the texts were uploaded to the Atlas.ti software. This software classified all the information, identifying codes in the responses and generating categories. Below are some of the most significant responses from the interviewees, following the order of the questions asked in the blocks.

#### 3.4.1 General impact of COVID-19

In the face of the pandemic, three entrepreneurs reported an impact on their businesses, which resulted in a decrease in sales ranging from 30% to 50%. The natural consequences of the situation resulting from the health emergency are that people do not go out and do not consume the same. Apart from this, one of the interviewees mentioned another point that also affected him.

*"The panic generated by social media, especially in the news towards consumers, urging them not to go out, not to consume, to try to stay at home, save, because the city is running out of jobs." - Interviewee 1.*

When asked about the impact, another interviewee emphasized the fact; however, they shared some company actions to cope with the situation. Although the government did not require them to keep their points of sale closed due to the economic contraction and the actual decrease in sales, they sought other strategies such as reducing inventories to basic and high-rotation products, reducing essential expenses, and cutting staff hours. However, all four interviewees stated that they did not have to lay off anyone due to the pandemic, in the words of one interviewee:

*"The expenses were greatly limited, products that could represent a major loss were limited, because of the danger that they would decrease, so the company tried to contain any impact, in addition to cutting back on hours." - Interviewee 1.*

One of the interviewees who owns multiple branches mentioned that the impact varied across different branches due to their location and their natural target market, as expressed below:

*"In certain branches, the impact was quite significant. For example, in the case of Portales, our largest market was the Presidency, with offices across the street. Due to COVID, many were sent home, so the offices remained closed. It was a big economic blow for us because they used to keep us supplied with coffee every morning." - Interviewee 2.*

In Puerto Vallarta, the economy is closely tied to tourism. Some businesses' main customers are tourists, so it became evident that the branches whose target market was related to tourism were more affected.

*"In the Marina, they relied heavily on tourism, and as a result of the decrease in tourism, Marina also suffered losses, just like Bucerias, their sales dropped for the same reason." - Interviewee 2.*

Only one interviewee stated that their company experienced the opposite trend compared to the other three interviewees. In contrast to the downturn, it should be noted that this business sector is not directly related to tourism, nor to hotels



or restaurants, as their target market is internal, specifically housewives. The business sector is butchers, and the interviewee expressed:

*"Perhaps it will sound bad, but we have benefited and experienced sales growth for our product since most businesses are closed. The hotels, which normally have their dining rooms for their employees, now with the staff cutbacks, they cook at home, and we have had growth, it has favored us." - Interviewee 3.*

It can be concluded that depending on the branch's location and the business's natural target market, the impact and its degree on sales due to COVID-19 in these retail food and restaurant businesses in Puerto Vallarta were determined. Continuing with these natural market changes resulting from health contingencies, the following section analyzes how home delivery behaved during this time.

### **3.4.2 Home deliveries amid COVID-19**

Regarding home deliveries, there was an increase at the beginning of the COVID-19 pandemic, as reported by the interviewees. Although specific amounts are not detailed, it is worth mentioning that they perceived a percentage increase in home deliveries relative to total sales despite the overall decrease in sales.

*"Due to COVID-19, the sales focus changed a lot; sometimes the restaurant is empty, but the kitchen is busy." - Interviewee 4.*

*"There was a greater increase in platforms because people couldn't leave their homes." - Interviewee 4.*

*"We had to strengthen our virtual platforms." - Interviewee 1.*

This section concludes that there were pandemic-related changes, with the interviewees reporting increased use of platforms and their own means for home deliveries.

### **3.4.3 Home deliveries via platforms**

In Puerto Vallarta, three platforms were present during the months under study: UberEats, Rappi, and Veloz. Although it provides deliveries, Veloz is a local company that operates more as an errand service and does not have agreements or price lists. Therefore, emphasize that we exclusively mean UberEats and Rappi when referring to platforms.

The first point that emerged in each interview when discussing platforms was related to costs, which they see as the primary disadvantage. Three of the interviewees use the platforms, and this is how they explained it:

*"UberEats charges 30% of the sales ticket, and the truth is that very few companies in Vallarta near us were prepared to absorb 30%, so it was a significant portion."*

**- Interviewee 1.**

*"Then Rappi arrived. Rappi has more interesting agreements, 25% or 27%; they give us 25% if we were exclusive clients, but we're not."*

**- Interviewee 1.**

However, two interviewees explained that UberEats increases from 25% to 30% of the price, but they consider this a surcharge because they provide their price list, and the platform adds this amount. There was a contradiction in this issue, so it cannot be concluded whether it is a surcharge or if they are required to respect the store price, within which the platform's percentage would be included. However, it was confirmed that this percentage on the purchase ticket ranges from 25% to 30% on both platforms.

One of the interviewees who viewed UberEats' cost as a surcharge commented:

*"What they ask of us is to put the part of schedules, and a standard price, the standard price of our menu, and UberEats sells it at a 25% surcharge."*

**- Interviewee 1.**

However, they say that the one affected is the final consumer, as they are the ones who pay this surcharge. Here is one comment:

*"Obviously, UberEats is more practical, but when you see the numbers through UberEats, you don't really know the prices we have here. A customer came by and said, I always order through UberEats, but it doesn't stretch as far. That's where the customer notices it. "*

**- Interviewee 1.**

On the other hand, the issue of the fiscal reform of the platforms came to light, and another interviewee commented:

*"Since February, with the reform to virtual platforms, the platforms themselves have transferred the VAT and IRS to us, 16% and 30%, plus the 30% they take from us, so there is no margin left."* - Interviewee 1.

The only interviewee who does not use platforms is because the 30% price on the product value is not feasible for the company's profit margins, which are for essential items, and imposing a surcharge for customers is not attractive because the company's image is at stake. It was also mentioned that Rappi arrived with more convenient margins, between 25% and 27%, but ultimately, the cost was very close to the UberEats platform, which they considered the primary platform. In the words of the interviewee:

*"We had some contact, about two years ago, with UberEats and Rappi, but we didn't reach an agreement because of the amounts they wanted to charge, which were about 30% more or less of the product value they would deliver to the customer, so there was no interest."*

**- Interviewee 3.**

The second disadvantage is being in the same place with all their competitors, in a "marketplace." However, later, another interviewee expressed it as an advantage, in the words of the former:

*"I think it should be seen as being in a marketplace. It doesn't suit me much."*

**- Interviewee 2.**

In the words of another interviewee who saw it as an advantage:

*"I'm satisfied with UberEats; if we hadn't had UberEats during the pandemic, I don't know what would have happened; they have another way of attracting people."* - Interviewee 4.

The third disadvantage is that they do not control the delivery service, and when a problem arises, it is very difficult for them to contact the platform or lodge a complaint.

*"UberEats acts as a delivery person who isn't ours, whom we don't know anything about."*

**- Interviewee 1.**

The ownership and management of information with delivery platforms represented a disadvantage as it seemed challenging for the company to detect customer dissatisfaction, delivery delays, or product deficiencies. In this platform model, direct contact with the customer or targeted promotions cannot be established, and many consumers forget the brand. They don't consider UberEats customers of the company providing the product; instead, they see them as platform customers.

*"If we want personalization and more brand positioning, there's nothing like that. On*

*UberEats, I feel like I'm at a flea market." - Interviewee 1.*

The advantages offered by platforms were also discussed. The first is the purchase amount; one interviewee commented:

*"The minimum purchase requested by UberEats doesn't limit you. For us, for home delivery, it's \$200 pesos to be able to deliver. So, as you can see, you could buy fewer products and quantities." - Interviewee 3.*

A phenomenon during the pandemic is that people limit their spending more due to the economic situation. The second advantage is attracting new customers, as expressed here:

*"If there are people who may not know us, through the platform, they can get to know us."*

**- Interviewee 4.**

Puerto Vallarta is a tourist city, and for these types of customers who come to a passing city, it is essential to place orders only through platform recommendations. Another advantage is the technology they handle, as everything is well-systematized. Additionally, at the beginning of platform use, UberEats and Rappi provided training, materials, and advertising so that

customers knew the company was on the platforms. Although the interviewees commented that there wasn't much difference between the two platforms used in Puerto Vallarta, which are UberEats and Rappi, a slight difference was noted in the cost and also in the training, as it is considered that Rappi has more advisors who are in the area in charge of businesses and follow-up.

*"Initially, they gave us training, materials, labels for branches, packaging materials, and the technology they bring. Of course, I would like to create a specialized App, but honestly, we will never surpass the technology they bring." - Interviewee 2.*

Another advantage of the platforms is the number of delivery personnel. This is a critical point on holidays since bakeries and butcher shops show high demand on certain specific dates, as expressed by one of the interviewees:

*"There are several delivery personnel in the area." - Interviewee 2.*

Although it is becoming easier to pay through various payment methods, one interviewee pointed out the advantage of platforms over proprietary methods.

*"UberEats has the ease of accepting practically any payment method you choose, and many companies do not have that ease." - Interviewee 1.*

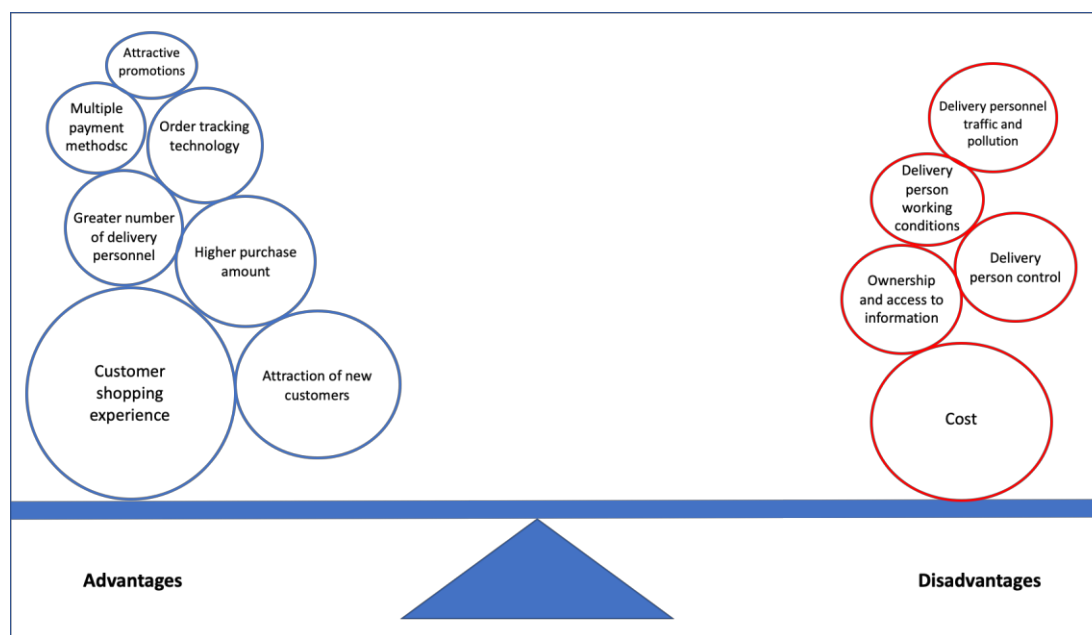
Finally, the three interviewees who use platforms see the customer's perception as the greatest advantage, in the words of one interviewee:

*"The user has an incredible shopping experience; in three clicks, I don't need to speak to anyone or explain anything, so it's very easy to place my order; I have a way to track it without any problems." - Interviewee 2.*

The interviewees were very clear about what they see as the advantages and disadvantages of the platforms, which can be summarized in Figure 2. The advantages detected by the interviewees in the recurrence range are the customer's shopping experience, attracting new customers, the minimum purchase amount, the number of delivery personnel in the area, order tracking technology, payment methods, and promotions. The disadvantages, although minor but significant, can be summarized as cost, ownership, access to information, control of the delivery person, delivery person's working

conditions, and delivery personnel traffic and pollution generation. All these factors are seen as endogenous to the platform delivery model, and some factors have been manifested as exogenous, as one of the interviewees says that the trend of online shopping is increasing. Due to COVID-19, which increased home delivery orders, platforms were the delivery option. Some previous studies point out the need to study the delivery person's working conditions and the traffic and pollution generated by the delivery personnel.

Figure 2. Advantages and disadvantages of home delivery platforms



Source: Own elaboration, 2020

#### 3.4.4 Home delivery by own means

The four interviewees make deliveries through their own means. The interviewees expressed various points of view regarding their costs and charges to customers for home delivery services. It cannot be concluded whether opinions converge or are related to business types or sizes; however, some findings are highlighted. One of them commented:

*"We don't have a problem with the amount because the delivery charge will be collected anyway. Initially, we didn't charge, but now we charge \$25 pesos to have a delivery person, but I'll take whatever you want, a juice or a sandwich, the amount is fixed." - Interviewee 2.*

Two other interviewees stated that they do not charge for delivery, but the minimum amount is \$200 pesos; if the amount is not reached, the delivery is not made. The last interviewee said that their main product is pizzas, so they always deliver a pizza and something else; they do not have problems with delivery; however, it consistently exceeds \$150 pesos. They only consider that their delivery cost is below what platforms charge, but when asked if they had calculated the delivery cost, none of them expressed having an estimate.

All the interviewees make home deliveries through their own means; however, this process has its complications. Placing orders, which is done primarily via phone, Facebook, and WhatsApp in all cases, represents a large margin of error because the person receiving the order sometimes does not understand what the customer needs or does not ask for more specifications.

Although these companies have a website, they do not use it to take orders; it is always done through a person. One company that has been in the market the longest (20 years) developed a Contact Center, which they manage as another branch, as one interviewee commented.

*"The company has a Contact Center, which used to be called telemarketing, focused on taking orders, has a specialized WhatsApp, has access to emails received from the website and the telephone; all this information is recorded in a system, and orders are given to the drivers. There is radio contact with the drivers, and they have a cash register because they deliver and collect the product and return to the Contact Center." - Interviewee 2.*

According to this interview, it can be confirmed that the telephone operator of the Contact Center is responsible for placing orders and organizing routes, as this company tries to send several deliveries on one route. Similarly, another interviewee commented that their home delivery service has a dual purpose: to make deliveries to the customer and to supply the branches. One interviewee expressed that using personnel to take orders and not having the menus systematized remains an area of opportunity.

*"Another big challenge is that the person taking the order does not have good communication with the customer, doesn't understand what the customer needs."*  
- Interviewee 1.

The issue of distribution problems, especially on holidays, is also highlighted because they cannot keep up with delivering orders. Although the previous section on platforms mentioned that not having control over the delivery person is a disadvantage, they mention that the delivery personnel of the same company had problems with delivery. They expressed it in their own words.

*"Here in Puerto Vallarta, it's very difficult sometimes with the delivery culture; no matter how much I wanted to inject that part of the service, the delivery person found it difficult."* - Interviewee 1.

*"There were problems with the products arriving slightly damaged, getting lost sometimes for hours; productivity was very low."* - Interviewee 4.

*"Sometimes the drivers were so careless when driving that the product arrived very damaged."* - Interviewee 2.

*"The most complicated point of all is really the product delivery, the transportation because the incidence of accidents is very high."* - Interviewee 2.

The four interviewees expressed different levels of development in their own home delivery models. Still, the challenge of personnel management and the level of technology was always evident in each one. On the one hand, the delivery personnel are part of their business. The personnel in charge of taking orders and supervising is very complicated. They consider technology a challenge and form part of their home delivery systems. The interviewees affirm that this is important through their own means.

*"The order is taken, registered in the platform we manage, in our software, and the order is passed."* - Interviewee 1.

*"I use CRM to know the consumption habits of the customer, what they buy, what they like, the average ticket, and obviously, we identify very recurring customers."* - Interviewee 1.

*"The people from the Contact Center have a control system where they can know where the drivers are, with GPS and radio contact with the drivers."* - Interviewee 2.

*"We had the information, and what we did with the database was advertising, but we didn't manage to reach the point of being able to make special promotions to each customer."*  
- Interviewee 1.



Finally, to contrast this with platforms, where they do not have customer information to make use of, through their own means, they are limited by the degree of technological development and information processing required. The value given to information to boost sales, make promotions, and create brand loyalty is a sufficient reason to consider a home delivery system through their own means alongside the many advantages of platforms. As one of the interviewees stated:

*“We don’t like it as much there because we lose control. We don’t know all the customer information; the customer belongs to UberEats or Rappi, not us. We sell to UberEats, and UberEats resells it practically. There is no customer information; I asked UberEats if there would be the possibility of making promotions or advertising, and they told me no, in the contracts, you sign that you have no access to that information.” - Interviewee 2.*

Some studies have suggested that e-commerce helps companies to have more information about their customers and products for decision-making (Lin et al., 2020). However, leaving this information in the hands of third parties does not seem to have the same benefit in decision-making.

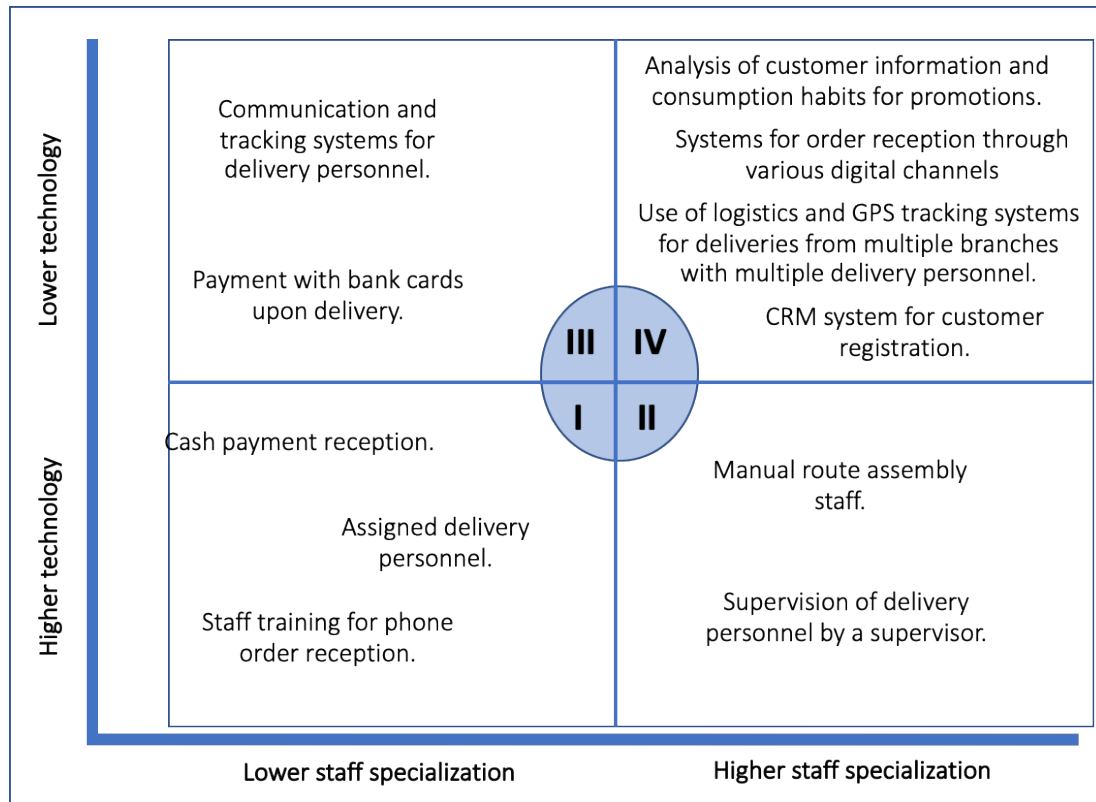
While home delivery by own means gives companies the opportunity to have control over the delivery personnel and access to information about the end consumer (such as their preferences, purchase frequency, and any statistics generated by each order), it represents a challenge, according to the interviewees. The interviewees expressed that to have a home delivery system by their own means, they had to develop in two directions: technology and personnel specialization.

Figure 3 shows the requirements for technology and personnel specialization in lesser and greater degrees. In quadrant I, with lesser technology and lesser personnel specialization, a basic delivery system is established: Orders are placed by phone, a delivery person is assigned, and payment is received in cash. Moving to quadrant II requires more specialized personnel for route design and control of delivery personnel by a supervisor. Subsequently, to

move to quadrant III, greater technology is used, such as a system that allows payment with bank cards at the time of delivery and a system for tracking delivery personnel. In quadrant IV, these two variables are maximized: a CRM system, logistics, and GPS tracking systems for delivery from various branches and with various delivery personnel, order reception systems through various digital media, and analysis of customer information and consumption habits for promotions.

All the companies that participated in this research had a home delivery system. They were placed in Quadrant I or had already moved through Quadrant II, and only one had developed the requirements of Quadrant III. Although none of the companies had the personnel and technology development to be in Quadrant IV, they stated in their interviews that when compared to delivery systems by digital platforms, the challenge would be to be in this last Quadrant.

Figure 3. Home deliveries through proprietary means, technology challenges, and staff specialization



Source: Own elaboration, 2020

### 3.5 Discussion

According to the studies presented in the introduction of this research, consumer behavior changed and triggered the home delivery channel for prepared food businesses such as restaurants or food retailers. Participants in this qualitative research in Puerto Vallarta also confirmed that they had more sales through home deliveries during the onset of the COVID-19 pandemic. However, meeting this market need was difficult as the demanded quantities changed suddenly. These two very different home delivery forms are complementary, as both delivery systems have advantages and disadvantages. A small business that does not have many branches or has not developed technological systems for delivery, tracking, and service

satisfaction may incur a higher cost by developing its own home delivery system than an established platform.

If a company were to use platforms, it would have to seek strategies that would allow it to have more information about its customers or reach an agreement with these platforms regarding access, use, and ownership of the information.

Home deliveries continue to grow in popularity, and during COVID-19, some companies were forced to strengthen this distribution method and develop new skills in using their own delivery system. On the other hand, digital platforms continue to diversify markets, so it is expected that this will be an option for more platforms in cities not as large as Puerto Vallarta.

### ***3.6 Conclusions and limitations***

Through a qualitative analysis, this study concludes how the owners of four food retail businesses and restaurants in Puerto Vallarta managed their home delivery services during the COVID-19 pandemic. On the one hand, the advantages and disadvantages of the platforms present in this city, such as Didi Food, UberEats, and Rappi, were identified. It is concluded that the advantages of the platforms are numerous, and they provide a quick option for offering home delivery services during the contingency.

On the other hand, the factors that owners express as disadvantages of the platforms cannot be eliminated, such as the percentage of the cost and ownership of information. Regarding the percentage of the cost, the only recommendation for companies is to stay alert to new platforms arriving in cities and review their value proposition, including their costs. The second disadvantage, which is ownership of information, can be addressed by developing systems with high technology and high personnel management from the company. In other words, a mixed system of home deliveries could

be implemented, taking advantage of the platforms' benefits and complementing the disadvantages with proprietary systems.

Regarding the control of delivery drivers, the platforms are the ones that control the drivers. The shared economy system is becoming increasingly popular, and the interviewees clarified that drivers from the company do not have the same efficiency level. Finally, companies are encouraged to have clarity about what each of the home delivery systems offers, both platform-based and proprietary, and to use a combination of both, as positive externalities are generated by both, and they can complement each other rather than compete.

This research is limited in several aspects. Being a qualitative study, a broader sample of interviewees is suggested. Additionally, there are different types of businesses in the food sector, so when expanding the sample size, including more types of businesses is recommended.

Regarding the challenges of home deliveries, further lines of research are suggested, including the analysis of new technological platforms, the services they offer, fees, and regions where they operate, as they are highly dynamic in the market.

## **Chapter 4: SUPPLY CHAIN RESILIENCE IN THE COVID-19 PANDEMIC. CASE: MEXICAN BUTCHER'S SHOP CHAIN**

### ***4.1 Abstract***

COVID-19 disrupted and had adverse economic effects on companies worldwide, and the economic downshift was one severe observed effect in many countries. Due to government restrictions and active workforce dropdown, most industries delivered unfavorable outcomes. Still, some economic sectors experienced advantages during the Covid-19 crisis. This article offers a case study of a Mexican chain of butcher's shops consisting of 21 stores where sales increased despite the confinement period. We considered the 2018-2022 period and used descriptive statistics to depict the sales increment during the lockdown. The results indicate that sales increased during the pandemic due to multiple factors, including restaurant and hotel operations restrictions, government constraints, direct competitors, and the capability of the supply chain to maintain operations. We applied System Dynamics to understand how the relationship among organizational factors such as network suppliers, waste management, and inventory management can foster supply chain resilience and organizational learning.

### ***4.2 Introduction***

2019 marked a turning point for many countries and organizations' dynamics due to the irruption of COVID-19 (Lai, Shih, Ko et al., 2020). In Mexico, the first positive case was detected on February 27, 2020, and the phenomenon was declared a pandemic in March of the same year (Suárez, Suarez Quezada, Oros Ruiz et al., 2020). Given the phenomenon's evolution, the Mexican government pronounced a national health emergency on March 30th. In this context, like other countries, Mexico tried to tackle the problem by restricting mobility and suspending non-essential activities. During the initial phase, many companies and stores remained closed, and this lockdown carried out

changes in services, organizational, and consumption patterns (Quintana-Romero, Mendoza-González and Álvarez-García, 2021). Consequently, the food supply chain abruptly changed due to excessive demand and unknown consumption patterns. Retailers confronted difficulties keeping inventory due to panic purchases among consumers, while suppliers were unexpectedly willing to satisfy their supply needs.

According to Schwaninger and Schoenenberger (2022), COVID-19 was a health problem and a systemic crisis that challenged conventional organizational structures and pushed response mechanisms and adaptive capabilities. This paper was developed in the Mexican meat industry, specifically in a local/regional supply chain where the arrangement differs from other countries as the Mexican geography fosters cohesive relations among actors. Therefore, in this study, local and regional food systems (LRSm) can be characterized as agile and connected (Tripti and Shankar, 2022), able to deploy a variety of responses to COVID-19 compared with large and multinational companies.

In this study, we present a causal-loop model to identify organizational factors and supply chain configuration that can promote adaptation capabilities in medium-sized amid a turbulent operational environment to address the gap between resilience understanding and courses of action deployment to reach it. The study also highlights the relevance of considering internal organizations' components to enable staff participation and facilitate adaptation rather than thinking about trying to return to a previous organizational state. The System Dynamics (SD) approach offers a perspective to help managers understand structural relations that could enhance the adaptation capability of these types of companies (Forrester, 1990). Based on the above, the article is organized as follows: 1) a literature review seeks to explore how SMEs have been supported on this matter; 2) a case study, where we briefly describe SD to

explore relations conducive to adaptation. Subsequently, se simulated the SD model, and 3) a concise conclusion is presented.

#### ***4.3 Literature review***

The resilience of supply chains has been a topic of interest in the literature in this century, primarily due to their increasing complexity and globalization, as well as the emergence of disruptive events of various types that cause significant adverse effects on operations. Ponomarov and Holcomb (2009) acknowledge that adaptation is a key capability required in resilient supply chains to respond to unexpected adverse disruptive events, and the logistic capability is particularly important to minimize the impact of these events. Tukamuhabwa, Stevenson, Busby et al. (2015) developed a literature review on supply chain resilience, and they expanded the definition to include cost-effectiveness as an aspect that is often ignored in the definitions. In addition, they identified twenty-four strategies to achieve resiliency in supply chains. These strategies can be proactive (e.g., supplier selection, cooperation, inventory management, etc.), and reactive (e.g., supply chain agility, increasing flexibility and velocity, etc.). Developing resilience capability requires the application and analysis of quantitative methods. Hosseini, Ivanov and Dolgui (2019) identified the quantitative methods whose application can provide the insights needed to develop a resilience strategy. Among the methods and approaches discussed are mathematical optimization, Bayesian network modeling, Markovian modeling, and multi-criteria decision-making. In addition, the authors highlight the advantages of dynamic simulation models, such as discrete-event simulation and systems dynamics, to study supply chain resilience. Recently, the characterization of supply chains to assess their resilience became a topic of interest for researchers and practitioners due to the stress imposed by COVID-19 worldwide. The food supply chain observed a significant disruption during the pandemic.



One of the effects of the COVID-19 pandemic was the abrupt shift in consumption patterns moving from food services suppliers to homemade meals due to government restrictions intending to contain infections and preserve people's health; consequently, the food retailing sector faced stress due to the massive closure of restaurants, coffee shops, bars, and hotels while many stayed home (Donthu and Gustafsson, 2020). Despite this context, and according to Glock and Grosse (2021) and Richards and Rickard (2020), overall food consumption preserved pre-pandemic levels because the retail industry might have gained the volumes lost by the food service channel. However, the confinement affected the food service and hospitality sectors. Oe and Le (2023) stated that by March 2020, grocery spending had reached a 10.4% increase compared with previous months. In contrast, industries such as travel, entertainment, and restaurants reported a 25%-30% contraction in incomes (Harchandani and Shome, 2023).

The meat supply chain in North America has a long relationship between the United States (US) and Mexico. Mexico exports young, low-weight live cattle, and the US, with more efficient systems and lower grain, is an importer of finished products. In exchange, Mexico imports processed meat for domestic use. The imported meat from the US to Mexico is mainly sold in restaurants, hotels, supermarkets, and department stores (Mathews and Johnson, 2011). Due to the pandemic, some American meat plants suspended their activities. In the last week of April 2020 and the first week of May 2020, US beef and pork volume imports were 40% below 2019 levels (Hobbs, 2021). Large meatpacking companies faced internal restrictions to work and supply problems due to restrictions to move live animals between countries and labor shortages.

The global supply chain operates with a relatively regular equilibrium between consumption, production, and inventory. Diverse factors can affect the food supply chain due to the implications of multiple nodes, such as workforce,

supply, and demand (Cruz-Cárdenas, Ekaterina, Guadalupe-Lanas et al., 2021; Tripti and Shankar, 2022). These interactions stress the idea of resilient supply chains. In this context, Mokline and Ben Abdallah (2021) and Ponomarov and Holcomb (2009) introduced the idea that a resilient supply chain is the adaptive capability of any supply chain to prepare for unexpected events, respond to constraints, and recover from them while maintaining the continuity of operations at the level desired connection and control over the structure. During the COVID-19 pandemic, retailers had to adapt their supply chains to meet customers' requests and new consumption patterns, adapting their organizational structure and relationships to stay flexible and competitive. According to Hashem (2020), large companies can use the economy of scale, automation, and efficiency to offer lower prices to the final consumer. However, the pandemic revealed meat processing plants' organizational and structural vulnerability as they were labor-intensive and forced to close or operate, undermining their capacity. As a result, the meat sector had difficulties transporting the required goods (Isensee, Teuteberg and Griesse, 2023).

On the other hand, local and regional food supply chains (LRFSC) are alternative structures characterized by their high connectivity degree and fostering communication to adopt flexible strategies to face contingencies. In this context, the pandemic exposed some short supply chain benefits, and researchers have paid particular attention to LRFSC (Glock and Grosse, 2021). Another factor to consider regarding LRFSC is the preference of many consumers to purchase from local companies. Previous research showed two factors for a consumer to choose buying local food: 1) “freshness” and 2) “support for the local economy” (Hardesty, Feenstra, Visher et al., 2014; Rehman, Bhatti, Kraus et al., 2021). During COVID-19, LRFSC made agile pivots to new market channels and buyers by leveraging relationships in local food supply chains. Because of the high connectivity in local food systems with their supply chain partners, local food companies can exhibit rapid response capability (Thilmany, Canales, Low et al., 2021; Almeida and Oliveira, 2023).

For instance, some retailers and grocery stores implemented online sales to meet the demand of their customers while complying with the lockdown restrictions (Glock and Grosse, 2021; Majid, Yasir, and Yousaf et al., 2021). In a crisis context, the organizational arrangement of the food supply chains is the structure that supports meeting unexpected demand changes (Marusak, Sadeghiamirshahidi, Krejci et al., 2021). Many regionalized food supply chains demonstrated a positive response to adapting to change and new consumer requirements. Hence, SMEs, defined in most countries as organizations with less than 250 employees (OIT, 2020), can be considered critical components in the supply chain as they can respond quickly to changes because of their concise structure bridging companies in the food sector belonging to regional supply chains and facilitating access to the retail distribution channel to satisfy the requisites needs of the final consumer.

During COVID-19, the health sector received the most attention and studies related to supply chain focused on this matter (Spieske, Gebhardt, Kopyto et al., 2022; Zamiela, Hossain and Jaradat, 2022). Other studies have focused on consumer behaviours and habits to comply with regulations and lockdowns (Fu, Qiang, Liu et al., 2022; Younis, Alsharairi, Younes, 2023). Additionally, other research efforts focused on events in specific industries regarding national and international supply chains. Therefore, there has been general discussion about the new strategies companies have gone through during COVID-19. However, Hobbs (2021) and Hsiao, Chen, Lin, et al. (2022) converge on the idea that few studies have shown favorable results on company sales during COVID-19 and focused on developing internal capabilities to cope with the context. Determining the possible causes that led to such results in a case study and demonstrating through a descriptive statistic and dynamic systems analysis that simulates these behavior models during COVID-19 is the primary goal of this research.

#### **4.4 Case study**

This section introduces the situation of Sierra Costa, a butcher's shop chain in Puerto Vallarta, Jalisco, Mexico, that increased revenues during the COVID-19 pandemic. This company joins internet-based businesses such as those related to online entertainment, food delivery, online shopping, online education, and remote work solutions, that increased their revenues during the pandemic (Donthu and Gustafsson, 2020). Quantifying the financial results of a sector, industry, or company is challenging. Specifically, we describe a meat commercialization company integrated with 21 stores showing positive financial results during the pandemic.

##### **4.4.1 Methodology for data collection and analysis for the case**

To generate a notion of the Sierra Costa company and identify patterns to understand its performance during the peak of COVID-19. We approached data as follows:

- 1) Analyse financial results from 2020, when government regulations were imposed due to the pandemic. Then, we compared with previous years (2018, 2019) when there was no pandemic and two subsequent years (2021, 2022) when mobility restrictions were less strict.
- 2) Analyse patterns to identify the company's supply chain strengths.
- 3) Use System Dynamics to structure knowledge of the managerial team to promote organizational learning to satisfy the increasing demand with the same installed capacity and identify critical factors to understand the relationships that allowed the company under study to overcome the restrictions imposed by the pandemic and based on the Forrester diagram, to propose actions that can be implemented permanently. In this regard, we follow the steps suggested by Forrester (1990) and Sánchez-García, Núñez-Ríos, López-Hernández et al. (2023):

- a) Propose a causal loop diagram: With the participation of the managerial team and owners; we used Forrester diagrams to illustrate the components and relationships of the company under study conducive to organizational adaptation.
- b) Design a stock and flow diagram and run a simulation model: Based on the statistical data and the knowledge of the managers and owners, we formulated a relationship diagram that allows the understanding of the organizational structure. Subsequently, the simulation was generated using the dSolve package (Duggan, 2016) in Rstudio.
- c) Validate the model.
- d) Formulate recommendations based on SD.

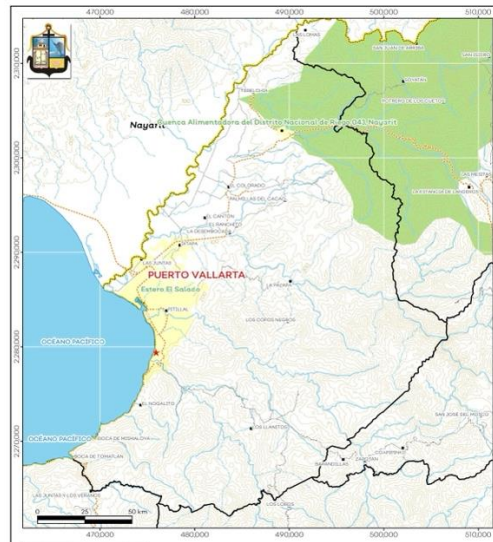
Being a wholesale distribution and not being packaged and labeled, the final customer needed help identifying the cattle's origin, so the company addressed that need of the final consumer. The company detected a market opportunity, and the first butcher shop was installed in 2013, with a growth of 2 or 3 branches per year. The butcher's network has facilities with operating areas ranging from 60 to 150 square meters that increased its service capability during the first two years of the COVID-19 pandemic. The location and extended service hours are considered a strength and position the stores as the first option for customers. However, to reach the final customer, key activities are centralized. This means product standardization, quality control, managerial activities, information analysis, marketing, accounting, and inventory management are carried out in a hub.

#### ***4.4.2 Company's supply chain***

Puerto Vallarta is a Mexican city on the Pacific Ocean coast of Jalisco state. Figure 1 depicts the state of Jalisco in Mexico and the Puerto Vallarta municipality. According to information from the Institute for Statistical and Geographic Information (IIEG for its acronym in Spanish), by 2020, the

estimated population of Puerto Vallarta was 304,141 inhabitants (IIEG, 2020). Additionally, Puerto Vallarta plays a crucial role in the Mexican economy as it is the third most important tourist destination, with an estimated 4,327,307 visitors per year (Quintana-Romero, Mendoza-González and Álvarez-García, 2021), and based on the 2020 census, tourism contributes with 80% of the economic activity (Cornejo Ortega and Malcolm, 2020).

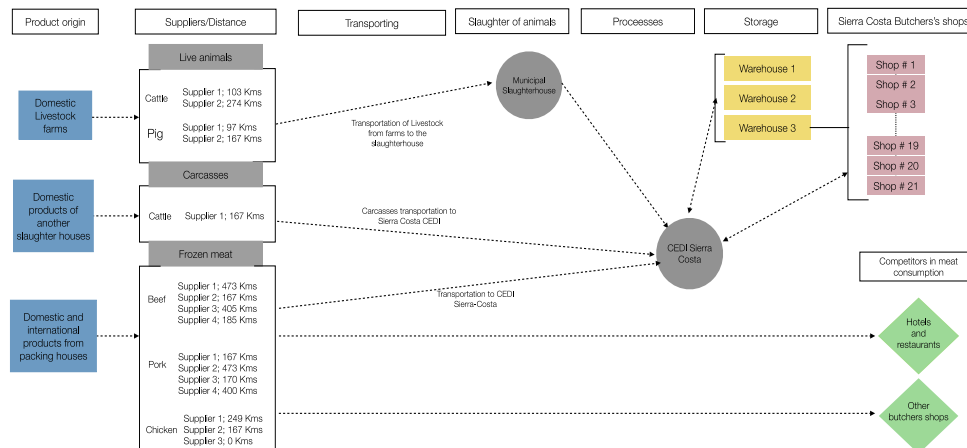
Figure 1. Location of Puerto Vallarta



Source: Based on Cornejo Ortega and Malcolm (2020).

This section briefly describes the system under study: Sierra Costa company's supply chain. Figure 2 illustrates the starting point of the leading products commercialized by Sierra Costa and significant factors: distances between suppliers-delivery point, logistics, main processes, warehousing, and final distribution to the stores.

Figure 2. Sierra Costa's supply chain



Source: Own elaboration, 2023.

Considering Figure 2, the supply chain of Sierra Costa recognizes three types of suppliers. The first type holds a 60% participation in the supply of meat marketed directly from domestic livestock farms. This set of products includes cattle, pigs, and poultry, and each product has two leading suppliers. Any of these suppliers compound a local supply chain, with a maximum distance transportation of 249 kilometers, and they locate in the same state. The suppliers transport their animals to the municipal slaughterhouse in Puerto Vallarta, Jalisco. The slaughterhouse services transported the carcasses to the Sierra Costa distribution center (CEDI, for its acronym in Spanish).

The second type of supplier delivers national products from another slaughterhouse (providing just cattle), representing 20% of products moving through the supply chain. These suppliers deliver products directly in the CEDI. Buying the animals or the carcasses depends on the price offer and diversification of suppliers. When products are already at CEDI, two critical processes occur: deboning and cutting the product. The third type of supplier provides around 20% of products storage-ready because these products do not require deboning or cutting. In addition to supplying Sierra Costa, these beef, pork, and poultry meat suppliers have other distribution channels: hotels,

restaurants, and other butcher shops. This third type of supplier is crucial because they supply distinctive meat types with great demand. It is necessary to clarify that obtaining these products through the livestock supply would cause a problem of inventory excess, disturbing the demand for units with a different demand level. Therefore, this type of provider helps maintain the inventories near the optimal level.

Following the critical process, staff allocates all products to cooling or freezing facilities. Regarding refrigeration storage, Sierra Costa can hold 25 tons inside the CEDI; this process foregoes distribution to the butcher shops or the three warehouses with freezing facilities capable of storing 300 tons of product. The product is stored in freezing rooms in three different locations until it returns to the CEDI, where it is distributed to each butcher shop. The main goal of not delivering products into stores and returning them to CEDI is maintaining inventory control. Additionally, when the health emergency started, the described warehousing capability, staff, conservation facilities and delivery capability helped to cope with unknown consumption patterns and satisfy the increasing demand.

#### ***4.4.3 Company's sales between 2018 and 2022***

Since products and prices change according to supply and demand, we handled sales data in kilograms to compare growth from 2018 - 2022.

Although Sierra Costa opened new stores yearly from 2019 to 2022, the managerial team considered those units operating since 2018 as data sources. In this regard, the goal was to identify the best comparison for the units under study. In this context, we analyzed the data for fifty-two weeks per year with seven working days. Four exceptions resulted when the stores were closed or during the leap year. These are:

1. The first week of the year, we had seven days from January 1 to 7, but only six business days since the stores closed on January 1.



2. In 2020, week ninth had eight days instead of seven because of the leap year.
3. In the last week of the year, we had eight days from December 24 to 31, but only seven business days since the stores closed on December 25.
4. The stores are closed on Thursday and Friday of each year during easter week, and dates vary each year, but we will explain this below.

Considering the exceptions above, we compared data per week during these five years. Table 1 exhibits weekly information and the exact dates in all years since they must be compared. We incorporate each week into the following month if it contains at least one day of the month. For example, week 5 of January includes 29, 30, and 31, and February 1, 2, 3 and 4. We assembled this matrix based on the days of each year with different sales behavior, and we conducted weekly or quarterly analyses. One challenge during this phase was making information comparable over the five years.

**Table 1. Week composition during the year**

| January |          | February |          | March     |          | April   |          | May      |          | June     |          |
|---------|----------|----------|----------|-----------|----------|---------|----------|----------|----------|----------|----------|
| Week 1  | 1 to 7   | Week 5   | 29 to 4  | Week 9    | 26 to 4  | Week 13 | 26 to 1  | Week 18  | 30 to 6  | Week 22  | 28 to 3  |
| Week 2  | 8 to 14  | Week 6   | 5 to 11  | Week 10   | 5 to 11  | Week 14 | 2 to 8   | Week 19  | 7 to 13  | Week 23  | 4 to 10  |
| Week 3  | 15 to 21 | Week 7   | 12 to 18 | Week 11   | 12 to 18 | Week 15 | 9 to 15  | Week 20  | 14 to 20 | Week 24  | 11 to 17 |
| Week 4  | 22 to 28 | Week 8   | 19 to 25 | Week 12   | 19 to 25 | Week 16 | 16 to 22 | Week 21  | 21 to 27 | Week 25  | 18 to 24 |
|         |          |          |          |           |          | Week 17 | 23 to 29 |          |          |          |          |
| July    |          | August   |          | September |          | October |          | November |          | December |          |
| Week 26 | 25 to 1  | Week 31  | 30 to 5  | Week 35   | 20 to 26 | Week 40 | 1 to 7   | Week 44  | 29 to 4  | Week 48  | 26 to 2  |
| Week 27 | 2 to 8   | Week 32  | 6 to 12  | Week 36   | 3 to 9   | Week 41 | 8 to 14  | Week 45  | 5 to 11  | Week 49  | 3 to 9   |
| Week 28 | 9 to 15  | Week 33  | 13 to 19 | Week 37   | 10 to 16 | Week 42 | 15 to 21 | Week 46  | 12 to 18 | Week 50  | 10 to 16 |
| Week 29 | 16 to 22 | Week 34  | 20 to 26 | Week 38   | 17 to 23 | Week 43 | 22 to 28 | Week 47  | 19 to 25 | Week 51  | 17 to 23 |
| Week 30 | 23 to 29 |          |          | Week 39   | 24 to 30 |         |          |          |          | Week 52  | 24 to 31 |

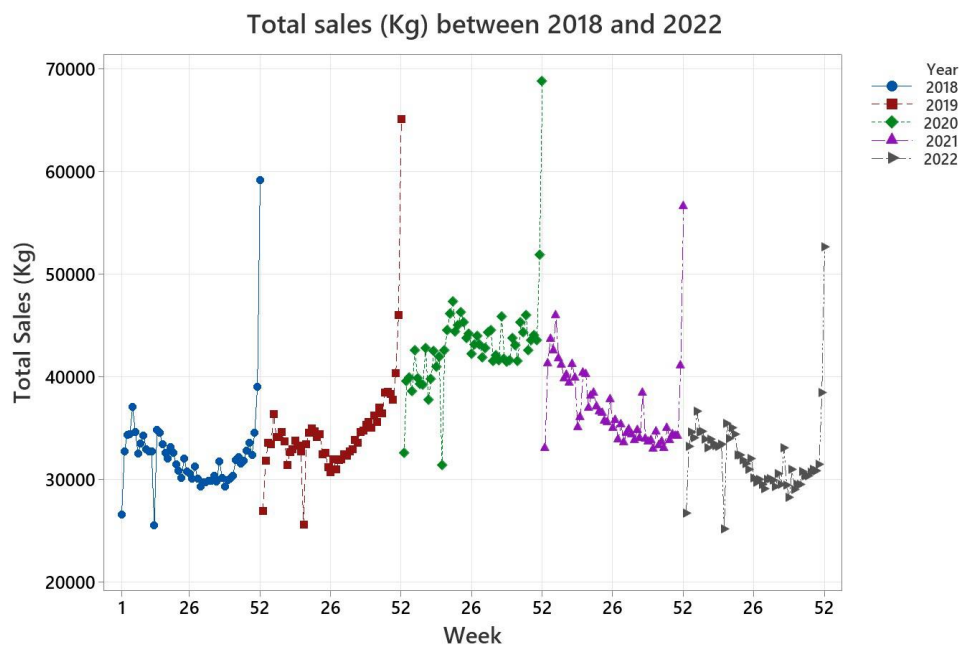
Source: Own elaboration, 2023.

#### **4.5 Results - Using System Dynamics for organizational learning**

Using Minitab Ver.20, we analyzed our three main products' weekly sales per kilo data: beef, pork, and poultry. It is pertinent to clarify that some Sierra Costa products consist of pieces, not kilograms. These can be dairy, tortillas, sausages, or compliments for meat. This product type represents 7% of total sales at most. For this, only products under the meat category are part of the

analysis. Based on weekly information, Figure 3 depicts a time series plot of the total kilos sold for the five years. The Covid-19 cases in Jalisco began during week 16 in 2020. In this context, the most critical social distancing restrictions in Puerto Vallarta began on March 17, 2020. From March to April 2020, schools, restaurants, hotels, and other commercial activities remain closed. For the rest of that year, tight restrictions were kept, including home school at all levels. These restrictions affected tourism (hotels, restaurants), and many workers stayed home. In consequence, the consumption habits fostered preparing and eating at home. As a result, the overall growth in sales (Kg) in 2020, concerning 2019, was 24.128%, significantly higher than the 7.137% sales growth between 2018 and 2019.

Figure 3. Total sales in kilograms from 2018 to 2022



Source: Own elaboration using Minitab Ver. 20.0.

Figure 3 shows that sales in 2018 had a stable pattern with an expected decrease in the first weeks of the year, as well as during the Easter season when butcher shops are closed for two days, and the highest peak occurs at the end of the year, on week 52, reaching approximately 60 tons. Additionally,

the sales patterns in 2019 and 2018 are similar. However, by 2020, sales significantly increased while the COVID-19 lockdown began in Mexico on March 16, 2020, (Delgado, 2022), and restrictions continued until 2020 and the first semester of 2021. Following Figure 3, it is possible to comment that sales reported a stable increase until the second half of the same year, and many companies and activities re-opened. Also, by June 2021, vaccination reached a new maximum (Quintana-Romero, Mendoza-González and Álvarez-García, 2021), fostering mobility and reactivating key activities such as the educational sector. However, in 2022, the sales volume returned to pre-pandemic levels.

Table 2. Total numbers (Quarters)

| Quarter           | Q1      | Q2      | Q3      | Q4      | Q1      | Q2      | Q3      | Q4      | Q1      | Q2      |
|-------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Year              | 2018    | 2018    | 2018    | 2018    | 2019    | 2019    | 2019    | 2019    | 2020    | 2020    |
| Number of tickets | 298,622 | 306,890 | 293,744 | 308,411 | 315,278 | 312,744 | 316,071 | 340,304 | 353,194 | 385,557 |
| Beef sold (Kg)    | 127,126 | 126,414 | 112,336 | 132,412 | 129,006 | 136,828 | 131,606 | 156,438 | 160,657 | 181,130 |
| Pork sold (Kg)    | 153,949 | 156,303 | 149,397 | 179,686 | 159,809 | 160,189 | 164,525 | 204,155 | 187,639 | 210,141 |
| Chicken sold (Kg) | 142,837 | 136,138 | 129,457 | 137,050 | 140,520 | 127,594 | 133,089 | 159,575 | 166,951 | 173,820 |
| Quarter           | Q3      | Q4      | Q1      | Q2      | Q3      | Q4      | Q1      | Q2      | Q3      | Q4      |
| Year              | 2020    | 2020    | 2021    | 2021    | 2021    | 2021    | 2022    | 2022    | 2022    | 2022    |
| Number of tickets | 389,293 | 389,025 | 373,078 | 357,451 | 346,917 | 334,958 | 328,416 | 313,266 | 306,901 | 311,421 |
| Beef sold (Kg)    | 179,001 | 190,902 | 167,950 | 157,914 | 146,569 | 146,997 | 137,597 | 130,596 | 119,371 | 126,586 |
| Pork sold (Kg)    | 203,800 | 232,291 | 193,159 | 175,465 | 165,595 | 190,304 | 168,812 | 167,323 | 152,602 | 167,728 |
| Chicken sold (Kg) | 175,301 | 176,809 | 164,130 | 151,261 | 138,991 | 133,701 | 128,762 | 120,422 | 116,227 | 130,977 |

Source: Own elaboration, 2023.

Table 2 depicts business results from Sierra Costa for 2018-2022, divided by quarters (Qs), and reports that despite operating amid a context with the tightest restrictions for organizations and schools, the number of tickets before the pandemic increased from 298,622 to 353,194. Starting in 2020, the number of tickets leaps to 385,557 and remains until Q1 of 2021, and it begins to drop with fewer restrictions in Q2 of 2021 and returning to 311,421 in Q4 of 2022. Beef, pork, and chicken sales have shown increasing behaviors during COVID-19. In this regard, Table 3 presents the analysis based on this information. For example, the total number of tickets in 2020, the year with the tightest restrictions, was 1,517,069 tickets, selling 711,691 kilograms of beef, 833,871 kilograms of pork, and 692,881 kilograms of chicken. In 2020, the

highest sales of the three main products and the number of tickets occurred, followed by 2021.

Table 3. Total numbers (years)

| Year              | 2018      | 2019      | 2020      | 2021      | 2022      |
|-------------------|-----------|-----------|-----------|-----------|-----------|
| Number of tickets | 1,207,667 | 1,284,397 | 1,517,069 | 1,412,404 | 1,260,004 |
| Beef sold (Kg)    | 498,287   | 553,878   | 711,691   | 619,431   | 514,150   |
| Pork sold (Kg)    | 639,336   | 688,678   | 833,871   | 724,523   | 656,465   |
| Chicken sold (Kg) | 545,482   | 560,777   | 692,881   | 588,084   | 496,389   |

Source: Own elaboration, 2023.

We also computed the yearly increase in tickets and sold meat. The first comparison was the year 2019 versus 2018. The highest point occurred in 2020, concerning 2019 (Table 4). As mentioned earlier, there were still some lock-off restrictions in 2021; however, the tightest restrictions occurred mainly in 2020. During this year, of the main three products, the highest yearly increase was beef meat (28.49%), followed by poultry meat (23.56%) and pork meat (21.08%).

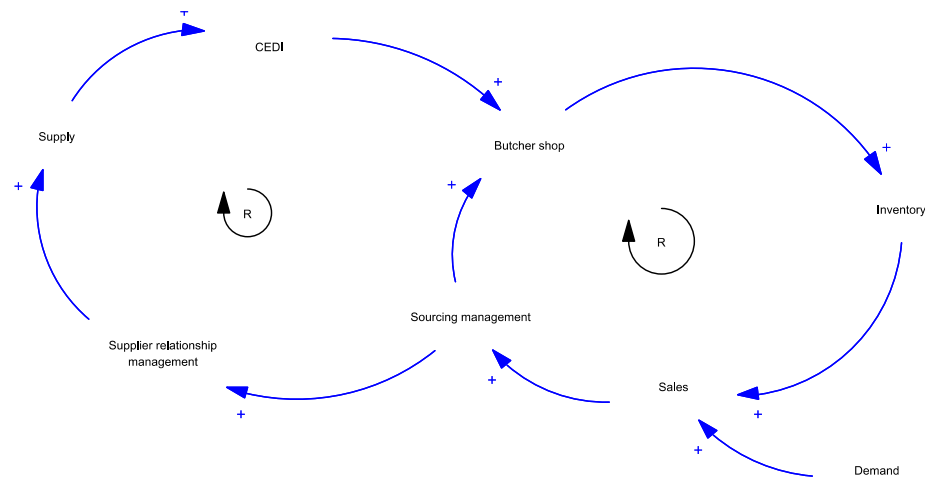
Table 4. Total numbers (yearly increase)

| Year              | 2018 | 2019   | 2020   | 2021    | 2022    |
|-------------------|------|--------|--------|---------|---------|
| Number of tickets |      | 6.35%  | 18.12% | -6.90%  | -10.79% |
| Beef sold (Kg)    |      | 11.16% | 28.49% | -12.96% | -17.00% |
| Pork sold (Kg)    |      | 7.72%  | 21.08% | -13.11% | -9.39%  |
| Chicken sold (Kg) |      | 2.80%  | 23.56% | -15.12% | -15.59% |

Source: Own elaboration, 2023.

According to Sterman (2000), SD allows participants and decision-makers to understand situations involving multiple relationships using feedback loops to learn and design courses of action to correct or preserve desirable situations. We complemented the descriptive statistical analysis with SD to help managers in Sierra Costa understand the behavior of variations in product demand. For this, a causal loop diagram helped managers comprehend the interactions between seasonal components related to COVID-19 and identify the organizational factors to deploy responses; that is, these factors helped establish a simple structure that involved factors available for the company's operation and ensuring the butcher shop's response (Figure 4).

Figure 4. Causal Loop diagram for structuring response in Sierra Costa



Source: Own elaboration based on company information using Vensim PLE for Macintosh Version 8.2.0 (Ventana Systems, 2021).

In the context of this article, Figure 4 illustrates the organizational factors and their relationships that, according to company managers, supported the response amid the pandemic's peak. To follow Figure 4, the arrows (+) establish that a change in each component generates an impact in the same direction in the subsequent factor. Thus, arrows with a negative sign (-) indicate that the influence or change occurs in the opposite direction. It should be added that although negative relationships may be related to a low capacity to cope with the demands of the environment, they also promote learning and continuous improvement (Sterman, 2000).

Figure 5 shows Sierra Costa's hypothetical behavior during the COVID-19 pandemic. This structure allowed us to observe the interaction between two causal loops in which reinforcing behavior is assumed. For example, competing for supply when suppliers' capacity was insufficient to satisfy consumer demands, the increase in supplier relationship management prevented a decrease in the supply of the CEDI, and the maintenance of stock in the CEDI favored the increase of inventories in the butcher shop. This positive behavior boosted sales, which maintained the objective of



Therefore, following Forrester, (1990), Figure 5 incorporates minimal but sufficient factors considering supplier negotiation, distribution center management, inventory discrepancy, and demand. Additionally, considering the ideas of Sterman (2000), Table 5 presents the polarity indicated by the changes in the factors, and Table 6 shows the model specifications.

#### 4.6 Key model features

The CEDI stock provides the ability to keep inventory on hand at each butcher shop. CEDI sourcing requires a network of suppliers and consideration of the lowest raw material wastage. The demand target initially determines the sourcing rate, but this investment rate is affected as sourcing management establishes strategic limits.

Table 5. Feedback loops expressing organizational learning.

|                                             |                                |   |                                |
|---------------------------------------------|--------------------------------|---|--------------------------------|
| <b>Positive feedback loop Supply</b>        |                                |   |                                |
| Positive feedback loop Supply               |                                |   |                                |
| ↑                                           | CEDI                           | → | Desired supply                 |
| ↑                                           | Desired supply                 | → | Supply network                 |
| ↑                                           | Supply network                 | → | CEDI                           |
| <b>1 Balancing feedback loop Meat waste</b> |                                |   |                                |
| ↑                                           | CEDI                           | → | Meat waste                     |
| ↑                                           | Meat waste                     | → | CEDI                           |
| <b>2 Balancing feedback loop adjustment</b> |                                |   |                                |
| ↑                                           | CEDI                           | → | Sourcing management            |
| ↑                                           | Sourcing management            | → | Inventory gap                  |
| ↑                                           | Inventory gap                  | → | Adjustment                     |
| ↓                                           | Adjustment                     | → | Negotiation supplier           |
| ↓                                           | Negotiation supplier           | → | Supply network                 |
| ↓                                           | Supply network                 | → | CEDI                           |
| <b>3 Balancing feedback loop adjustment</b> |                                |   |                                |
| ↑                                           | CEDI                           | → | Demand                         |
| ↑                                           | Demand                         | → | Butcher shop                   |
| ↓                                           | Butcher shop                   | → | Efficiency utilization of meat |
| ↓                                           | Efficiency utilization of meat | → | Demand                         |
| ↓                                           | Demand                         | → | Sales                          |
| ↓                                           | Sales                          | → | Inventory discrepancy          |
| ↓                                           | Inventory discrepancy          | → | Adjustment                     |
| ↓                                           | Adjustment                     | → | negotiating supplier           |
| ↓                                           | Negotiation supplier           | → | Supply network                 |
| ↓                                           | Supply network                 | → | CEDI                           |

Source: Own elaboration following Duggan (2016).

Butcher shop stock has only one output: the demand for meat. Demand is based on the quantity of meat available. However, efficient utilization rates of meat by-products are critical to maintaining the company's profitability.

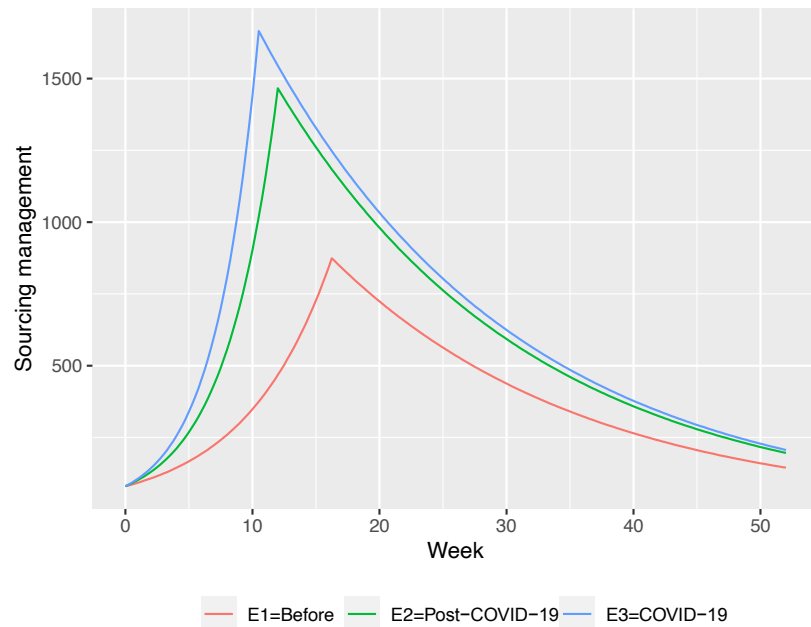
Table 6. Model specifications

|                             |                                                           |
|-----------------------------|-----------------------------------------------------------|
| <i>Stocks</i>               |                                                           |
| CEDI                        | $\int_0^t [Meat\ waste - Supply\ network] ds + CEDI$      |
| Butcher shop                | $\int_0^t [-demand] ds + Butcher\ shop$                   |
| <i>Flows</i>                |                                                           |
| Meat waste                  | $= CEDI \times meat\ waste\ rate$                         |
| Supply network              | $= desired\ supply - supplier\ negotiating$               |
| Demand                      | $= CEDI \times Efficiency\ utilization\ of\ meat$         |
| <i>Auxiliar</i>             |                                                           |
| Desired supply              | $= CEDI \times supply\ rate$                              |
| Sourcing management         | $= CEDI \times 0.10$                                      |
| meat efficiency utilization | $\Delta Butcher\ shop / \Delta Demand(t)$                 |
| sales                       | $= revenue\ per\ kilogram \times demand$                  |
| inventory gap               | $= sales - sourcing\ management$                          |
| adjustment                  | $= Inventory\ discrepancy \times fraction\ of\ adjsument$ |
| supplier negotiation        | $= Adjustment$                                            |
| supply rate                 | $= 0.07$                                                  |
| meat waste rate             | $= 0.05$                                                  |
| Adjustment time             | $= 0.12$                                                  |

Source: Own elaboration based on Sierra Costa information, 2023

The model was evaluated in three scenarios considering a 52-week horizon to compare the normal or pre-disturbance behavior generated by Covid-19 during and after the disturbance as suggested by (Sánchez-García, Núñez-Ríos, López-Hernández et al., 2023).

Figure 6. Simulation output of sourcing management in Sierra Costa company

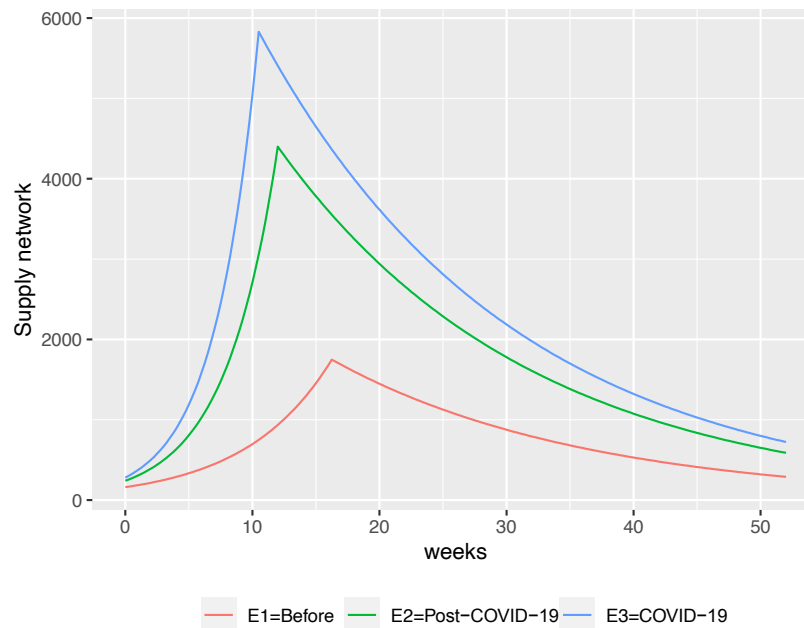


Source: Own elaboration 2023.



We first analyzed the sourcing management variable (Figure 6), the management capability to incorporate and coordinate internal networks and ensure decisions are made in anticipation of supply chain disruptions. This strategy reduces the impact and enables rapid recovery and cumulative learning after a disruption generated by the company's operating context (Tan, Daud Ahmed and Sundaram, 2010; Hsiao, Chen, Lin, et al., 2022). Thus, the graph in Figure 6 illustrates a behavior very similar to that of the disturbance period, i.e., it maintains an anticipatory behavior and establishes a responsiveness to any variation in supply. The organization plots responsiveness in less than 15 weeks because some mechanisms are still needed to ensure the flow of information for many of the decisions. These still have a reactive sense, which establishes a vision to understand and correct the available mechanisms of coordination between the management and the representatives of each butcher shop; this result allows us to be aware of three aspects: first, the differences in the coordination capacity, two the effective communication and three the mechanisms of information exchange (Hartmann, Weiss, Newman et al., 2020; Hsiao, Chen, Lin, et al., 2022). Some benefits are the reduction of mismatches between supply and demand and the increase in stock-out cost of some products.

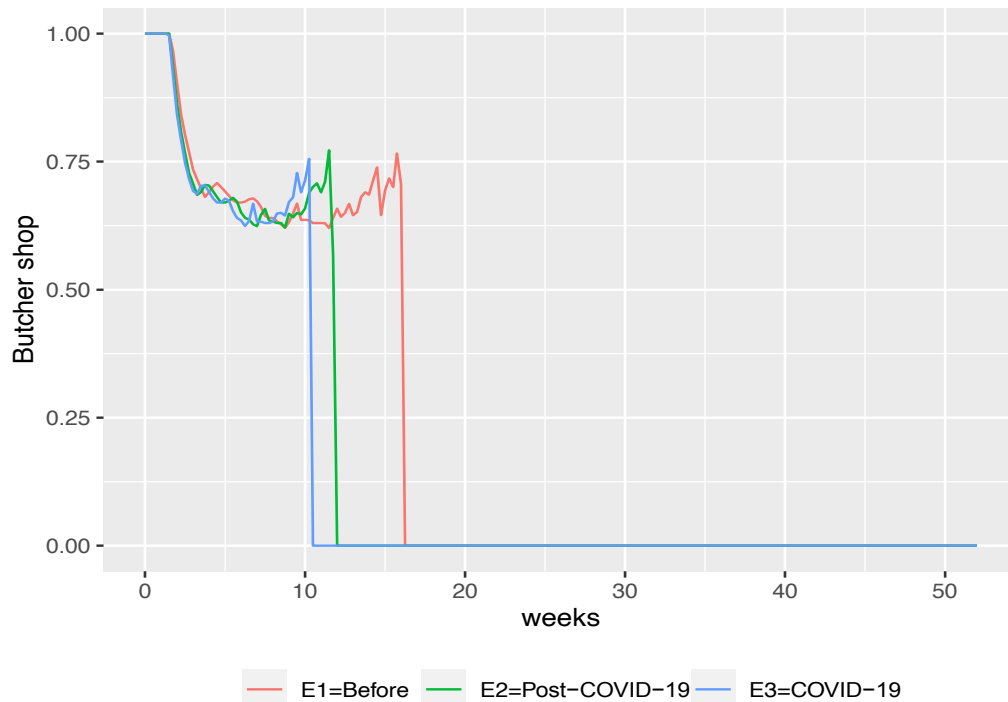
Figure 7. Simulation output of supply network in Sierra Costa company



Source: Own elaboration 2023.

Supply network management requires the development and stabilization of relationships through the observation of suppliers to create and improve the value of relationships and thus maintain an efficient supplier portfolio, as well as the dissolution of relationships with suppliers that are not conducive to responding to changes (Mokline and Ben Abdallah, 2021; Olivares-Aguila and ElMaraghy, 2021). The results for the three scenarios (Figure 7) indicate that the effects of strengthening relationships can establish arrangements to maximise procurement following the adjustments required by knowledge of demand. The company did not observe this factor as critical in the pre-pandemic scenario. To ensure the security of supply, an immediate and expanded local supply network was required, which allowed focus on the need to guarantee the continuous supply of meat by-products.

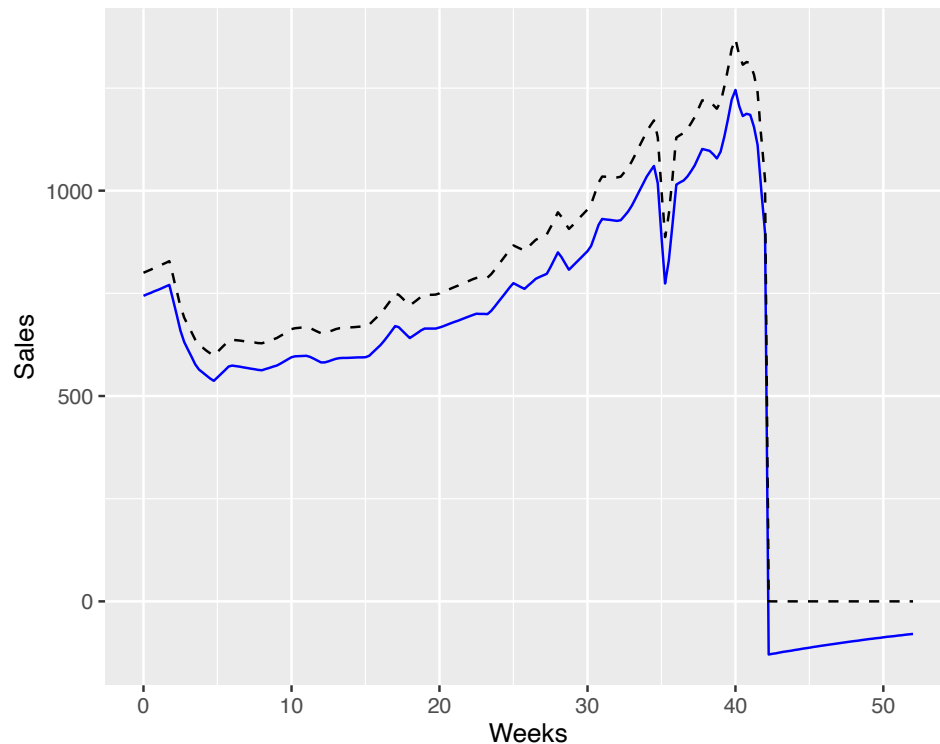
Figure 8. Simulation output of operative unit in Sierra Costa company



Source: Own elaboration 2023.

Regarding product availability in each butcher shop, standard conditions were a reference, and the achieved level during the pandemic resulted in a reduced time to maintain an inventory range between 65% and 75%. Figure 8 depicts a variation of 5 weeks concerning the time frame maintained before the pandemic and following the agility maintained during the pandemic (Almeida and Oliveira, 2023). Also, considering the information from the sourcing management and supply network study (Jahanshahi, Bhattacharjee and Maghsoudi, 2021), it can be inferred that the exchange of transactional and strategic information has an impact on two performance metrics for the butcher shop, i.e., it leads to a reduction in the time and level of inventory that ensures demand fulfillment. Since the organization has learned from these mechanisms, there is a more significant alignment and appropriateness of actions with short-term implications (Almeida and Oliveira, 2023).

Figure 9. Simulation output of sales in Sierra Costa company



Source: Own elaboration 2023.

Finally, the model highlights environmental, organizational, and individual factors concerning expected sales (dotted line in Figure 9). Based on SD, Figure 9 helps to understand that improvements in operational efficiency can be designed and implemented through sourcing management, reducing redundancy in access to supply capacity (Oe and Le, 2023). It is also necessary to work on organizational agility and flexibility to ensure the continuity of activities; otherwise, it may harm the ability to deal with changes, and vulnerability was observed in the supply chain that could affect the operation and the level of sales. However, the configuration of operations can be a mitigating factor (Gerstlberger, da Mota Pedrosa and Jasmand, 2022; Katsoras and Georgiadis, 2022). Persistent work is necessary to generate operative capabilities that lead to resilience. This should be based on a high level of learning capability of supply chain interactions and implementing

continuous inspections in the company to increase the resilience of the supply chain connections.

#### ***4.7 Discussion and Conclusions***

The studies of Thilmany et al. (2021) and Wided (2023) confirm that few economic sectors exhibited a positive effect during the COVID-19 emergency. Our proposal differs from the work of Katsoras and Georgiadis (2022) as these authors consider reorganizing food supply through reconfiguring or rethinking distribution channels to meet consumer needs. However, based on the Forrester diagram, the reconfiguration of distribution channels is subject to constant disruptions, so an SME should strengthen the analysis of information from the environment and forecasts to translate the information into clear and measurable actions.

On the other hand, the proposals of Harchandani and Shome (2023), Haryanto et al. (2022) and Domnina et al. (2022) emphasize that the increase in company profits is only conjectural, i.e. it is only due to the confinement imposed by the situation. In our case, the statistics show that being in this sector is not a sufficient condition to increase profits but that the increase in sales during the pandemic was the product of multiple factors. In this respect, some external factors to highlight were the exploitation of the cessation of operations of restaurants and hotels, containment rules and adverse effects on direct competitors. In line with Haryanto's et al. (2022) ideas, organizational factors play a relevant role in an organization's learning and adaptive capacity. In the case of Sierra Costa, factors such as organizational design, supply chain design, negotiation capacity with suppliers, storage capacity and adequate inventory control, adequate management of restrictions and sanitary measures, daily coordination, and coordination with the sales units as well as the proximity of the points of sale to the final customer.

During the pandemic, Sierra Costa adopted practices oriented towards human factor management, such as the adequate design of working hours, balancing production lines, increased safety, and job certainty. This approach contrasts with the work of Almeida and Oliveira (2023), who stressed that downsizing, increasing working hours and reducing costs should form the backbone of adaptation actions. Adopting this view can be risky because although it may generate short-term benefits, it needs to pay attention to the knowledge generated by a company's internal interactions, which is a necessary input for adapting to turbulent environments (Hobbs, 2020, 2021). In terms of inventory management, alliances were established with suppliers, which made it possible to ensure medium and long-term supply and to increase stocks in cases where the butchery chain absorbed storage costs, thus guaranteeing product availability (Majid, Yasir and Younis, Alsharairi, Younes et al., 2021; Rehman, Bhatti, Kraus et al., 2021). In this context, Sierra Costa took advantage of the integration of suppliers into short, local supply chains because they needed more options to move their products due to restrictions or closures of other distribution channels. Referring to the proposed Forrester diagram (Figure 5), this led to a situation of taking advantage of one of the reinforcement cycles in which factors such as negotiation with suppliers, inventory adjustments and the time factor were involved, as suppliers preferred to maintain or lower prices for some products in exchange for guaranteed sales (Haryanto, Pandu, Maminirina et al., 2022; Katsoras and Georgiadis, 2022). Considering the model proposed by SD, the relationship between CEDI, demand, butcher shop, and meat efficiency utilization allowed the group of outlets (butchers) to react to the growing market demand, demonstrating their resilience by adjusting to the new supply chain structures (Núñez-Ríos, Sánchez-García, and Ramirez-Nafarrate, 2023; Sánchez-García, Núñez-Ríos, López-Hernández et al., 2023). Alliances with suppliers and medium to long-term purchasing levels, increased inventories and staff retention practices were implemented continuously as part of organizational learning.

In terms of theoretical implications, the SD model was constructed considering the participants' perspective, who identified factors that can support organizational learning aimed at adaptation. In that sense, we consider that resilience in SMEs should be understood as the property of adaptation rather than the ability to return to a previous point (Núñez-Ríos, Sánchez-García and Ramirez-Nafarrate, 2023). Regarding practical implications, Helfgott (2018) and Sánchez-García, Núñez-Ríos, López-Hernández, et al., (2023) indicated that the concept of resilience is difficult to operationalize in practice, so focusing on the minimum factors to guide an organization towards adaptation is relevant. In addition, managers can focus on the factors proposed in the SD model.

Finally, we mention some limitations; the context of our work was in a region of Mexico. To address this limitation, managers or scholars could make minor adjustments to the proposed model to adapt it to other regions. As for future avenues of research, it is possible to extend the study on the adaptive capacity of supply chains by using data from other crisis scenarios, such as swine fever, avian influenza, or natural disasters. Study the adaptations of supply chains during and after such events with a representative sample of firms in each economic sector or geographical area.

## **CHAPTER 5 : DISCUSSION AND CONCLUSION**

### ***5.1 Discussion on the proposed hypotheses***

The synthesis of these three research products focuses on the retail food sector's response to an unexpected health crisis. In light of the COVID-19 pandemic, consumers and companies adapted to significant changes. A key aspect of addressing this crisis was determining how to effectively reach end consumers, which positioned the study of home delivery systems as a viable solution.

The first investigation utilized Porter's value chain (Porter, 1985) to analyze primary and secondary functions, thereby assessing the development level of home delivery systems. This analysis identified essential requirements for advancing improvement trajectories (Dixon, Arnold, Heineke et al., 1994), emphasizing the importance of technology and personnel management. The study recognized two distinct delivery systems, suggesting that progress is achievable for companies with established delivery frameworks and those just starting to implement their own.

Firms in this sector can enhance their delivery systems through effective personnel management and strategic use of existing technologies. The qualitative study, completed during the summer of 2020, evaluated both the firm's own system and the technological platform delivery system, concluding that these methods were essential for maintaining customer connections during the lockdown.

The research identified the advantages and disadvantages of home delivery platforms in Puerto Vallarta, concluding that while technological delivery platforms present a promising option, careful management of costs and data property is crucial. Practically, a hybrid home delivery system can optimize the benefits of technological platforms while mitigating the drawbacks of its own systems, revealing that the simultaneous use of both can generate positive externalities.

The third research product, a case study focused on vital economic sectors, observed a positive impact during the pandemic, aligning with findings from Thilmany, Canales and Low, 2021; Wided, 2023. The case study, grounded in the Forrester's diagram (Forrester, 1990), highlighted companies' need to enhance their environmental information analysis to implement clear and measurable actions. It was determined that the increase in sales during this period resulted not only from lockdown conditions but also from various



external and internal factors, such as operational restrictions on restaurants and hotels.

The case study incorporated human factors management practices, such as effective scheduling, production line balancing, enhanced safety measures, and job security. This approach contrasts with the perspective of Almeida and Oliveira (2023), who advocate for personnel reduction, extended working hours, and cost-cutting as the primary strategies for adaptation. The company also fostered integration with local short supply chain suppliers, who faced challenges in distributing their products due to restrictions or closures of alternative channels.

Utilizing the model proposed in Systems Dynamics, the interplay between CEDI, demand, and efficient product management enabled the sales points (butcheries) to respond effectively to the increasing market demand, showcasing their resilience by adapting to new supply chain structures (Núñez-Ríos, Sánchez-García, and Ramírez-Nafarrate, 2023; Sánchez-García, Núñez-Ríos, López-Hernández et al., 2023). The implementation of continuous alliances with suppliers, medium to long-term purchasing strategies, inventory increases, and personnel retention practices became integral to the organization's learning process.

The hypotheses and their result formulated for this project are the following:

Hypothesis H1: The development and implementation of home delivery systems can be analyzed through the primary and secondary functions of the value chain to identify the technology development and human resources management elements necessary to traverse improvement trajectories and significantly increase companies' adaptability to new market conditions.

Confirmation: The first article supports this hypothesis by demonstrating that the trend towards home delivery has been accelerated by the pandemic, with some companies having already established these systems before COVID-19. Using Porter's value chain (Porter, 1985), the article identifies critical functions, such as order entry and delivery, along with technological and human resource management, as essential components for enhancing delivery systems. This correlation indicates that understanding these elements is necessary for improving adaptability, thus confirming H1.

Hypothesis H2: In the context of the COVID-19 pandemic, some companies in the food sector in Puerto Vallarta faced the challenge of actively managing their own delivery systems and/or using third-party platforms to continue operating amid social distancing restrictions. These two delivery systems emerged as distribution alternatives during the pandemic, each facing different operational challenges.

Confirmation: The second article reaffirms this hypothesis through qualitative analysis of four food retail businesses in Puerto Vallarta. It highlights how these companies navigated the challenges of the pandemic by utilizing both own delivery systems and third-party platforms like Uber Eats and Rappi. The study discusses the advantages and disadvantages of these systems, providing evidence that both systems were crucial for maintaining operations during the pandemic, thus confirming H2.

Hypothesis H3: Organizational adaptability, grounded in a deep analysis of market fluctuations and effective supply chain management, has been essential for the sales growth presented by Sierra Costa during the crisis caused by the COVID-19 pandemic.

Confirmation: The third article supports this hypothesis by detailing how Sierra Costa successfully adapted its operations during the pandemic. It emphasizes

the importance of organizational design, supply chain management, and effective negotiation with suppliers as critical factors contributing to sales growth. The article contrasts its findings with other studies that suggest profit increases are merely conjectural, providing robust evidence that Sierra Costa's adaptability. Through practices such as human factor management and local supply chain integration was indeed essential for navigating the challenges posed by the pandemic, thereby confirming H3.

## **5.2 Conclusions**

The COVID-19 pandemic has profoundly transformed the retail sector, compelling businesses to adapt rapidly to new consumer behaviors and operational challenges. This thesis synthesizes findings from three distinct research efforts, each illuminating different facets of the retail industry's response to this unprecedented crisis.

Firstly, the initial article emphasizes the significant shift towards home delivery services, a trend accelerated by the pandemic. It notes that while some companies were well-prepared for this transition, others lagged due to a lack of established home delivery models. By applying Porter's value chain analysis (Porter, 1985), we identified that order processing and delivery systems were the most critical functions. The proposed model for developing home delivery solutions presents a strategic pathway for businesses to navigate the ongoing challenges posed by social distancing and evolving consumer preferences. Consequently, a tailored approach to home delivery can enhance competitive positioning, particularly for small retail businesses that may struggle to adapt to sudden market changes.

Additionally, the second article provides qualitative research on how food retail businesses in Puerto Vallarta managed their delivery services during the pandemic. It highlights both the benefits and challenges associated with using

third-party delivery platforms. While these platforms provided immediate solutions, significant concerns arose regarding high costs and data ownership for business owners. The recommendation to implement a mixed delivery system, combining external platforms with proprietary solutions, underscores the importance of strategic adaptability in navigating the evolving retail landscape. This study emphasizes that a clear understanding of various delivery system options can empower retailers to make informed decisions, ultimately enhancing their operational efficiency and resilience in a rapidly changing environment.

Finally, the third article offers critical insights into organizational resilience within the retail sector. It challenges the assumption that merely being part of the food industry guarantees increased profits during crises. Instead, it highlights the interplay of multiple factors, including effective supply chain management, organizational design, and the development of robust supplier relationships. The case of Sierra Costa illustrates how proactive measures, such as effective human resource management practices and strategic alliances, can enhance resilience and adaptability. This perspective redefines resilience as a return to pre-crisis conditions and an ongoing capability to adjust to evolving circumstances.

### ***5.3 Future research and study limitations***

While this study provides valuable insights into the retail food industry's adaptations during the COVID-19 pandemic, it has limitations. First, the research primarily focuses on a single case study of a Mexican firm, which may limit the generalizability of the findings. Although this case offers in-depth insights, this firm's unique context and conditions may not fully represent the experiences of other companies in different regions or markets.

Second, the qualitative nature of the research, while rich in detail, may introduce subjectivity in data interpretation. The reliance on interviews and case study analysis could lead to potential biases, as participants' perspectives may not encompass the full spectrum of experiences within the industry. Future research could benefit from a broader quantitative approach incorporating a larger sample size to enhance the robustness of the findings.

Finally, this study primarily examines the immediate responses to the pandemic, leaving room for exploration of longer-term strategic shifts and transformations within the retail food sector. Future studies could investigate how companies sustain the innovations and adaptations developed during the crisis in the post-pandemic landscape.

As the industry continues to adapt and change, the relevance of specific findings may diminish over time. Ongoing research is necessary to track these developments and their implications for future operational strategies.

By acknowledging these limitations, this research highlights the need for continuous inquiry into the dynamic landscape of the retail food industry, particularly in the wake of unprecedented challenges like the COVID-19 pandemic.

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## Appendix A - List of the doctoral student's publications

Lopez Dueñas, Araceli and Ramirez-Nafarrate, Adrian (2021) 'Improving Model of Home Delivery in the Face of Covid-19 for Small Retail Companies', *Proceedings of the Eleventh International Conference on Engaged Management Scholarship- EMS 2021*, Available at: <https://ssrn.com/abstract=3944726>.

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