

The impact of COVID-19 on supply chain decision-making of Gozitan organisations

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To Mum and Dad

I would like to dedicate this dissertation to my parents, who have always given be invaluable educational opportunity to be able to achieve my dreams. Their effort and struggles have allowed me to have a key to unlock the mysteries of the world.

Abstract

This study's primary goal is to examine the COVID-19 impact on the supply chain decision-making process of Gozitan organisations. This will be achieved by understanding the supply chain decision-making process during COVID-19. This study also aims to gain a better understanding of the adaptability of these organisations to the changing conditions and evaluate what is happening in a post-COVID-19 world. The manufacturing industry and importers and retailers are the two main industries which will be analysed in this study.

Interpretive research philosophy and in-depth semi-structured interviews were used. Interviews were held with 24 top-level managers. Since the study's main focus is on the impact that COVID-19 had on Gozitan businesses' supply chains, only Gozitan SMEs were chosen. A diversity case sampling was used to select the case studies. An exploratory mindset was adopted when designing this research. To analyse the qualitative data collected, thematic analysis was used and a deductive approach was taken in the design of this study.

From the primary data collected, all participants stated that before the pandemic, the supply chain was routine, however, this is no longer the case. None of the participants were prepared for the pandemic, and no one had a contingency plan in place. Businesses were faced with delay in orders, rising costs, increase in freight costs as well as delays with installations. Some were faced with cash flow problems because clients were taking longer to pay but they were given less time to pay their suppliers. Businesses had to plan way ahead when placing orders to ensure that they always had enough material in stock. It was essential for the participants to increase their engagement with suppliers. Technology played a very important role during the pandemic because businesses had to opt to telework when possible.

When businesses started to recover from the pandemic, they were immediately faced with the war which worsens the situation because it had stronger repercussions and the problems that businesses faced during the pandemic were prolonged during the war. When the participants were asked how they plan their future, three main concerns emerged. First, businesses are aware that they could face a recession. Secondly, after facing staggered interruptions, it is time for some businesses to start joining forces together. Finally, a major problem that is going to persist in the future is the labour shortage, given that employees are opting to work with the public sector instead due to more security.

Keywords: COVID-19 impact, Supply Chain Management, Gozitan SMEs, manufacturing industry, importers and retailers.

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List of Abbreviations

CEO	Chief Executive Officer
CIPS	Chartered Institute of Procurement and Supply
EU	European Union
FREC	Faculty Research Ethics Committee
GBC	Gozo Business Chamber
GDP	Gross Domestic Product
GVA	Gross Value Added
ISM	Institute for Supply Management
SCM	Supply Chain Management
SME	Small Medium Enterprises
WHO	World Health Organisation

Chapter 1 – Introduction

This chapter aims to introduce the subject and orient the reader toward the main purpose behind this research. First, the scope and aims of this study will be introduced. Then, a brief overview of the area under study including an introduction to a pandemic, supply chain and post-COVID-19 world will be given. The shift will then focus on the manufacturing, importers and retailers industries in Malta. This leads to the inherent characteristics of the Gozitan Economy. This chapter will conclude with a brief overview of the dissertation.

1.1 Scope of the study

From a previous study that the researcher had carried out, titled “The effect that the pandemic of COVID-19 left on businesses operating on the island of Gozo with a special focus on tourism and manufacturing” the results delved briefly into the disruptions that businesses in the manufacturing industry faced in their supply chain. This happened because of higher raw material costs as well as delays in receiving their goods. Therefore, the main focus of this review is the link between the COVID-19 pandemic and the supply chain, as well as how the pandemic impacted the supply chains of Gozitan firms.

Additionally, the research on the effect that the pandemic had on the supply chain specific to Malta is limited. Indeed, the literature review will refer to international academics. Due to the lack of research specific to the island of Gozo, this research will help to better understand the impact that the pandemic had on the supply chain of Gozitan SMEs. The primary data was collected from 24 top-level managers, given their overview of the supply chain. Data was

collected using semi-structured interviews. Only Gozitan SMEs were selected since the majority of Gozitan businesses are mainly small to medium enterprises and the focus is specifically on the effect that the pandemic has on the supply network of Gozitan businesses.

1.2 Aims of the Study

The main aim of this study is to study the impact of COVID-19 on the supply chain decision-making process of Gozitan organisations. This will be achieved by understanding the supply chain decision-making process during the pandemic by analysing the manufacturing industry, importers and retailers. Additionally, this study aims to gain an understanding of the adaptability of these organisations to changing conditions and evaluate what is happening in a post-COVID-19 world.

1.3 The context under study

The outbreak of COVID-19 has had a major effect on businesses and economies across the globe (International Monetary Fund, 2020). The pandemic has spread at an alarming rate and millions of people were infected. To end the spread of the virus, several countries imposed a nationwide lockdown, which brought economic activity to a close halt.

This pandemic has disrupted both the world's economy as well as the global health system (Francis, 2020). While the healthcare systems and governments were dealing with effectively treating patients and stopping the spread of the virus, businesses were dealing with the impact that the pandemic had on their supply chain. Supply network managers were constantly assessing their strategic and tactical positions (Francis, 2020). The pandemic has boosted

innovation and investment in online food ordering because restaurants were forced to switch to online food deliveries (Gavilan et al, 2021). Telework has been widely used as a means of ensuring company continuity (Tavares et al, 2020; Mihalca et al, 2021). These were all strategic management decisions which were taken to lessen the impact of the pandemic.

This pandemic significantly impacted supply chains (Magableh, 2021) because it disrupted international trade. Businesses were faced with higher costs due to the scarcity of raw materials as well as delays in receiving their goods (Cai and Luo, 2020; Remko, 2020). As a result of the closure of factories and the disruption of supply networks, firms were experiencing some difficulties finding suppliers to meet their demands. At the beginning of the pandemic, demand for certain products increased, which resulted in suppliers being unable to keep up with the demand (Francis, 2020). Healthcare supplies like ventilators, surgical masks, and personal protective equipment were in high demand. (Bown, 2022). Determining the locations where important suppliers are producing essential goods and keeping an eye out for disruptions is essential. A successful reaction requires knowledge of current and anticipated market disruptions. Given supply chain costs, such disruptions require quick decision-making in such a complex and challenging setting (Magableh, 2021).

Managing highly complex supply networks in today's business environments, which are characterised by rapid expansion, quick change, and usually unstable conditions, is the responsibility of today's supply chain managers (Manuj and Sahin, 2011). Due to the environment's dynamism and volatility, supply chain professionals are given increasingly challenging tasks and must overcome more obstacles while making supply chain decisions such as delays, cash flow problems, and lack of materials (Sarkis, 2020; Cai and Luo, 2020; De Vet,

et al., 2021). Businesses had to adapt fast to the dynamic environment that COVID-19 brought with them, or else organisations risked bankruptcy.

In a post-COVID-19 world, without a doubt, supply network processes will change. The move to a more sustainable supply chain depends on technological and societal advances (Sarkis, 2020). Understanding the abilities and capabilities of the supply network is necessary for building resilience. This reinforced the need for this study as by investigating supply chain and supply chain decision-making during such a crucial time, we become more resilient to any future disruptions.

1.3.1 The Manufacturing industry in Malta

While employment in the manufacturing industry has decreased over time, concurrent with the growth of other industries, what distinguishes Maltese manufacturing above all else is its willingness to adapt (Malta Profile, n.d.). The industry has changed strategically in recent years, moving away from large-scale production for mass markets and toward exclusivity, added value, and a concentration on targeting niche markets (Malta Profile, n.d.).

The manufacturing sector's contribution to Maltese economic production decreased from 12.9% in 2010 to 8.1% in 2013 as the country continues to transition to a service-based economy (Fabri et al., 2020), as can be seen in Figure 1.1. Despite this, manufacturing grew by around €200 million and it employed more than 23,000 people throughout this time, which is equivalent to around 15% of the island's labour force (Fabri et al., 2020). The industry increased by almost €185 million reaching a total stock value of more than €1 billion in 2018, continuing to be a significant source of foreign direct investment in Malta.

There are over 3,400 manufacturing businesses in Malta, most of which are SMEs. There is a broad consensus that Malta's manufacturing sector will continue to be important to the country's economy, and it is heartening to see that new businesses are starting up (Malta Profile, n.d.).

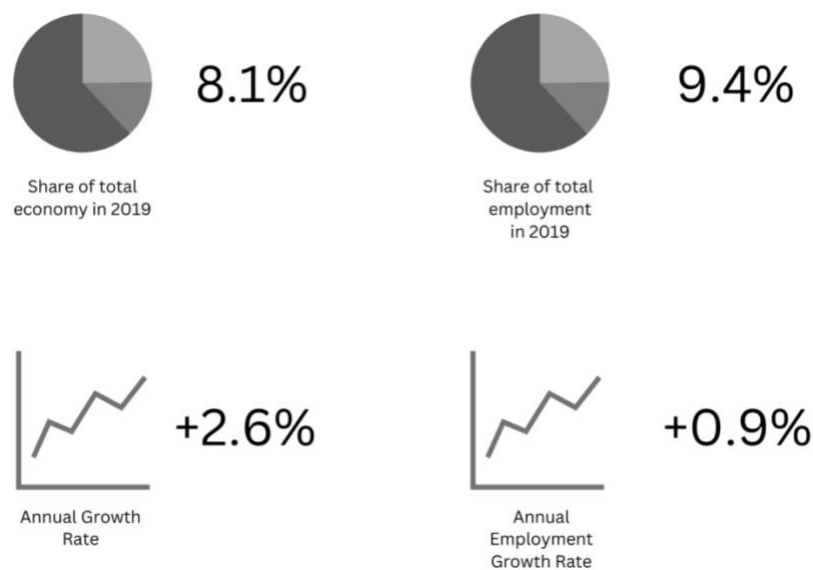


Figure 1. 1: The Manufacturing Industry in Malta. Source Seed (2020).

1.3.2 The Importers and Retailers Industry in Malta

From wholesalers selling to conventional shops to major department stores, Malta provides a broad spectrum of sales and distribution channels. Despite some sizable local manufacturing enterprises importing these commodities directly, the majority of goods are still imported by Maltese importers through agents and wholesalers, particularly capital goods and raw materials.

Despite accounting for 13.7% of all registered employment and 9.8% of the country's total GVA, the wholesale and retail sectors are still a significant pillar of the Maltese economy (Fabri et al., 2020). As can be seen in Figure 1.2, the industry had a 7.1% yearly growth between 2010 and 2019 because of a great tourism market and a growing population that was mostly driven by a rise in the number of foreign employees (Fabri et al., 2020).

Due to the limits that were put in place for health concerns in 2020, this industry has been among the most severely impacted. Retail stores have taken the brunt of the decline in demand due to social isolation, forced closures for non-essential items, and lack of tourism (Fabri et al., 2020).

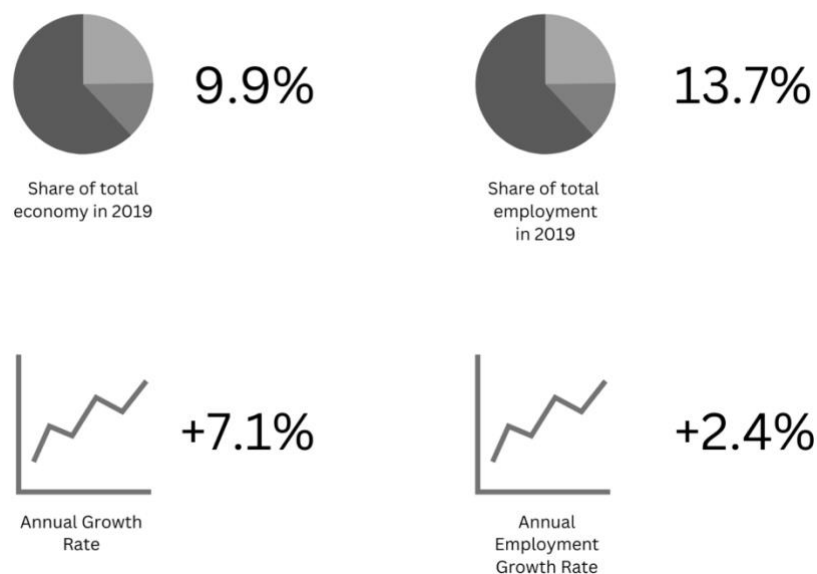


Figure 1. 2: The Importers and Retailers Industry in Malta. Source Seed (2020).

1.3.3 Inherent Characteristics of the Gozitan Economy

Although all islands are insular, not all of them are located in remote areas. Insularity and remoteness bring several problems associated with transportation and communication (Guillaumont, 2010). Due to a lack of raw materials, islands are heavily dependent on importation. Indeed, the costs related to importation to an island are usually slightly higher per unit imported than in other countries because only air and sea transportation can be used, while other countries can make use of land transportation.

Although Malta is insular and is mainly connected to the rest of the world through air and sea transportation, Gozo faces an additional layer of difficulty, that of double insularity. Gozo is only connected to Malta through sea transportation. Indeed, the GBC (2022) proposed that now it's time for Gozo to have a rural airfield. The Chamber also added that there should be adequate services for transporting goods between the two islands, such as the re-introduction of the cargo ferry linking Gozo to Sa Maison.

Gozo's twofold insularity implies that our economic eco-framework is already fragile all alone, as illustrated by the 2019 European Commission report on the social and economic circumstances. The economy of Gozo is still very reliant on Malta for its economic development in almost all industries. Indeed, Gozo has suffered more than Malta economically during the pandemic, and it has only kept afloat through government assistance and the domestic market. The restrictions and drawbacks caused by Gozo's dependency on the main island, dual insularity and current accessibility continue to be significant hindrances to the island's economic growth and its current inability to retain businesses to operate from Gozo.

1.4 Dissertation Overview

This research study is split into a total of five chapters. An overview of the subject under study is given in chapter one. The second chapter delves into the literature and examines numerous aspects like the supply chain, the impact of COVID-19, the importance of adaptability and resilience to mitigate economic shocks and more. Chapter three justifies the research approach and the methodology adopted for this research. The findings of this research are presented in chapter four, under six main themes, which are then discussed in detail in chapter five. The key findings are summarised in this thesis's conclusion.

In the next chapter, a detailed discussion of the literature in the area under study is undertaken.

Chapter 2 – Literature Review

This chapter aims to introduce the background and main issues surrounding the research problem. It gives an overview of what is known in the literature about supply chain decision-making and the impact of COVID-19.

2.1 Introduction

The literature review starts with a discussion of the general definitions of the supply chain as defined by different scholars, followed by a discussion on supply chain decision-making, which is said to be very important in complex situations. This will be followed by an analysis of the pandemic's effects on the supply chain and the ripple effect that COVID-19 had on businesses including SMEs and manufacturers. The literature will then delve into the post-COVID-19 world, including more integration of newer technology in modern supply chains. This review will then conclude with the importance of adaptability and resilience to mitigate economic shocks. This analysis will help to understand better how the COVID-19 pandemic has impacted supply chain decision-making.

Although research on supply chains is common, the effects of the COVID-19 pandemic on small islands are poorly understood and rarely analysed. To address this gap, the purpose of this study is to evaluate the impact that COVID-19 had on the supply chains and the decision-making of businesses operating from an island, specifically from the island of Gozo. Businesses operating from an island were faced with different challenges and therefore, had to take different decisions.

2.2 Defining Supply Chain

Academics are increasingly interested in the formation and operation of supply chains, which have resulted in a plethora of definitions and terminologies (Mentzer et al., 2001). Some of the definitions that have been examined for this thesis are listed below.

Beamon (1998) defined a supply chain as an organised manufacturing procedure where raw materials are turned into completed items and then distributed to clients. Indeed, Pienaar (2009) agrees with Beamon (1998) and explains how the term supply chain refers to the process integration involving companies turning raw resources into completed goods and delivering the goods to the client.

The aforementioned definitions concentrate on the key components of a successful supply network where they accept the idea that the supply chain is the process where raw materials are turned into a finished product. They indicate the necessity for provenance and a destination within which things move. The following definitions include an expanded picture of a supply network and incorporate additional processes into its function.

Indeed, Ayers (2001) and Chow and Heaver (1999) delve deeper when defining supply chain than Beamon (1998) and Pienaar (2009). According to Ayers (2001) supply chain are the life cycle activities that include the exchange of information, physical commodities, and financial resources to satisfy end-user requirements with products and services from numerous, connected providers. According to Chow and Heaver (1999), a supply chain is a group of producers, suppliers, distributors, retailers, transporters, and other logistics management service providers involved in delivering goods to customers.

For this study, the researcher will consider the supply chain as an added value to a product by conveying it from one site to another, while the good can be altered throughout the process (Mentzer et al., 2001). Customer satisfaction and profit generation are the primary goals of the supply network. Therefore, the supply network set out to maximise the overall value that can lead to a competitive advantage (Chopra and Meindl, 2016).

Supply network performance is critical to the efficient operation of economies, and flaws can result in bottlenecks that have negative consequences for economic productivity and growth. Given the growing specialization of industries across different countries and because of globalisation (Arvis et al., 2018), even minor interruptions in a single country can disrupt global supply chains.

When one experiences transportation interruptions, the supply network may be harmed and there is the risk of damaging the service level to the clients (Albertzeth, 2020). Wilson (2007) and Sheffi et al. (2003), defined a disruption as an incident that disrupts the supply network material flows and abruptly stops the transportation of items which exposes firms to operational and financial risk. Supply chain issues existed before the COVID-19 pandemic (Alicke, et al., 2020) however, COVID-19 increased the urgency and unpredictability. Managers must regularly assess what is happening in the external world and take effective decisions if they want their organisation's supply chain to be successful (Manuj and Sahin, 2011). The following section will discuss decision-making in the supply chain and decision-making under stress.

2.3 Supply Chain Management (SCM)

Douglas (1998), and Manuj and Sahin (2011), define SCM as the integration of all operations within the company that bring value to clients and all stakeholders in the chain, wherein all procedures are in line with the overall system goals. It is crucial to acknowledge that, while SCM is not a new concept, it is continually changing and it is challenging to apply previous studies to the COVID-19 pandemic (Meier and Pinto, 2020).

Supply networks were rocked by the COVID-19 pandemic. Businesses saw ripples in supply and demand as well as chaos and resonance effects, spreading across international networks (Sarkis, 2020). Indeed, at the beginning of the pandemic, around 75% of businesses had already suffered supply chain disruptions, 62% of companies reported delays in orders, while 53% had difficulty in their supply chain from China (Magableh, 2021). A qualitative study by Sarkis (2020) shows that some companies adopted fourth-party logistics to identify many viable logistics solutions rather than a single-source logistics provider. This helps businesses in building the agility and resilience they need in difficult circumstances.

If a few years ago supply chains used to be taken for granted, the pandemic revealed how supply networks are the backbone of the economy (Ivanov, 2020). Therefore, it is critical to map the structure of the supply network, encompassing all of its participants, including suppliers, clients, and distribution channels, to be able to spot any bottlenecks that may limit the production's capacity and flow.

Although the effects of interruptions are clear, not all businesses are eager to spend money on risk-reduction measures (Albartzeth, 2020). Many decision-makers are hesitant to move beyond the risk acceptance choice because they may still view the mitigation efforts as just costs. Contrarily, most businesses' failure to engage in a risk mitigation program will have a

negative influence on the supply network, such as poor customer service levels and excessive inventory costs (Melnik, et al., 2014).

2.3.1 Supply Chain Complexity

Several supply chain experts are aware of and experience the drawbacks of complexity in supply networks, yet they frequently fail to recognise its root cause. They frequently attribute poor strategy execution as the cause of complexity, but in reality, a lack of understanding of the drivers and inadequately formulated strategies are the cause of these undesirable results. Companies frequently embrace a more complicated supply network to meet their aims for corporate profitability (Manuj and Sahin, 2011). Highly complicated supply networks present managers with several difficulties when making business decisions.

Supply chain complexity can be decreased but never eliminated. However, to reduce the negative effects of complexity on decision-making and system performance, managers must employ strategic moderators. The degree of complexity is determined by the structural characteristics of the system, which are impacted by the quantity and variety of the supply chain component, as well as their interactions (Manuj and Sahin, 2011).

In today's increasingly competitive world, managing a fully integrated supply network is getting harder (Butt, 2021). A complex global network is a result of factors such as greater supply and demand instability, shorter product and technology life cycles, market globalisation, and expanded use of production, distribution, and logistics partners. Several businesses acknowledge that supply network disturbance is inevitable due to how intricate supply networks are (Butt, 2021).

2.3.2 Decision-Making Under Stress

A lot of decisions have to be made under stress and pressure. Indeed, this was true for supply chain managers during the COVID-19 pandemic. Therefore, it merits reflecting on what the literature says about decision-making under stress. Several decision-making circumstances themselves cause stress. As a result, stress and decision-making are closely related, and it is particularly interesting to consider how stress affects the quality of a decision. A review by Starcke and Brand (2012) found that humans do not always make well-informed strategic judgments. “Instead, humans have been shown to make decisions based on heuristics, biases and other ‘non-rational’ or intuitive tendencies” (Starcke and Brand, 2012, p. 1230)

A strategic decision following the guidelines of mathematical computation is not conceivable if the decision is accompanied by ambiguity, either because the repercussions of a decision are only supplied implicitly or because the individual is unable to understand the entirety of the information (Janis and Mann, 1977). Both decreased executive performance and changed emotional feedback processing may be brought on by stress-induced changes. These stress-related changes most likely have an impact on the development and use of adequate decision-making methods. Indeed, a study by Keinan (1987) shows that stress tends to decrease good decision-making and attention span.

In conclusion, research shows that stress might affect the decisions taken. Under stress we tend to not consider all the risks, ending up taking decisions urgently without thinking. That’s why it is important to understand decision-making under stress to ensure not to repeat the ‘bad’ decisions taken during the pandemic, in future stressful scenarios. Moving on, to try to

comprehend how supply networks were impacted by the COVID-19 pandemic, one first needs to understand what a pandemic is, and the impact that the pandemic had on supply chains.

2.4 The COVID-19 Pandemic

A disease outbreak that spread across countries is referred to as a pandemic. Compared to an epidemic, a pandemic impacts more people and takes more lives. A pandemic can be defined as follows:

“Pandemics seem to occur at 10–50-year intervals as a result of the emergence of new virus subtypes from virus re-assortment” (Potter, 2001, p.572).

The COVID-19 pandemic originally surfaced in Wuhan, China, in late December 2019, but quickly started to spread worldwide. Indeed, COVID-19 was classified as a pandemic by WHO on March 11, 2020. The first COVID-19 case in Malta was registered on March 7, 2020.

The pandemic has had a significant influence on world economies (Fabri et al., 2020). It has disrupted global supply chains and impacted the production process of many businesses (Paul and Chowdhury, 2020). Several restrictive measures had to be introduced by governments to stop the spread of the virus, which resulted in more restricted commercial activity (Cai and Luo, 2020; Farlow, 2020).

Although during the past 10 years, the world has seen more than 1,400 epidemic outbreaks, each epidemic having a substantial impact on productivity and operations of the supply network of businesses (Blos and Wee, 2018; Chowdhury, et al., 2021), firms were still not prepared for the COVID-19 pandemic. Unlike earlier epidemics, COVID-19 has simultaneously affected all nodes and links in a supply network, significantly disrupting the network's flow (Gunessee and

Subramanian, 2020; Paul and Chowdhury, 2020). One has to note that the impacts of COVID-19 were much more severe than earlier epidemics (Haren and Simchi-Levi, 2020; Koonin, 2020). This shows how important it is for businesses to have a resilience plan in place (Paul and Chowdhury, 2020).

Businesses realised they needed to react to supply chain disruptions quickly (Armani et al., 2020). Time is extremely important to respond efficiently to a pandemic. Continuous monitoring of global events and possible disruptions is necessary for effective responses. Continuity plans make it possible for a corporation to keep an eye on crucial items and the place of origin to check for any potential disruptions (Francis, 2020).

2.5 The Impact of COVID-19

The outbreak of COVID-19 has severely disrupted supply chains all over the world. It disrupted the supply chain due to its ripple effect which impacted several industries (Butt, 2021). In reality, businesses were compelled to stop the flow of raw materials due to a nationwide lockdown, which created significant problems for manufacturers and their logistical departments. In a report by Fortune (2020), COVID-19 caused supply network interruptions for 94% of Fortune 1000 companies.

It is impossible to compare this pandemic with previous pandemics (Baldwin and Weder di Mauro, 2020; Ulucan Erkesim, 2021) because the effect of the COVID-19 pandemic was much worse than the effect of previous pandemics and also, countries are becoming increasingly interconnected. The coronavirus has brought attention to the fragility of the supply chains for businesses and their capabilities to satisfy consumers' demands (Mollenkopf, et al., 2020). This

supply chain disruption shows the importance of greater attention to the fundamental procedures involved in the manufacture and delivery of a good.

COVID-19 was primarily viewed as a health emergency; however, it was also a supply chain emergency (Mollenkopf, et al., 2020). Not only did the interruption in the supply network made life difficult for people and businesses but also these disruptions can prolong the current crisis, thereby compounding the problem. As a result, determining the possible effects of interruptions under various scenarios should therefore help with planning and recovery (Goel, et al., 2021).

Due to a paucity of raw materials, disruptions in manufacturing and transportation, and societal conflict, the coronavirus has revealed the weakness of global supply networks. Companies must carefully anticipate the challenges that may occur throughout the recovery process and put in place appropriate safeguards if they are to survive and maintain a sustainable supply network.

COVID-19 caused several plants to experience production interruptions or delays. Due to the scarcity of raw materials, several industrial firms that are heavily connected to the global supply network were forced to close down in a short period (Cai and Luo, 2020). The expense of operation went up because of the pandemic's continued proliferation, while raw material prices kept rising due to a scarcity of raw materials (Cai and Luo, 2020).

According to Remko (2020), a qualitative survey by CIPS showed that the pandemic affected 86% of supply networks and another qualitative survey by ISM found that between February and March 2020, the percentage of businesses reporting supply network interruptions increased from 80 to 95%. There were numerous difficulties with resilience as a result of the supply chain

management's short-term cost emphasis and cost obsession (Remko, 2020). The shift to source from low-cost nations has resulted in lengthy pipelines and insufficient local backup supplies.

The globalisation of the supply chain may certainly lower the cost of goods supplied through economies of scale and the location of manufacturing in regions with favourable factor cost dynamics (Remko, 2020). However, as the logistics pipeline gets longer, there is a chance of supply delays and a dependence on distant suppliers (Harrison et al., 2019).

Global supply chains which are connected to Europe, USA or China were impacted the most. High demand and order congestion led to demand fragility and shocks. COVID-19 has brought supply chains to light and questioned more than thirty years of advancements in globalisation. It emphasizes the need for stronger supply network operations (Feinmann, 2020).

2.5.1 The impact on SMEs

The impact on SMEs is severe, mostly due to higher levels of susceptibility and lesser resilience to their size. The effects on SMEs were various and occurred on both the supply and demand sides. On the supply side, these were due to disruptions in the sources of supply and transportation, logistical problems in supply networks, workers being absent from work due to illness or having to take care of their children when schools were closed, as well as restrictions on people's movements, SMEs incurred a loss in the source of labour (Susanty, et al., 2021). On the demand side, a sharp and unanticipated decline in demand and revenue has resulted in a lack of liquidity (Susanty, et al., 2021). When consumers incur income loss, they cut back on their spending and consumption, which led to a loss of demand.

2.5.2 The impact of COVID-19 on manufacturers

Given that logistics permit the free movement of products and services required for businesses and the economy to function, they are considered the backbone of the economy (Sharma, et al., 2020). As the pandemic was spreading, supply networks and logistics were becoming increasingly vulnerable (Sharma, et al., 2020).

The manufacturing industry faced several challenges because several raw material manufacturers closed down which resulted in numerous logistical difficulties (Cai and Luo, 2020; Paul, et al., 2021). Remko (2020) added that the closure of several plants resulted in delays in orders for certain products from days to weeks and from weeks to months. This resulted in businesses not having enough inventory, unable to fulfil the demand.

During March and April 2020, European manufacturing businesses experienced a substantial decline in their production, -11.1% and -20% respectively (De Vet, et al., 2021). Then, the same businesses experienced a recovery during May and June 2020, with a change from the previous period of 13% and 10.4% respectively (De Vet, et al., 2021). This was because several restrictions were lifted including the opening of the borders which remained open, allowing for more product flow and fewer supply disruptions.

A common trend from a study by De Vet, et al., (2021) was that the second wave was less harmful than the first one given that factories and borders remained open, businesses had adjusted to new safety and social distance measures and dealerships continued virtually. However, those start-ups which were still new to the market, unfortunately, were also hit during the second wave. This resulted because of less capital stock at hand (De Vet, et al., 2021).

2.6 Post-COVID-19 World

Due to the COVID-19 pandemic, the supply chain has seen substantial disruptions. The pandemic affected worldwide activities. Magableh (2021) suggest that COVID-19 will have a permanent impact on businesses, and it is doubtful whether the supply chain will return to its pre-COVID-19 position.

In a post-COVID-19 world, without a doubt, supply network processes will change. The move to a more sustainable supply chain depends on technological and societal advances (Sarkis, 2020). Understanding the skills and capabilities of the supply chain is necessary for building resilience. Magableh (2021) suggest that in a post-pandemic world, crises will hasten the digital transformation of supply networks to overcome innate vulnerabilities and deficiencies. Additionally, after the pandemic, Magableh (2021) states that several strategies can assist companies in developing resilient supply chains.

The pandemic has created a new setting of variability where business is now performed with frequent adjustments to the external environment. Digital supply networks were essential for surviving the outbreak. They will be even more essential in a post-COVID-19 world to increase the supply network's intelligence and responsiveness (Cai and Luo, 2020). Many sectors' supply network operations have already been significantly impacted by cloud and big data technology, which enable them to quickly resume operations after a crisis, manage under uncertainties and anticipate customer demands.

2.7 Importance of Adaptability and Resilience to Mitigate Economic Shocks

When a unit is well prepared to manage and adapt, the shocks' potential damage is reduced and the bounce back will be faster (Schipper and Longston, 2015) and less painful. When a unit is incapable of managing and adapting to shock, negative impacts will be maximised (Jorgensen and Siegel, 2019). Bahadur et al. (2015) stated that a unit increases its resilience to shocks by being informed of the risks it is exposed to, the factors at play, and its strengths. A unit survives the shocks' impact if it can cope immediately. Thus, its capacity to cope is crucial.

The strict constraints and restrictions stemming from the pandemic caused massive social shocks and economic deterioration. Supply choice was broken down, successful enterprises closed and whole sectors collapsed leading to unemployment.

2.7.1 Economic Shocks

Hill et al. (2012) refer to economic shocks as unexpected events which affect an economy either positively or negatively. The impact of these shocks is not the same in all countries because it depends on how one responds, reacts and manages to adapt to such economic shocks.

An economic shock raises the risk involved in growth reconfiguration by increasing environmental unpredictability. Economic shocks entail a brief period of capital limitation, a downturn in the economy, and unpredictability; when dramatic business change, such as expansion, may harm performance and raise the likelihood of company failure (Chakrabarti, 2015).

Economic shocks often feature a quick fall in capital availability and a dramatic contraction in market demand (Chakrabarti, 2015). When capital abruptly leaves an economy that has been supported by significant capital inflows, the outflow is indicated by a sharp reversal in the current account balance (Calvo, 1998).

2.7.2 Economic vulnerability

According to Guillaumont (1999), vulnerability is the chance of suffering harm or being negatively affected by unanticipated events, including economic ones. As a result, vulnerability might be seen as an economy's susceptibility to negative situations.

Cordina (2004) demonstrates how the amount of per capita output and economic growth are significantly impacted by the vulnerability. Cordina defines vulnerability as the inherent sensitivity to external shocks. He discovered that certain nations with relatively high per capita incomes are more economically fragile than those with lower levels of development. Despite their high vulnerability to external economic shocks, many small states can produce a GDP per capita that is higher than that of other developing nations. This implies that there are variables that can mitigate the drawbacks of such weakness.

When an economy builds up its capital base, resilience tends to grow since the consequences of asymmetry between unfavourable and favourable shocks on production and welfare would be lessened. Economies that experience bigger external shocks have the propensity to stabilize at a level of higher capital stock and per capita output but lower per capita consumption levels. When resilience is often low, vulnerability tends to impede economic progress, slowing the convergence of developed and emerging economies (Cordina, 2004b).

2.7.3 Economic Resilience

According to Pike et al., (2010), several authors refer to the concept of resilience as the ability of different businesses to react, manage, respond and adapt to unforeseen situations which impose turbulently and require quick change.

The economic literature that discusses the concept of resilience usually focuses on how well the economy of a particular nation can bounce back from an external shock to its pre-shock level and growth rate of production and employment. When a nation is faced with an economic shock, the nation should respond to it with some form of resilience. Economic resilience is possible due to less drastic economic changes, changes in the industrial structure, or the region's economic recovery (Hill et al., 2012).

Macroeconomic resilience consists of two components: dynamic resilience, which is the capacity to rebuild and recover, and instantaneous resilience, which is the capacity to restrict the severity of immediate output losses for a given level of asset losses. Resilience is frequently used to describe an economy's capacity to reduce economic losses in the event of a crisis of a specific severity (Hallegatte, 2014).

2.7.4 Resilience and Recovery

Research by Remko (2020) shows that businesses were not prepared for the COVID-19 pandemic. Businesses did not have any recovery or resilience plan in place and were simply hoping to get rid of the pandemic as soon as possible. However, this wasn't the case because

things prolonged. Supply networks typically encounter several difficulties when recovering from a pandemic (Paul, et al., 2021).

Firms may face more difficulties recovering from larger pandemics because these outbreaks have far-reaching effects on organisations and call for more elaborate recovery plans. Therefore, it is crucial to identify potential supply network recovery bottlenecks and their impact on their recovery during a big outbreak to ensure supply networks develop the right plans to address such concerns.

Resilience is one of the goals of supply network design. If a supply chain can continue operating at the required level of performance irrespective of a disturbance, it is said to be resilient. According to Ishfaq (2012), businesses may increase the resilience of their supply networks by keeping their transportation operations flexible in the face of disruptions in the transportation system.

The agility and resilience of a supply network for a business when faced with unpredictable scenarios, are improved through proactive action based on continuous monitoring (Francis, 2020). Despite all of our preparatory efforts, COVID-19 showed how vulnerable supply networks can become in a matter of a few weeks if there is an excessive dependence on importation (Francis, 2020).

2.8 Research Questions

Having reviewed the literature, the below research questions were formed. The research questions are three:

1. What effect did COVID-19 have on supply chain decision-making?
2. How did such businesses manage to adapt their supply chain, with strategic decision-making to continue operating?
3. What were the effective decisions (regarding the supply chain) taken during the COVID-19 pandemic by such businesses?

2.9 Conclusion

This literature review has helped to refine the research questions and key findings related to the key themes present in the literature. The chapter started by examining several definitions of the supply chain. Although in the literature there are several definitions of the supply network, the majority agree that it is the process to turn raw resources into completed commodities and convey them to the end user. The performance of the supply chain is crucial for the efficient operation of economies, and flaws can result in bottlenecks that have detrimental effects on the level of economic growth and productivity.

The literature then explores supply chain decision-making. The COVID-19 pandemic rocked supply networks. Issues existed before the pandemic; however, the pandemic increased the urgency and unpredictability. We saw ripples in supply and demand as well as chaos and resonance effects spreading across international networks. If a few years ago supply chains used to be taken for granted, the pandemic showed us that supply networks are the backbone of the economy.

Then, the term pandemic was defined. It was discussed that COVID-19 has had a major impact on world economies. It has disrupted global supply chains and impacted the production process

of many businesses. One has to note that the impact of COVID-19 was much more severe than in previous outbreaks.

The impact of COVID-19 on the economy was also examined. The pandemic disrupted the supply chain and caused several ripple effects, which had an impact on several organisations. Additionally, COVID-19 caused simultaneous changes in supply and demand, which is very detrimental. Some literature on the post-COVID-19 world was also explored. Lastly, the literature in the field reveals how important it is to be resilient and adapt to economic shocks, such as COVID-19. In a time of crisis, organisations need to adapt to new circumstances as quickly as possible.

The research methodology for this study will be described in the next chapter.

Chapter 3 - Research Methodology

3.1 Introduction

After the literature review, chapter three outlines the research methodology selected for this study. This chapter aims to explain the approach used to collect all the data and to give justifications for the chosen method. For this research study, in-depth semi-structured interviews were selected as the primary data collection method. A brief description of the questioning technique will also be outlined. The chapter concludes by listing the ethical considerations that were taken into account.

3.2 Research Design

Since the primary goal of this study was to explore the effects that COVID-19 had on the supply chains of Gozitan businesses and to understand supply chain decision-making during the pandemic, an exploratory approach was adopted when planning the study. Only two sectors were selected to be analysed: (a) the manufacturing industry; and (b) importers and retailers.

3.3 Participants

Given that this methodology focuses on the experience of individuals, top-level managers were selected as the key persons to carry out interviews with, given their overview of the organisations' supply chain and therefore they can provide the organisation's supply chain with a strategic perspective. One person from each case study was interviewed, for a total of 24

individuals. These were consequently chosen after discussion with the dissertation supervisor and numerous experts in various fields. Given that the study is focusing specifically on how COVID-19 impacted the supply chain of Gozitan businesses and to gain an understanding of how supply chain decisions were taken throughout the pandemic, only businesses operating from Gozo were interviewed. Manufacturers, importers and retailers were interviewed because they could offer first-hand information from the perspectives of managers who dealt with supply chain issues that the pandemic brought with it.

Case studies with various characteristics were chosen because diversity case sampling strategy was used (Patton, 2015). This improves the study's external validity (Punch, 2013). The case studies from the manufacturing sector include garage doors, carpenters, brick, apertures, blinds and food manufacturers. The case studies from the importers and retailers sector include tile, furniture, marble, lighting, construction materials, solar panels, appliances, glass, food and beverages importers and retailers. In Appendix 1, the case studies are described in further depth.

A significant business organisation in Gozo is the GBC. It was discovered during the fieldwork that the CEO of the GBC might provide useful information. This enabled triangulation of data, which improved the research quality (Patton, 2015). The results will be presented to the GBC and they will be asked what kind of recommendations they do advise to sustain the concluding remarks and way forward.

3.4 Research Methodology

The most frequently used research methodologies are qualitative, quantitative, and mixed methods (Kothari, 2004). To gather the correct data for a study, it is crucial that the researcher analyse various research methodologies and then select the most appropriate methodology (Morgan, 2016).

Henning (2004, p.5) describes qualitative research as “the type of enquiry in which the qualities, the characteristics or the properties of a phenomenon are examined for better understanding and explanation”. The main aim of this research method is that it grants an exhaustive examination of the subject which enables the researcher to acquire a rich, descriptive and valuable understanding of the research question. Qualitative researchers reject the natural science model adopted by quantitative researchers and focus on the individuals who view and interpret the social world (Bell et al., 2015). Interpretive research philosophy is used where reality is present in the opinion of individuals (Saunders et al., 2016).

Although interviews are very time-consuming, one however can get a spontaneous response, explain questions when they are not understood by the participants and observe the participant’s body language (Kumar, 2011). This assists in the collection of rich primary data reflecting the participants’ opinions. When opting to make use of interviews, there is better interaction between the respondent and the researcher. Also, interviews allow the researcher to ask probing questions to generate more detail. Indeed, a qualitative methodology was favoured because the experience of individuals plays a key role in the supply chain decision-making of Gozitan organisations. This methodology focuses on the experience of individuals.

Contrary to qualitative methodology, quantitative researchers try to describe, explain and predict factors relevant to a phenomenon (Easterby-Smith et al., 2015). The researcher limits

involvement to sustain objectivity. The research design is set before the beginning of the research with supporting hypotheses. Numerical data is collected, which is then analysed statistically. Collecting questionnaires is the easiest way to collect primary data, especially if they are web-based questionnaires. This allows for a large sample (Gray, 2014). Given that there is no face-to-face interaction, individuals can express their opinions more freely (Kumar, 2011). The participants may consult with other people when filling out the questionnaires, which would fail to reflect the opinion of the individual. Also, there is the risk of a low number of respondents and questionnaires are more difficult to probe (Kumar, 2011). Another methodology is mixed methods which is an integration of quantitative and qualitative research (Bell et al., 2015), which requires sufficient time to collect and analyse the data. That's why a qualitative methodology was preferred.

3.5 Research Philosophy and Approach

This research is founded on contingency theory. Since this theory states that there isn't an ideal system for organising an organisation, every business has its decision-making when dealing with the supply chain. Also, since the optimal course of action is dependent upon the internal and external situations, and the researcher is analysing whether the pandemic had any impacts on supply chain decision-making, leaders are flexible in adapting to suit changes in a situation to a particular period in time with the contingency theory.

Humans should be considered social agents, according to interpretive scientists (Saunders et al., 2016). As a result, rather than treating people as things, one should conduct studies among them. Phenomenology and symbolic interactionism are two academic traditions that inform interpretivism (Saunders et al., 2016). These indicate that people perceive the world through

their own eyes and that there is a consistent process through which people interpret the acts of others and respond appropriately.

Interpretivism has been criticized for producing subjective results, which has a detrimental impact on research dependability. Saunders et al. (2016), claim that interpretivism is well-suited to management studies that focus on organisational behaviour and human resource management. Greeff (2015) elaborates on this topic, arguing that while looking at diversity from an interpretive viewpoint, one is looking at how workers interpret and experience the company setting as mediated through their perspective. An interpretivist research philosophy will be adopted given that business conditions are not only complicated but also seem to be distinctive. Since the focus of the author is to observe how different businesses dealt with the pandemic in their own business, a deductive approach was taken.

3.6 Research Instrument

The primary data was collected using semi-structured interviews where all participants were asked the same questions in the same order. This sustains the research validity (Gray, 2014). This was crucial given the unique nature of the research; therefore, the questions were structured in a way that would allow the participants to go into more detail on their responses while still being relevant to the study's objectives.

The interview questions as well as the interview guide were developed specifically for this study. The interview guide was divided into the following four sections: (1) a general introduction about the business; (2) their operation before the pandemic; (3) their operation during the pandemic; (4) recovery from COVID-19 and the future.

Section 1: General introduction about the business

The purpose of the first section of the interview was to give the participant time to get comfortable with the situation and the researcher. In this section, the participants were asked to respond to general questions about the firm.

Section 2: Operation before the pandemic

The second section was intended to comprehend how the supply chains of the businesses taking part in the study used to operate before the pandemic.

Section 3: Operation during the pandemic

This part of the interview was related to the operation of the supply network during the pandemic. Questions in this section were formulated to address the challenges that the participants faced during the pandemic. Also, participants were asked what were the effective decisions taken to combat the pandemic.

Section 4: Recovery from COVID-19 and the future

The final section of the interview focused on the recovery that the participants went through when recovering from the pandemic. Questions in this section included the effect that the war had on their supply chain and their decision-making when recovering from the pandemic. The last question asked the participants how they envisaged the future of their business.

In Appendix 2, one can find a template of the interview questions asked. A day and time convenient to the participants were selected to conduct the interviews after the participants gave their consent to participate in the study. All participants opted to do the interview face-

to-face. The interviews were recorded using a smartphone, and then transcript afterwards. The interviews lasted thirty minutes.

3.7 Data Analysis

Since thematic analysis helps to determine differences and key relationships between the themes, this approach was used to analyse the qualitative data collected (Harding, 2013). First, after carrying out the interviews, the recordings were transcribed and read to identify the codes. These were then reviewed multiple times to make sure that all codes, trends and patterns are noted. Recurring topics that may be investigated and compared to the literature were identified (Braun and Clarke, 2006). Secondly, pattern codes were identified using a cognitive map of the key factors presented in the qualitative data.

The researcher kept an eye out for recurrent patterns during the data collection to determine whether there was a point of information saturation. This denotes the moment when no more information is discovered and denotes the right ending point for the interviews.

3.8 Ethical Considerations

Initially, an ethical form was submitted to the FREC to seek ethical approval. No data was collected before FREC gave their approval for this research. Approval was received on 13 June 2022. The primary data for this study were collected between 11 July and 2 August 2022. Before collecting any data, an information letter (Appendix 3) and a consent form (Appendix 4) were communicated to the participants, ensuring that they were informed what the study is all about and help them decide if they should participate.

Ethical considerations were explained to the participants to make sure that they are aware of their rights in participating in this study. The choice to participate was made by the participant, and this was attested to by their signature on the consent form. Before the interviews commenced, all participant gave their consent to be recorded. The permission to record the interview was also listed in the consent form. Interviewees were assured that they can stop the interview at any time, without having to give a reason or face any penalties. Also, following the interview, if participants felt that they do not want their input to be included, they were able to withdraw from the study any data gathered was erased as long as this was technically possible. Participants might experience psychological stress during the interview (Gray, 2014). The researcher avoided this psychological stress by ensuring that no individual was forced to participate or to answer all questions.

After the completion of the study and publication of results, all the data collected will be deleted within six months. To keep the identity of participants anonymous, the data was stored and presented in an anonymous form, with the use of pseudo-names. Also, participants were aware that some extracts from their interviews were going to be reproduced in the outputs in an anonymous form. Before the publication of results, participants had the possibility to review extracts from the transcripts and were able to make changes if they considered the change a necessity.

3.9 Conclusion

Interpretive research philosophy and a qualitative methodology were used to carry out this study. Also, a diversity case sampling was used to select the case studies, which were

organisations operating in Gozo. To collect the data, top-level managers were interviewed using semi-structured interviews. Thematic analysis was used to analyse the data collected. The researcher was ethical by being honest, and transparent and safeguarding the participants' anonymity all the time. In the next chapter, the data collected will be analysed and presented.

Chapter 4 – Data Analysis

This chapter aims to present the main themes which were identified from the qualitative data collected from the twenty-four interviews performed with Gozitan SMEs operating in the manufacturing industry, as well as importers and retailers. This exercise focuses on challenges that the participants faced during the pandemic, the effective decisions taken as well as the recovery and post-pandemic world. The themes extracted from the findings will be outlined and categorised as follows:

1. Challenges
2. Liquidity
3. Adaptability
4. Effective decisions
5. Recovery
6. Post-pandemic

Following the transcription of the interviews, codes were identified. These were then reviewed multiple times to make sure that all codes, trends and patterns are noted. Recurring topics that may be investigated and compared to the literature were identified. Pattern codes were identified using a cognitive map of the key factors presented in the qualitative data. The themes and codes extracted are presented in Appendix 5. All the persons invited for the interviews accepted to take part in this study, which is equivalent to a 100% response rate.

4.1 Theme 1 – Challenges

The first theme reflects on the challenges that businesses faced when they were hit by the pandemic. The interview started by asking the candidates what challenges they used to face in their supply chain before the pandemic. All participants stated that before the pandemic, the supply chain was an easy process and it was a normal routine. P7 explained:

“It was easy, we used to order when stock is running low and within a few weeks the order would be here. It was so much easier than it is nowadays. We rarely used to have any problems because we were used to the process, we had our suppliers, we knew how they work, and we had consistency. Prices were stable, deliveries were always on time.”

However, P17 highlighted that this is no longer the case because the pandemic disrupted the whole process of the supply chain:

“Nowadays, although it is still called supply chain, we are not operating in a chain, there are a lot of disruptions. Although we are still getting material shipped to us because we are still placing orders but there is no consistency.”

The challenges that one used to face before the pandemic, and the challenges that businesses were faced with during the pandemic, are completely different. P5 explained that during the pandemic, businesses faced additional challenges:

“You cannot compare the challenges that we had before the pandemic with the challenges that we were faced with during the pandemic ... The usual challenges remained there, but we faced additional challenges.”

However, not every business was impacted negatively. P6 explained that the pandemic didn't impact their supply chain because they kept operating business as usual:

“Operating before the pandemic, and operating during the pandemic, there was no difference in my supply chain. My business was not affected at all.”

P4 added that their business was not impacted mainly because their suppliers remained open during the pandemic, therefore, they kept placing orders regularly and didn't experience any major interruptions. P4 also added that they keep large stocks:

"However, we were not impacted because we still had enough stock to meet the demand because we have a large storage space."

The candidates were also asked whether their business was prepared for the pandemic. All participants explained that they were not prepared and no one was imagining that their business could be hit by such a major disruption. P18 highlighted:

"We never thought that we are going to be faced with such a major disruption ... it was a shock for us to adapt to."

Furthermore, the majority of the participants had no contingency plan in place to resist the COVID-19 pandemic, as stated by P4:

"I don't think that you can have any contingency plans because this pandemic was new, there was no one right way of doing business and therefore I don't think that we as a business could have developed any contingency plan."

Opposingly, P16 developed a contingency plan during the pandemic:

"Once we were hit by the pandemic, we immediately developed a contingency plan of how we are going to operate."

The majority of the participants explained that the challenges that they faced during the pandemic were the result of suppliers closing down due to lockdowns, and were also because of the lack of containers, as highlighted by P13:

"The suppliers we used to import from had to close down because of the restrictions that they had in their countries."

P3 highlighted that since they import mainly for the tourism industry, at the beginning of the pandemic when the government halted the tourism industry, they ended up with stores full of inventory:

“When we were hit by the pandemic, our stores were full of inventory.”

Then, when P3 was faced with a delay in orders and stock was running low, they were unable to keep up with the demand and some of their clients opted for different suppliers:

“Some of our clients opted for different suppliers ... there we lost clients which was a result of a delay in orders and because some of our suppliers closed down.”

A further challenge that businesses were faced with was concerning employees. During the pandemic, foreign workers returned to their country of origin, and local workers resigned, as stated by P18:

“Employees were a challenge on their own. A lot of our employees left during the pandemic, either to return to their countries ... or local workers left to work with the public sector.”

P8 and P10 added that customers were adding additional challenges to their business because they were hoarding goods and buying in bulk:

“We faced another challenge at the beginning of the pandemic, bulk buying.”

“Our clients started panicking and hoarding goods ... because they were afraid that this pandemic will impact the production of goods.”

When asked whether they were faced with different challenges in their supply chain, specifically during the pandemic, when compared to a business which operates in Malta, the majority replied that everyone faced the same challenges, as stated by P19:

“The challenges that we faced as a business in Gozo were faced also by a business operating in Malta.”

A side effect of all of this is that if something happens to one part of the business, it will have an impact on another part of the business, because after all in a supply chain, everything is interconnected. P5 stated:

“Every part of the business was affected because our production is a chain. When something happened to one part of the business, it had a negative effect on the rest of the business. Everything is interconnected.”

4.2 Theme 2 – Liquidity

The second theme is liquidity. It encompasses the problems which businesses faced during the pandemic, such as delays in orders, rising costs, increases in freight costs as well as delays with installations. An extract from P1 sums this up as follows:

“First, we experienced rising costs when it comes to transport ... There was a lack of raw materials ... Also, we experienced longer deliveries ... Prices increased phenomenally.”

Some candidates also highlighted that they were faced with cash flow problems because clients delayed payments but they were given less time to pay their suppliers. P1 and P17 highlighted this:

“We also experienced cash flow problems, because clients were taking longer to pay.”

“While before the pandemic we had 3 months to pay our suppliers, nowadays they are giving us less than a month.”

Additionally, P3 experienced a substantial reduction in sales, with some having no income at all:

“We had almost no sales at all ... In April till mid-May 2020, we didn’t receive a single euro.”

Opposingly, others experienced an increase in sales, as stated by P17:

“During the first few months of the pandemic ... we had an increase of around 20%.”

4.3 Theme 3 – Adaptability

To combat the challenges that the participants faced, they had to adapt to the new realities. Businesses had to plan way ahead when placing orders to ensure that they always had enough material in stock, given that they experienced a delay in orders, as stated by P14:

“Nowadays, once the container is here, we plan to place the next order because else we would be left with no products in stock until the next order is here because orders are taking very long to arrive, and that would stall our sales.”

Instead of ordering more frequently, P2 decided to increase their stockholding to combat the delay in orders:

“The stockholding of certain materials was increased from 3 months to 6 months to ensure no disruptions in the chain.”

P18 started communication with different suppliers as well, although this was not always easy:

“When some of our suppliers closed down, we had to search for different suppliers.”

Technology played a very important role during the pandemic. P15 stated that they already had an IT infrastructure in place that enabled them to adapt immediately to telework:

“We already had a good IT infrastructure in place and when Malta found the first cases, we switched immediately to telework because we already had the system in place.”

P15 added that to continue with their operation, they had to adapt to online consultations and take orders through their website:

“We also offered online consultation services which were very effective to continue with our sales.”

Additionally, certain businesses invested in a website and had to increase digital marketing. P3 stated:

“We set up a website and started accepting online orders ... we increased our digital marketing campaigns to raise more awareness.”

P14 mentioned that to combat the rising prices of raw materials, they had to shorten the validity of quotes:

“Quotes were valid for 31 days, nowadays I am only giving the client 5 days to decide because the future is uncertain and prices are fluctuating every single day.”

Certain businesses used to work on a limited number of projects before the pandemic, however, since they were experiencing a delay in orders and a lack of certain raw materials, businesses opted to work on multiple projects simultaneously. P12 stated:

“We started to work simultaneously on different projects because sometimes, we had a lack of a certain material.”

P13 also highlighted that during the pandemic, they had to start importing unrelated material:

“We were asked to import protective equipment such as face masks and PPEs, which were unrelated to our usual business.”

4.4 Theme 4 – Effective Decisions

The fourth theme focuses on the effective decisions that businesses took when dealing with the pandemic. Indeed, P18 explained that if their decisions were effective and on time, else they would have not been able to survive:

“If my decisions were not effective and on time, I would have lost sales and I would have closed down the business eventually, but that was not the case.”

Opposingly, P11 said that although some of the decisions taken were beneficial and on time, others were not that effective:

“If we could have known what was going to happen and how the pandemic was going to develop, I would have taken more decisions. ... I think that the decisions taken were effective, however, I believe that I could have taken more effective decisions.”

To combat the challenges that the pandemic brought with it, certain businesses opted to stop importing certain materials. P16 stated:

“We had to stop importing certain products from a certain brand because their prices were too expensive to be sold in the local market.”

The participants also highlighted that it was essential for them to increase their engagement with suppliers. P18 stated:

“You cannot have a successful business and not have continuous communication with your suppliers. For us, our suppliers are everything.”

P13 tried to order in larger quantities, however, they were not successful because of the shortages of raw materials:

“We tried to order in larger quantities but we were not given any additional materials.”

Some participants found new suppliers and opted to import from them. P12 stated the following:

“Our suppliers closed down immediately at the beginning of the pandemic because of the lockdowns. Therefore, we had to opt for different suppliers.”

However, it was not always easy to change suppliers as outlined by P16:

“Some businesses could have opted to import from different manufacturers, but we were not able to do that because clients come here and they tell you I want a Samsung washing Machine or a Bosch air conditioner. So, how could I change my suppliers if these are the renowned brands that are the most popular.”

An effective decision taken by P17 was to exchange materials with competitors:

“Sometimes we also had to exchange some materials with other businesses.”

Given that suppliers were giving less time for businesses to pay, they had to give less time for customers to pay. P17 stated:

“We have to request money from our clients as soon as possible.”

4.5 Theme 5 - Recovery

After two years of dealing with the challenges that the pandemic brought with it, businesses started to recover. First of all, P7 highlighted that the pandemic is not over yet for the business world, as shown in this quotation:

“We are still experiencing the repercussions nowadays, now that everyone is saying that the pandemic is over. The pandemic may be over for the public, but it's not over for us as a business.”

When businesses started to recover from the pandemic, they immediately faced the war. P2 stated that the war worsens the situation because it had stronger repercussions and the problems that businesses faced during the pandemic were prolonged during the war:

“The impact was much bigger than that of the pandemic. No one was expecting that after the pandemic, we were going to face a war. In our case, when it comes to supply, the impact was much worse than the impact of the pandemic because delays were delayed even further, and prices kept rising.”

Theme 1 showed that some businesses were not faced with any additional challenges when the pandemic hit them. However, they cannot say the same when they were hit by the war. P6 stated:

“When we thought that we got rid of the pandemic and thank God we were not affected, we faced the war, which, unfortunately, I wish that I could say that we were not affected as well.”

All the participants were faced with further delays, and prices and freight costs increased even further. P24 stated:

“We faced rising costs, delays in orders, problems finding enough containers to ship our orders from the country of origin to Gozo, freight costs increase so much. Also, now we had to start and search for different suppliers to try and bargain prices.”

When businesses were hit by the war, they experienced a lack of raw materials. P17 explained:

“One of the challenges we faced was the lack of materials when recovering from the pandemic.”

P21 also highlighted that when they were recovering, they were faced with a national election, which imposed additional challenges to their recovery plan:

“The war and the election ... the election because a lot of our employees left the business and got employed by the public sector.”

Moreover, P20 added that they experienced a decline in sales when they were recovering from the pandemic:

“During the war, we saw a decrease in sales, for 2 main reasons, first of all, because prices increased and secondly because nowadays people are going abroad on holiday again.”

4.6 Theme 6 - Post-pandemic world

The final theme deals with the post-pandemic world and the future. When the participants were asked how they plan their future, there were mixed reactions. P2 stated that the future is bright and if they keep understanding the market, they should be able to survive:

“... if we keep understanding the market, and providing the market with what they want, we are facing a bright future.”

P6 mentioned that in the future they want to grow their business and increase sales:

“I wish to grow my business. During the pandemic, I manage to grow my business by 20%, and in 5 years I plan to grow the business by 100%.”

Additionally, P19 added that they are not afraid of the future, and they want to internationalise the business, as evidenced in this quotation:

“We will start exporting paint, plastering and cement in the future.”

Opposingly, P12 stated that their business will slow down in the future:

“I am envisaging that business will slow down a bit in the local market.”

As stated by P8, in the future they want to strengthen further their supply chain by searching for different suppliers and switching to direct imports:

“The future, as I just told you, we are in the process of growing the business to the next step and starting importing products directly ourselves.”

However, the future is not bright for every business. P7 stated that they cannot plan their future because they are living in a highly uncertain dynamic environment:

“Unfortunately, the future is still uncertain. I cannot predict. We don’t know what the future holds.”

P1 and P11 highlighted the fact that after facing Brexit followed by another black swan and then by the war, it is time for some businesses to start joining forces together, as shown in these quotations:

“I think that in the future, some businesses will have to join forces together and operate as one business.”

“We hired a consultant to study our sector and our business and he recommended that now it’s a good time to join forces with other businesses.”

Almost all participants mentioned that a major problem that is going to persist in the future is labour shortages, given that they are opting to go and work with the public sector instead. P6 and P23 stated:

“I am not finding enough employees to keep up with the demand which is a burden to continue to grow the business. Everyone wants to get employed by the government.”

“The problems that we are facing are workers ... everyone is leaving us to go and work for the government.”

Furthermore, facing staggering interruptions in the economy, the world could now face a recession, as stated by P2 and P10:

“... we are aware that the world now can go through a recession, ...”

“I think that like other countries, we will have to face a recession.”

P21 ended by stating that delay in orders is the future, and businesses have to adapt to the new realities:

“I would say delays are something normal nowadays. I think it will take several years to return to the supply chain and delivery time we had before the pandemic if we will ever return to those pre-COVID days.”

4.7 Presentation of finding to the Gozo Business Chamber (GBC)

A significant business organisation in Gozo is the GBC. It was discovered during the fieldwork that the CEO of the GBC might provide useful information. Therefore, the results of this study were presented to the GBC for their comments, as indicated in the methodology chapter.

It is important to highlight that the GBC was unaware of some of the findings that this research explored. The GBC was aware that people were buying in bulk, but was not aware that customers were hoarding goods. Also, the GBC thought that the supply chain of a Gozitan business was impacted more severely, than the supply chain of a Maltese business. However, this was not the case. Additionally, the GBC was not aware of businesses were being given less time to pay suppliers. The major shock and most interesting result to the Chamber was that some businesses are thinking to join forces. Another shock to the Chamber was the labour shortages that SMEs are being faced with. The Chamber highlighted that this could be a major problem to persist in the future, given that employees are opting to go and work with the public sector due to more security. Although the GBC was aware of the majority of the problems as a whole, they were not aware of the way businesses dealt with the pandemic and tackled certain problems.

4.8 Conclusion

In summary, the results have shown that during the pandemic, businesses dealt with additional challenges. Before the pandemic, the supply chain was routine, while during the pandemic, businesses were faced with several challenges such as delays in orders, rising prices and a lack of supply. The results highlighted how local businesses were not prepared for the pandemic and contingency plans were not in place.

Additionally, businesses faced cashflow problems because clients delayed payments, while suppliers were demanding immediate payments from customers. Participants started communicating with different suppliers and they had to plan way ahead when placing orders. Furthermore, to adapt to the new realities, businesses had to take effective decisions under these stressful conditions.

When businesses started to recover from the pandemic, they were immediately faced with another setback, and the problems that businesses faced during the pandemic were prolonged during the war. The major problems that businesses are facing are labour shortages. Some businesses expressed that to be able to survive in the future, they need to join forces, facing the fear that they might face a recession.

The following chapter will present a discussion of the findings presented in this chapter with the literature presented in Chapter 2.

Chapter 5 – Discussion

The main aim of this dissertation was to explore the effects COVID-19 had on the supply chain of Gozitan businesses and to comprehend how supply chain decision-making were made during the pandemic by analysing the manufacturing industry; importers and retailers. Furthermore, the link between the main stakeholders was investigated by interviewing top managers from Gozitan SMEs.

In chapter 2, the literature on supply chain and supply chain management together with the impact that COVID-19 had on the supply chain was reviewed. In the previous chapter, the findings collected from the interviews were presented leading to six main themes. These themes were chosen because of how well they fit with the theories presented in Chapter 2. The purpose of this chapter is to discuss the results in light of the literature available

5.1 Summary of the findings

This research aimed at answering three main research questions. The first research question, ‘What effect did COVID-19 have on supply chain decision-making?’ was addressed under the themes of ‘Challenges’ and ‘Liquidity’. One of the main findings here was that the pandemic disrupted the whole process of the supply chain. The participants were not prepared and did not have any contingency plan in place to resist the pandemic. The problems which businesses faced during the pandemic include delays in orders, rising costs, increases in freight costs as well as delays with installations. Some participants also highlighted that they were faced with cash flow problems. Additionally, during the pandemic, foreign workers returned to their

country of origin, and local workers resigned. Customers were adding additional challenges to businesses because they were hoarding goods and buying in bulk.

The second research question read: ‘How did such businesses manage to adapt their supply chain, with strategic decision-making to continue operating?’ This was addressed under the theme of ‘Adaptability’. The main findings under this theme included that businesses had to plan way ahead when placing orders, given that they experienced delays. Technology played a very important role because businesses had to adapt to telework and online consultations. To combat the rising prices of raw materials, businesses had to shorten the validity of quotes. Additionally, since businesses were experiencing a delay in orders and a lack of certain raw materials, they opted to work on multiple projects simultaneously.

The third and final research reads, ‘What were the effective decisions taken during the COVID-19 pandemic by such businesses?’ was answered under the theme of ‘Effective Decisions’. This theme revealed that some decisions taken were very effective and on time, however, there were other decisions which were not that effective. To combat the challenges that the pandemic brought with it, certain businesses opted to stop importing certain materials. The results also show that it was essential for them to increase their engagement with suppliers. Some participants found new suppliers and opted to import from them, however, it was not easy due to the shortages of raw materials.

The findings also shed light on the recovery challenges that businesses were faced with when recovering from COVID-19, and how businesses envisage their future in a post-COVID-19 world. Indeed, these were two important themes that were discussed in the preceding chapter because they shed light on how COVID-19 affected these businesses. A major finding was that

once businesses started to recover, they immediately faced the war. It worsens the situation because it had stronger repercussions and the problems were prolonged. Those businesses which were not impacted by the pandemic, unfortunately, were hit badly because of the war. Regarding their future, some participants explained that they cannot plan their future because we are living in a highly uncertain dynamic environment. A major finding was that after facing staggered economic shocks, it is time for some businesses to start joining forces together. Almost all participants mentioned that a major problem that is going to persist in the future is the labour shortage, given that they are opting to go and work with the public sector due to more security. Furthermore, facing staggering interruptions in the economy, the world could now face a recession.

5.2 Implications of theory

The majority of the findings were consistent with the literature presented in Chapter 2. Below, the general research findings are presented and compared to their implications on theory.

Businesses were faced with several liquidity problems in the past two years. The findings revealed that businesses experienced shortages of raw materials and orders were delayed. Additionally, prices kept rising due to a scarcity of raw materials. The findings complement the literature because the literature showed that the pandemic impacted supply chains severely (Cai and Luo, 2020; Remko, 2020, Ulucan Erkesim, 2021). During the pandemic, businesses were operating in situations of uncertainty. Indeed, today's supply chain managers are tasked with managing more complex supply networks.

To combat the spread of the virus, several restrictive measures had to be introduced by several counties, including travel restrictions, lockdowns and slow importation (Cai and Luo, 2020; Farlow, 2020). These resulted in more restricted commercial activity. Indeed, the results highlight that the main challenges that participants faced during the pandemic were the result of suppliers closing down due to lockdowns, and a lack of containers.

Some candidates highlighted that they were faced with cash flow problems because clients delayed payments and they were given less time to pay their suppliers. To combat the rising prices of raw materials, businesses had to shorten the validity of quotes. Businesses had to plan way ahead when placing orders to ensure that they always had enough material in stock. Due to the closure of factories and value chain disruption, several firms were experiencing difficulties finding suppliers to satisfy their demands. When one experiences transportation interruptions and therefore, items shipped may not arrive on time, the supply network may be harmed and there is the risk of damaging the service level to the clients (Albertzeth, 2020).

Although during the past 10 years, the world has seen more than 1,400 epidemic outbreaks, businesses did not have any recovery or resilience plan in place and were simply hoping to get rid of the pandemic as soon as possible. Goel, et al., (2021) state that to survive and secure a sustainable supply network, firms must carefully anticipate the challenges that may develop throughout the recovery process and put in place appropriate safeguards. Firms may face more difficulties recovering from larger pandemics because these outbreaks have serious, lasting effects on organisations (Paul, et al., 2021).

To combat the challenges that the pandemic brought with it, certain businesses opted to stop importing certain materials. It was essential during the pandemic for businesses to increase

engagement with their suppliers. The theme of effective decisions revealed that businesses had to search for new suppliers and opt to import from them, which was not always an easy process. Magableh (2021) stated that the pandemic caused supply network interruptions in the majority of organisations' capabilities. A successful reaction requires knowledge of current and anticipated market disruption.

Businesses had to adapt fast to the dynamic environment that COVID-19 brought with, or else organisations risked bankruptcy. According to Briguglio, et al. (2006), businesses need to adapt quickly when faced with shocks. The data collected raised concerns about how organisations responded to the sudden and unanticipated changes in their external economic environment. However, it was evident from the interviews that almost every participant needed to adapt in some way.

The theme of adaptability revealed that businesses had to plan way ahead when placing orders to ensure that they always had enough material in stock, given that they experienced a delay in orders. The primary data collected revealed that none of the participants was prepared for the pandemic, and no one was imagining that their business could be hit by such a major disruption. When a unit is well prepared to manage and adapt, the shock potential damage is reduced and the bounce back will be faster (Schipper and Longston, 2015). Bahadur et al. (2015) stated that a unit increases its resilience to shocks by being informed of the risks it is exposed to, the factors at play, and its strengths.

Telework has been widely used as a means of ensuring company continuity as a result of the COVID-19 pandemic (Tavares et al, 2020; Mihalca et al, 2021). Indeed, the findings revealed that, teleworking played a very important role during the pandemic because businesses had to

opt for telework practices. Also, businesses had to adapt to online consultations and take orders through their website. Indeed, these were all strategic management decisions which were taken to lessen the impact of the pandemic.

When businesses began to recover from COVID-19, they were immediately faced with the war, which worsens the situation because it had stronger repercussions and the problems that businesses faced during the pandemic were prolonged. This study revealed that businesses experienced further delays, and prices and freight costs increased even further.

A major problem that is going to persist in the future is the labour shortage, given that they are opting to work with the public sector instead. This could be because the private sector was hit harder than the public sector during the pandemic. After all, the latter kept operating with minimal changes. Due to uncertainties, employees in the private sector were scared of losing their job. Therefore, an employee in the public sector has more security than an employee in the private sector.

For an organisation to have a successful supply chain, managers must continuously analyse what is happening in the external environment and take effective decisions (Manuj and Sahin, 2011). Indeed, participants stated that delays in orders are part of their future, therefore, businesses must adapt to the new realities. Understanding the skills and capabilities of the supply chain is necessary for building resilience. According to Francis (2020), continuous monitoring of global events and possible disruptions is necessary for effective responses. Continuity plans make it possible for a corporation to keep an eye on crucial items and the place of origin to check for any potential disruptions.

5.3 Implications of practice

The challenges that one used to face before the pandemic, and the challenges that businesses faced during the pandemic, are completely different. During the interviews, all candidates stated that before the pandemic, the supply chain was an easy process and it was routine. This is no longer the case because the majority of the participants explained that COVID-19 disrupted the whole process of the supply chain. However, some participants explained that the pandemic didn't impact their supply chain. They kept placing orders regularly and didn't experience any major interruptions. If a supply chain can continue operating at the required level of performance irrespective of a disturbance, it is said to be resilient. According to Ishfaq (2012), businesses may increase the resilience of their supply networks by keeping their transportation operations flexible in the face of disruptions in the transportation system. One can conclude that those businesses which had a stronger supply chain were faced with fewer challenges and they managed to tackle the pandemic better than those businesses which had a much more complex supply chain.

This research revealed that a lot of decisions have to be made under stress and pressure. Some of the participants explained that their decisions were effective and on time. Opposingly, others explained that some decisions taken were not that effective. This finding complements the review by Starcke and Brand (2012) who found that humans do not always make well-informed strategic judgments under stress. Therefore, this study suggests that the pandemic was a stressful environment which required a lot of decision-making under enormous pressure, which sometimes led to ineffective decisions.

Technology played a very important role during the pandemic. When possible, participants had to switch to telework practices to be able to continue with their operations during the pandemic. Some participants, when faced with the pandemic, had to invest in the infrastructure to be able to use telework practices. However, some already had an IT infrastructure in place. Therefore, the latter was able to adapt immediately to telework and continue operating without any disruptions.

From the data collected, one cannot conclude whether a business within the same niche was impacted more positively or negatively than its competitors. If one looks at the two manufacturers of upward garage doors interviewed for this study, one mentioned that the business didn't face any major disruptions during the pandemic, while the other business mentioned that the pandemic impacted severely the business. Again, if one looks at the importers of tiles and bathrooms interviewed for this study, some mentioned that the pandemic had no repercussions on their business, while others stated that they experienced major challenges.

5.4 Reflections and Recommendations

From the results presented in the previous chapter, one can see how important it is to have a resilience plan in place. The results showed that businesses were not expecting the pandemic and had no contingency plan in place showing the need for more preparation. Businesses must be more resilient and develop a recovery plan to be able to adapt to economic shocks quickly.

One of the major findings that this study revealed was that after facing several economic shocks, Gozitan SMEs are planning to join forces together to be able to combat the future.

Another important finding that this study revealed was that a major problem which is going to persist in the future, is labour shortages, given that they are opting to go and work with the public sector instead. Moreover, businesses are aware that they could face a recession, and indeed they are planning for such an instance. These 3 findings were even surprising for the Chamber.

Businesses must also build stronger supply chains, by re consolidating their supply chain in Europe. Businesses complicated their supply chains because they started to import from countries such as Turkey and China, which during the pandemic showed that this is not sustainable. Therefore, one of the recommendations the researchers propose is that businesses must rethink their supply chain and opt to import from European countries.

The results also revealed certain businesses had only one supplier for a particular product, and during the pandemic, they had to search for different suppliers to keep up with the demand. However, this was not easy because everyone was facing the same challenges, which were lack of raw materials and delay in orders. Therefore, another recommendation is that businesses should keep contact with multiple suppliers when possible so that if something happens in one part of the supply network, they can rely on the other part of their supply network.

We are operating in a different environment nowadays, that is, what used to work in the past does not mean that will continue to work in the future. Businesses must be innovative in such an uncertain environment. Therefore, this research recommends that Gozitan businesses must move more towards a service-based economy to survive. Additionally, adaptation to new and emerging trends is essential. Businesses must realise that change is constant.

Finally, nowadays, the public and private sectors are in direct competition. In 2020, the percentage distribution of full-time employment by region of work, with the public sector in Malta stood at 21%, while in Gozo full-time employment with the public sector by region of work stood at 32% of the total full-time employment on the island. After discussing with the Chamber, the researcher recommends taxing all overtime earned for employees working in the private sector at a flat rate of 15%.

5.5 Further Research

Since no study has been done about the effects of the pandemic on the supply network of Gozitan SMEs operating in the manufacturing industry, as well as importers and retailers, this dissertation should act as a starting point for future investigations.

The same study should be repeated, but this time it should analyse SMEs operating in the manufacturing industry, as well as importers and retailers, which operate in Malta. A similar research approach should be used. Themes that support the conclusions of this dissertation may potentially result, along with additional themes.

In a post-pandemic world, some participants stated that a major problem that is going to persist in the future is the labour shortage. Additionally, after facing several economic shocks, some businesses stated that they are thinking of joining forces together. These are two areas of interest which should be studied further. Indeed, the GBC showed the need to study further the matter of businesses joining forces together since this was even a surprise for them. Additional research based on the recommendations discussed should focus on the future rethinking processes of businesses to be able to survive in this dynamic environment.

5.6 Obstacles and Limitations

During the process of carrying out this research, some limitations were incurred. The major limitation was the lack of prior research on the subject under study that was explicitly focused on the local scenario, especially in Gozo. Indeed, the literature review referred to international academics, due to the lack of research.

Although this study had a 100% response rate, one of the limitations faced was that at first, participants were finding it difficult to find a thirty-minute slot to carry out the interview. However, when assured that the interview will not take longer than thirty minutes and that all data will be kept confidential, they accepted.

A further limitation was that originally, two interviews were going to be conducted with each case study – one with the director and another one with the supply chain manager. However, participants were not willing to sacrifice thirty minutes each. Therefore, one interview had to be conducted with each case study.

Out of the 24 interviews, only five were female. This shows a gender imbalance; therefore, one could argue that this study does not adequately represent both genders and hence the findings need to be interpreted with caution.

5.7 Conclusion

The outbreak of COVID-19 has had a major effect on businesses and economies across the globe. This study has clearly illustrated how the COVID-19 pandemic impacted the supply chain of Gozitan businesses. Due to the lack of research specific to the island of Gozo, this study helped to better understand the impact of the pandemic on the supply chains of Gozitan SMEs. Additionally, this study also gained an understanding of the adaptability of these organisations to the changing conditions and evaluated what is happening in a post-COVID-19 world.

Although no one was prepared for the COVID-19 pandemic or had any contingency plan in place, businesses were highly adaptable to the pandemic, which significantly lessened the pandemic's severe negative consequences. However, uncertainty and unpredictability were significantly concerning businesses. Since things were changing so fast, businesses were unable to make long-term plans.

This study revealed three main problems that businesses will have to deal with. First, a major problem is the labour shortage, given that employees are opting to go and work with the public sector instead due to more security. Secondly, participants are aware that after facing staggered interruptions in the economy, the world could now face a recession. Lastly, facing consecutive shocks, the results revealed that it is time for some businesses to start joining forces together. Businesses must reconsolidate their supply chain in Europe and it's time for businesses to rethink. We are operating in a different environment nowadays and what used to work in the past does not mean that will continue to work in the future.

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Appendices

Appendix 1 - A Detailed Description of each case study

Company	Characteristics
P1	This is a manufacturing business which manufactures furniture. Also, they import and sell ready-made furniture too. Mainly they manufacture furniture for contracts, but also domestic homes.
P2	This is a major manufacturing company in the food industry.
P3	Recently, this business moved to direct imports of food and beverages and is a known distributor and retailer with local restaurants, bars and hotels.
P4	This company is a manufacturer of aluminium apertures both for contacts as well as for the domestic market.
P5	This is a manufacturing business which focuses mainly on manufacturing aluminium apertures for the local market.
P6	This manufacturing company manufactures upward garage doors
P7	This business manufactures upward garage doors, shutters and gates
P8	This business is a major wholesaler of food and beverages, cleaning products and detergents to name a few. They sell both to supermarkets as well as smaller grocery shops.
P9	This business is an importer and retailer of tiles and bathrooms.
P10	This business is an importer and retailer of tiles and bathrooms.
P11	Importers, wholesalers and retailers of building materials and finishings

P12	This business is a carpenter, specifically they manufacture furniture for contract work. They focus specifically on work related to restaurants, hotels and healthcare projects
P13	This is a major business in Gozo which import and sell all sort of building materials.
P14	Importers and retailers of air conditions, solar panels and solar water heaters
P15	This is another major import and retailer of furniture, doors, bathrooms and tiles. They import everything that has to deal with the furnishing of an apartment.
P16	This business is an importer and retailer of refrigerators, cookers, microwaves, air conditioning, washing machines and other appliances.
P17	This is an importer and retailer of flat glass.
P18	Importers and retailers of tiles, furniture, and wall panels.
P19	This is a manufacturing business which focuses on manufacturing blocks of bricks, paint, cement, plastering, insulation, waterproofing, tile adhesives and grout, stone and protection.
P20	This is a manufacturing business which manufactures furniture. They are also importers of house furnishing such as lighting, mattresses and house decorations to name a few.
P21	Mainly they focus on importing and retailing furniture. they also have a small niche where they manufacture some products in-house such as wall frames.
P22	Importers and suppliers of marble, granite, travertine and other natural stone, as well as patterned tiles and quartz.

P23	Importers and manufacturers of blinds.
P24	Importers and retailers of furniture and tiles.

Appendix 2 – Interview Questions

Section 1: General introduction about the business

1. Describe the nature of your business?
2. What is your position within the company?
3. How Many employees do you employ?

Section 2: Operation before the pandemic

4. How would you describe your supply chain operation before pandemic?
5. What were your challenges in supply chain operation during the pandemic?
6. Was your business prepared for a major disruption as COVID-19?

Section 3: Operation during the pandemic

7. Which areas of your business were most impacted?
8. Where the challenges during COVID different than before pandemic or you faced the same challenges?
9. Has the COVID-19 pandemic changed the way you operate your supply chain?
10. Did you take decisions differently during the pandemic?
11. What were the effective decisions taken in specific situations related to the COVID-19 with regards to lock downs, suppliers closing down, delay in orders?
12. You import your raw materials yourself, right?
13. Where your decision effective and on time? Would you make the same decisions?
14. Is your company engaging with suppliers to address supply issues both during the pandemic and now that the pandemic is over?

15. Did your company have a contingency plan in place that could be deployed during COVID-19?
16. Do you think that operating a business in Gozo effected the supply chain differently than operating a business in Malta during COVID?
17. And during the March – May 2020 period, when the government introduced restrictive measures to cross between the 2 islands, were you effected by that?

Section 4: Recovery from COVID-19 and the future

18. Did the war worsen the effect on your supply chain and on your decision making?
19. What are the challenges you faced in recovering from COVID-19?
20. What changes are needed to strengthen your supply chain against future disruptions?
21. How are you envisaging your future?

Appendix 3 - Information Letter

Dear Sir/Madam,

My name is Jan Luca Gatt and I am a student at the University of Malta, presently reading for a Masters of Science in Strategic Management and Digital Marketing. I am presently conducting a research study for my dissertation titled “The impact of COVID-19 on supply chain decision making in Gozitan organisations”. This is being supervised by Ms Gertrude Spiteri. This letter is an invitation to participate in this study. Below you will find information about the study and about what your involvement would entail, should you decide to take part.

My study aims to assess the effect that COVID-19 had and is still having on the supply chain of Gozitan businesses and to understand the supply chain decision-making during the pandemic. Your participation in this study would help contribute to a better understanding of the impact that the pandemic is having on your business. Any data collected from this research will be used solely for the purposes of this study.

Should you choose to participate, you will be asked a number of questions relating to the impact that the COVID-19 pandemic had on your supply chain, and what decisions you had to take in order to adapt to the new realities you faced, and are still facing today because of the war.

Data collected will be treated confidentially and only Ms Spiteri and I will have access to the raw data. Data sources will be pseudonymised when the data is published.

Participation in this study is entirely voluntary; in other words, you are free to accept or refuse to participate, without needing to give a reason. You are also free to withdraw from the study

at any time, without needing to provide any explanation and without any negative repercussions for you. Should you choose to withdraw, any data collected from your interview will be erased as long as this is technically possible (for example, before it is anonymised or published), unless erasure of data would render impossible or seriously impair the achievement of the research objectives, in which case it shall be retained in an anonymised form.

If you choose to participate, please note that you will be benefiting directly from the outcome of this study, as this will be sent to you once published. Your participation does not entail any known or anticipated risks.

Please note also that, as a participant, you have the right under the General Data Protection Regulation (GDPR) and national legislation to access, rectify and where applicable ask for the data concerning you to be erased. All data collected will be stored in an anonymized form upon completion of the study. A copy of this information sheet is being provided for you to keep and for future reference.

Thank you for your time and consideration. Should you have any questions or concerns, please do not hesitate to contact me by e-mail at: jan.gatt.18@um.edu.mt. You can also contact my supervisor via email: gertrude.spiteri.95@um.edu.mt.

Sincerely,

Jan Luca Gatt

jan.gatt.18@um.edu.mt

Ms Gertrude Spiteri

gertrude.spiteri.95@um.edu.mt

Appendix 4 - Participant's Consent Form

“The impact of COVID-19 on supply chain decision making in Gozitan organisations”

I, the undersigned, give my consent to take part in the study conducted by Jan Luca Gatt. This consent form specifies the terms of my participation in this research study.

1. I have been given written and/or verbal information about the purpose of the study; I have had the opportunity to ask questions and any questions that I had were answered fully and to my satisfaction.
2. I also understand that I am free to accept to participate or to refuse or stop participation at any time without giving any reason and without any penalty. Should I choose to participate, I may choose to decline to answer any questions asked. In the event that I choose to withdraw from the study, any data collected from me will be erased as long as this is technically possible (for example, before it is anonymised or published), unless erasure of data would render impossible or seriously impair achievement of the research objectives, in which case it shall be retained in an anonymised form.
3. I understand that I have been invited to participate in the interview in which the researcher will be asking me questions and I answer accordingly to investigate the effect that COVID-19 had and is still having on our supply chain. I am aware that the interview will take approximately 30 minutes. I understand that the interview is to be conducted in a place and at a time that is convenient for me.
4. I understand that my participation does not entail any known or anticipated risks.
5. I understand that a direct benefit to me from this study will consist of further awareness on the impact of the COVID-19 on the supply chain decision making on similar

businesses in this sector. I also understand that this research may benefit others in the same sector, as the study will be disseminated to those who are participating, though identities will remain anonymous.

6. I understand that, under the General Data Protection Regulation (GDPR) and national legislation, I have the right to access, rectify, and where applicable, ask for the data concerning me to be erased.
7. I understand that all data collected will be erased on completion of the study and following publication of results, within 6 months of completion.
8. I have been provided with a copy of the information letter and understand that I will also be given a copy of this consent form.
9. I am aware that, if I give my consent, this interview will be audio recorded and converted to text as it has been recorded (transcribed).
10. I am aware that, if I give my consent, extracts from my interview may be reproduced in these outputs in anonymous form [e.g. respondent A, B etc].
11. I am aware that I may ask to be given the opportunity to review relevant extracts of the transcript of my interview before the results of the study are published. I am also aware that I may ask for changes to be made if I consider this to be necessary.
12. I am aware that my data will be pseudonymised; i.e., my identity will not be noted on transcripts or notes from my interview, but instead, a code will be assigned. The codes that link my data to my identity will be stored securely and separately from the data, in an encrypted file on the researcher's password-protected computer, and only the researcher and his supervisor will have access to this information. Any hard-copy materials will be placed in a locked cupboard. Any material that identifies me as a participant in this study will be stored securely for the duration of the study.

13. I am aware that my identity and personal information will not be revealed in any publications, reports or presentations arising from this research.

I have read and understood the above statements and agree to participate in this study.

Name of participant: _____

Signature: _____

Date: _____

Jan Luca Gatt

jan.gatt.18@um.edu.mt

Ms Gertrude Spiteri

gertrude.spiteri.95@um.edu.mt

Appendix 5 – Codes and Themes

Codes	Themes
SC was a routine before COVID Not prepared for the pandemic No contingency plans Suppliers Closing Down / remained open People hoarding the goods / bulk buying Lack of containers Stores full of inventory Limited storage capacity Unable to keep up with demand Local customers opted for different suppliers Foreign workers left Gozo and Malta same challenges	Challenges
Delay in orders Rising Costs Clients taking longer to pay Freight Costs increased Lack of supply Less time to pay suppliers Delay with installations	Liquidity
Found alternative markets Plan way ahead when placing orders	Adaptability

Worked on multiple projects simultaneously Started communication with different suppliers Started importing unrelated material Shorten the validity of quotes Switched to online consultation Increased digital marketing Invested in a website Increased stock holding	
Stopped importing certain products Ordered more frequently Found new suppliers Exchanged materials with other businesses Gave less time for customers to pay Engagement with Suppliers increased Tried to order in larger quantities, but unsuccessful	Effective Decisions
Pandemic not over yet The war worsens the situation COVID problems were a continuation during war Not finding raw materials Lack of products Election Decrease in sales	Recovery
Grow the business Problems regarding employees Business will slow down	Post Pandemic/ Future

Recession	
Search for different suppliers	
Uncertain	
Join forces	
Export and internationalize	
Strengthen further the supply chain	