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The 9th International Conference on Marketing and Retailing**SUPPLY CHAIN DISRUPTIONS IN THE FOOD
MANUFACTURING INDUSTRY**

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Abstract

During the COVID-19 pandemic disaster, the food industry must deal with four significant challenges that arise in the logistics and supply chain for food. During this outbreak, the most difficult difficulty for businesses is acquiring funds to develop internal capacity and supply enough supplies to society. In times of crisis, social communication is critical. When the food supply system in Canada was disrupted by the COVID-19 epidemic, short-term panic buying became self-perpetuating. Automotive, pharmaceutical, food, healthcare, and aerospace are the top five industries most likely to be affected by changes in manufacturing facility location. Automotive, pharmaceutical, food, healthcare, and aerospace are the top five industries most likely to be affected by changes in the location of manufacturing facilities, suppliers, and distribution facilities. These five industries are crucial to the economy and account for the majority of the country's manufacturing. During the COVID-19 pandemic disaster, the food industry must deal with four significant challenges that arise in the logistics and supply chain for food. The COVID-19 pandemic prompted consumer stockpiling, resulting in product shortages at major stores across the country and an increase in home delivery. During this outbreak, the most difficult difficulty for businesses is acquiring funds to develop internal capacity and supply enough supplies to society. The efficiency-seeking benefits of locating production are linked to forecasts of increased costs from new import and export taxes, as well as border delays induced by new customs clearance processes.

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1. Introduction

Supply chain disruptions refer to the inability of a company to match demand with supply. They are unintentional incidents that negatively impact a company's normal operations and can occur on both the supply and demand sides of the supply chain (Abideen et al., 2023; Sivan et al., 2023). The causes of supply chain disruptions can be diverse and include natural disasters such as pandemics, floods, storms, fires, and tsunamis, as well as events such as the loss of critical supply chain employees or IT system failures. These disruptions can have a major impact on a company's operations and can lead to decreased productivity, increased costs, and lost revenue (Abideen et al., 2023). Companies need to have a plan in place to deal with disruptions to minimise their impact and maintain continuity in their operations. Dealing with disruptions in the supply chain is an important part of any company's strategy (Aljoghaiman & Sundram, 2023). Having a plan in place to deal with disruptions can improve a company's ability to recover and minimise losses. This can also give companies a competitive advantage by allowing them to minimise the impact of disruptions on their operations and maintain continuity in the face of unexpected events.

Effective supply chain disruption management requires a combination of proactive and reactive strategies (Siti Noor Roseamirah et al., 2020). Proactive strategies such as diversifying suppliers, building up inventory, and implementing flexible production processes can help companies prepare for and minimise the impact of disruptions. Reactive strategies such as crisis management and contingency planning are also important for quickly identifying and addressing disruptions as they occur. It is also important to note that supply chain disruption management necessitates a level of resilience and toughness to endure unforeseen and often unwelcome setbacks. This requires the ability to adapt quickly to changing circumstances and make difficult decisions to protect the company's operations and maintain continuity.

The food service industry has been greatly affected by the COVID-19 pandemic, leading to an increase in research on the subject. These studies primarily focus on the various types of shocks that have occurred during the pandemic. Demand-side shocks such as panic buying or hoarding have led to imbalances in food supplies and shortages in the early stages of lockdowns in many countries. This was caused by increased demand due to stockpiling by consumers and disruptions in transportation and logistics. Natural disasters such as tsunamis, firestorms, hurricanes, and earthquakes can have devastating effects on communities, not only in terms of human lives but also in terms of damage to financial and natural resources. These types of events can significantly disrupt food supply chains (FSCs), particularly in island territories, where the geomorphology and insularity make them net food importers and rely on the domestic FSC's stability and capacity to sustain supply chain nodes after a disruptive event. The disruptions caused by natural disasters can have catastrophic effects on the food supply and availability of the people living in these territories. These disruptions can also cause significant economic losses and damage to infrastructure, making it difficult for the community to recover and rebuild.

2. Supply Chain Disruptions in Food Manufacturing Industry

2.1. Natural Disaster

Supply chain interruptions have a significant impact on a company's financial, operational, and market performance. The disruptions arise from external, internal, and financial limitations. External vulnerability factors appear to be evenly spread around the city. The total system failure had a significant impact on their business. The loss of telecommunications (cell, Internet, land phone, etc.) and energy (power, batteries, back-up generator failures due to a lack of diesel fuel, etc.), poor transportation systems (vehicles, obstruction in streets, a lack of stop lights, insecure main and distant roads, etc.), and government intervention (FEMA controlling ports, local government curfews/shutdown, water rationing plan, etc.) hampered their ability to return to a regular operational pace for a length of time following the Hurricane Maria event. For example, in September 2017, Hurricane Maria made landfall and severely destroyed Puerto Rico's electric power infrastructure and resulting in the loss of all communications and Internet connection for months. The Category 5 hurricane destroyed 80% of the island's agricultural value and damaged hundreds of communications towers, roads, bridges, and ports.

Besides, internal vulnerability variables seemed to be distributed differentially among individuals. In the situation of limited resources, for example, increasing demand and insufficient inventory posed a dilemma. They agreed that due to panic buying by customers, product supply, namely drinking water and non-perishable and canned food, ran out a few weeks after the occurrence (Bhatti et al., 2023). For example, in Canada, when the food supply chain was interrupted by the COVID-19 epidemic, short-run panic buying became self-perpetuating, and the government and food sector limited food product purchases. Not only that, after Hurricane Katrina, customers said that they would buy as much as they could after travelling considerable distances to find an open business. Consumers acknowledged buying more than they required in the weeks after the Great East Japan Earthquake happened. In terms of financial limitations, their financial troubles came when telecommunications failed and banks were unable to transmit electronic payments or cash on time. The only payment option available for conducting business was a return to the previous cash and temporary credit system.

2.2. Geopolitical Disruption

Effects of man-made and natural disruptions on industrial placement decisions in the literature that is currently available are usually neglected, geopolitical events affect where manufacturing facilities are located (Al Daghan & Sundram, 2023). This is a crucial omission given the intensity and regularity of geopolitical events. Recent political difficulties, such as the termination of NAFTA and the US-China trade war, have resulted in significant shifts in the location of industrial facilities. Managers need advice on how to relocate production assets in the event of a geopolitical disruption to prevent supply delays at border crossings and price increases caused by newly installed tariff and non-tariff barriers.

The food supply chain is also expected to be significantly impacted by Brexit, the following statement describes how supplier locations are moving to the UK which is certain suppliers are being changed as a result of preparations for a "no deal" scenario. In the food business, this has frequently led to

supply being diverted to the UK whenever it is practical, such as buying fresh chicken in the UK rather than from Poland. Due to cost and UK capacity, this activity frequently has restrictions that limit how much can be accomplished. Massive stockpiling occurred in the UK food industry in anticipation of border crossing delays following Brexit, which can lower the shelf life of perishable commodities. The adoption of a worldwide production and supply chain model by major frozen food manufacturers has been the most significant change. They stockpiled up in anticipation of Brexit as a short-term plan to avoid stockouts caused by border delays. This has come at a significant cost and expense, with the possibility of having a negative influence on corporate operations and earnings during regular seasonal peaks and promotions such as Easter (Goulding & Pomfret, 2022).

2.3. Pandemic

The global lockdown measures put in place to slow the spread of COVID-19 have had a significant impact on food security. The restrictions on movement and economic activity have disrupted food production, processing, and distribution. The COVID-19 pandemic has caused disruptions in the food production industry worldwide. Many crops are being left unharvested due to a shortage of farm workers and border restrictions. Many migrant workers, who typically make up a large portion of the farm labour force, are hesitant to travel and work due to fear of contracting the virus (Vatumalae et al., 2022, 2023). This has led to significant losses for farmers and a potential shortage of certain foods in the market. According to recent research, UK farmers are concerned about a shortage of personnel to complete the timely harvest of fruits during the COVID-19 pandemic (Ramanathan et al., 2022). The virus has resulted in consumer stockpiling, which has led to product shortages at supermarkets and an increase in home deliveries. This has created a major challenge for firms in the industry, as they struggle to find funding to expand internal capacity and meet the increased demand for supplies. This has led to a significant economic impact on the agricultural industry, as well as potential food security concerns for the country.

The global lockdown measures put in place to slow the spread of COVID-19 have had a significant impact on food security. The closure of borders and disruptions in transportation have led to difficulties in the import and export of food, which has affected developing countries that rely heavily on imported food and cannot produce enough food to meet their domestic needs. This has led to food shortages and price increases, putting pressure on vulnerable populations who already have limited access to food. Additionally, the disruptions in transportation and logistics have made it more difficult for food retailers and distributors to meet the needs of their customers and maintain stable food supplies, leading to further strain on food security. The panic buying by the public, as a reaction to the pandemic, also created imbalances in food supplies and shortages in the early stages of lockdowns, which further exacerbated the food security issue (Alabi & Ngwenyama, 2023). The COVID-19 pandemic has had a significant impact on the financial stability of Canadians, leading to job losses and reduced work hours for many individuals and families. This has led to increased financial insecurity and economic hardship for many, including difficulty affording necessities such as food. Food insecurity experts have warned that the pandemic's financial impacts could lead to a significant increase in the number of Canadians experiencing food insecurity. Food insecurity refers to the lack of access to enough food for an active and healthy life, and it

is a complex issue that is influenced by various factors including poverty, unemployment, and inadequate social support. The government has implemented various measures to address the issue, such as increasing funding for food banks and nutrition programs. However, the situation remains challenging as the pandemic continues.

3. Mitigation Strategies

3.1. Natural Disaster

For resilience, they mitigate disruptions by innovation, adaptivity, transformation, and flexibility. Innovation appears to be a mitigating factor for system collapse. They discovered a technique to communicate as a priority to restore their companies' functioning. Some relocated their staff to areas where some mobile towers were operating, while others set up ad hoc Wi-Fi networks and still others utilised satellite phones; regardless of the technology employed, the goal of establishing connections was only partially met. Besides, adaptivity aided in mitigating the effects of government interventions. Because of federal and municipal government initiatives, they were forced to hunt for replacement or new items to suit client demand. One participating group proposed that FEMA establish its working zones in ports to prevent interfering with ordinary import/export activities.

For example, according to Banana Association members, they said that 100% of the banana and plantain harvest was lost and they had to ask the government for approval to import these products from the Dominican Republic and Costa Rica. Besides, the coffee farmers added that they had to purchase coffee from neighbouring countries since all of the harvests and coffee plants were lost. Last but not least, transformation and flexibility helped in mitigating limited resources and financial limitations. In terms of transformation, they discovered that the single component shared by all participant groups was the purchase of more inventory. They raised their concerns about the government's excessive tax collection and the long-term viability of these emergency or alternate inventories. For example, in terms of flexibility, six out of seven (86%) participant groups felt that flexible financial arrangements with suppliers and purchasers would alleviate possible financial constraints created by a systemic financial system failure during a crisis management scenario.

3.2. Geopolitical Disruption

The first one is an eclectic paradigm. The latest benefaction to the eclectic paradigm considers government policy as a facilitator of resource-seeking advantages through infrastructure supply, market-seeking benefits through market access, and efficiency-seeking benefits through tax cuts and subsidies. Uncertainty in government policy is the driving reason for production relocation, as seen by multinational corporations' reactions to Brexit. This is an important result since the eclectic paradigm assesses uncertainty in connection to internalisation variables, and it demonstrates that hierarchical governance styles emerge when increased uncertainty is mixed with opportunism and restricted rationality.

According to Raassens et al. (2022), the key drivers of the manufacturing supply chain site selection were market-seeking and efficiency-seeking benefits. Access to the bigger European Union (EU) market and access to international trade accords negotiated between the EU and third nations were

among the market-seeking benefits for UK-based enterprises shifting manufacturing to the EU. The biggest incentives for UK-based firms to keep production in the UK were proximity and convenience of access to UK clients, as well as maintaining customer service benefits. The efficiency-seeking benefits of a UK-based location is to consider shifting production to the EU were connected to estimates of rising costs from new import and export tariffs, as well as border delays caused by new customs clearance processes. Another major consideration was the need to minimise currency fluctuations connected with having facilities in the UK and selling in the EU, where transferring facilities to the EU would eliminate exchange rate changes. Managers contemplating maintaining manufacturing in the UK stated that the key efficiency-based advantages for avoiding the high cost of shifting operations were the avoidance of tariff/non-tariff obstacles.

3.3. Pandemic

Buffering in supply chain management refers to the strategies and practices used to reduce dependency on specific supply chain partners and mitigate risks. There are two main types of buffering strategies: exploitative buffering and exploratory buffering (Raassens et al., 2022) Exploitative buffering strategies are focused on gaining business from alternative supply chain partners or new markets. This can be achieved through service innovation, such as developing new products or services or improving existing ones. It also aims to increase competitiveness and gain a strategic advantage over other supply chain partners. Exploratory buffering strategies, on the other hand, aim to reduce the importance of specific supply chain partners by increasing efficiency and reducing costs. This can be achieved through process innovation, such as automating processes, improving logistics, or outsourcing certain activities. The goal of exploratory buffering is to increase the resilience of the supply chain and decrease the impact of disruptions.

Both exploitative and exploratory buffering strategies are important for supply chain management as they help to mitigate risks and maintain stability in the supply chain (Rajagopal et al., 2016). It helps companies to be more flexible in their approach, to be able to adapt to changing market conditions, and to increase their resilience. Supply chain resilience is a proactive, holistic approach that aims to prepare and adapt to unforeseeable disruptions. It involves reducing uncertainty and vulnerabilities by developing the capacity to quickly respond to changes brought by a supply chain disruption. Enhancing resilience is essential to maintain business continuity during disruptions such as the COVID-19 pandemic. Adaptability is a key element of supply chain resilience as the desired state after a crisis is often different from the original, pre-crisis state. This means that supply chain resilience goes beyond simply reacting to disruptions and enables actors within the supply chain to not only resist difficulties but also gain an advantage by moving to a new, more desirable state. This is important as it allows the company to adapt to the new market conditions and increase its competitiveness. Supply chain resilience is not only reactive but also proactive. It requires a systemic view of the supply chain and the ability to anticipate and adapt to potential disruptions. This can be achieved through various strategies such as diversifying suppliers, building up inventory, and implementing flexible production processes. This is key for companies to be able to prepare for unexpected disruptions and maintain stability in the supply chain.

4. Recommendation

There are several recommendations based on the issue above which are knowledge management, to avoid geopolitical disruption, and agility in responding to unprecedented changes. Knowledge management is a process of adopting critical thinking in an organisation (Sundram & Jaafar, 2021). They must understand first the main issue developing supply chain disruption in their company and to mitigate it, they need to recognize an important resource and join other organisations to collaborate to manage the disruption. Knowledge management can be tacit, explicit, in individual opinion, a pool of group discussion, and public and private knowledge (Umar et al., 2021). Knowledge management capabilities can be divided into two categories which are knowledge infrastructure capabilities and knowledge management process. According to Umar et al., (2021), knowledge infrastructure capabilities can be divided into three capabilities which are technical, structural, and cultural as a basis in an organisation while the knowledge management process is a process of acquisition, creation, sharing, and utilisation to get in line in the market.

Managers should be aware of how important it is to base emergency plans on worst-case scenarios to avoid geopolitical disruption. This gives companies a framework on which to build their plans and makes them less worried about the risks in the supply chain. Aside from that, you can also avoid these problems by being proactive. For example, investing in risk detection and market intelligence, which gives valuable information that can be used to make plans, is one way to do this. If a proactive approach won't work, it's best to take a reactive one. This could mean buying extra stock, getting more and different suppliers, and making the supply chain stronger. Last, taking a "wait-and-see" approach at first, which involves gathering information, is a good way to reduce the perceived uncertainty in the supply chain. This makes it easier for a company to make decisions that cost a lot of money and commit real resources.

Last but not least, agility in responding to unprecedented changes is very crucial to avoid lead time and customer distrust regarding food manufacturing processing. Due to the lockdown and hectic phase of the pandemic, many food industries created a sharp downturn and rethought their strategies (Raassens et al., 2022). Not only that, the demand is also shifting from physical stores to online platforms and some of the supply chain has been disrupted such as the packaging of food items in food manufacturing (Do et al., 2021). A speed of responsiveness strategically becomes a competition to the supply to fulfill customer demand. Firms and their supply chains must continue to provide competitive benefits in the entire market by bringing down the cost to the normal price (Mkumbo et al., 2019). Overall, supply chain disruption in food manufacturing can be prevented in some way to ensure it can fulfill the demand in the market and reduce the derecognized lead time while developing new products to change the marketplace (Selvaraju et al., 2019).

5. Conclusion

This is the first research to look at food supply chain (FSC) resilience from the standpoint of a net food importer economy in the aftermath of a natural disaster and a prolonged CI system breakdown. It emphasises the significance of integrating transportation, distribution, and telecommunications infrastructure, which has been overlooked in prior research. Food security is a critical concern for the

economy of importing islands. Based on the findings, this work adds to the literature on food supply chain resilience by developing an FSC resilience model that describes the food product and transport flow across production, processing, distribution, and retailing in the event of CI collapse following a natural disaster.

There is no denying the difficulty of the food supply system. Regardless of whether the business has international operations or relies on local suppliers, they must always maintain a high standard of quality and safety for the completed product. In general, organisations can manage their supply chains more successfully the more communication and collaboration there is between them. Big gains can be achieved by concentrating on a few key areas. They will have a more effective supply chain, better goods, and more devoted consumers if they invest in the finest suppliers, seasoned logistics partners, and the correct technology. The consideration of business performance is also very crucial (Nurul Syakirah et al., 2020).

There is no doubt that the food supply system is complicated. Whether the company has international operations or relies on local suppliers, the finished product must always meet a high standard of quality and safety. In general, the more communication and collaboration there is between organisations, the more successfully their supply chains may be managed (Selvaraju & Sundram, 2017; Zulfakar et al., 2019). Concentrating on a few important areas can result in significant gains. They will have a more efficient supply chain, better products, and more loyal customers if they invest in the best suppliers, experienced logistics partners, and cutting-edge technology.

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