



## **Russo-Ukrainian War Effects on Brown-Forman Finland Supply Chain Operations**

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Bachelor of Business Administration

Thesis

2023

## Abstract

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<b>Degree</b> Bachelor of Business Administration
<b>Report/Thesis Title</b> Russo-Ukrainian war effects on Brown-Forman Finland supply chain operations
<b>Number of pages and appendix pages</b> 45 + 8
<p>We live in a very concerning time since now there has been going on war for more than year-and-a half between Russia and Ukraine, which has affected millions of people's lives. Russo-Ukrainian war has negatively also affected lots of businesses. Author decided to investigate further on how Russo-Ukrainian war has affected the supply chains and its operations of Brown-Forman Finland (BFF).</p> <p>This research analysed the current supply chain operational performance and the effects of Russo-Ukrainian war on the supply chain operations of Finlandia Vodka at Brown-Forman Finland. The aim was to analyse the effects of Russo-Ukrainian war on BFF's supply chain operations and how can BFF prepare for future crises. By doing so, the company can see the effects of war on its supply chain operations, improve the supply chain operations and be prepared for any future crises by creating good contingency plan and crisis strategy.</p> <p>The author chose to focus the research on the interpretation of numerical data and on the overall structure of the supply chain processes. The primary data was collected while working as a Logistics Specialist at the company. There were also several meetings with the company's Managing Director, Sami Pulkkinen. The secondary data used for analyses was comprised of the company's own data, which was related to the company's supply chain operation's performance results.</p> <p>The findings revealed that the Russo-Ukrainian war had negative impact on Brown-Forman Finland's supply chain operations. Many important supply chain performance metrics and supply chain operations were affected negatively by the Russo-Ukrainian war. The research also revealed that Brown-Forman Finland's supply chain operations, emergency strategy and contingency plan needs to be improved to stay prepared for any future crises.</p>
<b>Key words</b> KPIs, Bullwhip Effect, Contingency plan, Risk assessment, Supply chain operations, Supply chain disruption

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# 1 Introduction

This is a research-based bachelor's thesis for the Degree Programme in International business in the major specialization of Supply Chain Management in the Haaga-Helia University of Applied Sciences. The thesis aims analyse and investigate how current on-going crisis has affected the supply chain operations of the case company, and lastly the thesis provides outcomes of the current crisis that the case company can use for preparing for similar unfortunate event in future. In this first chapter you will find introduction to author's thesis topic, research question, project scope, benefiting parties, and key concepts.

## 1.1 Background

We live in a very concerning time since now there has been going on war for more than year-and-a half between Russia and Ukraine, which has affected millions of people's lives. This war is official called Russo-Ukrainian war, and the actual conflict started already in 2014 February however February 2022 it escalated into a full-blown war by Russia invading Ukraine (Science Direct 2022).

Russo-Ukrainian war has negatively affected millions of people, but also lots of businesses. Author specializing himself in Supply Chain Management, he wanted to investigate on how this war has affected the supply chains and its operations of international companies, specifically Brown-Forman Finland (BFF). Russia and Ukraine have both been very important countries for supply chain operations worldwide. Russia and Ukraine have been important strategically for transporting goods through their territories to other countries, both have lots of production sites for global companies, and the citizens of these countries are important customers for different international companies. On top of that, because of the sanctions placed on Russia, it has affected enormously the whole global supply chain.

Working in one of the leading spirits distributing companies globally, Brown-Forman Finland (BFF), author realized how much has this international conflict daily affected the supply chain operations of BFF. This inspired the author to focus and analyse deeper on the outcome of the war to Brown-Forman Finland's supply chain operations.

The author in this thesis will explore the deeper consequences of the current crisis on the company's supply chain operations and will help the company to navigate through crisis in the future.

## 1.2 Research questions

The aim of the thesis is to analyze the effects of on-going war between Russia and Ukraine on supply chain operations of Brown-Forman Finland. The outcomes of the thesis will provide Brown-Forman an outcome on how has this on-going war affected the supply chain of company. In the future, Brown-Forman can use this thesis as a reference if similar event would occur.

This thesis will be written based on Brown-Forman Finland example, which is one of the leading spirits distributor's branch company globally. This thesis covers the impact of international conflict on a globally distributing liquore company.

The research question (RQ) of this thesis is "What is the impact of the Russian-Ukrainian war on Brown-Forman Finland supply chain operations?" The research question was divided into investigative questions (IQ)

IQ 1. Which functions of Brown-Forman Finland were affected during the Russo-Ukrainian war?

IQ 2. What kind of challenges has the war caused to Brown-Forman and what are the risks?

IQ 3. How have the business figures changed during the war for Brown-Forman Finland?

IQ 4. What kind of strategies has Brown-Forman Finland applied to overcome the challenges caused by the war?

IQ 5. What could be the contingency plan for Brown-Forman Finland in future for political crises?

Table 1. Overlay matrix

Investigative questions (IQS)	Theoretical Framework (chapter)	Research methods	Results (chapter)
IQ. 1: Which functions of Brown-Forman Finland were affected during the war?	2.1 Overview of supply chain management and global supply chain	Mix of quantitative research and qualitative analysis: discussion with the managing director	4.1 Supply chain processes of Finlandia Vodka in Brown-Forman Finland
IQ. 2: What kind of challenges has the war caused to Brown-Forman Finland and what are the risks?	2.2 Crises effects on supply chain operations and their functions	Quantitative desktop research	4.2 Challenges and risks caused by the war
IQ. 3: How have the business figures changed during the war for Brown-Forman Finland?	2.3 Supply chain management KPIs and their correlation to crises 2.4 Bullwhip Effect theory	Quantitative desktop research	4.3 Brown-Forman Finland changes in performance figures
IQ. 4: What kind of strategies has Brown-Forman applied to overcome the challenges caused by the war?	2.5 Risk assessment in supply chain management	Mix of quantitative desktop research and qualitative interview method with managing director	4.4 Risk assessment by Brown-Forman Finland
IQ 5: What could be the contingency plan for Brown-Forman Finland in future for political crises?	2.6 Strategies to overcome crisis in supply chain	Mix of quantitative desktop research and qualitative interview method with managing director and author's analysis	5.1 Contingency plan improvement for Brown-Forman Finland

### **1.3 Delimitation**

In this thesis author will be using lots of company's provided data to cover the Russo-Ukrainian war effects on the whole Brown-Forman Finland supply chain operations. The focus will be on Brown-Forman Finland company, which distributes Finlandia vodka internationally. Author will be covering theory of supply chain management and supply chain operations. Also, author will be defining what is crisis and what are the effects of the crisis on the global supply chain management in general and specifically on Brown-Forman Finland supply chain operations. Additionally common risks and challenges caused by crisis will be explained and correlated to Brown-Forman Finland's operations. Lastly author will be explaining risk assessment and strategies to overcome the challenges and risks associated with crisis, and how can Brown-Forman Finland be prepared for crisis in the future. Furthermore, the research will help the author and company to see the deeper effects of Russo-Ukrainian war on Brown-Forman Finland's supply chain operations. The thesis will also include a conclusion and contingency plan with an emphasis on allowing the reader to draw upon their own thoughts and opinions.

### **1.4 Benefits**

This thesis will benefit the management of company by providing outcomes of how the crisis has affected the supply chain business and performance figures. Furthermore, it will help the company to prepare for crisis in the future by knowing what can be expected based on current crisis and use this thesis to create a contingency plan for future crises. It will show the SCM management team how have the KPIs been influenced by on-going crisis. For BFF's finance team this thesis will be a great example on how has the crisis affected the different financial KPIs. Finally, it will show the BFF how well company has been performing during the on-going crisis.

For myself this thesis will allow me to understand better how the supply chain operates in the company and will give me a better understanding of how supply chain works in big corporations such as Brown-Forman. On top of that, it will show me the outcome of global crisis on the global supply chain and will give me knowledge on how can companies prepare for crisis in future. Also, it will provide me different business contacts for future and will make me more valuable for the commissioning company, where I am currently working at.



## 1.5 Key concepts

The purpose of this subchapter is to outline the key concepts in which the reader can gain an understanding on key concepts which relate to the thesis topic.

**Crisis** is an occurrence, or a chain of occurrences, that significantly disrupts businesses. A crisis happens suddenly and causes a lots of difficulties or risks to companies. It creates emergency situation where choice must be made quickly. The main types on crises are natural disasters, technological disasters and accidental disasters. (NI Business 2013)

**Crisis, conflict** and **war** are all interconnected. They are all characterized by enmity, unrest, tension, and hatred between rivals. (Brecher 1996, 127)

**Russo-Ukrainian war** is an ongoing armed conflict between Russia and Ukraine that started in February 2014 with the covert invasion of the Ukrainian autonomous republic of Crimea by disguised Russian Troops. On February 2024, Russia launched a full-scale invasion of Ukraine. (Ray 2022)

**Supply chain** is a group of people and businesses responsible for producing a product and getting it to the consumer. The raw material producers are the first links in the chain, and the last link of the chain is the transportation that delivers the finished product to the end user, which is consumer. Supply chain consists of producers, vendors, warehouses, transportation companies, distribution centers, and retailers. (Hayes 2023)

**Global supply chain** is defined by International Labour Organization as “cross-border organization of activities required to produce goods or services and bring them to consumers through inputs and various phases of development, production and delivery” (ILO 2016).

**Bullwhip effect theory** is defined by CIPS as “the demand distortion that travels upstream in the supply chain from the retailer through to the wholesaler and manufacturer due to the variance of orders which may be larger than that of sales” (CIPS 2022).

**KPIs** are crucial key performance indicators and measures of company’s results and goals. KPIs give strategic and operational improvement a direction, give decision-making an analytical foundation, and help focus on what matters most to the company’s success. Managing KPIs includes setting goals, and monitoring development towards those goals. (Henningan 2023)

**Risk assessment** is an analysis of the probable consequences of a crisis or danger. Risk assessment is done through the process of risk assessment. There are various risks to take into

account, and each risk may have a wide range of potential outcomes due to or as a result of it. (Ready 2023)

**Contingency plan** is a tool used by management that involves the whole organization. Contingency plan helps a company in responding to particular circumstances or crises that may or may not be beyond company's control. This plan is most oftenly included in risk management, disaster recovery, and emergency planning. (Leonard 2023)

**Safety stock** is defined by Zoho as "an extra quantity of a product which is stored in the warehouse to prevent an out-of-stock situation and it serves as insurance against fluctuations in demand" (Zoho 2020).

## 1.6 Commissioning company: Brown-Forman Finland

The comissioning company is Brown-Forman Finland (BFF). It was established in 2013 and it is a branch of Brown-Forman Corporation (BFC), that is mainly responsible for production and distribution of Finlandia vodka, which this thesis will be focusing on. Brown-Forman specialises in alcoholic beverages distribution world wide. It owns alcoholic beverages brands such as: Jack Daniels, Finlandia, Woodford Reserve, Old Forester, Benriach Ford Gin and many more. Company has 5,200 employees, operates in over 170 countries and is 5<sup>th</sup> largest global spirits company. Brown-Forman has corporate offices and production facilities in more than 50 cities around the world. In 2022 Brown-Forman Corporation generated net sales worth of \$3.9 billion, and operating income of \$1.2 billion. (Brown-Forman 2023)

Brown-Forman being one of the leading global spirits companies worldwide, it has been affected heavily by current crisis. Therefore, it is important for the company to see the outcomes of the crisis to it's supply chain- and business operations deeper which the thesis will be focusing on and analysing.

## 2 Theoretical framework

In this segment author will be covering the theoretical framework which discuss author's key concepts in more details. This includes supply chain and global supply chain definitions, different crises effects on SCM, KPIs and their correlation to crises, bullwhip effect theory, risks, risk assessment, and finally strategies and contingency plan on how to overcome crisis and be prepared for crisis in the future. Author has included figure to visualise the work below as Figure 1.

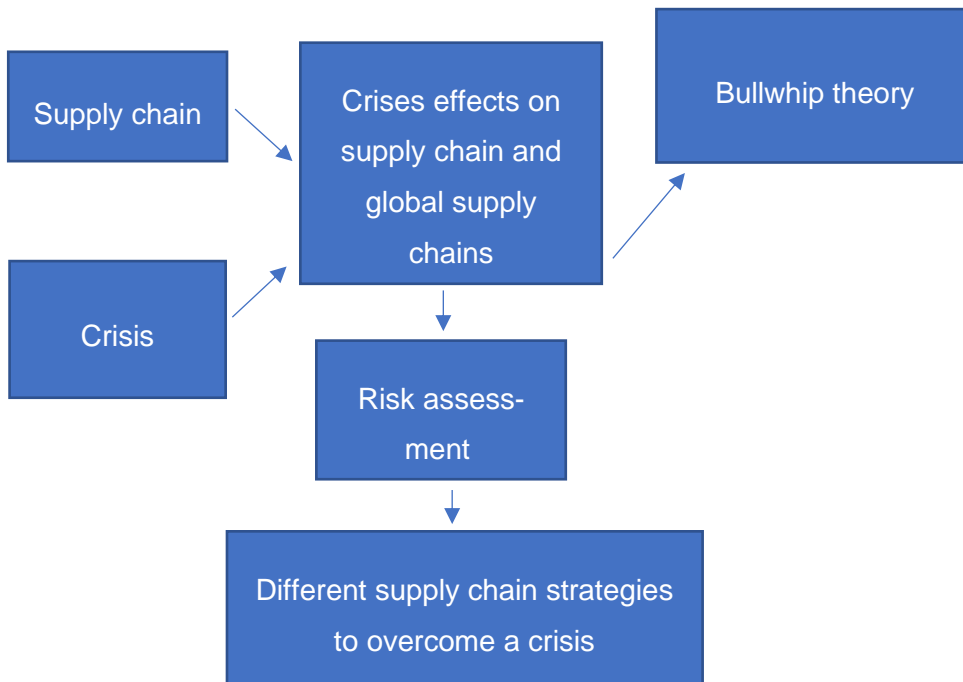


Figure 1. Thesis framework

### 2.1 Overview of supply chain management and global supply chain

In this chapter definitions of supply chain and global supply chain are defined. The focus is on understanding the main concepts of both supply chain and global supply chain since it is a relevant and important phase for this thesis. It makes it simpler for the reader to understand a supply chain and the differences between supply chain and global supply chain, and how they function.

#### 2.1.1 Supply chain and supply chain management

A supply chain is a chain that consists of different interconnected parts and functions to create the finished goods or service that customer purchases (McKinsey & Company 2022). It's a chain of networks of businesses, people, functions, information, and resources which creates and delivers the end product or service to the final end consumer in a timely and economical manner. Although the idea and concept of supply chain has been around for centuries, it was not until the early 1900s

that it became recognized as a business process. At that time, manufacturers started employing assembly-line production techniques to boost productivity and save costs (Ashcroft 2023).

Based on McKinsey & Company (2023) article, supply chain consists of:

- Producers create or grow the raw materials for goods.
- Vendors purchase and sell materials.
- Manufacturers transform raw materials into finished products.
- Transport and logistics companies move products around the world.
- Supply chain managers make sure everything from planning to sourcing raw materials, manufacturing, delivery and returns runs smoothly.
- Retailers sell goods and services either online or physically in stores.
- Consumers purchase the end product or service and use it.

Supply chain involves numerous different suppliers, manufacturers, retailers, and transportation providers. In big international companies there could be thousands of different suppliers and lots of manufacturers, retailers, and transportation providers. (Ashcroft 2023)

The main goals of the supply chain are to source, produce and move goods from their original destination to a final destination, in most cases from a supplier to an end consumer. Supply chains can be very complex, crossing multiple countries and having lots of crucial processes. The chain consists of crucial processes and functions, they can be broken down into 5 different and simple functions. The key processes in a supply chain are:

1. Sourcing and procurement of raw materials.
2. Processing and manufacturing raw materials into basic parts by using suppliers.
3. Assembling finished goods from basic parts.
4. Making finished goods and services available for purchase to end users.
5. Transporting and delivering finished goods and services to end users or consumers.

(Blume 2019)



Figure 2. Supply chain elements. (adapted from CFI 2023)

According to IBM (2018) supply **chain management** (SCM) is “the handling of the entire production flow of a good or service – starting from the raw components all the way to delivering the final product to the consumer”. Meaning supply chain management manages every stage of a company’s product or service, from initial creation to final sale. A SCM is the term for the centralized control of the flow of goods and services, which encompasses all operations that convert raw materials into finished goods. The difference between supply chain and supply chain management is that the supply chain begins with distribution of raw materials from a supplier to a manufacturer, and it ends with the delivery of the finished good or service to the customer. However, supply chain management controls every little function of the whole chain and ends with product return, if needed. There are so many points throughout the supply chain where efficiency can add value or lose value due to higher costs, effective SCM can boost revenues, cut costs, and have an impact on a company’s bottom line. SCM controls the production, shipment, and distribution of a product. Supply Chain Management monitors and controls supply side activities to maximize consumer value and get competitive advantage in the market.

There are 5 crucial parts and operations of supply chain management as the end goal for SCM is to minimize shortages and keep costs down (Fernando 2021):

1. **Planning** is important to match manufacturing and customer demands with supply. It’s crucial to know what their customers need and plan accordingly to that. It corresponds to raw materials needed during every stage of manufacturing, equipment, technology, and finally employees.

2. **Sourcing and procurement** are another key component, to make sure that all the raw materials are in compliance with the requirements for manufacturing goods. Also, that the prices paid are consistent with what the market would anticipate. In the event of crisis, the vendor should have the flexibility to send emergency supplies. It is important that the supplier has a track record of providing goods that are both on time and of high quality.
3. **Manufacturing** is the key element of production, and it should be planned throughout. The manufacturing process consists of machinery, labor and other external forces to make a new product out of raw material. During the manufacturing process, companies must be aware of waste and other manageable issues that could lead to changes from the original intentions.
4. **Delivering** comes in the stage when the product is ready and sales are made, and the company needs to deliver the end product to the end customer. It is important for the company to have good transportation and logistics strategies to ensure the product arrives safely, on time and cost effectively.
5. **Returning** is the final process of supply chain management and is called reverse logistics. The company must make sure that it has a good returning system in place for customers to return products and refund for returns received. An important part of returns is identifying defective products and non-conforming products which will save the company's whole supply chain management operations.

To conclude supply chain and supply chain management, they are very important since they help companies to achieve lots of business goals. Controlling production processes will enhance product quality while lowering the chances of recalls and legal action and assisting in the development of a powerful consumer brand. Controls over shipping processes will enhance customer service by preventing expensive shortages or periods of inventory overproduction. Overall, supply chain management is very important, and it gives businesses several chances to increase their profit margins and is especially important for global businesses. (Fernando 2022)

### 2.1.2 Global supply chain

The company analysis is done based upon Brown-Forman Finland company, which operates internationally, and that means BFF's supply chain and operations are global. Therefore, it is important for the reader to understand the differences between the supply chain and the global supply chain in the company analysis chapter.

Almost all supply chains are global to some level. All the supply chains include things like materials, parts, and services that come from another country that will be in the final product in the supply chain. However, that is not the only thing that makes the supply chain a global supply chain. The

global supply chain is not only an extension of the domestic supply chain, but it is more complex, has diverse set of conditions of environment, and in it's harder to manage. It faces a global economy when it comes to producing, trading, consuming, and using technology. Also, usually the end goal of global supply chain is also different. (Larsen, Schary, Mikkola & Kotzab 2007, 399.)

A **global supply chain** can be defined as using an international network for producing goods and services. The networks are usually in different countries and continents to supply and source goods. Global supply chain allows companies to purchase and use goods that foreign companies manufacture. Flow of information, resources and processes are worldwide in global supply chain, and it is referred also as global value chains. Key functions in global supply chain are very similar to domestic supply chains such as: material purchasing, production planning, resourcing, sales forecasting, and customer service but just performed internationally. Global functions help global companies to lower production costs and operate on high-scale efficiency. (Indeed 2023)

The main benefits of using global supply chain over domestic supply chain are (Indeed 2023):

- Reduced costs by having access to finding raw materials for cheaper prices by outsourcing labor and resources to countries with lower costs.
- Higher quality suppliers by having access to multiple suppliers and partners which in turn improves quality of products and services.
- More customers worldwide by entering worldwide markets.
- Quicker transportation and better logistics to distant locations by having manufacturing operations worldwide.

The main differences between the global supply chain and domestic supply chain are in higher environmental and structural complexity. In **environmental complexity**, there are lots of different dimensions, political and foreign-exchange risks, cultural and geographical differences. Also, legal systems and infrastructures are different than in domestic supply chains. **Structural complexity** involves different businesses functions, organizational forms, markets, and goods all which a company must be able to manage and have control over. (Larsen, Schary, Mikkola & Kotzab 2007, 400.)

Some of the main key points and functions global supply chain deals with are (Larsen, Schary, Mikkola & Kotzab 2007, 400.):

- Supplying value proposition to consumers around the world, not just domestically.
- Competing with competitors from around the world.

- Adapting company's supply chain to different national environments with different culture, politics, economics, business practices, tax and legal systems.
- Dealing with global politics of economy and trade practices.
- Confirms the availability and performance of transportation infrastructure and telecommunications.
- Managing the international network of suppliers, production plants, intermediaries, and customers in the whole supply chain.
- Responds to changes in monetary exchange rates by moving production to lower cost sites by re-routing the whole network.

There are huge differences between the local supply chain and global supply chain. Global supply chain involves various different functions, opportunities, risks, complications but also lots of different benefits. A global supply chain operates worldwide; however, domestic supply chain operates within one country and has less functions, complications and risks.

## **2.2 Crises effects on supply chain operations and their functions**

It is crucial to understand the effects of crises on supply chain operations and their function since in the case company analysis, the author will be analyzing how crisis has affected case company's supply chain operations and functions.

Crises happen to lead to disruptions in the supply chains. Supply chain disruption can be defined as a supply chain which is not functioning optimally (McKinsey & Company 2022). These disruptions have a detrimental impact on the economic wellbeing of a nation by causing shortages of essential goods, price inflation, industry closures, and undelivered goods. They also have an impact on a wide range of goods, from pricey goods like vehicles and technology to basics like food, medications, oil, and gas, all of which affect the cost of living. Supply chain bottlenecks and rising freight costs have a major and cumulative impact on prices, especially for producers and manufacturers who import goods like fertilizer and construction goods. Many country's economies rely largely on imported goods, are largely dependent on imports and they are susceptible to negative effects of supply chain disruption on both productivity and consumption. (FTI 2022, 1)

Supply chain disruptions can be caused by different events, such as natural disasters, political instability, wars, and customer demand changes (Hans 2021). These disruptions cause changes for businesses, customers, and the whole economy but most importantly they cause changes in supply chain operations and functions.



In the author's case analysis, the crisis has affected the company negatively, so the author is focusing and analyzing the possible negative effects of crisis on SCM operations. Depending on the event of crisis and company's business sector, it can impact the operations positively or negatively.

The five supply chain operations categories that are affected during the supply chain disruptions are (McKinsey & Company 2022):

1. Planning and supplier networks
2. Logistics and transportation
3. Producing goods
4. Sales to consumers
5. Labor

During the supply chain disruption in the supply chain, there is huge drop in demand. The demand for products suddenly decreases, meaning that manufacturing processes will be minimized (VEM no date). As well as **demand forecasting** changes drastically, this is cause of unexpected shifts in consumer behavior, market instability, and uncertainty. Accurate demand forecasting is a challenge when it comes to forecasting demand during a crisis. Big problems are things, such as overstocking or understocking, and they all influence the outcome of the final demand forecast. (Recasens 2020)

The transportation networks are interrupted, and supplier contact becomes challenging which results in a decline of the **supply chain visibility**. This issue causes inefficiencies and delays in the whole supply chain operations. As mentioned, during a crisis, suppliers may experience their own difficulties, which usually cause disruptions in the supply of vital parts of raw materials, and this causes issues with suppliers. (SCD 2021)

Stock shortages or surpluses can result from major supply chain disruptions, both of which cause serious financial declines in the business. This causes major issues in the **inventory management** in the company's supply chain. (FTI, 5)

Another major challenge in supply chain operations during the crisis is in production and **manufacturing**. Things such as labor shortages, operational limitations, or disruptions in the supply of critical components have influence on the capacity to produce and manufacture goods. (Safety Culture 2023) Human resources are affected by things such as safety concerns, remote work arrangements, employee well-being. They all have effects on supply chain operations. (Furtado, Kolaja, Mueller & Salguero 2020, 2)

Supply chain disruptions during a crisis affect transportation networks and cause delays and higher shipping and logistical expenses. The promptness of product delivery to clients may be influenced by this drastically. Logistics and transportation will become more challenging. (FTI 2022, 2)

During the crises there are higher risks which means **risk management** is influenced by supply chain disruptions caused by crises. Reevaluating risk management practices is frequently needed in crisis time. To coordinate operations, communicate disruption information, and adjust to changes, effective communication within the supply chain is disturbed. (Scheunemann 2020)

Crises cause new regulations and compliances, so regulatory changes of regulations happen during crises, which makes companies adapt their supply chain operations accordingly. This also causes changes in strategic planning. Crises force companies to reevaluate their long-term supply chain strategies, sometimes diversifying suppliers, building redundancies, and putting more effort into risk mitigation. (Cascade 2023)

Different crises cause issues in customer service, meaning that it can be difficult to meet consumer expectations during a crisis, and businesses may need to modify **lead times**, communicate more openly, and offer substitutes to complete orders. (Furtado, Kolaja, Mueller & Salguero 2020, 4.)

All these disruptions in the supply chain causes issues with cost management. Costs may grow because of higher logistical costs, faster shipment, and initiatives to ensure supply continuity. Controlling these expenses becomes essential and important for companies to perform normally. (Hans 2021)

Supply chain disruptions cause delays, shortages, and many more issues within the supply chain operations resulting in increased costs and decreased customer satisfaction. Businesses should be ready to tackle crises and have a plan set to mitigate crises' impact on supply chain operations.

### 2.3 Supply chain management KPIs and their correlation to crises

In this chapter the author explains the definition of KPIs and their correlation to crises, how crises affect and regulate the outcome of different important supply chain business KPIs. It is important to understand the connection between supply chain KPIs and the crises since the company analysis part includes KPI data provided by company and the author analyses it to show the correlations between crisis and company's KPIs to explain the outcomes of crises on company operations.

**KPI** stands for key performance indicator, and it is quantitative measure of performance over time for a certain objective. KPIs offer goals for teams to strive towards, benchmarks to evaluate progress, and insights that assist individuals in the organization in making better business-related decisions. Key performance indicators support the strategic advancement of every department within the company, from marketing and sales to finance and supply chain management. (Qlik, 2020) KPIs are measures that can be used by supply chain experts to gauge the efficacy and efficiency of different supply chain operations. Supply chain KPIs primarily refer to the key performance indicators that have a significant impact on the supply chain's functioning. (B2BE 2021)

Some of the most important reasons on why supply chain management KPIs are important:

- **Performance monitoring:** KPIs offer a precise and measurable approach to keep track of how various supply chain components perform internally and externally. This makes it possible for businesses to evaluate how well they are achieving their goals and objectives.
- **Data-Driven Decision-Making:** KPIs provided information and insights are used to make data-driven decisions. Supply chain managers can adjust, and enhancements based on real-time knowledge rather than speculation when they have relevant KPIs on hands.
- **Efficiency improvement:** businesses can find inefficiencies in their supply chain operations by monitoring KPIs. This can aid in streamlining processes, cutting costs, and allocating resources more efficiently.
- **Risk management:** effective risk management is crucial in supply chain operations. Key performance indicators (KPIs) play a role in identifying risks and vulnerabilities within the supply chain. These risks can include supplier-related issues, inventory shortages or delays. By leveraging KPIs businesses gain insights that allow them to proactively address these challenges and implement risk reduction strategies successfully.
- **Customer satisfaction:** this is directly impacted by KPIs relating to order fulfillment, delivery times, and product quality. Higher levels of repeat company and customer loyalty can result from meeting or exceeding these KPIs.

- **Cost control:** KPIs that relate to cost per unit, transportation costs, and inventory turnover. By monitoring these metrics companies can identify areas where they can implement cost-saving measures.
- **Resource allocation:** KPIs assist in determining the placement of resources throughout the supply chain. Resources can be reallocated to locations based on these indicators.
- **Forecasting and Planning:** the insights provided by supply chain KPIs can be highly advantageous for demand forecasting and capacity planning. This enables businesses to align their distribution and manufacturing capabilities with market demands.
- **Continues improvement:** KPIs form the foundation of improvement initiatives. They provide companies with reference points and benchmarks to evaluate the lasting impact of process enhancements, making them integral components of long-term company strategies.

(La Londe 2016)

In conclusion, supply chain management KPIs are critical because they allow businesses to monitor performance, make data-driven decisions, increase efficiency, manage risks, improve customer satisfaction, control costs, and promote continuous supply chain operations improvement. They are an essential tool for making sure the supply chain runs smoothly and effectively to achieve the company's long-term goals. (B2BE 2021)

There are lots of different KPIs and they can be categorized into three main categories. The first category is product excellence, in which companies prioritize product excellence to optimize their production and sales processes. These KPIs aim to maximize value while minimizing costs through an emphasis on supplier availability, reliability, and the cost effectiveness of their supply chain in relation to the value it generates. The main KPIs that fall into this category are:

- Perfect Order Tracking: tracks percentage of orders without any issues.
- Fill rates: tracks order fulfillment measurements.
- Inventory turnover: measure how many times a company's inventory turns over or cycles each year.

(Murphy 2018)

The second category of KPIs is the service excellence category. It's prioritized by businesses that are driven by service excellence. These companies look for a flexible and real-time-ready supply chain to help them meet and surpass their customers' expectations as well as the company's high standards for internal process efficacy. The KPIs in this category are:

- Supply chain cycle time: measure how long it would take to fill an order if company's warehouse were out of stock.
- Days sales outstanding (DSO): measures how quickly a company can collect accounts receivable from customers.
- On time shipping rate/late orders: measure the percentage of goods arrived on scheduled ship date.
- Lead times: amount of time it takes to deliver a product to a customer, from the moment the customer requests it to the moment it has been delivered.
- Inventory to sales ratio: amount of inventory in warehouse compared to the sales company is completing.

(Murphy 2018)

The last category of supply chain KPIs is operations excellence. This category focuses on measuring a company's efficiency of day-to-day operations. These KPIs help to identify which operational strategies are effective and the opposite of which harm the supply chain operations. The KPIs aim to anticipate and get rid of delays, mistakes, and other obstacles before they become problematic for the company's efficiency. The KPIs in this category are:

- Return of investment (ROI): measures total performance by comparing value of an investment vs profit or loss.
- Cost of goods sold: measures the worth in financial measurements of products or services sold.
- Cash-to-cycle-time: measures the time between purchasing materials and getting payment from the customer for the goods produced with purchased materials.
- Inventory on hand: show how fast a company uses inventory levels on average and how many goods the company has available for sale at a certain time.
- Total supply chain costs: shows much company is spending to generate revenue.

(Murphy 2018)

In conclusion, KPIs are very important key metrics for measuring the supply chain's performance and setting long-term business goals. There are a variety of different KPIs for different supply chain functions. The KPIs fluctuate based on what is happening in company's operations, in crises KPIs tend to fall tremendously since crises cause supply chain disruptions and interrupt the operations. It's extremely important to understand the concept of KPIs and how to implement them to supply chain operation's performance.

## 2.4 Bullwhip effect theory

In this chapter the author defines and explains bullwhip effect theory. It's important to understand the Bullwhip Theory since it has a connection between crises and whole supply chain operations. In company analysis, the author has analyzed the Bullwhip Theory based on company's example, so this chapter will explain to author what it is, what causes it, and what effects it has on the whole supply chain operations.

The term "**Bullwhip Effect**" was first originally used in early 1990s by Procter & Gamble researchers. It explained the phenomenon the researchers noticed in the diapers supply chain when working for the Pampers brand. The researchers found that small changes changed consumer demands as they moved up the whole supply chain, which lead to big inefficiencies and increased expenses. (Inbound Logistics 2023)

The Bullwhip Effect Theory is phenomenon in which the product demand shifts at the end of a supply chain and causes inventory swings further down the chain (Georgiev 2021). The term Bullwhip Effect describes the occurrence of a chain reaction because of variations in demand at the customer end of supply chain, causing crucial adjustments at the manufacturing end. It results in either frequent or infrequent supply purchases. It also causes **out-of-stock** or **backorder** situations, which make companies reduce prices of goods and lose money. (Wallstreet Mojo 2020)

The bullwhip effect impacts the supply chain heavily, and some of these negative impacts are (Wallstreet Mojo 2023):

- Produced excessive stock.
- Shortage of stock due to irregular demand.
- Disruption of the supply chain.
- Warehouse storage cost increases.
- Shipment delays.
- Increased transportation costs.
- Customer dissatisfaction.
- Increased labor.

- Increased waste.

When it comes to bullwhip effect, there are many causes of it in the supply chain. The main causes of the bullwhip effect are (Inbound Logistics 2023):

Issues with **Lead Time**, long lead times cause information to flow between supply chain partners slowly which creates delay and bigger inventory level changes in the supply chain. Suppliers find it challenging to precisely estimate demand and decide on appropriate inventory and production levels. Lead time is one of the most important functions of inventory control and impacts customer demand. Issues with lead times come from issues anywhere along the supply chain.

Lack of **communication**, lack of visibility and coordination in the supply chain is caused by poor communication. Poor or lack of communication makes it challenging for suppliers to precisely forecast demand and choose appropriate production and inventory levels. One of the reasons for the Bullwhip Effect is cause of poor communication that causes an overestimation of demand and increases inventory levels hugely. Due to all this, suppliers respond to changes in demand too late, which results in an excess inventory or a stock-out.

Incorrect or changes in **demand forecast**, when there are big changes in demand, it causes suppliers, retailers and distributors to base the projections of demand forecast based on incorrect information. This leads to overestimated demand and an increase in inventory levels. Batch orders are orders that are placed in bulk. Instead of making orders as demand arises, the suppliers and retailers agree on a schedule for doing so. Batch ordering distorts perception of the true level of demand. The misinformation caused by this causes an excess inventory, which results in a stock-out or increase in holding costs. By delayed flow of information can happen Bullwhip Effect. The delays make suppliers respond to changes in demand too late, which results in an excess of inventory or a stock-out.

**Complex supply chain**, when supply chain has too many intermediaries and each one of them uses different methods to forecast demand and place orders, it causes Bullwhip Effect. It causes overestimated demand at higher levels of the supply chain, leading again to increased inventory and production, causing the Bullwhip Effect.

Forecasted inefficiencies in the supply chain and distribution channels are what cause the Bullwhip Effect. It happens when retailers increase their anticipations of consumer demand. As a result, the supply chain can experience a snowball effect. To stop the bullwhip effect from occurring in the supply chain, it is crucial to understand its causes and effects on the supply chain operations. (Inbound Logistics 2023)

## 2.5 Risk assessment in supply chain management

In this chapter the author will be explaining and focusing on risk assessment. It is important to understand risk assessment since the company analysis part will be focusing on case company's risk assessment and management. Understanding risk assessment is critical for this thesis. This thesis focuses on crises effects on supply chain operations and a big part of it is also risk assessment.

In the past years, several businesses have experienced unanticipated supply chain disruptions that have resulted in recalls that cost lots of money in a variety of business sectors. Additionally, a number of companies have dealt with consequences of COVID-19 pandemic crisis, cybersecurity breaches, and losing crucial intellectual property because of crises and flaws in the supplier's system. (Bailey, Barriball, Dey & Sankur 2019)

As mentioned there have been constantly lots of **crises** and disruptions happening to businesses and to their supply chains. In the supply chain there are many stages and suppliers involved as well, that disruptions and vulnerabilities can happen at any time. To prevent disruptions and guarantee the performance, compliance, and reputation of businesses to stay functioning, risks need to be evaluated, followed up on, and managed. (Minett 2022)

**Risk assessment** is part of supply chain risk management, which includes controlling the company's complete manufacturing flow and managing supply chain risks. It involves locating hazards in the supply chain, determining their likelihood and seriousness, and then taking proactive measures to reduce or eliminate these risks. Strategies for managing supply chain risks should be integrated into the company's policies, practices, operations, and the company's suppliers. By integrating them, the company can make sure that risks are under control and that compliance is maintained across the whole supply chain. (Minett 2022)

The main reasons why companies should prioritize the risk management are (Minett 2022):

- Prevents supply chain disruptions, effective risk management strategy ensures the preparation for any disruptions and helps companies to keep supply chain operations run smoothly during any unforeseen event.
- Helps to respond quickly to unexpected events and disruptions, risk assessment helps businesses to prepare for the worst scenarios, if any unexpected disruptions happen, companies can respond quickly and prevent from affecting business' reputation, profitability, and performance.



- It keeps people safe during business operations, through good risk assessment businesses can ensure people are safe if any unexpected disruptions happen.
- Company achieves supply chain compliance, complying with all risk management law and regulations protects businesses from compliance risks and legal liabilities.

The three main steps involved in risk management to reduce supply chain risks are (Minett 2022):

- Risk identification, to manage risks companies need to know the hazards and risks that are presented in the company's supply chain. Risks such as health, safety, finance, environment, crisis, sustainability, and cybersecurity risks.
- Risk assessment, after identifying supply chain risks, companies need to assess the likelihood of the risks to happen, seriousness of the consequences and the impact risks can have on businesses.
- Risk mitigation, stage where companies plan and implement control measures and put action plans in place for potential supply chain disruption event.

As we have seen in the past years, there have been many unforeseen events happening that have damaged businesses and their supply chains tremendously. Therefore, it is important for businesses to have a good supply chain risk management in place. It is also important to have good risk identification, risk assessment and risk mitigation in place to prevent any supply chain disruptions, keep labor safe, and to respond quickly to these unexpected events and supply chain disruptions.

## 2.6 Strategies to overcome crisis in supply chain

In this chapter the author explains and analyses different supply chain strategies that companies can use to imply in their supply chains in case of any supply chain disruptions. It's an important chapter since the author will be implying some of the strategies to overcome crisis to case company analysis and recommendation chapter.

There are many supply chain disruptions, some of them are predictable by company, such as seasonal delays during national holidays, while there are some that are not, such as global crises, pandemics, cyber-attacks and many more author has discussed in previous chapter. However, knowing and learning how to overcome supply chain disruptions by using the right strategies and tools is crucial for the company's supply chain operations. These strategies and tools will help the company to continue to operate and maintain profitability even when some unexpected disruption would happen. (Champion 2023)

The majority of supply chain disruptions are outside the control of companies. However, by putting in place plans and strategies to reduce disruption, businesses can better prepare for unexpected supply chain disruptions in advance. The seven different strategies to implement during or before a crisis to supply chain management are (Lau 2021):

1. Creating a **contingency plan** for future supply chain disruptions. It's very important for businesses to have contingency plans in place for supply chain disruptions and emergencies. A contingency plan is a strategy created to assist an organization in effectively responding to a large crisis that may or may not occur in the future. The first step in contingency plan is to identify every stage of a supply chain and knowledge of organization of what to do if that certain stage was disrupted, such as rebalancing inventory, shifting orders to alternative vendors, communication between stakeholders, and critical operations. A good contingency plan includes an estimate of how much certain disruption would cost to each stage of the supply chain. Using "PPRR" contingency plan strategy is widely used, it stands for prevention, preparedness, response, and recovery. Contingency plans need to be reviewed and updated often.
2. Auditing supply chain's vulnerability. Auditing the supply chain and identifying its weaknesses is a necessary step in developing a contingency plan and preparing for supply chain disruptions. The importance of each link in the supply chain should be considered initially. The high risks supply chain points must be considered while analyzing the supply chain's susceptibility. It's important to identify which suppliers pose a high risk to the company and how important the suppliers are. It is important to know what or who could disrupt the supply chain, how likely it is to happen, and an impact it would have on the supply chain operations.

3. Identifying backup suppliers and diversifying suppliers' base. Having backup suppliers and a diverse supply base is a crucial aspect of overcoming supply chain disruptions during crises. Making a list of suppliers and companies that could handle orders for each stage of the supply chain and all the goods and services the company requires. If something goes wrong with the primary source, the company will have quick access to a range of suppliers. The effects of supply chain disruptions might be lessened by locating suppliers who have manufacturers or suppliers in several different locations and who also have a broad supply base.
4. Build up back up inventory. Having extra quantities of goods will help the company to survive any supply chain disruptions, whether they be finished goods, parts and components, or even raw materials. Determining the products company needs to stockpile and the quantity company requires. When a disruption in the supply chain occurs at any stage, the company can sketch out what they need and have. Even though increasing inventory is an additional cost that many companies find difficult to handle, it will be preferable to overcome the crisis in the supply chain. Additionally, companies should think about storing up ahead of busy seasons or times of the year when environmental factors, such as hurricanes or floodings may have an impact on suppliers' supply chains.
5. Prioritizing production. When there is a material shortage or a supply chain disruption, some products become more urgent. Sorting things into appropriate categories to maintain operations, even though complete inventory options might be temporarily limited. When a supply chain interruption happens, companies should also consider the advantages and potential negatives of a shortened timetable so that shipments don't stop altogether. Eliminating the risk of stockouts by prioritizing the most crucial products first.
6. Having alternative logistics in place. There is usually a large backlog in logistics from crises that result in rising freight rates, unavailable transportation, clogged ports, and a lack of truck drivers. To adapt shipping strategies to shifting client demand, it is important to have an alternative strategy in place for logistics. It means having multiple carriers and transportation companies ready to carry the company's goods when needed.

Supply chain disruptions frequently occur without warning, are unpredictable, and are outside of the control of the companies they affect. Businesses that have strong supply chain disruption management strategies in place can prevent disruptions, lessen its effects, and efficiently recover from the crises' disruptions. Recovering from disruptions is easier for company, if company knows potential risks of its supply chain, has up-to-date contingency plans in place, has back up inventory, increases production upfront, has back up suppliers, and has alternative logistics in place.

### **3 Research Methodology**

In this section author discusses the research methods applied to conduct the research that is presented in chapter 4. First author has presented the different phases in the research design and their correlation to each of the investigative questions introduced in chapter 1. Lastly, the data analysis explains how the data was collected.

#### **3.1 Research design**

The research aims to evaluate Russo-Ukrainian war effects on Brown-Forman Finland supply chain operations. It aims to focus and analyze how the crisis has affected the different supply chain operations in the company, how is Brown-Forman Finland recovering from the effects of crisis and what is Brown-Forman Finland planning to do, to stay prepared for unexpected crises in the future. The method of research design is shown in Figure 4. The previous chapter looked at the literature review in phase 1. The theory provided the needed concepts that were necessary to comprehend the supply chain structure analysis of the company later. The theory introduced the topics related to supply chain management, supply chain operations, crises effects, KPIs, Bullwhip Effect theory, risk assessment and lastly strategies to overcome crisis in supply chain. These topics are all related to investigative questions 1, 2, 3, 4 and 5.

The second phase collects data needed to answer the investigative questions about which functions were affected by crisis, challenges crisis has caused to BFF, business figures affected, and what measurements BFF has taken to overcome the challenges. These are investigative questions 1, 2, 3 and 4. Phase 3 is built on knowledge gathered in phase 2. The acquired data was organized and analyzed during phase 2. Once the analysis of phase 2 was completed, it was possible to successfully answer all investigative questions. These questions would give an overview of how the war has affected BFF's supply chain operations and functions. In the last phase, phase 4 is where conclusions are made using the data from prior analysis and the theory from phase 1. These findings led to how could company prepare for crisis in future by preparing a good contingency plan, which relates to investigative question 5 and answers of one of primary research questions.

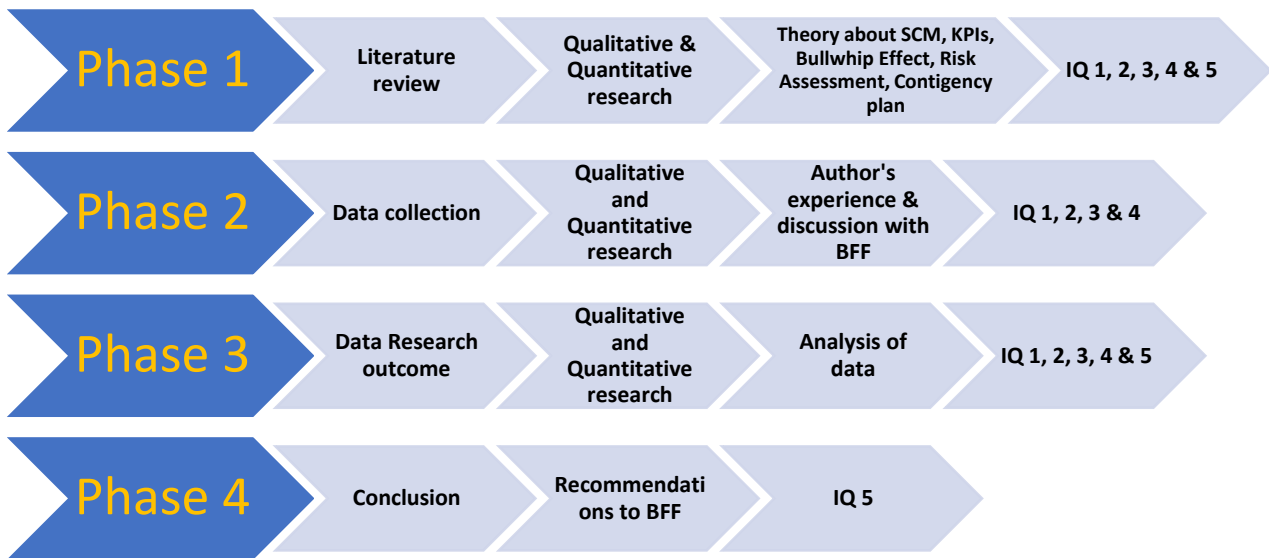


Figure 3. Research design

### 3.2 Research methods

The author has used a mix of qualitative and quantitative research methods for this thesis. Quantitative research is the main research method for this thesis, whereas qualitative research method is used to see the reasoning behind some of the numerical data of company's performance indicators and numerical values. So, the qualitative method is a small amount of research and used to back up the quantitative research findings. Main quantitative data was numerical data that was provided by the company, such as key metrics and graphs. That data was backed up by discussions and analyses with the company's managing director to find the reasoning behind the data and which functions were affected during the crisis in a non-numerical way. The goal of the thesis was to analyze the statistical data in detail and to determine the business performance before and during the on-going crisis.

Consequently, the author made the decision to concentrate on the interpretation of numerical data combined with small focus on non-numerical data, to understand the data gathered through discussion. The goal of the thesis is to explain how the war had an impact on the company's supply chain operations. It is also important to state how can BFF prepare for similar crisis in future based on current research findings. The research needs to focus on the performance results themselves because the primary research question is to examine the performance of supply chain operation during the war.

### 3.3 Data collection and analysis

There were two types of data collected: primary and secondary. Primary data was collected through the work experience as the author works as logistics specialist in BFF. This provided close and good knowledge of company's supply chain and supply chain operations of Finlandia Vodka at Brown-Forman Finland. Primary data collection to observe is a business and management research method that has been often neglected, but it provides valuable business data (Saunders 2015, 354).

For obtaining the better knowledge of processes and measuring performances, the unstructured interviews were done. Unstructured interviews were used to gain insights of specific data, functions and changes in data or performances. The unstructured interviews did not have predetermined set of questions but were done in free conversation way to explore further the data and reasoning behind the changes in data and performances of the company functions. Exploratory research is performed when research is moving forward and is very flexible. The direction of research can change as new results, data and insights come up. (Saunders 2015, 175)

This method was applied once the author received new company data and insights. The author had a topic on mind before starting the discussions with the company's managing director Sami Pulkkinen. Once the topic was decided by the author, it evolved into meetings with managing director Sami Pulkkinen to get the approval to base this thesis on the company. Once the topic was presented to the managing director, it was approved immediately and needed data and information to be provided to the author by the company's managing director Sami Pulkkinen. Once the data and information were received, the author started to plan and write the thesis.

The secondary data was company's own data. Data collected by people other than the author, being one of its advantages in validating (Ng & Coakes 2013, 40). The data collected from the company was related to the company's supply chain operations and its performance. Since the data is confidential, it cannot be shared in this research, but conclusions based on it will be analyzed.

The methods used to perform the analysis of the data were: observation, unstructured interviews, and secondary data given by the case company. At first, the author explained the structure of the supply chain and its operations based on his own experience and knowledge. Graphs and different maps were used to illustrate the supply chain and its different functions. Also, secondary data was used to explain different functions and operations and how the company's supply chain performs, which functions and figures have changed negatively, challenges caused by war. Lastly, the author has explained what measurements and strategies the company has applied to fight against the challenges and what strategies can be used to be prepared for crisis in future.

### 3.4 Research planning

The different stages and tasks involved in the research process are illustrated in Appendix 1.

Phase 1 began at the beginning of August and involved developing the theoretical framework.

Eight major tasks were completed over a two-month period, including researching the literature, choosing the sources, and writing on various supply chain and supply chain management crisis related topics and issues.

Phase 2 began in early November and was based on gathering and analyzing the company's data. First, the author examined the organization's current supply chain and supply chain processes using his knowledge and experience from his employment in the case company. The managing director was then presented with this information during a meeting, where additional conclusions and insight were presented to the author by the managing director. During this stage, a second meeting took place. The author discussed his analysis of the supply chain operations and its performance with the managing director Sami Pulkkinen. The phase was completed by writing various concepts discussed at the two meetings, and the material analyzed in October and November. It ended with drawing conclusions about the data collection and meetings with the managing director.

Based on his findings from phase 1 and phase 2, the author developed several improvements for the third and final phase. In the third phase, the author prepared the contingency plan based on BFF's managing director recommendations and insights that were drawn from another meeting. After that, the author finished writing the thesis and once it was completed another meeting was scheduled with the managing director of BFF. The final thesis was presented at the beginning of December in the final meeting with the managing director. The author presented the whole thesis to the company's managing director and got positive feedback.

## 4 Company analysis: Brown-Forman Finland

This chapter describes and analyses the current supply chain operations and its functions of Finlandia Vodka at Brown-Forman Finland during the Russo-Ukrainian war. At first, the supply chain of BFF is presented to understand how it functions, what operational stages it involves, and different stakeholders involved in the whole supply chain. Secondly, it will be analyzed which functions and overall BFFs supply chain were affected during the war. Then the author will be analyzing what kind of challenges has the war caused to BFF supply chain. After that author will be analyzing the SCM performance data and how have the business figures changed during the war. Lastly, the author will be discussing what measurements BFF is currently using to overcome the challenges caused by the war.

### 4.1 Supply chain process of Finlandia Vodka in Brown-Forman Finland

As a start it is very important to understand how the case company's whole supply chain operates to later analyze the effects of crisis on the whole supply chain. As in section 2.1.1 and 2.2.1, the author discussed the definition of supply chain and global supply chain. In case of Brown-Forman Finland, the supply chain is global supply chain since the supply chain operates internationally. The author himself works as a logistics specialist in BFF and is responsible for logistics and transportation part of supply chain. The author is responsible for transporting the finished goods from the warehouse to several customers around the world. Different logistics responsibilities are included in this work, which are stated in the theoretical framework. Furthermore, numerous stakeholders are involved in the supply chain processes of BFF.

There is no comprehensive process description or graphic representation of the Finlandia Vodka supply chain process flow by the BFF. Therefore, the author decided to create a visual supply chain process flow based on his experience while working in BFF.

In the figure 5 author illustrates representation of the global supply chain of Finlandia Vodka in Brown-Forman Finland. The specific country market's supply planners create forecasts for their countries about how much goods they are expecting to distribute and move it on to retailers. The new orders are then sent to BFC which is located in Louisville, USA. Brown-Forman Corporation receives the orders and enters the received information from the specific country market customers to the company's information base. Once the orders are approved BFC forwards the information and orders to Brown-Forman Finland (BFF) who will process the orders and organizes the shipments and delivery for the required orders. BFF also creates forecast for production of Finlandia Vodka goods in future. The forecast is delivered to the next important stakeholder- producer of Finlandia Vodka goods Anora. Anora production site is located in Rajamaki, Finland. Anora produces



the good of Finlandia Vodka for Brown-Forman Corporation. The production site is also creating their own forecasts for raw materials and purchasing the raw materials needed to produce the Finlandia Vodka. Once the Finlandia Vodka is produced in the Anora production site, it is bottled and stocked up in their own warehouse facilities and once the process is finished, the goods are entered into stock in Brown-Forman Finland's SAP system. Brown-Forman has their own warehouse also in Riga, where some of the goods produced by Anora are transported to. From the Riga warehouse, the products are picked, loaded, and transported to certain countries agreed beforehand. Finally, after preparing and transporting the goods to specific countries either by trucks or vessels, they are delivered to final customers through retailers. However, BFF works only with specific country market distributors. Brown-Forman Finland functions as outbound logistics team in the global supply chain. Anora is responsible for producing the goods, purchasing raw materials, and stocking up the produced goods for BFF in their own warehouse. Anora and BFF are, however, interdependent and must work together to ensure that the entire supply chain process is efficient as possible.

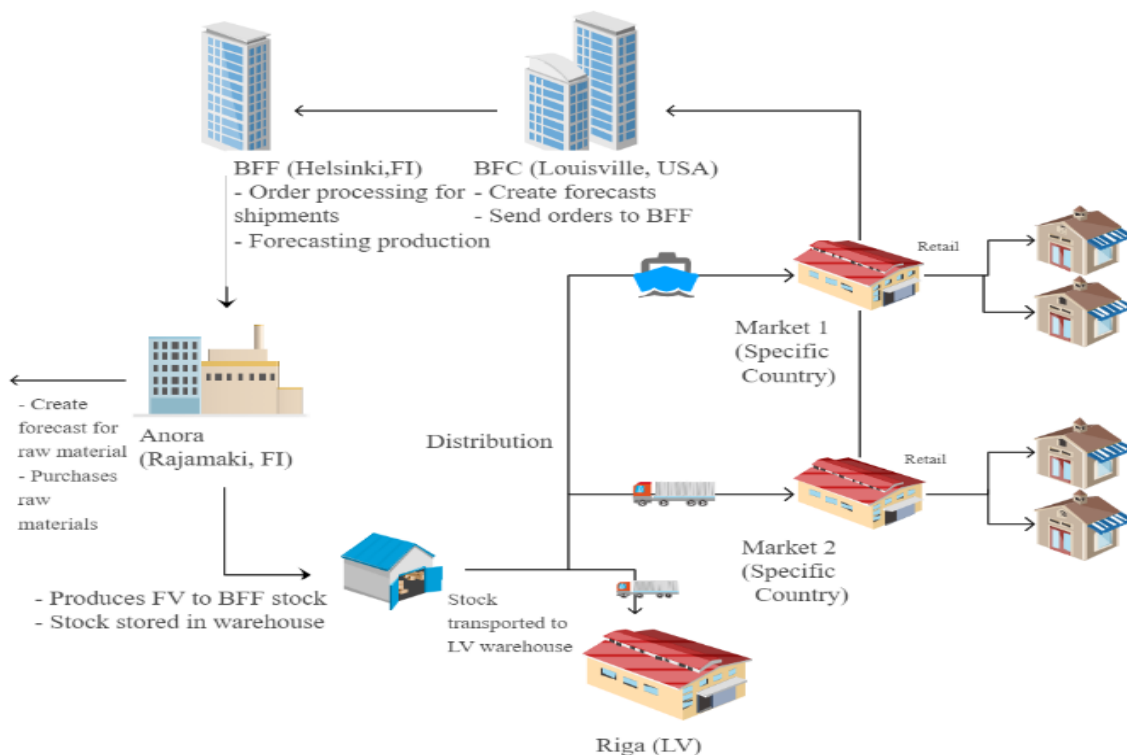


Figure 4. Brown-Forman Finlandia Vodka global supply chain flow.

#### 4.1.1 Brown-Forman Finland's supply chain functions affected during the war

Previous section explained and illustrated the whole global supply chain of Brown-Forman Finland and how it functions. This section will be explaining and analyzing which functions of Brown-Forman Finland's supply chain were negatively affected by the Russo-Ukrainian war. The data used for the Chapter 4 comes from Brown-Forman Finland provided file called: FY23 Supply Chain – Finlandia Metrics (BFF 2022). This is excel file that has gathered raw material and processed data from 2010 until May 2023, which reveals a metric summary of the Finlandia Vodka performance.

The first and most important function that was affected by the Russo-Ukrainian war, was distribution to Russian market. Russia was the biggest consumer of Finlandia Vodka from all the customer distributor countries. The estimated percentage that Russia bought of all the Finlandia Vodka production was 75%. Meaning that Russia bought 75% of all the products produced by Brown-Forman Finland. Once the war started lots of companies stopped exporting and selling their goods to Russia to show that they are against the war, as did also Brown-Forman Finland. The EU placed huge sanctions against Russia, EU banned for individuals to enter or transit to Russia through EU territory, by either land, air or sea. The EU has imposed a variety of import and export restrictions on Russia as part of the economic features, this means that European companies will be unable to export products to Russia (Consilium 2022). This meant that Brown-Forman stopped exporting its goods to one of the biggest distributors of Finlandia Vodka completely and unexpectedly, and that negatively affected Brown-Forman's **distribution**, sales, and finances. The number of orders decreased by 25% in the month EU sanctions were placed. Total shipments in the month of April 2022 were down by 37% and in the month of May 2022 they were down by 31% compared to March 2022. (BFF 2022)

Another important functions of Brown-Forman's supply chain were harmed as a result of export restrictions to Finlandia Vodka's biggest consumer. These functions were **production** and **demand forecasting**. Figure 6 below shows the big changes in monthly production volume numbers in the period of sanctions and war starting fully. The biggest effects were in April and May since war had taken its full action on companies and sanctions were placed at the end of March. Exact numbers cannot be shown because of the confidentiality of the company's data.

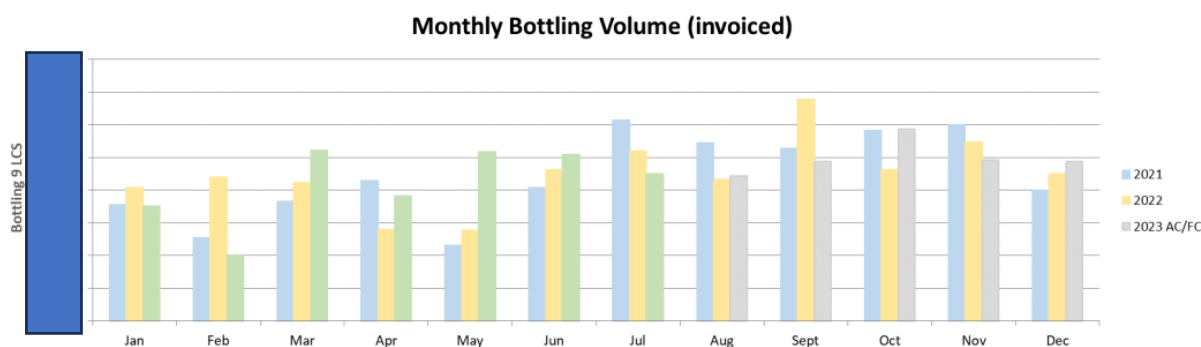


Figure 5. Monthly bottling volume of Brown-Forman Finland (BFF 2022)

In the first two months of war, the BFF's production volume decreased drastically. The war started officially in February 2022 and sanctions by the EU were placed at the end of March. In April the Brown-Forman Finland's production volume decreased by 36% and in May it decreased by 25%. (BFF 2022) It stabilized back in June and has been stable since May of 2022. Also, different SKUs produced were lowest in April 2022, the decrease in number of different SKUs produced from previous month was 62%, which is the lowest since beginning of 2021.

War caused lot of uncertainty regarding the future for different businesses, so it also did for Brown-Forman Finland. As sanctions were placed immediately and very suddenly, the war and sanctions affected already distribution to biggest market, sales, finances, and production. On top of that, it also affected tremendously the demand forecasting for Brown-Forman production. The demand forecasting was negatively affected because of sanctions from government and EU, also from uncertainty, and lastly consumer confidence. The uncertainty and fear associated with war lead to a decrease in consumer confidence, and consumers demand decreased for Finlandia Vodka goods. The demand forecast accuracy for the beginning of 2022 was down by 20% of its every year target accuracy. That being said, demand forecasting function was negatively affected by the Russo-Ukrainian war.

Lastly, **the transportation** and logistics functions of the supply chain were affected negatively. Since lots of goods were transported through Russia and Ukraine to other destined customer countries, such as Georgia, Kazakhstan, and China, it made it challenging to organize transportation for these shipments. There were major disruptions of key trade routes which made the flow of goods and transportation challenging. On-time shipment percentage for Brown-Forman Finland for the year 2022 was down compared to previous year by 20%.

Table 2. Supply chain functions affected in Brown-Forman Finland (BFF 2022)

SCM function affected	SCM metrics	April 2022 compared to March 2022	May 2022 compared to March 2022
Distribution	Total shipments	-37%	-31 %
Distribution	Number of orders	-25%	-23%
Demand forecasting and production	Production volume	-36%	-25%

The war had lots of negative effects on Brown-Forman Finland supply chain. Sanctions placed by EU, governments and people behavior have negatively affected functions, such as distribution, sales, finances, production, demand forecasting, transportation, and logistics. Table 2 above shows some comparison in data which are correlated to different functions in Brown-Forman Finland supply chain.

## 4.2 Challenges and risks caused by the war

The war that started in February 2022 has caused many challenges and risks to Brown-Forman Finland. Some challenges already existed before the war started, and the war has made the risks and problems more challenging. Some challenges are new and caused as a result of the Russo-Ukrainian war. The challenges caused by the war start from high barley prices and go up to transportation and logistics stages due to the consequences of the on-going war.

### 4.2.1 Barley and ethanol prices

The price of barley affects the price of ethanol as barley is one of the feedstocks used in the manufacturing of ethanol. When the price of barley rises, the cost of producing ethanol rises as well. Ethanol producers pay higher prices for barley, which results in increased production costs. (Rinne, Lankoski, Ollikainen & Mikkola 2011) In September 2022 barley price was higher by 44% from the previous year September. Brown-Forman Finland produces alcoholic beverage such as Finlandia Vodka, and as it is alcoholic, Brown-Forman needs to buy in ethanol to produce the alcohol. Since the barley price has raised by 44% from previous year, it also resulted in higher ethanol prices and bigger financial spending for Brown-Forman Finland. (BFF 2022)

In summary, an increase in barley prices results in higher production costs for barley-based ethanol which Brown-Forma Finland uses, which in return increases the prices for ethanol. This is one of the challenges and risks for Brown-Forman Finland since the war started in February 2022 and the price of barley and ethanol continues to grow. This results in bigger spendings to produce Finlandia Vodka, and this is one of the most important risks that Brown-Forman Finland needs to deal with and find a solution to.

#### **4.2.2 Forecast accuracy challenges**

As discussed in theoretical framework, war has a considerable impact on the accuracy of demand forecasts, mainly due to the disruptions it causes in different stages of the economy and supply chain. Brown-Forman Finland has been dealing with inaccurate forecast accuracy already before the war started due to non-existent good forecasting system and strategies. To this day Brown-Forman Finland has a person who is creating demand forecasting based on her years of experience and historical data.

In 2021 the forecast accuracy was down by 20% of the set target forecast accuracy, which already shows that there have been on-going issues with forecast accuracy way before war (BFF 2022). The war even made it more challenging, as big markets like Russia, Ukraine and many more started to order less Finlandia Vodka products or even stopped completely due to the uncertain situation in the world that war caused. As discussed in section 4.1.1 Russia was the biggest market for Brown-Forman Finland, and once the war started, the biggest market was closed and that had huge effects on forecast accuracy. Many customers started ordering less because of the fear of economic instability, different government policies placed on exporting and importing between countries. This has caused still an on-going issue and challenge for Brown-Forman Finland to prepare accurate demand forecast and bringing up the forecast accuracy to desired target.

As the demand forecasting is still being a risk and challenge for Brown-Forman in September 2023 as it was already before the war started, it is important for Brown-Forman to adopt more flexible and adaptive forecasting model, monitor closely war events, maintain good communication with customers, and be ready to adjust their strategies in response to changing conditions. I believe that using historical data and a good forecasting system would help to tackle the on-going issue regarding demand forecasting.

### 4.2.3 Transportation and logistics risks

In transportation and logistics field are also challenges and risks that Brown-Forman Finland must deal with. Before the war, biggest cargo vessels were shipping from and to Russian ports globally and that changed since sanctions were placed and all the Russian ports and vessels stopped operating and lost their connection to another European ports. The very important port, Great Port of Saint Petersburg was closed, and big vessels did not ship their cargo there anymore. Saint Petersburg was an important port for Brown-Forman Finland, since the port is close to Finland and the vessels going to or coming from Saint Petersburg stopped for loadings in Finland, where Brown-Forman Finland loaded their containers to the big vessels with big container capacities. The big transportation vessels had huge container capacities, meaning that the vessel could load huge number of containers onboard and ship them globally. This caused some challenges and risks for Brown-Forman Finland, since the BFF shipped out big number of containers globally and used the vessels that were going or coming from Saint Petersburg port and stopping in Helsinki ports. The shipping container capacity became a challenge and is still a challenge to this day. Brown-Forman Finland must ship now containers using more vessels to be able to ship all the containers to required destination countries and manage the container capacities on shipments. (Pulkinen 2023)

Another challenge regarding transportation and logistics is the issue with truck drivers. There are issues with carriers not having enough truck drivers, and that is because majority of truck drivers driving goods for Brown-Forman Finland carriers were Russians. That has caused a challenge for Brown-Forman Finland to find carriers with enough truck drivers to ship BFFs goods via truck. (Pulkinen 2023)

### 4.3 Brown-Forman Finland changes in performance figures

In this section author will be analyzing different and most important Brown-Forman Finland's key performance figures also known as **KPIs**. These figures and analyses show how has the Russo-Ukrainian war affected different performance figures of Brown-Forman Finland. This is an important chapter since seeing how the KPIs have changed during the war gives the reader a bigger picture of how much of effect war has had on the company's performance overall. The author will be analyzing year the war started in 2022 and some months of the on-going year 2023 to see how the company is performing and how has Brown-Forman Finland recovered from the effects of the war. Lastly, author will be analyzing the **Bullwhip Effect** the war caused to Brown-Forman Finland's supply chain.

#### 4.3.1 KPIs of Brown-Forman Finland

Author has taken the most important BFF's KPIs metrics and analyzed them and compared them from the year before the war 2021 and the year of the Russo-Ukraine war 2022. The most important KPIs that author has chosen from available company's data are on-time shipping, late shipments, forecast accuracy, inventory turnover, orders out-of-stock and supply chain costs based on SKUs shipped.

In the first KPI which is **on-time shipping**, Brown-Forman Finland did a better job with that KPI measurement in 2021, year before the Russo-Ukrainian war started. On-time shipping in 2021 was higher by 10% compared to the year of war started 2022. In 2021 it was short only 7% from the company's every year target and in 2022 it was off by 14% of the target set by Brown-Forman Finland. This shows that the war had its negative effects on the on-time shipping of Brown-Forman Finland. War has caused delays to required delivery dates which makes sense, more transportation issues, different sanctions placed, and key routes must be changed or replaced which affects the delivery time.

The second KPI author chose from the BFF's data is **late shipments**. Late shipment shows how many of total shipments in the year were delivered past the set required delivery date and arrived later to customer than agreed to. In 2021 there were 10% less late shipments than in the year 2022. The 2021 late shipment was 2% over the yearly target and in 2022 it was even 11% over the yearly target set by Brown-Forman Finland. Late shipments and on-time shipping goes in hand to hand, and as we saw previously the war has had its negative effects on on-time shipping and as well as on late shipments KPIs.

The order out-of-stock KPI was interesting one for Brown-Forman Finland, but it made perfect sense at the same time. The out-of-stock order in 2021 was 6% higher than in 2022. The target in 2021 was over the target by 3% and in 2022 it was in the perfect target range. This makes sense, since in the year of the war there were less shipments due the customers ordering less order because of the instable situation caused by the war. Some customers stopped ordering overall and some customers such as Russia were removed completely as a customer. Other big customers took a break from ordering to wait until the situation stabilizes and see how the sanctions affect the global logistics and supply chain overall.

**Forecast accuracy** KPI was very surprising to see and analyze for the Brown-Forman Finland. The forecast accuracy percentage in 2022 was better by 23% than in the year 2021. Author would have assumed that the war effects had negatively affected the forecast accuracy, but it comes out that the forecast accuracy has been a problem for Brown-Forman Finland already before the war started. In 2022 the forecast accuracy was 23% lower than the set yearly target and in 2021 it was surprisingly 45% lower than the set yearly target. This shows that the company has a big issue with forecast accuracy and the war did not impact it negatively but rather brought the focus on forecast accuracy and it has improved.

**Inventory turnover** KPI was very similar compared to the year before the war and the year war started. The difference was only 0.1%, meaning that in 2022 inventory turnover KPI was 0.1% higher than in the year 2021. In both years the inventory turnover rates were 2% lower than set target goals by Brown-Forman Finland. Inventory turnover KPI shows how many times inventory has been sold and replaced, so in both years it was equal, which is a bit surprising. The author would have expected it to be less in the year 2022. It means that war did not affect the inventory turnover at all.

Lastly, the supply chain cost KPI was analyzed by the author. In 2021 the costs were higher by 9% than in 2022. This makes sense since there were more shipments and production in 2021. In 2022 production was brought down because of the instable situation and different sanctions that lead to less orders and less production of Finlandia Vodka.



Table 3. Different BFF's KPIs affected by the war (BFF 2022)

KPI metrics	2021 compared to 2022	BFF's target in 2021	BFF's target in 2022
On-time shipping	+ 10%	-7%	-14%
Late shipments	-10%	over the target by 2%	over the target by 11%
Order out-of-stock	+6%	over the target by 3%	perfectly in target range
Forecast accuracy	-23%	45% less than the target	23% less than the target
Inventory turnover	-0,1%	2% less than the target	2% less than the target
Supply chain costs	+9%	No target set	No target set

Table 3 above summarizes the different KPI metrics that were affected by the Russo-Ukrainian war that started in 2022. Most of the KPIs were better in 2021, the year before the war started except KPIs like forecast accuracy and inventory turnover. It shows that forecast accuracy was and still is a big problem for the Brown-Forman Finland regardless of the effects of the war. Most of the important KPIs even in 2021 did not meet the desired company's targets and in 2022 they did not meet majority of the target goals set by BFF. In summary author has concluded the analysis of KPIs and it shows that the war has affected some of the most important supply chain functions of the Brown-Forman Finland.

#### 4.3.2 Bullwhip Effect

In chapter 2 the Bullwhip Effect theory is explained in detail. The bullwhip effect occurs when there are small fluctuations in the demand that cause changes in wholesale, distribution, and production demand. Usually, they result in inefficiency and issues in the whole supply chain. In Brown-Forman Finland's supply chain, the Russo-Ukrainian war caused Bullwhip Effect. War significantly impacted BFF's supply chain, which caused bullwhip effect. During the war there were minor factors that caused the Bullwhip Effect.

Russo-Ukrainian war caused disruption in Brown-Forman Finland's supply chain due to the difficulties with transportation routes and big vessels going to Russia. Brown-Forman Finland's some of the key logistics routes were changed or blocked off, and big capacity vessels stopped going to Finland due the sanctions placed to Russia and Russian ports, which all caused disruption in the logistics sector of supply chain. BFF did not know at the start of the war how the logistics routes would be open for transportation which in turn changed the production demand. BFF had to decrease the production quantities since the company did not know if they could send out logistically as many cases of Finlandia Vodka as before the war. (Pulkkinen 2023)

Another big push for Bullwhip Effect to happen was uncertain demand. During wartime, demand for certain goods became very unpredictable. As mentioned in the beginning of chapter 4, the biggest consumer of Finlandia Vodka, which was Russia, was cut off as a customer. This already gave lots of uncertainty regarding the demand for Russian market and Brown-Forman Finland's production. The new sanctions placed by EU and governments also affected the demand for Finlandia Vodka, as BFF did not know exactly how the new sanction will affect the production and acquiring of raw materials. Consumer behavior changed drastically since the war brought on unknown situation regarding purchasing goods from BFF. Customers wanted to wait out to see how the world reacts to the war and unstable situation. Most of the customers postponed their orders to let the situation stabilize and then continue with orders in a more well-known situation. This hugely affected the demand for the goods, so Brown-Forman Finland had to again cut down their production of Finlandia Vodka goods until situation stabilized. (Pulkkinen 2023)

Lastly, in the beginning of the war the supply chain **lead times** became significantly longer due to bigger security measurements, border restrictions and as mentioned before the transportation challenges. BFF's production plant, however, did not panic and did not order larger quantities in advance, which did not lead to increased inventory levels and bigger Bullwhip Effect in the long run. (Pulkkinen 2023)

In general, Brown-Forman Finland managed their supply chain operations wisely without panicking and the war did not create a big Bullwhip Effect as many would have thought. The Brown-Forman Finland implied strategy to rather decrease and hold the production quantities than start panicking and increase the production heavily. The key factors for that were clear communication with suppliers and having a flexible production system in place. However, the Bullwhip Effect did have its effects on the whole supply chain, since the demand forecast accuracy was affected by the war and the production was lessen down, but it did not create major Bullwhip effect in the Brown-Forman Finland's supply chain operations.

#### 4.4 Risk assessment by Brown-Forman Finland

As analyzed in chapter 2, risk assessment is a crucial process for companies. It involves identifying, evaluating, and analyzing potential risks to company's operations. Brown-Forman Finland reacted quickly to the start of the Russo-Ukrainian war. The management of BFF implied right away the contingency plan created beforehand in case of crisis and identified all potential risks to Brown-Forman Finland's supply chain operations.

From the beginning of the Russo-Ukrainian war the priority for BFF has been Anora production plant in Finland. Production plant uses electricity and natural gas to produce the Finlandia Vodka, so it was crucial for Brown-Forman Finland to evaluate and analyze how are the electricity and natural gas prices are going to be affected. The electricity and natural gas prices were analyzed and identified as potential risk in BFF's risk assessment and contingency plan. The BFF compared and forecasted all the natural gas and electricity prices comparing to different countries and possibilities, even in case of emergency how to bring electricity from different countries. Another big reason why electricity price and natural gas were on top of the list in risk assessment is because they both affect the barley pricing. The higher the electricity prices the higher the barley prices. And since barley is used to produce ethanol which is the main ingredient in the BFF's Finlandia Vodka goods. Ethanol prices since the beginning of the war have increased by 48% and continues to be higher than before the war. Figure 7 illustrates the graph of the ethanol prices before war and forecast until 2024. It was immediate red flag for Brown-Forman Finland, but the management of BFF decided to stock up and increase the **safety stock** on ethanol and keep more in stock for future productions. This was first and most important risk assessment step for Brown-Forman Finland once the war started in February 2022 to keep the production going and to tackle different financial risks. (BFF 2022)

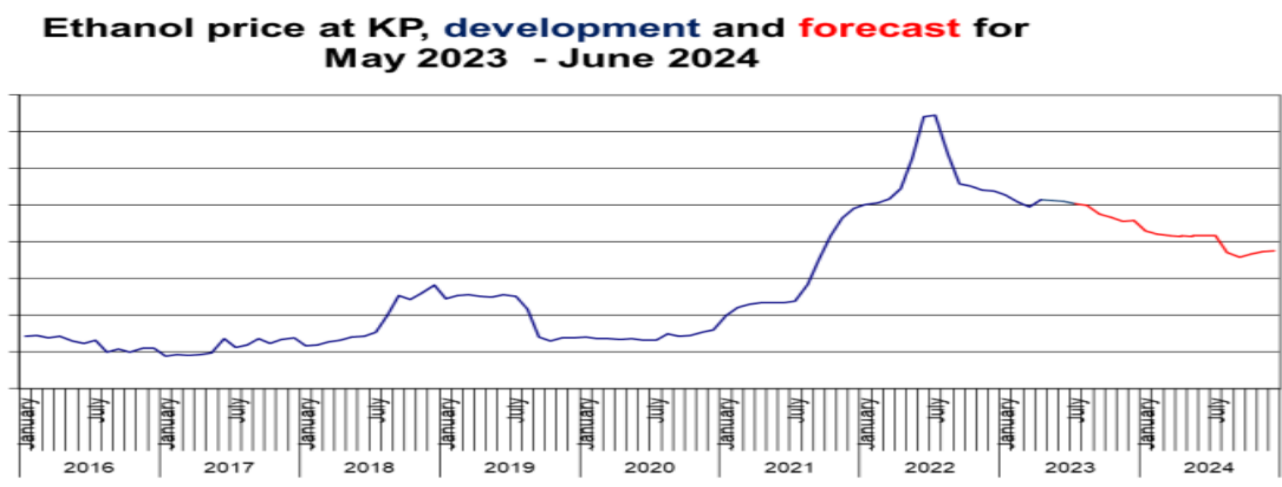


Figure 6. Ethanol prices and forecast for future (BFF 2022)

Next risk that was assessed by Brown-Forman Finland was **disruption of logistics routes**. Especially the possible disruption of Baltic Sea routes for vessels and trucks. The Baltic Sea is crucial transportation route for Brown-Forman Finland since Finland is surrounded by Baltic Sea and Russia, and transporting goods via Russia became impossible and out of question. The BFF analyzed the risk of if Baltic Sea would get disrupted, that would cause loads of shipment interruptions since the main route for 85% of shipments is via Baltic Sea to customers. For that matter Brown-Forman Finland considered and planned out re-routing in case of disruption on Baltic Sea due to the war. The BFF planned alternative different routes for shipments that would go through Sweden to destined countries. That would tackle the logistical routing risk but would result in longer delivery times. (BFF 2022)

Another big risk that was considered and analyzed by BFF was Russia invading Finland or Latvia. Finland has the most important thing, which is production plant which produces Finlandia Vodka goods and stores most of the BFF's goods in their warehouse. Latvia is also important piece of the whole supply chain of Brown-Forman Finland since it stores lots of BFF's goods as well that ship out of Latvia. If that would have had happened, then it would have stopped production and loss Brown-Forman Finland inventory. That would have resulted in shipment interruptions and office closures and would have been an issue for employee safety. However, that was analyzed as a low risk of this happening, but it was still analyzed and discussed. (BFF 2022)

Ingredients of Finlandia Vodka goods were also analyzed and confirmed that there will be no sanctions placed on importing grains used for vodka production from Russia. However, it was also analyzed and discussed. This was the first risk that was confirmed and ruled out to tackle the raw material risk possibility. (BFF 2022)

Bottling is important aspect of Finlandia Vodka since the product is stored in the glass bottles and the glass bottle production is based in Estonia. As soon as the war started, Brown-Forman Finland analyzed the risk if something would happen to bottle production. The alternative suppliers of glass bottles were listed out and the minimum stock level of glass bottles was raised immediately to rule out any issues with glass supply.

In general Brown-Forman Finland did a great job by assessing all the risks by creating right away meetings regarding possible risks and implying the contingency plan. Things such as production was made sure to find alternative solution in case of something happens, ethanol's safety stock was increased as well as glass bottle safety stock. All the main possible risks were covered and analyzed by Brown-Forman Finland.

## 5 Contingency plan proposal for future crises

In this chapter, author presents various proposals for the improvement of the contingency plan for future crises for Brown-Forman Finland. These proposals are written based on the theoretical framework, the company's data collected and analyzed, and meetings with managing director Sami Pulkkinen.

### 5.1 Contingency plan improvement for Brown-Forman Finland

Author looked at the contingency plan for Finland and Latvia in case of political conflict, and the first thing that stuck out was the non-structural contingency planning. Contingency plans should be well structured that it is easy to read and follow. The first step in contingency plan is to identify every single stage of supply chain and what to do if certain stage was disrupted. In Brown-Forman Finland's contingency plan there were not every stage of supply chain identified and analyzed but rather was just couple important functions brought out. Also contingency plans include estimated costs of how much each disruption would cost to each stage of supply chain. BFF's contingency plan did not include any costs associated with disruption of supply chain and their stages. (Lau 2021)

Using "PPRR" contingency plan strategy would benefit Brown-Forman Finland enormously. PPRR strategy is widely used, and it stand for prevention, preparedness, response and recovery. Prevention assists company in mitigating supply chain risks by implementing preventative measures that reduce or eliminate occurrences. The most important thing to have to identify and prevent dangers. Prepared enables company to design an effective response strategy to these disturbances that companies would not get caught off guard. Response outlines the specific activities companies take to contain and mitigate the effects of supply chain interruptions. It's outlined how important personnel in company will carry out emergency response strategies. Lastly, recovery determines how the company will resume normal activities as soon as possible. It can be a difficult strategy to imply but it definetly would help Brown-Forman Finland in creating a good contingency plan. (Trade Beyond 2020)

Auditing supply chain's vulnerability is important and is something that Brown-Forman Finland has to do a better job. It's important in auditing the supply chain vulnerability to identify its weaknesses to develop a good contingency plan. Brown-Forman Finland should consider each each link in the supply chain as important. In the supply chain the high risks points must be considered while analyzing supply chain susceptiblity. BFF should identify better which suppliers pose a high risks to the company and how important are the supplier for the company. The BFF did list their alternative suppliers in case of emergency but it is important to have current suppliers and their risks brought

out since it's important to know which suppliers could disrupt the supply chain, the likelihood of it and impact of it on supply chain operations. (Lau 2021)

The Brown-Forman Finland is part of the big Brown-Forman Corporation which headoffice is located in Louisville, US. This means that in case of emergencies it would be a challenging to contact the US regarding some big decisions since the time difference is huge. Communication strategies should be improved between Brown-Forman Finland and Brown-Forman corporation. In the current contingency plan there were no strategies brought out regarding the communication between the US and Finland in case of emergency. In contingency plan there was not mentioned the key personnel from the various department of BFF who are responsible for developing and implementing the contingency plan, as well as handling different crises when they happen. However, communication is a key of having a good contingency plan. It is important for BFF to develop clear and understandable communication strategies in the contingency plan.

Lastly, it's important to educate and train employees about the contingency plan. Author working himself in Brown-Forman Finland has never been trained or educated about the company's contingency plan. It's important to provide comprehensive training to employees on the contingency plan and conduct regular meeting to ensure that employees have knowledge of how to handle crises effectively. Brown-Forman Finland should provide guidance on crisis communication, risk management, and adaptive decision-making. Author thinks that company needs to adjust and improve their education and training for the employees regarding the contingency plan.

Brown-Forman should imply into the contingency planning the PPRR contingency plan strategy, audit supply chain vulnerability, improve communication between offices, educate and train its employees. By adding these different strategies into the contingency plan, the Brown-Forman Finland can create a resilient framework that will allow it to navigate through various crises while preserving operational continuity and customer satisfaction.

## 6 Conclusions

This is a final chapter that summarizes the main points presented in the study, highlights the recommendations to the company, and evaluates the research's applicability and limitations. The author reflects on his learnings in the conclusion part.

### 6.1 Key findings

The aim of the thesis was to investigate the Russo-Ukrainian war effects on Brown-Forman Finland's supply chain operations and how can Brown-Forman Finland stay prepared for future crises. In the literature review the study analyzed the main aspects related to supply chain management and crisis management. The author discussed in theory part mainly the supply chain operations and risk management. The main key aspects analyzed were supply chain disruption, KPIs, risk management, Bullwhip Effect, and contingency planning which were all correlated to the Russo-Ukrainian war effects on BFF's supply chain operations. Company's performance metrics were a vital aspect of the theory since the performance metrics gave the opportunity to compare effects before and during war and showed the main effects on the whole supply chain operations.

The author acquired data from case company to analyze its current supply chain performance based on literature review. This was accomplished by combining the author's experience from personally working with Finlandia Vodka's logistics department, many discussions with the BFF management and analyzing the company's performance metrics. The author found two main key findings related to the research. The main key finding was that the war affected Brown-Forman Finland's supply chain operations in many functions, such as transportation, production, demand forecasting, costs, and distribution. The second key finding was that Brown-Forman Finland's risk management was handled well to overcome the negative effects of the Russo-Ukrainian war on the company. However, in risk management the contingency planning and risk management strategy could be improved a lot to stay more prepared for any crises in future.

### 6.2 Recommendations

Some recommendations were given to the case company to improve its risk management strategy and contingency planning to stay better prepared for future crises. As analyzed in chapter 5, even the risk strategy plan and contingency plans were easy to follow and were very clear, the Brown-Forman Finland needs to still improve its communication strategies in order to operate well if any crisis happens. The main office is in US and the time difference between Finland and US is big, which requires to have a better strategy regarding the communication in case of crisis.

Another recommendation would be that Brown-Forman Finland would start auditing its supply chain vulnerability, to identify its weaknesses to develop a good risk strategy and contingency plan. That includes identifying high risks suppliers who could disrupt the supply chain functioning, chances of it happening and finally their importance to the company's supply chain operations.

Lastly, Brown-Forman Finland should invest more time and resources in educating and training its employees about the contingency plan and risk strategies. The author working himself in the company feels like there is no training or information about the contingency plan or risk strategies. It's crucial to provide good training to employees on the contingency plan, so when crisis happens to strike every employee knows what to do, to minimize the effects on the company's operations.

The author's recommendation to the case company regarding the risk management and contingency planning is to start implementing PPRR contingency planning strategy. PPRR strategy is designed to make company's risk management smoother and more functional, and that would in turn improve right away the contingency plan of the Brown-Forman Finland for future crises. Auditing supply chain vulnerabilities, improving communication strategies and training its employees are also heavily recommended by the author to make the risk management and contingency plan more resilient.

### **6.3 Limitations and suggestions for further research**

In the research certain areas would have benefited from additional clarification. Breaking down certain data into smaller groups would have made the examination of several areas deeper and more detail oriented. The managing director of the case company provided the author company's performance data metrics and different KPIs from various angles, however, there were not enough KPIs, and performance metrics related to author's research topic to include in the research. Having more performance metrics in the data would have benefited this research more.

The limitations show that there is room for improvement in analyzing the case company's supply chain performance and operations. The study's scope can be expanded to include more detailed supply chain processes and operations within Brown-Forman Finland and Brown-Forman Corporation. The research can be used as foundation for additional research of Russo-Ukrainian war effects on Brown-Forman Finland's supply chain operations and risk management of BFF.



## 6.4 Validity and reliability

The validity and reliability are extremely important concepts in a thesis to evaluate the quality of a research. The accuracy with which a method measures what it's supposed to measure is referred to as its validity. High validity means the research provides conclusions that correlate to real traits and characteristics. Validity ensures that the findings and conclusions from a study are trustworthy and meaningful. (Middleton 2023)

The consistency with which a method measures something is referred to as its reliability. The measurement is regarded reliable if the same results can be consistently obtained by using the same methods under the same conditions. Reliability means consistency and stability of research findings. (Middleton 2023)

The author made sure that the secondary data was gathered from reliable sources such as academic books, journals, articles, reliable websites and from the case company's official database. All materials used for secondary data gathering have been mentioned in the text and sources list following the Haaga-Helia writing report guidelines. By applying Haaga-Helia writing report guidelines, it establishes the reliability of the sources and results. The case company did not allow due to confidentiality to show exact numbers of company's data and results, so author used percentages to show the outcomes of the data changes and results in this research.

The primary data collection was done by following the mandatory requirements. The mentioned positions and names of conducted free flow interviews were recorded in the research. Author ensured that all the company data, personal experiences, and interview results were accurate, unchanged, and reliable.

## 6.5 Reflection on learning

The author has gained new knowledge for future development as a result of writing this research. This research has expanded the author's understanding of various supply chain operations within the company the author works at. It has been extremely beneficial for the author's future development in the field of logistics and supply chain management. The different analyzing skills, such as breaking down business data and creating flow charts, tables and figures were further developed while writing the research thesis. The author learned how to use the data available by the case company to further understand and analyze the supply chain performance of the case company. Writing this research also developed time management skills since timing and staying time schedule was important to this research.

## Sources

Ashcroft, S. 2023. What is ... supply chain? Supply Chain Digital. URL: <https://supplychaindigital.com/digital-supply-chain/what-is-reverse-logistics>. Accessed: 18 September 2023.

B2BE. 2021. Which Supply Chain KPI Is Most Important Overall To You or Your Organization? Business to Business e-Solutions. URL: <https://www.b2be.com/blog/which-supply-chain-kpi-is-most-important/#:~:text=KPIs%20are%20the%20metrics%20that,problems%20of%20the%20supply%20chain>. Accessed: 25 September 2023.

Bailey, T., Barriball, E., Dey, A & Sankur, A. 2019. A practical approach to supply-chain risk management. McKinsey & Company. URL: <https://www.mckinsey.com/capabilities/operations/our-insights/a-practical-approach-to-supply-chain-risk-management>. Accessed: 30 September 2023.

Blume 2019. The Supply Chain, Explained. Blume Global. URL: <https://www.blumeglobal.com/learning/supply-chain-explained/>. Accessed: 18 September 2023.

Brecher, M. 1996. Introduction: Crisis, Conflict, War-State of the Discipline. International Political Science Review / Revue Internationale de Science Politique. JSTOR. URL: <https://www.jstor.org/stable/1601299>. Accessed: 16 September 2023.

Brown-Forman 2023. About us. URL: <https://www.brown-forman.com/about-us>. Accessed: 16 April 2023.

Brown-Forman Finland (BFF) 2022. FY23 Supply Chain – Finlandia Metrics. Brown-Forman Finland.

Cascade. 2023. Supply Chain Strategic Planning: A 5-Step Process. Cascade. URL: <https://www.cascade.app/blog/supply-chain-strategic-planning>. Accessed: 26 September 2023.

CFI 2023. Supply Chain. Corporate Finance Institute. URL: <https://corporatefinanceinstitute.com/resources/management/supply-chain/>. Accessed: 18 September 2023.

Champion, A. How To Overcome Supply Chain Disruptions. FlowSpace. URL: <https://flow.space/blog/how-to-overcome-supply-chain-disruptions/>. Accessed: 30 September 2023.

CIPS 2022. What is the Bullwhip effect? CIPS. The Chartered Institute of Procurement and Supply. URL: <https://www.cips.org/knowledge/procurement-topics-and-skills/operations-management/bullwhip-effect-in-supply-chain/>. Accessed: 21 April 2023.

- Consilium. 2022. EU sanctions against Russia explained. Council of the European Union. URL: <https://www.consilium.europa.eu/en/policies/sanctions/restrictive-measures-against-russia-over-ukraine/sanctions-against-russia-explained/>. Accessed: 9 October 2023.
- Fernando, J. 2022. Supply Chain Management (SCM): How It Works and Why It Is Important. Investopedia. URL: <https://www.investopedia.com/terms/s/scm.asp>. Accessed: 18 September 2023.
- FTI 2022. Supply Chain Disruption – The Risk to Global Economic Recovery. FTI Consulting. URL: <https://www.fticonsulting.com/insights/articles/supply-chain-disruption-risk-global-economic-recovery>. Accessed: 23 September 2023.
- Furtado, V., Kolaja, T., Mueller, C & Salguero, J. Managing a manufacturing plant through the coronavirus crisis. McKinsey & Company. URL: [https://www.mckinsey.com/capabilities/operations/our-insights/managing-a-manufacturing-plant-through-the-coronavirus-crisis#](https://www.mckinsey.com/capabilities/operations/our-insights/managing-a-manufacturing-plant-through-the-coronavirus-crisis#/). Accessed: 25 September 2023.
- Georgiev, N. 2021. Bullwhip Effect In Supply Chain: Definition & Example. Blue Cart. URL: <https://www.bluecart.com/blog/bullwhip-effect-definition>. Accessed: 28 September 2023.
- Hans, R. 2021. Supply Chain Disruptions: A Bad News for Businesses. Deskera. URL: <https://www.deskera.com/blog/supply-chain-disruption/>. Accessed: 23 September 2023.
- Hayes, A. 2023. The Supply Chain: From Raw Materials to Order Fulfillment. Investopedia. URL: <https://www.investopedia.com/terms/s/supplychain.asp>. Accessed: 16 September 2023.
- Henningan, L. 2023. What Is A KPI? Definition & Examples. Forbes. URL: <https://www.forbes.com/advisor/business/what-is-a-kpi-definition-examples/>. Accessed: 16 September 2023.
- IBM 2018. What is Supply Chain Management? IBM. URL: <https://www.ibm.com/topics/supply-chain-management#:~:text=supply%20chain%20management%3F-,Supply%20chain%20management%20is%20the%20handling%20of%20the%20entire%20production,final%20product%20to%20the%20consumer>. Accessed: 18 September 2023.
- ILO 2016. What are supply chains? ILO. International Labour Organization. URL: <https://lib-guides.ilo.org/global-supply-chains-en>. Accessed: 21 April 2023.
- Inbound Logistics. 2023. Bullwhip Effect: Example, Causes, and Impact on Supply Chain. Inbound logistics. URL: <https://www.inboundlogistics.com/articles/bullwhip-effect/>. Accessed: 28 September 2023.

Indeed 2023. Global Supply Chain Definition (Plus Benefits and Tips). Indeed. URL: <https://ca.indeed.com/career-advice/career-development/global-supply-chains-definition>. Accessed: 20 September 2023.

La Londe, P. C. 2016. KPIs Are Key To Successful Supply Chain. Supply Chain Brain. URL: <https://www.supplychainbrain.com/articles/24209-kpis-are-key-to-successful-supply-chain>. Accessed: 25 September 2023.

Larsen, T. S., Schary, P. B., Mikkola, J.H & Kotzab, H. 2007. Managing The Global Supply Chain. 3<sup>rd</sup> edition. Copenhagen Business School Press. Denmark.

Lau, G. 2021. 5 Ways to Mitigate Supply Chain Disruption Effects on Your Businesses. Shift4Shop. URL: [https://blog.shift4shop.com/mitigate-supply-chain-disruption?hs\\_amp=true](https://blog.shift4shop.com/mitigate-supply-chain-disruption?hs_amp=true). Accessed: 30 September 2023.

Leonard, K. 2023. What Is A Contingency Plan & How Do You Create One? Forbes. URL: <https://www.forbes.com/advisor/business/contingency-plan/>. Accessed: 16 September 2023.

McKinsey & Company 2022. What is supply chain? McKinsey & Company. URL: <https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-supply-chain>. Accessed: 18 September 2023.

Middleton, F. 2023. Reliability vs. Validity in Research | Difference, Types and Examples. Scribbr. URL: <https://www.scribbr.com/methodology/reliability-vs-validity/#:~:text=Validity%20refers%20to%20how%20accurately,that%20a%20measurement%20is%20valid>. Accessed: 12 November 2023.

Minett, A. 2022. An Introduction to Supply-Chain Risk Management. Chas. URL: <https://www.chas.co.uk/blog/supply-chain-risk-assessment/>. Accessed: 30 September 2023.

Murphy, K. 2018. Supply Chain Management KPIs. Planergy. URL: <https://planergy.com/blog/supply-chain-management-kpis/>. Accessed: 26 September 2023.

Ng, W. & Coakes, E. 2013. Business research: enjoy creating, developing, and writing your business project. Kogan Page. London. URL: <https://r2.vlereader.com/ErrorInvalidExpired>. Accessed: 3 October 2023.

Ni Business Info 2013. Business continuity and crisis management. North Ireland Business Info. URL: <https://www.nibusinessinfo.co.uk/content/potential-business-crisis#:~:text=Guide,have%20to%20be%20taken%20quickly>. Accessed: 16 September 2023.

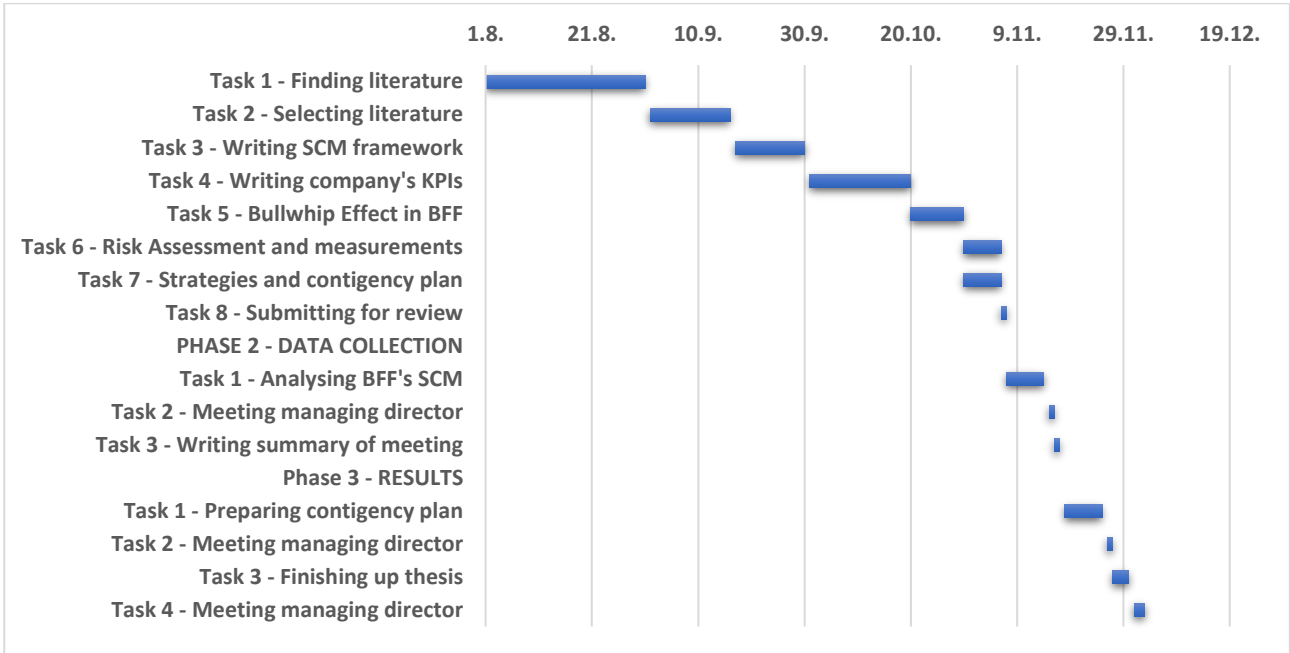
- Qlik. 2020. What is a KPI? Qlik. URL: <https://www.qlik.com/us/kpi>. Accessed: 25 September 2023.
- Ray, M. 2022. Russo-Ukrainian War. Britannica. URL: <https://www.britannica.com/event/2022-Russian-invasion-of-Ukraine>. Accessed: 21 April 2023.
- Ready 2023. Risk Assessment. Ready. URL: <https://www.ready.gov/business/planning/risk-assessment>. Accessed: 16 September 2023.
- Recasens, J. 2020. Forecasting In Time of Disruption. Medium. URL: <https://medium.com/opex-analytics/forecasting-in-times-of-disruption-9e7b2d9bd2e4>. Accessed: 26 September 2023.
- Rinne, J., Lankoski, J., Ollikainen, M & Mikkola, H. 2011. Ethanol production under endogenous crop prices: Theoretical analysis and application to barley, biomass and bioenergy. Science Direct. URL: <https://www.sciencedirect.com/science/article/abs/pii/S0961953411001000>. Accessed: 10 October 2023.
- Safety Culture. 2023. Supply Chain Disruption. Safety Culture. URL: <https://safetyculture.com/topics/supply-chain-disruption/#:~:text=Supply%20chain%20disruption%20is%20an,of%20specific%20goods%20or%20services>. Accessed: 26 September 2023.
- Saunders, M. N. K. 2015. Research Methods for Business Students. Pearson. URL: <https://ebookcentral.proquest.com/lib/haaga/reader.action?docID=5138717>. Accessed: 3 October 2023.
- SCD. 2021. The importance of supply chain visibility. Supply Chain Dive. URL: <https://www.supply-chaindive.com/spons/the-importance-of-supply-chain-visibility/611212/>. Accessed: 26 September 2023.
- Scheunemann, C. 2020. Supply Chain Disruption: How to Manage and Avoid Breakdowns. Sphera. URL: <https://sphera.com/spark/supply-chain-disruption-how-to-manage-and-avoid-breakdowns/>. Accessed: 26 September 2023.
- Science Direct 2022. The Russo-Ukrainian war and financial markets: the role of dependence on Russian commodities. Science Direct. URL: <https://www.sciencedirect.com/science/article/abs/pii/S1544612322004007>. Accessed: 16 September 2023.
- Trade Beyond. 2020. Supply Chain Risk Management 101: What it is and why it matters. URL: <https://tradebeyond.com/blog/supply-chain-risk-management-101-what-it-is-and-why-it-matters/>. Accessed: 18 October 2023.

Wallstreet Mojo. 2020. Bullwhip Effect. URL: <https://www.wallstreetmojo.com/bullwhip-effect/#causes-solutions>. Accessed: 28 September 2023.

Zoho 2020. What is Safety Stock? Zoho. URL: <https://www.zoho.com/inventory/guides/what-is-safety-stock.html#:~:text=Safety%20stock%20is%20an%20extra,insurance%20against%20fluctuations%20in%20demand>. Accessed: 16 September 2023.

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