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Research Article

The impact of the Russia-Ukraine war on the Russian supply chain

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Abstract The Ukraine and Russia war has damaged the worldwide supply chains during the war, several countries imposed dozens of sanctions worldwide which crippled the supply chain of Russia to a great extent. In many nations, bans were also imposed on industrial products, fossil fuels, raw materials, and grains. In this regard, the authors have analysed how the war between Ukraine and Russia has affected the supply chain of Russia, and that analysis is presented in this dissertation. The findings presented by this research have indicated that finished goods, fuels, and energy shortages have augmented inflation. The war affected the routes of transport which in turn impacted the goods and logistics of the commodities by Russia. Due to war, Europe has taken the step to welcome the Russians leaving their country. The sanctions imposed have adversely affected the Russian imports from Europe and exports to Europe. However, European countries such as Poland, Germany, and Finland imported natural gas from Russia and the imports of fossil fuels were increased by nations like Turkey, China, and India. In this way, Russia's earnings from its sales of fossil fuels rose. Unfortunately, everything gets costly because the cost of transport increased, and worldwide prices of energy elevated. Intense inflation was led by this war.

Keywords: Supply Chain; Russia-Ukraine war; sanctions; logistics; disruptions; export; import; material shortage; disrupted logistics; inflation; global supply chain.

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1. Introduction

COVID happened in 2019 roughly four years back. When people recovered from this difficult crisis after the pandemic Ukraine was invaded by Russia during that period. Globally a war commenced and has brought new problems (Prohorovs, 2022). Economic stability declined during the war and it is still faced today (Yotzov et al., 2022). The worst decline in economic stability will be experienced by Russia because of this war according to reports (NEZHYVA & MYSIUK, 2022). In 2022 and 2023 Russia's GDP declined by 2.1% and 0.2% (World Bank Group, 2023) as depicted by Figure 1.

Russian imports were banned by Canada, the United States, and the European Union because sanctions were imposed on Russia and the reason was that it invaded Ukraine (Glauber and Laborde, 2022). During the period of war exports to Russia decreased due to sanctions (Darvas & Martins, 2022) indicated by Figure 2. Worldwide largest grain exporter is Russia and the grains include barley (12.2%), vegetable oils (18.6%), maize (1.1%), rye (0.4%), oats (1.6%), wheat and meslin (17.7%), rice 0.3% (Rose et al., 2023). In contrast to 2019,2020, and 2021, Russian exports of grains decrease in 2022 as depicted in Figure 3 Russia's supply of crude oil was to be 20% percent (Nadig, 2023a). The exporting of fossil fuels was used to generate revenue for Russia which then dropped by 17% (Meredith, 2023a). Due to this reason in 2022, Europe experienced an increase of 70% and 54% in the prices of natural gas and energy (Nadig, 2022c).

Several raw materials such as palladium are exported by Russia and it is used for the manufacturing of batteries, and steel is also used in catalytic converters of batteries in nickel and electric vehicles (Orhan, 2022). The usage of nickel is also done in lithium-ion batteries (LIBs), slow delivery of nickel for electric vehicles was crucial. Despite the small volumes used for the batteries, higher cost volatility may increase the price of battery-powered automobiles by up to 1000 dollars (Pickrell, 2022). The United States chip industry has a supplier industry from Ukraine called Neon. For the production of medical devices, vehicles, jet engines, and semiconductors vital components are supplied by Russia (Tan, 2022a). Ukraine and Russia are the worldwide suppliers of 60000 enterprises approximately and the United States has ninety percent of these enterprises situated in it (Noble, 2022). These large numbers are partially due to the reason that exports such as semi-finished iron goods, natural gas, petroleum, wheat, corn, and seed from both countries' sunflowers are important for America's existence (Noble, 2022). consequently appears that developing new markets for these things unexpectedly became important (Noble, 2022).

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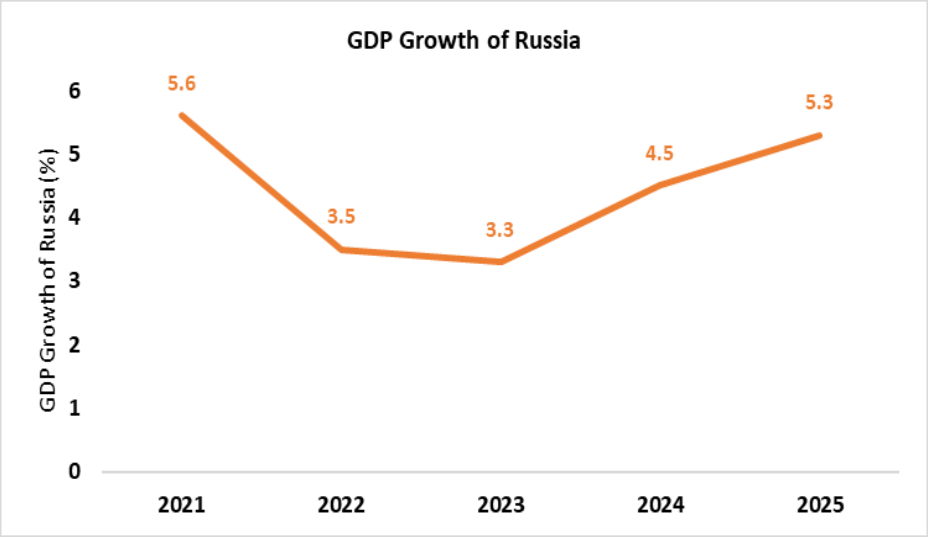

Fig.1 The percentage increase in GDP at market prices (Source: (World Bank Group, 2023)(p.7). Note: The mentioned source is used from which the data is obtained and the author himself has plotted the figure.

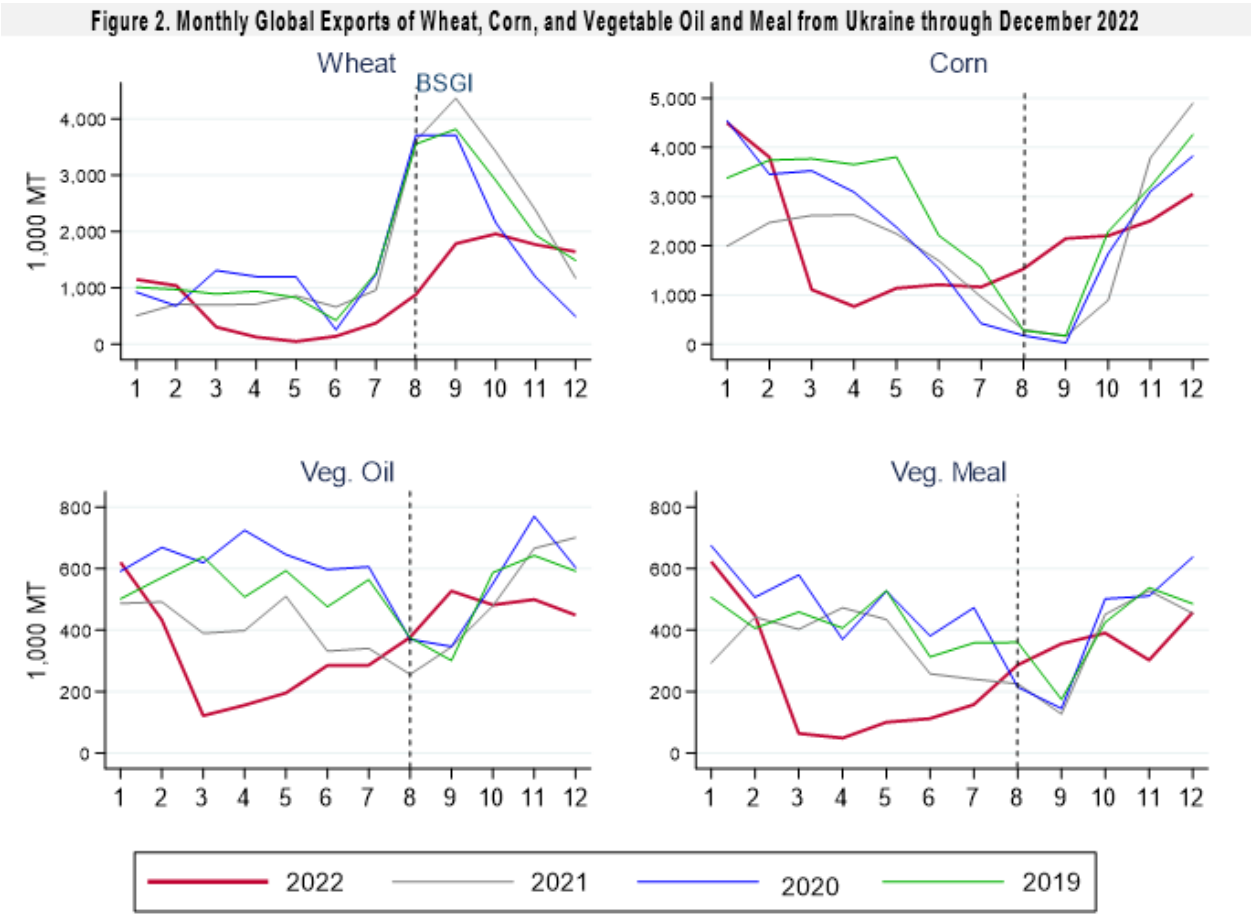

Fig.2 Since 2019 TO 2022 Russia Grain Export (Source: (Grant et al., 2023)

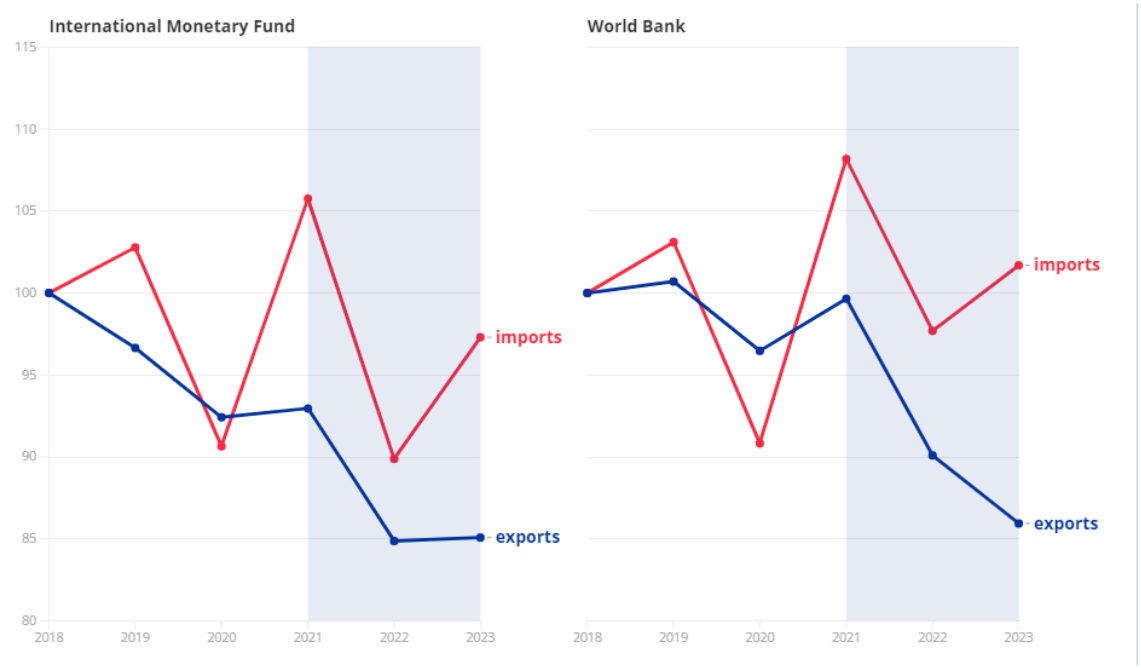

Fig.3 Russia's exports and imports decreased (Source: (European Council, 2023b)

Ukraine and Russia's war has caused transportation problems and disrupted the supply chain of many raw materials. Goods were transported either by ships or cargo (OECD, 2022). Since March 2022 cargo services have been stopped worldwide by the large corporations associated with shipping activities; specifically from the ports of Russia which resulted in the transportation of limited goods to several countries (OECD, 2022). The shipment of oil, gases, fertilizers, and metals was reduced to the western countries by the Government of Russia (TASS, 2022). Several raw materials such as sixteen percent potassium, forty-four percent fertilizer, nine percent phosphate, ammonia (23%), fourteen urea, and different metals, and grains (as described in the section 1 proposal) are exported by Russia (Grant et al., 2023). Raw materials such as machinery and equipment (34%), metals (7%), chemicals (12%), transport equipment (15%), food (11%), and textiles (6%) are imported by Russia from different countries imposing sanctions on it which can be depicted Figure 4.

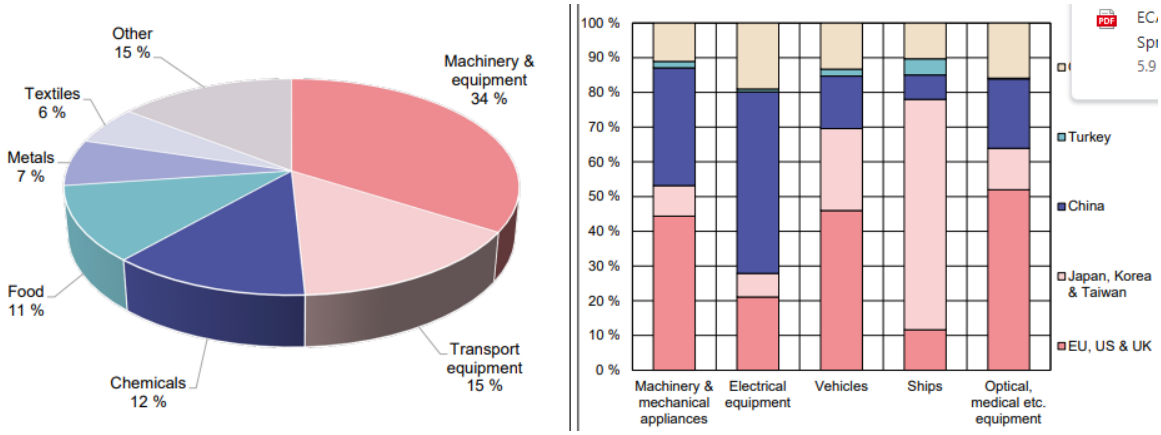

Fig.4 Global imports of Russia (Source: (Heli, 2022)

2. Research Gap

How the supply chain of Russia and Ukraine impacted is a new research topic therefore limited publications are available on this problem (Ngoc et al., 2022). Rose, Chen, and Wei (2023) analyzed how the export of grains was influenced by the Russia-Ukraine war, and for this, the global trade analysis project (GTAP) computable model of general equilibrium was used (Rose et al., 2023). Dyson et al. (2023) investigated the impact of the Russia-Ukraine conflict on the worldwide supply chain of food and how potential resilience may be established (Dyson et al., 2023). Naz and Kear's (2023) goal was to evaluate how the food and energy supply chain in the South Asian region was affected by the Russian invasion of Ukraine (Naz & Kear, 2023). In addition, Jagtap et al. (2022) attempted to study the consequences of the Russia-Ukraine war on the adaptability and efficacy of worldwide food supply networks (Jagtap et al., 2022). Global supply chains have been analyzed based on several perspectives by numerous researchers. However,

this present research is based on a new perspective by analyzing how the supply chain of Russia was disrupted by the Russian encroachment of Ukraine.

3. Impact of War on the Russian Supply Chain

3.1 Disrupted Logistics Due to Russia-Ukraine War

The situation in Ukraine had interrupted the conventional supply routes which highlights the importance of designing the worldwide supply chain to have adaptability. Before the conflict businesses were experiencing challenges such as long lead times, port congestion, shortage of containers, and increased rates of shipping. However, more interruptions are being caused after the conflict happened (Kilpatrick, 2022a). For the global supply chain, two nations play an important role in it being situated at the center and these nations are Russia and Ukraine. The location of both countries is between large markets of Asia and Europe. In terms of transport between Russia and Ukraine, the key corridors namely the Belt Road initiative of twenty-six trillion dollars signed by Ukraine and Russia (Wilson, 2022).

3.2 Manpower Shortages in Russia

According to the reports by Ferrell and Nowrasteh (2022) countries in the European neighborhood have given refuge to four million refugees and it is still elevating to fifty thousand a day due to the conflict between Russia and Ukraine (Orrell & Nowrasteh, 2022). Stognei and Ivanova stated that when Russia was invaded by Ukraine in 2022 three lac individuals were mobilized to fight. To avoid conscription thousands of men who were educated and skilled flew abroad due to this departure information technology and other sectors were badly impacted due to their dependence on skilled labor (Stognei & Ivanova, 2023). The magnitude of Russian laborers who left Russia after the war is represented in Fig.5.

Fig.5 The labour market of Russia depicted (Source: (Stognei & Ivanova, 2023)

Smith (2023) stated that more than one million individuals in Russia under the age of thirty-five have left the labour force in 2022; however additional factors may be involved in influencing (Smith, 2023). To retain staff, various corporations have defined their policies by attempting to avoid government pressure in 2022 (Ilyushina, 2023). The Russian government has taken the stance to act independently and there is disagreement on proceeding ahead (Ilyushina, 2023).

3.3 Production and Export of Fuels by Russia

Russia's war with Ukraine had not only affected Ukraine's energy market but also worldwide markets. Elevation of inflation, increased prices, and interruptions of the supply chain caused the affordability crisis of fuel faced by various countries due to which huge losses occurred to the Russian economy (Flowers, 2023). Nadig (2022) reported that during the invasion of Ukraine, detachment from President Putin's administration was requested from various Western countries however oil production dropped only 3%. According to the reports of IEA published in August in July every day 3 Million barrels were produced which showed a decrease from the previous levels and the 580,000 barrels each day decrease was done to overall export levels. Generally, these figures do not affect the economy of Russia (Nadig, 2022a). In August 2023 every day, one million barrels of crude oil was produced by Russia which is similar to the reading of last month as reported by Statista (2023) (Statista, 2023a).

Before the Ukraine invasion, Russia was in the lead in supplying oil, fossil fuel, and natural gas to Europe and these supplies served as the main component for providing energy to the nation (Nadig, 2022a). In the year 2019, Russia was recognized as the second largest in rank for supplying crude oil globally with a total of $123bn investment to the economy of the country (Nadig, 2022a). High volume crude was supplied to Asia and Europe and it was possible due to the pipeline capacity of large exports of oil. Druzhba pipeline system is the largest pipeline network worldwide, its length is 5500km which allows the pipeline to transfer of 7,50,000 bpd crude to East refiners and Europe. In the past Russia was providing European refineries with 20% crude rates (International Energy Agency, 2022). Furthermore, Russia attacked Ukraine. United States and EU exports have drastically declined due to the enforcement

of restrictions on the purchase of Russian oil since the beginning of 2022 (Statista, 2023c). Russia exports fuel and gas such as liquified natural gas, oil products, pipeline gas, crude oil, and liquified petroleum gas to countries like India, Turkey, and China as given in Figure 6. Europe and the United States have stopped the import of oil from Russia. The revelation on 14 January 2023 by Statista that Each day Russia has shipped 55 million metric tons of crude oil for 30 days to China (Statista, 2023c).

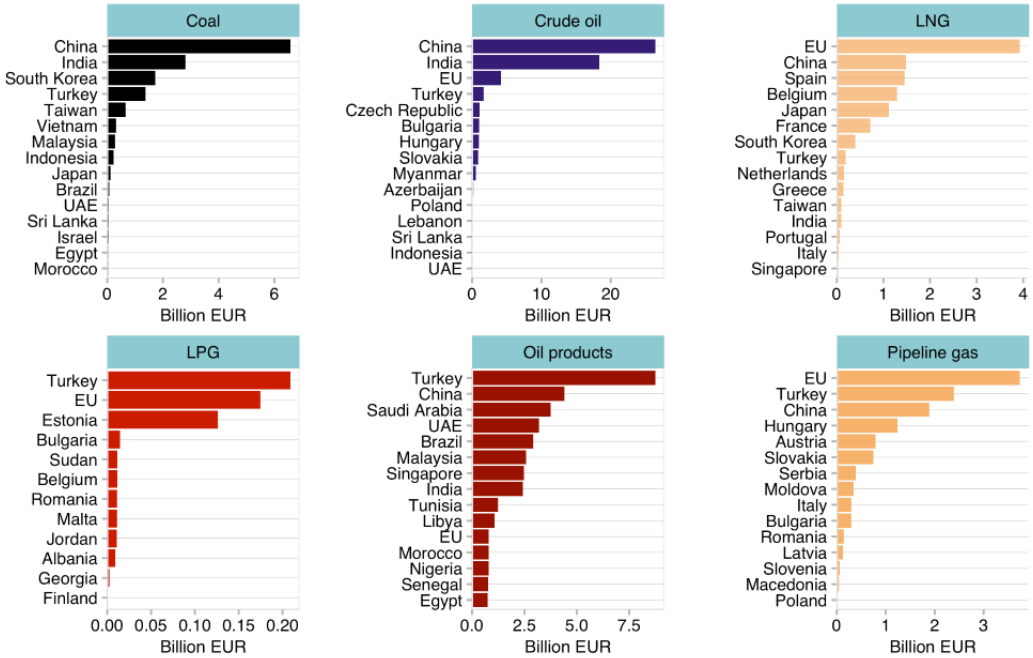

Fig.6 Export of Fuels from Russia (Source: (Levi, 2023)

Each day Russia's exports make 688.3 million dollars per day but according to the Centre for Research on Energy and Clean Air (CREA) reports a decrease of $1,075m is estimated in March to May. Since then the largest importers of energy in Russia are Japan, South Korea, Turkey, and China (Nadig, 2023b). On February 2, 2023, the purchase of fossil fuel was elevated, From the very first day of Russia's invasion of Ukraine India's purchasing cost was 3 million and it went up to $81 million in imports. Ultimately the deficit of six fifty-five million caused by the EU to Russia is not enough to cover this large deficit. At the beginning of December 2022, fuel imported from Russia to African countries was doubled but the exports of seaborne oil products are still 21% lowered from January (Conte, 2023). European Union has shipped crude oil through Hungary and the Czech Republic by pipeline and Bulgaria by sea. Bulgaria was banned from importing oil from Russia but this country was given an exemption to import oil without having sanctions (Levi, 2023).

3.4 The Disrupted Supply of Materials

A report "Global Business Impacts: Russia-Ukraine Crisis" by Dun & Bradstreet stated that worldwide six lac businesses rely on Ukraine and Russia supplies of which 90% of businesses are in the US (Noble, 2022). The figure is high due to the exports such as sunflower seed, oil, gas, corn, wheat, semi-finished iron items, and various other commodities done by Ukraine and Russia (Noble, 2022). An urgent topic of discussion is now finding novel avenues for these products (Noble, 2022). Transport disruption has made the availability of raw materials affected by the imposition of sanctions and restrictions on exports. Rail and container ships are used to transport raw materials (OECD, 2022). The arrival and departure of cargo at Russian ports were ceased by various shipping corporations by March 2022. The supply of Russia was limited to many nations (OECD, 2022). Moreover, the restrictions imposed on exports such as fertilizers, gas, metals, and oil to Western countries and shipment services suspended made the Russian government respond according to the TASS news agency of Russia (TASS, 2022). Europe's dependence on Russian crude energy and natural gas, as well as its reliance on the agriculture products of Russia and Ukraine, is a weakness that Europe must address (Kilpatrick, 2022b). The trade of wheat is 25% made by both Russia and Ukraine and 60% in sunflower oil, and the export of thirty percent of barley is reported by the Food and Agriculture Organization of the United Nations. Fertilizers are globally supplied by Russia so shortfalls in agricultural production might be affected internationally (Kilpatrick, 2022b). The Russian invasion of Ukraine has given a very strong reminder to strengthen the network supplies. Best practices of supply chain reduction, maintaining close relationships with suppliers, and cost engineering are applied to avert cash shortages and prepare the inventory lines for anything that happens next (Williams, 2022).

3.5 Production of Goods

As compared to June 2022, a 6.5% increase is done in Russia's manufacturing output. This occurred after the financial system was adjusted and adopted a defensive mode to help the nation maintain the current disagreement while maintaining Russia's domestic objectives for consumer growth (Russia Briefing, 2023a). The optical products, electronic products, and computers production rate

increased to 71.6%, the equipment of shipbuilding aviation production rate increased to 26.1%, the 45.8% rate of production of finished metal increased, the equipment related to the electrical field rose by 32.1%, the 15.1% increase was observed in metallurgical and agricultural equipment, rubber and plastic production rose to 15.7% whereas extraction of stones and sand are lowered by 14.8% (Russia Briefing, 2023a). The production of food increased to 5.4% in April 2023 as compared to April 2022 and then decreased by 5.5% in March 2023. As compared to January to April 2022 escalation of 4.9% in food production was observed from January to April 2023 (Russia Briefing, 2023b).

3.6 Impact on Russian Exports

In the past ten years, Russian wheat production has increased by 60% it happened Russia is one of the nations that exports wheat in large quantities but because of the war happened reduction of 20% occurred in wheat exports (Hamaide & Trompiz, 2023). In 2021, Russia supplied 47% of palladium, 13% of aluminum, 25% of potash fertilizers, more than 16% of nickel, and 17% of oil traded on the global market (Aleksashenko, 2023). Nitrogen is a major source of supply of energy for Europe and globally 25% of its production is provided by Russia according to Hamilton (2023). Russia is the top exporter of fuel and energy products because its export magnitude is 63% along with this exports of machinery equipment, chemical equipment, and metals are also done by Russia. However, the export of fertilizer from Russia has lowered. The nations that are on their priority list of exports are Germany, the Netherlands, and China (Hamilton, 2023). The exports were reduced due to the sanctions enforced by several countries and imports were also stopped. Even across sanctions and non-sanctioning categories, the effect has been fairly unequal about the counterfactual. The United States suffered the highest decline in exports to Russia, plummeting 87 percent. Among their no-war counterfactuals, the disparities were reduced by punishing nations (Figure 2). The exports of turkey to Russia increased in May however there was a decline in their exports in March and April. In July and August Turkish exports increased even more in reality they exceeded expectations by more than eighty percent. Figure 7 shows that Turkish-Russia commerce was highlighted in a good way through the high exports. Furthermore, Griffin and Wang (2023) stated that the Russian export of oil to nations such as Turkey, India, and China has increased (Griffin & Wang, 2023). This could be the reason why the Russian economy is lowered.

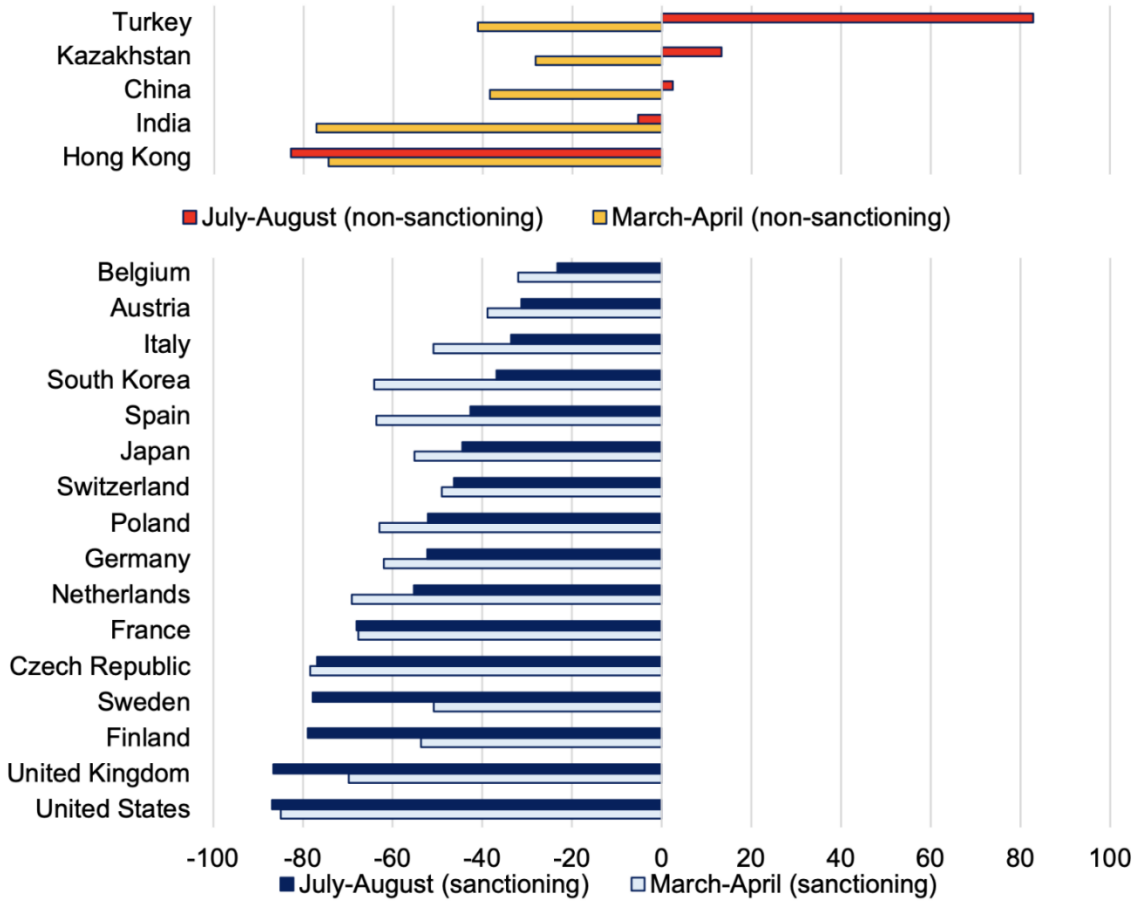

Fig.7 A comparison of how Russian exports were affected by the Russia-Ukraine war (Source: (Conteduca et al., 2022)

There are goods with dual usage that were restricted as an outcome of the conflict between Ukraine and Russia and had badly affected the exports of Russia such as the electronics and automobile industries. As compared to no war counterfactual nearly sixty percent decrease was to the automobile and electronics sector. Over forty percent of the difference was seen between the opposite scenario and these industries (see Figure 8-Conteduca et al., 2022).

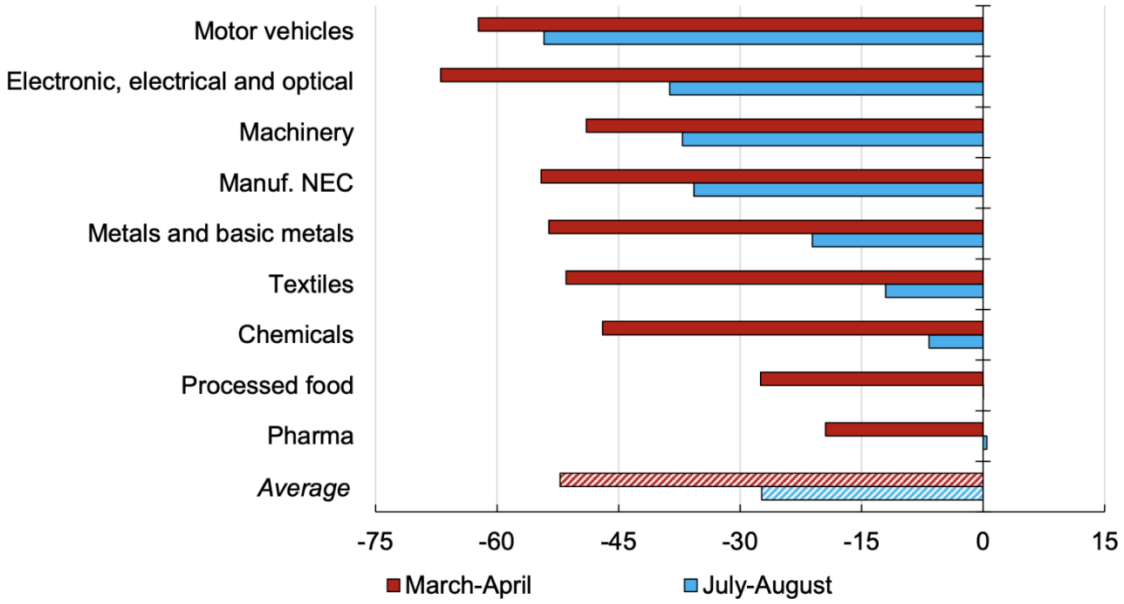

Fig. 8 The exports of Russia from the Manufacturing Sector impact due to Russia-Ukraine War (Source: (Conteduca et al., 2022)

3.7 Imports of Russia

The reasons why Russia experienced a long-term drop-down worldwide were (1)technological transfers were lowered (2) supply chains were interrupted(3) brain drain (Markus, 2022). The high-tech goods exported such as aircraft, telecommunication, and microelectronics to Russia were restricted by key foreign corporations with the cooperation of the US-led campaign. Annually Russia makes up to $19bn in imports and high-tech providers of Russia are the EU(45%), the US(21%), and China(11%) (Marcus et al., 2022). For technological needs, Russia was highly reliant on China due to the loss of NATO-aligned providers. However, all the requirements of Russia could not be fulfilled by China. The nations that excel in technology and produce medical military equipment, batteries, computer systems, electrical vehicles, and semiconductors for sustaining a modern economy through smartphones are Japan, Taiwan, and Korea. However, these countries have shown support to the United States in implementing sanctions (Cohen, 2022). The departure of 200000 literate and young generation from Russia has taken place due to the invasion. Regarding brain drain Russia's rank was lowered globally. Furthermore, supply chain interruptions and technological shortages have also played a role in lowering the rank of Russia in the world's worldwide market (Markus, 2022).

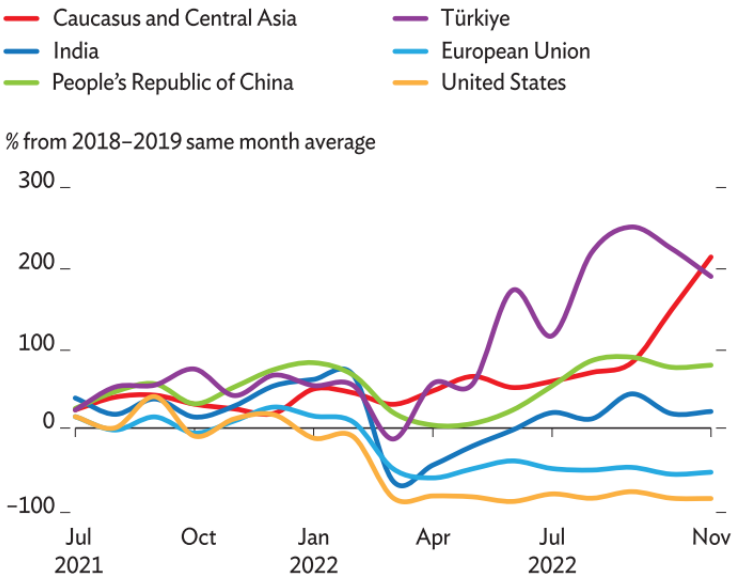

Figure 8. Exports to Russia (Source: (Asian Development Bank, 2023)

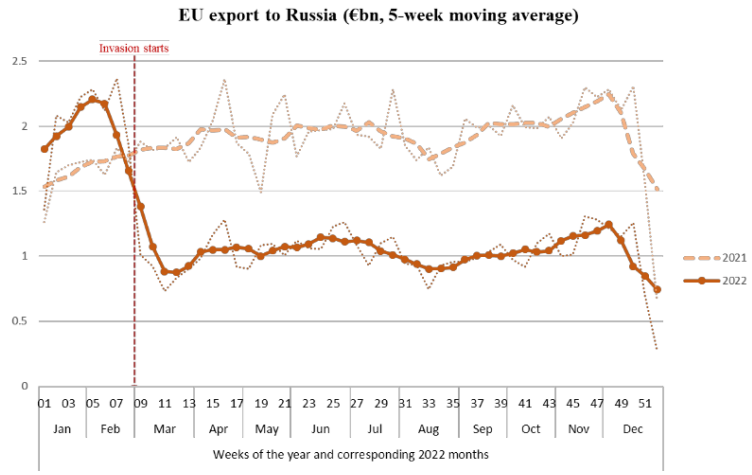

Fig.9 The import from Europe in Russia (Source: (European Commission, 2023)

Figure 8 depicts the nations that helped Russia to elevate their imports from India and Turkey. Europe was not exporting anything to Russia verified by the European Commission data due to the sanctions enforced as depicted in Fig 9.

4. Impact of Russia-Ukraine War on Grains Supply Chain

When Russia invaded Ukraine it caused a loss of property, assets, lives, and infrastructure in Ukraine leading to humanitarian damage and it all started on 24 February 2022. After World War 2 again Europe experienced a severe refugee crisis (Leon et al., 2022). Globally food security dealings have been crippled, and the worldwide supply chains have been greatly impacted the reasons are clear that is Ukraine conflict and sanctions enforced on Russian exports such as fertilizer and Russian grain (Dongyu, 2022). Global food security consists of two important components fertilizer and grain. World's Nutrition needs and dietary energy are met by the supplies of grain (Poutanen et al., 2022) Wheat, in particular, accounts for more than one-fifth of global dietary calories and proteins (Glauber et al., 2022). In an intensive agriculture system, the crop yield can be boosted by 30 to 50% by utilizing potassium, nitrogen, and phosphorus which helps the production fulfill the growing population's food requirements (Day et al., 2023).

Worldwide edible oil and grain suppliers are Ukraine and Russia. Together in 2019 eighteen percent maize, thirty percent durum wheat, twenty percent barley, and twenty-five percent meslin and wheat were produced by both countries (Zhang et al., 2023). Nearly 12% of calorie trade was represented in the form of exports worldwide (Laborde & Piñeiro, 2023). The exports such as mixed fertilizer(15%), nitrogen(13%), and potassium(16%) are accounted for in Russia which makes it the largest exporter worldwide (Zhang et al., 2023). The export of grain decreased due to the conflict between Ukraine and Russia (see Figure 11 to international markets (Ziolkowski, 2023). International barriers have made the situation worse by raising prices. The export of maize, rye, wheat, and barley was stopped by Russia to neighboring Eurasian Economic Union states including Kyrgyzstan, Armenia, Kazakhstan, and Belarus. Similarly, white raw sugar and grain exports were also stopped to ex-Soviet states. Figure 12 depicts how this war has brought about the shortage of grains and the elevation of prices in the international market. A 40% rise was observed in the annual cost of energy and food in Egypt because it highly depends on these two nations for its food and energy reserves. Numerous other countries were also impacted by the rising cost of transport, high prices of food internationally, and low imports (Tortajada & Biswas, 2023). Globally the energy prices and food costs provoked a surge due to this war because both nations are important in supplying oil, maize, wheat, and sunflower oil, and Russia's significance cannot be denied internationally related energy and fertilizer market (Glauber et al., 2022). Globally in mid-May high record was observed by FAO in the food price index (see Figure 10).

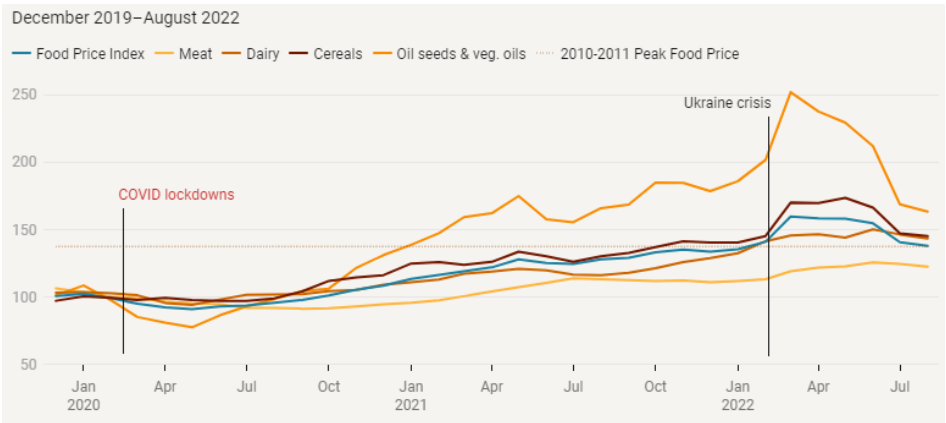

Fig.10 Nominal monthly food price index from FAO (Source: (Glauber et al., 2022)

At the beginning of the war, wheat prices increased by up to 32%. By historical standards, the prices remain high which reflects how supply chain interruption has impacted the overall economies.

Fig.11 Grain prices before and after the Russia-Ukraine war (Source: (European Council, 2023a)

Globally the export of grain was suspended by Russia but during the same time, Turkey, Ukraine, and Russia signed an initiative called the Black Sea Grain Initiative to create a corridor to make the export of grain and fertilizer easy through the black sea from 3 ports of Ukraine and those three ports namely are Yuzhny/Pivdennyi, Chornomorsk, and Odesa (Ziolkowski, 2023).

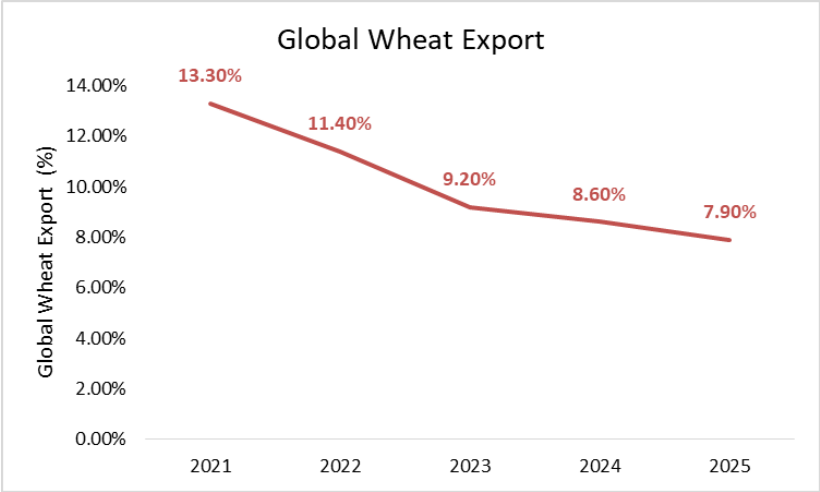

Fig.12 The percentage of global export of wheat from Russia (Source: (Ziolkowski, 2023)

Ocean shipping costs have risen due to numerous port shutdowns because of war, as reported by GEP. The worldwide supply chain condition has deteriorated due to changing the routes, which results in congestion and delayed cargo flows. Moreover, the sanctions and restrictions led to the use of ocean transport instead of rail transport, causing more pressure which resulted in a severe container shortage. This led to a sharp rise in the rise of many important goods, like grains, whose prices increased up to 60% between February and May 2022. This conflict caused an ample increase in pickup costs in India because of container scarcity. Which results in chaos when shipping season is at its peak. High-volume container delivery, which increases the prices on the East and Gulf coasts. The warehousing cost is increasing rapidly due to the increase of containers on the East Coast providing an advantage to the warehouse sector. The prices increased by about 8% in August 2022 (GEP, 2022).

5. Impact of Russia-Ukraine War on Supply Chain of Technology Products

Industrial value chain inputs are mainly provided by Ukraine and Russia, according to WTO in 2022. Due to the black seaport and other numerous routes, being inoperative the logistics were in chaos, many products such as food products, metals, fertilizers, transport equipment, and chemicals were stopped after the war. Manufacturing semiconductors, in the automotive sector producing catalytic converters, and supplying rhodium and palladium by Russia make it one of the main countries for these supplies. A significant amount of semiconductor production depends on neon supplied by Ukraine, other low-tech products like wire harnesses are also

provided to the European automobile value chain. The recovery of automobile manufacturing could be damaged, by the continuous interruption in the supply of these goods (World Trade Organisation (WTO), 2022).

It is well known that Russia is one of the main and significant exporters of the commodities mentioned above according to Deloitte (Kalish, 2022). The US Department of Interior has highlighted some minerals that are considered crucial in terms of the nation's economic security interest and those thirty-five minerals are provided by Russia which includes the world's largest supply of platinum group elements like palladium,13% of titanium, and 11% of nickel (Kilpatrick, 2022b). Russia is the largest producer of nickel and platinum, and it also controls about 10% of the world's copper reserves according to Tan in 2022. Nickle is the main raw material used in electric vehicle batteries, and copper which is widely used in electronics manufacturing and the building of homes is broadly seen as an economic bellwether (Tan, 2022b). Russia is the largest provider of neon which is used for etching circuits on silicon wafers (Kilpatrick, 2022b). Palladium a crucial component of catalytic converters for cars has risen to 80% in cost since the Ukraine invasion. Because of the conflict in Ukraine, LMC Automotive has withdrawn its prediction that light vehicle sales in Europe would increase by two million products annually over the following twenty-four months (Kilpatrick, 2022b). Globally the businesses of Russia will experience a loss in ability to compete because of decreased technological transfer, supply chain breakdown, and brain drain (Markus, 2022). To decrease high-tech exports to Russia, specifically in microelectronics, naval equipment, and telecommunications aerospace, the US-led drive is joined by numerous national companies. Most of Russia's high-tech imports whose value is 19 billion dollars per year are provided by the EU(45%), the US (21%), and China (11%) throughout history (Marcus et al., 2022). Russia due to losing its NATO-aligned suppliers has to depend on China for its high-tech necessities. Still, not all Russia's needs may be fulfilled by China. Through military supplies, computer systems, and semiconductors the maintenance of the modern economy along with batteries and electric vehicles, semiconductor production is very necessary and is specifically dominantly produced by the US and Asian countries like Japan, Taiwan, and Korea Cooperation with the US sanctioning efforts has been shown by all of these countries (Cohen, 2022). Since the Ukraine invasion specifically the literate and young generation of the Russian workforce of about 200000 departed from their country. This brain drain will significantly lower Russia's competitiveness in the global market, along with supply chain disruptions and technology shortages. Russia's competitiveness in the global market is mainly decreased by this brain drain and also due to technology shortages and supply chain disruption (Markus, 2022).

6. Supply Chain of Fuels

40% of the natural gas to EU countries is supplied by Russia in 2021. having the largest importer Germany followed by Italy and Netherlands (see Figure 13). In August 2022 it had lower to seventeen percent.

Fig.13 Gas Network from Russia to European nations (Source: (Horton & Palumbo, 2023)

An estimated $171.8m per day loss was caused to Russia due to price cap imposition by g7 countries and a ban on Russia's seaborne crude oil by European countries, as reported by news agency CNBC. In December 2022, Russia's oil and gas income decreased by seventeen percent and it was due to actions taken by Western countries (Meredith, 2023b). Along with a twenty-three percent decrease in selling cost, crude oil exports of Russia also lowered by twelve percent, according to CREA (Myllyvirta, 2023). Oil revenues of the countries dropped by 32% in December 2022. Moreover when Germany imposed a ban on oil pipelines which elevated a 5% increase to the previously mentioned figure (Nadig, 2022b). 3.3 billion dollars was made by Russia through the export of crude oil on vessels in which price cap was included, because of which the Russian government gained 2.2 billion dollars as tax income, it is uncertain if this export price continue to fall, then how Russia will get profit from its exports (Nadig, 2023c). As fossil fuels in Russia are banned in several countries, instead of that some countries are buying as depicted in Figure 14. Since the beginning of the Ukraine crisis, china has been the leading fossil fuel buyer from Russia. From August 7, 2023 onwards, fossil fuels worth 97 bn euros were exported by Russia to China.38.3 bn euros of fossil fuel was exported to Turkey making it the second largest receiver.

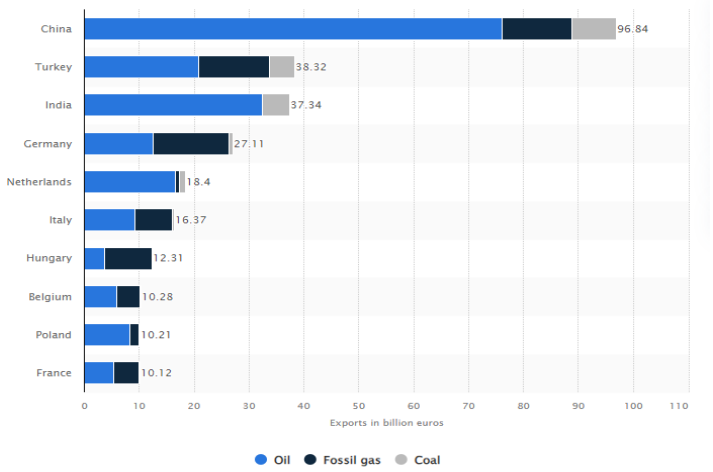

Fig.14 The export of fossil fuels from Russia (Source: (Statista, 2023b)

Russian pipeline flows of fossil fuels and ship movements are tracked by CREA.158 billion euros of fossil fuels were exported by Russia from which 85 billion euros were exported to European countries and it is reported in the initial 6 months of the invasion of Ukraine.43 billion euros were added to the Russian federal budget due to these imports. 34.9 billion euros were generated from China making it the largest single country, followed by Germany, turkey, and the Netherlands. The price of Russian exports dropped in April and June, they covered this fall by higher prices, despite the discounted prices for their oil. Russia gained more oil exports in July and August because of higher export value (Bolton, 2023). The global supply chain of Russia is immobilized due to surging oil and gas prices along with geopolitical risk awakened from the dispute, prominently in the energy-intensive logistics sectors (Kumar & Kumar, 2023). 120-130% rise was observed in the cost of natural gas since the beginning of this war in the 6 months, furthermore, 95-97% of the coal cost increased during the same period. Russia is the largest producer of crude oil, soybean, and corn and their prices increased since the Ukraine invasion (Kumar & Kumar, 2023).

7. Conclusion

The supply chain process consists of the activities that relate to starting from the first stage of raw materials to the end user. The process of the supply chain has a vital part called logistics and that includes transport; the usage of fuel is done in the transportation activity but due to the Ukraine and Russia conflict prices of fuel have increased. On the planet technology products, grains, and metals are exported by Russia on a large scale which makes this nation the largest exporter of such products but after Ukraine was invaded by Russia numerous countries banned its exports, and thus in 2022 a significant decrease was observed in exports of information technology solution, metals, fossil fuels, grains. Therefore, globally metals, fuel, and food energy are disrupted due to the war between Ukraine and Russia. This research was conducted to analyse the war between Ukraine and Russia and its impacts on the supply chain of Russia. Inflation expedite because finished goods, fuels, and energy were short indicated by the present literature review. The transport routes were affected because of the war which in turn impacted the logistics of goods and commodities by Russia. Whereas Europe took a step ahead and welcomed the Russians who left their country because of the conflict. The enforced sanctions have severely damaged the imports from Europe and exports of Russia to Europe. However, the import of fossil fuel from Russia was increased by countries like Turkey, China, and India and some countries of Europe (Poland, Germany, and Finland) also imported natural gas from Russia. Fossil fuel sales have increased the revenue of Russia. Unfortunately, the war has led to intense inflation; globally the prices of energy took a hike, the cost of transportation was elevated and due to high transport prices the cost of everything increased significantly.

Conflict of Interest

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