

# Supply Chain Issues in Times of Pandemics and Crises (Study on the Covid19 and Ukraine Crises)

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## Abstract

The purpose of this research is to examine the ways in which the global supply networks were affected by the COVID-19 pandemic and the Russian-Ukrainian conflict, and how these two crises caused delays and disruptions in these systems. The necessity of reevaluating supply networks to create more adaptability and resilience has been brought to light by the epidemic and the crisis in Ukraine. To reduce the likelihood of adverse events in the future, those involved in the supply chain must rethink their current approaches and consider new ones, such as increasing supply chain openness and visibility through the use of digital technology and broadening their pool of potential suppliers. Companies without the digital infrastructure or those depended on a single source of supplies were severely impacted by the market shifts, while those with diverse supply chains and investments in digital technology fared better. There are growing obstacles to accomplishing these goals because to the COVID-19 outbreak and the conflict between Russia and Ukraine. The combined impact of these two crises is sending labour and commodity costs soaring to new heights, which in turn is disrupting supply networks throughout the world. In light of the recent events in Ukraine and the COVID-19 outbreak, it is clear that global supply chains are extremely vulnerable and that stakeholders must work together to strengthen them.

**Keywords:** COVID-19, Russia-Ukraine War, Supply Chains

## Introduction

In light of the continuous growth of globalization, supply chains have become more interconnected and sophisticated, providing a competitive advantage for many production and commercial companies. However, their global nature has also made them vulnerable to various risks such as crises, epidemics, and sudden setbacks. Various global crises cause damage and changes to countries' economies, exposing them to complex economic problems, with the most severe and influential ones affecting poor and developing nations. The COVID-19 pandemic, which emerged in late 2019, caused a health crisis that devastated the world's population, prompting most governments to take strict measures to limit the continued spread of this dangerous phenomenon. Implementing these barriers has exerted significant pressure on global supply chains, affecting the agricultural, industrial, and service sectors. This has resulted in a severe crisis and a sudden slowdown in the global economy.

Thus, supply chains have faced obstacles and difficulties in adapting to the demands and needs of a closed world, and the impact has extended from farms to consumers. This disruption in the supply of agricultural food products to markets and consumers has caused severe shortages in many countries, especially the poorest countries. In early 2008, Ukraine announced its intention to join the North Atlantic Treaty Organisation (NATO), a move that Russia rejected. This led to a conflict between the two countries, culminating in an explicit Russian invasion of Ukrainian territory. It seems that the effects of the Russian-Ukrainian war on the global economy portend the existence of a three-dimensional crisis: food, energy, and finance, and global economic indicators point to some serious repercussions. The effects of the COVID-19 pandemic and an unprecedented wave of inflation, which have worsened in the wake of the Russian-Ukrainian war, intertwine with the challenges of the global economy. Fears of a food crisis, which could affect most of the world's population, particularly the poor countries that rely on Russia and Ukraine for their imports of grains and wheat due to their low prices, are being stoked by these ongoing challenges. Therefore, importing countries are resorting to searching for alternative countries to continue providing these necessary crops, albeit at higher costs due to the long distance and the increase in oil prices. The cost of transporting goods between countries reflects these factors, thereby threatening the food security of the world in general and the Arab countries in particular.

From this point The importance of the research stems from the need to address the inherent problems in supply chains caused by pandemics and crises, which result in a severe shortage of goods and services for most of the world's population. Additionally, the research focuses on how to maintain the continuity of supply chains to keep pace with emergency conditions.

### **Problem Statement**

Pandemics and political crises, along with their aftermath, have significantly impacted the global supply chain situation, particularly in terms of securing humanitarian and essential needs for various countries, especially developing and poor ones. This impact can be attributed to either the closure policies implemented by supplying countries or the scarcity of supplies (supply shock) resulting from pandemics or wars, which have put global human security at risk.

### *Research Questions*

What strategies and innovations proposed in the literature are the best for optimizing supply chain logistics for emergency medical supply during pandemics?

Did the COVID-19 pandemic contribute to the slowdown of global supply chains?

Did the Ukrainian-Russian crisis affect global commodity prices?

How can we address crises and ensure sustainability in global investment??

### **Literature Review**

#### ***Supply Chains***

##### *The Concept of Supply Chains*

Companies have begun to utilise supply chain management as a crucial strategy to compete with rivals in the international market(Li, S.; Ragu,2006) While supply chains were not used as a competitive advantage until the 1990s, they have since been extensively utilised, particularly due to technological advancements and evolving consumer needs. (Christopherm,2013). Hugos (2003) cited Napoleon's assertion that "the army cannot move

unless the soldiers are fed" as a pertinent supply chain principle, underscoring its vital significance for enterprises. (Hugos,2003). The advent of cross-border trade has led to the emergence of multinational corporations with offices, warehouses, and factories in several nations. The growing membership in the SC has led to significant challenges in the execution and administration of operations. Consequently, the supply networks of firms have grown increasingly intricate. According to Lee and Billington (1992), "managing supply chain management has become more challenging than managing a company." (Lee, H.L,1993). Nonetheless, as the efficacy of supply chain management influences all participants in the network, efforts have been initiated to address these difficulties. (Jainm,2009). Consequently, organisations have begun to transform this complexity into an opportunity. In the current competitive landscape, only offering low-priced items is insufficient for the sustainability of firms. The SC serves purposes beyond only lowering the product's price. Effective supply chain management is essential for delivering superior products and enhancing competitive operations. The supply chain encompasses all entities engaged, directly or indirectly, in addressing client demands and signifies the conversion of materials from the first supplier to the ultimate consumer. The supply chain encompasses all organisations and divisions that are directly or indirectly engaged in fulfilling client requirements. The supply chain includes manufacturers, suppliers, transportation companies, warehouses, retailers, and customers. The supply chain comprises several firms, each of which may engage in multiple distinct supply chains. Distinct supply networks will influence each product and service in unique ways.(Sunil.2012)

Managing the flow of goods and services from beginning to finish in a way that benefits both the company and the consumer is what supply chain management is all about, according to the Institute of Supply Management. For supply chain integration to be successful, it is crucial to develop and integrate people and technology resources. Supply chain management is defined in the article by Lee and Billington as the coordination of all the processes involved in the creation of raw materials, their transfer to intermediate goods, their transformation into a finished good, and finally its delivery to the end user.The following are some of the many steps that could be included in a standard supply chain:(Nguyen,2022)

- Customers;
- Retailers;
- Wholesalers/distributors;
- Manufacturers;
- component/raw material suppliers.

#### *Role and Characteristics of Supply Chains*

Supply chains play a very important role, as they directly affect the production and business activities of enterprises. Additionally, the supply chain is a critical component of business development. The enterprise will establish a strong presence in both domestic and international markets, acquire a competitive advantage, and expand its reach if the supply chain functions efficiently. Before the product is delivered to the consumer, it undergoes numerous processes. These processes have the capacity to convert basic materials into finished products and distribute them to distributors. The products are subsequently distributed to retail locations by the distributors. The supply chain encompasses each of these procedures. Consequently, the supply chain is essential for the most expedient delivery of

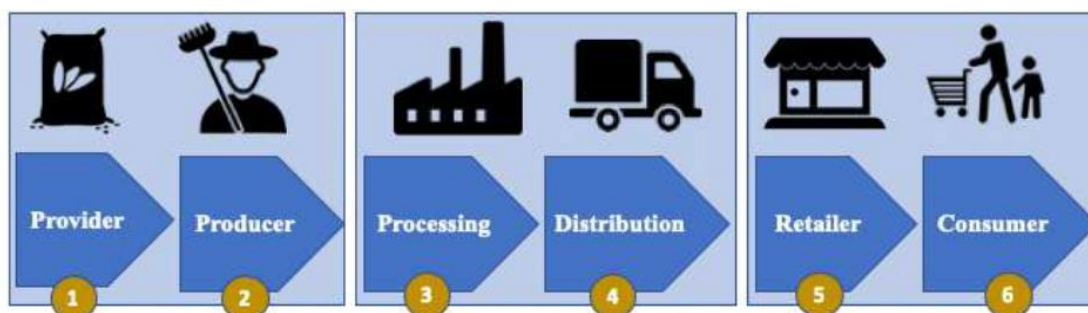
products and services to consumers. A company that experiences consistent growth in profits and high product sales is indicative of a well-functioning supply chain (Minh, 2017).

### *Supply Chain Management and Organizations*

The world of supply chain management has seen tremendous advances in artificial intelligence and atoms of things in recent years, with companies and organisations now able to access, store, and process vast amounts of data to better integrate it into their decision-making process across the supply chain. From food and beverage distribution to advanced technology, companies analyze data sets, identify key insights, and integrate analytics that apply to their supply chain operations. These organizations then utilize this data to integrate it into their supply chain organizational structure. It's evident that big data has gained significant importance across various companies and industries (Alsuwailem, 2021).

### *Food Supply Chains the food*

The supply chain is defined as a series of links and interdependencies from farms to food consumers' plates, which includes a wide range of disciplines. Thus, food moves from food manufacturers to consumers through the following six stages: suppliers, producers, processing, customization, retail, and consumption. The food industry is a set of contextual and socially, culturally, and politically evolving social practices, including food production and consumption( Kamilaris, 2019).



### *The Repercussions of the Corona Crisis and Ukraine on Global Supply Chains*

The COVID-19 pandemic is a global health crisis with devastating effects on the global economy, both directly and through the measures taken to contain the spread of the virus. These measures have led to delays and disruptions in global supply chains. Another crisis emerged when Ukraine decided to join NATO in early 2008, which angered Russia and led to the outbreak of war between the two countries. The ongoing conflict has sparked concerns about a potential food crisis in numerous countries that rely on grain imports, particularly wheat, given the low prices in these two nations.

### *The impact of the COVID-19 pandemic on the food supply is significant.*

Being an unexpected and sudden event, the Corona virus (COVID-19) has revealed the weaknesses in the global supply chain, and the repercussions of the effects suffered by the supply chain due to the pandemic are of particular importance in today's context, because they have led to a rethinking of activities, but above all, in the structure of the supply chain itself, recent changes have been promoted that are set to continue and become permanent, to overcome the weaknesses that caused the blockage of the global supply chain, agriculture is the most resilient sector, however, Covid-19 has led to losses in the agricultural sector, as a result of the closure and prevention policies to limit the spread of the virus, which led to an

increase in the prices of food commodities in the markets due to the blockage of the food supply chain, and then the risks can be defined as the possibility of not delivering goods in terms of time, quality and quantity, and the resulting in the non-completion of orders. So, in order to keep operations running smoothly, governments, via their sectors and businesses, need to come up with a plan to stop supply chain fragility. This necessitates keeping tabs on occurrences that can interrupt the supply chain and making the most of any opportunity to get insight from these and similar incidents. This improves the supply chain's capacity to react proactively, which is a win-win. (LORENZO MUSELLA,2023).

A resilient supply chain can be defined as one that is able to prevent, respond to, and recover from disruption events within an acceptable time frame and at an acceptable cost while maintaining a positive, stable process.

#### *The Impact of COVID-19 on Agricultural Crop*

COVID-19 has significantly affected the socio-economic activities in agricultural systems. We assessed the impact of COVID-19 on agricultural sector production in smallholder farming systems, including crop and livestock systems. We also conducted surveys using structured questionnaires to measure the impact of COVID-19 on agricultural operations and the trends in average crop yield before and during COVID-19.

Table (1)

*The Countries with the Highest Production of Wheat, Barley and Rice in the World (Million Tons)*

Country	Wheat production	Country	Barley production	Country	Rice production
China	137	Rusia	17.9	China	149
India	107	Germany	10.7	India	129.5
Russia	76	France	10.3	Bangladesh	36
U.S.A	44	Ukrenia	9.5	Indonesia	34.5
France	36	Australia	8.9	Vietnam	27
Canda	35	Canda	8.7	Thailand	20
Ukrenia	33	Spain	7.9	Philippines	13
Pakestan	27	Turkea	6.7	Myanmar	12.5
Germany	22	U.K	6.6	Pakistan	9.5
Argentina	20	U.S.A	4.3	Japan	8

Table (1) reveals that several countries across different continents concentrate on wheat production, with China, India, and Russia at the top. Meanwhile, Asia dominates rice production due to its lifestyle, while Europe dominates barley production for its industrial uses. It is appropriate to point out that, in addition to the problem of ensuring supplies of agricultural crops, most farmers suffer from restrictions on access to agricultural inputs such as seeds, fertilizers, herbicides, fungicides, and insecticides during the COVID-19 pandemic, which resulted in a continuous decline in the yield of corn, dry beans, and soybeans over two years of agricultural seasons. Therefore, the COVID-19 closures accompanied by strict restrictions on movement negatively affected food production for major crops.( Salah,et al ,2023)

The impact of the COVID-19 pandemic on food prices is significant. There are various channels through which COVID-19 can affect food prices. The indirect (demand side) effects of COVID-19 are linked to the impact of lockdowns on household income, resulting in a decline in the amount of cash available for food purchases. This implies that the pandemic will cause the food demand curve to shift to the left, leading to a decrease in prices, provided the food supply curve stays stable. Conversely, the pandemic could trigger a psychological factor known as epidemiological uncertainty, potentially leading to a rise in the family's precautionary food demand and a shift in the food demand curve to the right. The rise in food prices could then explain these effects. (Mohammed, 2023) The impact may be direct (supply side) through the disruption of food systems by COVID-19, such as a decline in production due to limited labour supply in support of production distribution chains, changes in food consumption patterns, higher raw material prices, and the response of crude oil prices to the pandemic.

#### *The Impact of the Russian-Ukrainian Crisis on Food Supply*

The Russian-Ukrainian war, exacerbated by the COVID-19 pandemic, has significantly disrupted global food supply systems. The disturbances to food production, global supply networks, availability, and cost may have enduring consequences. Food is one of the most extensively traded commodities, and the supply and accessibility of various food raw materials and finished goods are jeopardised, particularly as global markets have lately experienced surges in food costs. The Russian-Ukrainian war has adversely affected food supply chains, resulting in substantial alterations in production, sourcing, manufacturing, processing, and logistics, along with notable swings in demand among nations dependent on imports from Ukraine. (Salah, et al, 2023)

#### *How has the Ukrainian-Russian Crisis affected Agricultural Crops?*

The COVID-19 pandemic presented significant challenges to global food security, which were further exacerbated by the ongoing conflict between Russia and Ukraine. Russia and Ukraine significantly contribute to global food production and supply, representing over one-third of international grain exports. Russia ranks as the largest exporter of wheat globally, while Ukraine holds the position of the fifth largest exporter. Collectively, they account for 14% of global wheat exports, 19% of the world's barley supply, and 4% of maize production. They are significant suppliers of rapeseed, accounting for 52% of the global sunflower oil export market. Russia is the foremost producer of agricultural fertilisers. Disruptions in the supply chain and logistics of grain and oilseed production in Ukraine and Russia, coupled with restrictions on Russian exports, may considerably affect global food supplies. (Serhan, 2022)

The impact of the Russian-Ukrainian crisis on food prices:

Approximately 50 nations rely on imports for a minimum of 30% of their wheat requirements from the Russian Federation and Ukraine, with many of these nations classified as least developed, low-income, or food-deficit countries. Among these nations, 26 procure a minimum of 50% of their wheat requirements from the Russian Federation and Ukraine. A multitude of nations in Europe and Central Asia rely on Russia for over 50% of their fertiliser supplies; interruptions in logistics and limits on Russian shipments would impact food security in these nations. The crisis has resulted in a rise in food costs, which were already elevated before to this event. The Food Price Index has experienced a notable rise of around 40% since the latter part of 2020, before to the onset of the Russian-Ukrainian crisis. The crisis in March

2022 also precipitated a rise, greatly contributing to the escalation of food and oil prices.( Abdul Qader 2022)

Table (2)

*Development of global prices of major food commodities during the period 2015-2022 (dollar/ton)*

Commodity	2015	2016	2017	2018	2019	2020	2021	2022
Wheat (\$/ton)	232.3	196.4	211.8	241.1	219.8	239.4	315.8	430
Sunflower Oil (\$/ton)	888.5	867.3	817.9	814.4	965	1432.4	1746.1	1650.8
Soybean Oil (\$/ton)	755.6	815	850.4	789.1	765.4	837.5	1375	1666.7
Peanut Oil (\$/ton)	1378	1380.6	1460.8	1446	1407.4	1970.7	2289.6	2202.5
Medium Sugar (\$/ton)	302.2	406.4	360.2	282.4	286.7	288.9	397.4	396
Beef (\$/ton)	4550	4060	4380	4190	4760	4660	5380	5700
Rice (\$/ton)	386	396.2	398.9	420.7	418	496.8	458.3	436
Fresh Salmon (\$/ton)	5320	7170	7420	7540	6940	6110	6860	8400

The COVID 19 pandemic has significantly impacted the prices of primary commodities due to the closure of factories, disruption of supply chains, and increased demand for certain commodities. Additionally, the general closure of all life facilities to curb the spread of Covid-19 has led to significant fluctuations and escalation in the prices of basic materials. This has resulted in a near-total halt in factories and airports, as well as the isolation of countries from each other and the implementation of strict laws and penalties to curb the spread of the new Covid-19 virus. The table above shows that the prices of most commodities rose during the Corona virus outbreak, and the strict closure policies of most countries contributed to this general increase in commodity prices. Following the control of the Corona pandemic, countries started to gradually open up. The need to import basic commodities to meet the increasing demand resulted in a relative stability in the prices of primary commodities. (Mujahid, 2024)). However, due to developments in trade during the Russian-Ukrainian war, commodity prices significantly increased in 2023 and continued to rise sharply thereafter. Russia is one of the world's largest exporters of fertilizers used for agriculture, as well as the world's leading exporter of wheat for the years 2020–2022, with 37.3 million tons. Russia also ranks among the world's top producers in the food industry. Ukraine is also one of the world's top 10 grain exporters, with Ukraine alone producing 16 million tonnes annually, equivalent to \$2.5 billion. Let's not forget that Russia and Ukraine produce 14% of the world's wheat and represent 29% of global exports. Sunflower products are also worth \$ 3-4 billion annually, and corn is produced by 60% of Ukrainian lands, with an export value of \$ 3-5 billion annually.

#### *The Russian-Ukrainian Crisis and its Consequences for the Global Economy*

Ukraine plays a crucial role for Russia following the disintegration of the Soviet Union, serving as its European flank. Its location is particularly sensitive, as it serves as the boundary between

Russian and NATO lands(Al mamouri ,2017). In light of the negative repercussions resulting from the crisis of the Russian war on Ukraine, food prices have risen in the global market due to the disruption of food and grain exports from Ukraine and Russia, in addition to threats related to its transportation and the security required for ships and workers in agriculture and transportation. The Russian war on Ukraine has disrupted the global food production system, as Russia and Ukraine produce a third of the world's ammonia and potassium exports, essential for the fertiliser industry. Additionally, they serve as the world's breadbasket, exporting about 30% of wheat and barley, 65% of sunflower seed oil, and 15% of corn.

Many countries, particularly those in Central and Western Asia, the Middle East, and North Africa, heavily rely on wheat as a staple food, including imports from Russia and Ukraine. For example, Syria and Yemen are suffering from an ongoing refugee crisis and food security problems, and they will undoubtedly be affected by the Ukrainian war due to their heavy reliance on wheat and their exposure to rising prices and potential shortages. However, this does not negate the impact on all importing countries unless there are long-term contracts with suppliers with fixed prices and strong hedges. Russia and Ukraine's contribution of about 20% of the total food commodities provided in 2020 will also impact the World Food Program of the United Nations. As Russia and Ukraine are major commodity producers, disruptions to supply chains have sent global prices soaring, particularly for oil and natural gas. Food costs have also soared to historic highs for wheat, with Ukraine and Russia accounting for 30% of global wheat exports. The war's effects, beyond the humanitarian crisis and suffering, will manifest through three main channels:( Shantanu,2022)

First, higher commodity prices such as food and energy will drive inflation higher, eroding incomes and weakening demand.

neighboring economies, in particular, will struggle with disruptions to trade, supply chains, and remittances, as well as a historic surge in refugee flows.

declining business confidence and increased investor uncertainty will weaken asset prices, tighten financial conditions, and possibly stimulate capital outflows from emerging markets.

Table No. (3)

*The Extent of the Impact of the Russian-Ukrainian Crisis on Global Economic Growth*

Countries	2020	2021	2022	2023	2024(exp.)	2025(exp.)
Global Economy	-3.1	6.0	3.4	3.3	3.2	3.3
Advanced Economies	-4.5	5.2	2.7	1.7	1.7	1.8
United States	-3.4	5.7	2.1	2.5	2.6	1.9
Euro Area	-6.3	5.2	3.5	0.5	0.9	1.5
Emerging Market and Developing Economies	-2.1	6.6	4.0	4.4	4.3	4.3
Russia	-3.0	4.7	-2.1	3.6	3.2	1.5
china	2.3	8.1	3.0	5.2	5.0	4.5



Table No. (3) clearly shows that there is a negative impact of the crises, which led to a slowdown in the global economy and thus a decline in the expected economic growth rates due to the pressures imposed in light of the efforts and endeavours aimed at recovering the global economy from the effects of the COVID-19 pandemic. The Russian-Ukrainian crisis will impact Europe, as Russia plays a significant role in its natural gas imports, and any disruption in supply chains could lead to increased inflation and a slower recovery from the COVID-19 pandemic. Europe will witness financial pressures to provide and secure energy sources. Given Europe's interest in diversifying its supply sources, we hope that countries exporting hydrocarbons in the Middle East and Africa will see an improvement in their foreign revenues and growth rates. As for the countries that do not export hydrocarbon resources, they will be negatively affected, and the repercussions of the crisis may lead to other social tensions and tangible effects on their economies, as they depend mainly on Ukraine and Russia for their food imports, especially wheat, because the crisis leads to the disruption of supply chains and thus food prices increase in countries that depend on their imports from Russia and Ukraine.

### **Research Methodology**

The research relied on the descriptive analytical approach in presenting the research content. Then we will discuss the repercussions and effects that occur on the global economy as a result of the Corona crisis and the Russian-Ukrainian war crisis, based on reports, studies, and research that analysed these effects. Then we will shed light on the impact this has on food and supply chains, specifically Iraq. Finally, we will analyze the economic impacts of various factors (economic sanctions, costs of war) on the global economy, including international trade, supply chains, food prices, energy prices, economic growth, etc.

### **Discussion**

The global economy is currently suffering from a decline in the rate of economic growth and high inflation rates. The Covid-19 pandemic crisis and the Russian-Ukrainian crisis have contributed to the increase in commodity prices globally. These crises have also presented fresh obstacles to global economic growth, leading to challenges and difficulties in supply chains and the provision of basic needs and requirements. The Corona pandemic virus has had a direct impact and pressure on supply chains for several reasons, including: strict restrictions imposed on various means of transportation in all their forms, land, sea, and air, in addition to delays and shortages in transporting goods due to the difficulty of international supply chains; the disruption of workers due to the closure of factories and most companies; and the prevention of the export of essential and basic goods from some countries producing wheat, sugar, oils, and gThe Russian-Ukrainian crisis has resulted in a surge in the prices of basic commodities like wheat and rice, posing a threat to the food security of many countries worldwide. This situation necessitates a shift towards local production and the development of the agricultural and industrial sectors, rather than heavily relying on imports from abroad. time. According to the United Nations Conference on Trade and Development (UNCTAD) report, there are three options available to enhance the capacity of supply chains to handle emergency situations. These options include restructuring networks, which involves decisions about production and investment locations, risk management planning, flexibility, crisis management strategies, and sustainability in global investment.

### **Conclusion**

Global crises like the COVID-19 pandemic have significantly impacted global supply chains, leading to a surge in the prices of basic materials for global commodities. The Covid-19 pandemic's previous closure decisions and strict measures have significantly impacted global supply chains. The Covid-19 pandemic's previous closure decisions and strict measures have had a significant impact on global supply chains, affecting production, sourcing, manufacturing, processing, and logistics. This is due to the cessation of supply across borders (land, sea, and air) or the challenges posed by health conditions in certain countries. crisis on global supply chains and the occurrence of other additional disruptions in global supply chains after the impact of COVID-19 and the incurring of long-term costs. The conflict between Russia and Ukraine has resulted in a severe shortage of basic food items, leading to global inflation in numerous countries. The crises have left the world and the affected Arab countries with no other choice but to diversify the sources of imports of basic food materials, find alternatives and solutions that mitigate the severity of the shocks, initiate negotiations, and develop new ways to provide basic food resources.

### **Recommendations**

It is necessary to strengthen supply chains through the optimal use of digital technology, conduct a thorough study of the supply chain following the economic crises that have hit the world's countries, and identify, evaluate, and monitor risks in order to identify defects and gaps and achieve stability for global supply chains.

Relying on diversifying supply sources to more than one party, country, and supplier to avoid interruptions that occur according to studied rates and trying to rely on oneself, i.e., partial or total interruption from global supply chains.

Companies must make investments in new ways that enable them to easily adapt to the disturbances that occur in global supply chains and expedite treatments in the event of a specific crisis.

Developing a new vision for the quantity of food commodities and working on the optimal use of resources is crucial to meet local demand and prevent disruptions caused by wars and conflicts. We are striving to create a unified Arab market, leveraging the challenging lessons learned from the global crises. This market enhances food security for the majority of countries in the region.

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