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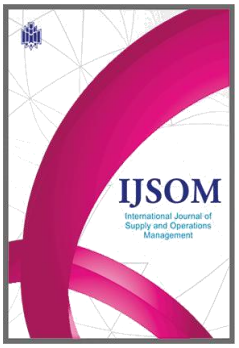

How has covid-19 affected the logistics of Europe, Asia and Africa, and do appropriate solutions differ between countries?

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Abstract

Depending on the differences in the capabilities and conditions of countries and continents, and the size of the variance when dealing with emergency crises such as the Covid-19 crisis, which has left a significant impact on logistics around the world. The study aims to identify the most prominent problems faced by countries and continents during the Covid-19 pandemic only, as well as to determine the levels of similarity and differences for these problems and methods of dealing with them in each country according to the available capabilities. This work also aims to clarify and highlight the most influential problems in various Asian, European and African countries, and to show the most appropriate solutions for each continent (Asia, Europe and Africa). In this paper, the Step-Wise Weight Assessment Ratio Analysis (SWARA) method was used, in this method experts are the main elements, and on this basis, a list was prepared that includes a set of problems and solutions got from research papers conducted during the outbreak of COVID-19, then this list was sent to a group of experts in different countries via e-mail, some of them are Asian countries, some are European, and some are African. The number of experts who responded to the questionnaire sent to them reached 22 experts, 8 from Asia, 9 from Europe, and 5 from Africa. The study found that there are great variations in the size of the problems faced by supply chains in the continents and their countries, and the solutions differ from one continent to another and from one country to another with different capabilities and adherence to the instructions for closure and cultural awareness. Therefore, understanding the problem and the solutions to it contribute a lot to addressing logistics disorders during emergency crises.

Keywords: Covid-19, logistics problems and solutions, SWARA, Supply Chain Management.

1. Introduction

The impact of COVID-19 was first felt in China because of the role it plays in global manufacturing (with Wuhan, the epicenter of the epidemic, playing an important role - over 200 Fortune Global 500 companies are there). China is also a major consumer of global agricultural commodities and products. China's manufacturing disruption has spread across global supply chains. Shipments were piling up at China's major container ports, travel restrictions led to a shortage of truck drivers to pick up containers, and shipping carriers cancelled sailings. The resulting shortage of components from China has affected manufacturing operations abroad. Major industries worldwide, including automobiles, electronics, pharmaceuticals, medical equipment and supplies, as well as consumer goods (IFC,2021). The pandemic has spread to the rest of the world, leading to lockdowns and border closures that have restricted the movement of goods. Additional protocols (such as social distancing in warehouses) provided to ensure worker safety have contributed to shipping bottlenecks. For example, in the European Union, trucks formed 37-mile queues on the A4 motorway after Poland closed

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its border with Germany in mid-March. In India, the lockdown has caused a shortage of truck drivers, resulting in a backlog of over 50,000 containers at Chennai Kammerer and Katupali ports, and sea, land and air freight have also been affected badly (Y. Xu et al., 2021). Global supply chains (GSCs) are facing supply and demand disruptions around the world. Global and local economies are severely affected by the outbreak of the Covid-19 (Singh et al., 2021) (Kim, 2020 ( )Meyer et al., 2021), thus reducing the availability of supply and the imbalance with the increasing demand for basic commodities. Although many sources of risk cannot be controlled. The COVID-19 pandemic is one of the most important problems to address, posing a major challenge to supply chains across the board (Ivanov & Das, 2020). All countries from all directions are seeking to confront this epidemic to reduce its side effects by imposing strict policies and laws that work on the safety and security of countries.

The impact of this pandemic is not limited to small or medium-sized companies but includes all types and forms of companies, and this was confirmed by Fortune in its report on the cause (COVID-19) of 94% of the companies listed in the Fortune 1000 list of disruptions in their supply chains, and 75% of companies were significantly affected. As well as lowering growth forecasts for 55% of companies (Fortune, 2020) (Queiroz et al., 2020), about 1,000 supply companies have signed up for preventive quarantine (Grida et al., 2020). Hence most of the industrial managers and policymakers searched for strategies and policies to renew production patterns and meet consumer demand because of the COVID-19 pandemic breaking most of the transportation links and distribution mechanisms between suppliers, production facilities and customers (Kumar et al., 2020), because of supply and demand disruptions around the world and the lack of control over many sources of risks, and therefore a significant decrease in international trade as it fell between 13% and 32% (Sharma et al., 2020).

The study aims to identify the most prominent problems faced by countries and continents during the Covid-19 pandemic only, as well as to determine the levels of similarity and differences for these problems and methods of dealing with them in each country according to the available capabilities. This work also aims to clarify and highlight the most influential problems in various Asian, European and African countries, and to show the most appropriate solutions for each continent (Asia, Europe and Africa). The current work is characterized by the study of the most important problems facing supplies and the appropriate solutions for them and for each country or continent of the countries located in Europe, Asia or Africa, due to the great differences in the method of dealing with closures and the capabilities that those countries possess and the degree of response to emergency situations during the pandemic, in When the previous work focused on studying these problems for a specific country or company, as many researchers addressed, such as (Wells et al., 2020) (Singh et al., 2021) (Kim, 2020)(Meyer et al., 2021) (Majumdar et al., 2020)(Paul et al., 2021) (Guan et al., 2020)(Chowdhury et al., 2021) (Singh et al., 2021) (Kim, 2020) (Meyer et al., 2021) (Queiroz et al., 2020) (Sharma et al., 2020), Thus these differences may create a big difference in dealing with these problems that the researchers tried to address, and the current study dealt with a survey of these problems and their inventory, while the previous studies dealt with part of these problems and studied them in a specific environment. At the same time, the current research worked on extracting the most important proposed solutions to confront the disruptions of supply chains during the pandemic, while previous work focused on the use of these solutions for a specific sector, a particular company or a particular country, such as (Naz et al., 2021a)(Belhadi et al., 2021) (Nagar et al., 2021) (Rewari et al., 2020) (Liu et al., 2020) (Z. Xu et al., 2020) (Singh et al., 2021) (Smith et al., 2021) (Alkahtani et al., 2021) (Kuo et al., 2021) (Dorofeev et al., 2020) (Govindan et al., 2020b ( )Kumar et al., 2020) (Ivanov, 2020) (Sharma et al., 2020) (Queiroz et al., 2020).

In this paper, a survey of a group of studies and research published during the spread of the Covid-19 pandemic, which dealt with problems and solutions to the disruptions faced by the supply of countries of the world, was conducted. As well as preparing a list of all problems and solutions and working to unify them on a list. It should be noted that some squints and challenges are similar and repetitive for some researchers, so they were unified and the repetitive ones were deleted and organized. To understand the content of this paper, a set of questions was raised: -

- What supply chain problems are countries and continents facing during the Covid-19 pandemic and what are the solutions.
- Are the problems faced by supply chains the same in all countries and continents?
- Is it possible to confront these problems in the same way in all countries and continents?
- What are the most affected problems in the various Asian, European and African countries?
- What are the most appropriate solutions to face the disruptions of supply chains for each continent (Asia, Europe, and Africa)?

In this paper, Step-Wise Weight Assessment Ratio Analysis (SWARA) was used, in this method experts are the main elements, and on this basis, a list was prepared that includes a set of challenges and solutions got from research papers

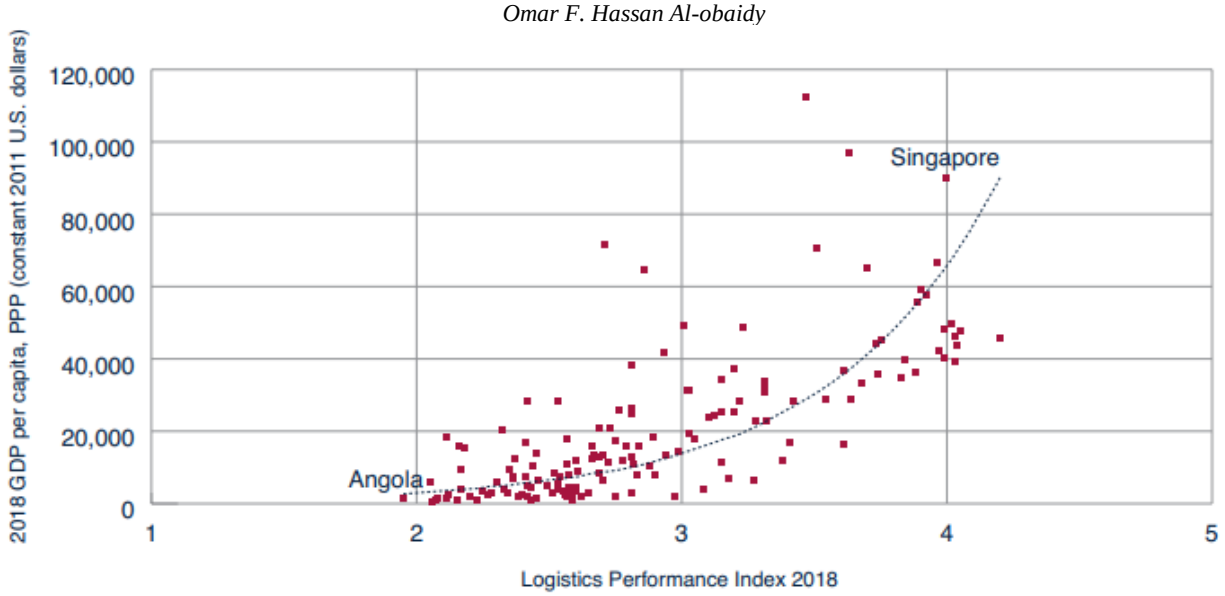

Figure 1. How does logistics performance contribute to GDP. Source: (IFC,2021)

conducted during the outbreak of Covid-19 Then this list was sent to a group of experts in different countries via e-mail, some of them are Asian countries, some are European, and others are African. The number of experts who responded to the questionnaire sent to them reached 22 experts, 8 from Asia, 9 from Europe, and 5 from Africa.

The rest of the paper is organized as follows. The second section is a literature review of relevant studies. In the third section, the method for this paper was prepared. In this fourth section, the results of the study were presented, discussed, and future work.

2. Literature Review

Quarantine conditions arising from the Coronavirus (COVID-19) have had a significant impact on global production rates and supply chains leading to global disruptions, with nearly 35% of manufacturers reporting disruptions due to the global coronavirus pandemic (Shokrani et al., 2020). This disruption included even existing projects and increased their risk (Chernogorova et al., 2021)And most importantly, food insecurity (Farrell et al., 2020), And the increase in uncertainty (Alkahtani et al., 2021a)(Alam et al., 2021), and increasing obstacles to the sustainability of the supply chain (Guan et al., 2020) (Chowdhury et al., 2021), Unpredictability of supply and demand (Alkahtani et al., 2021b)) Kwon, 2020). The COVID-19 disease is causing huge problems for the logistics industry (Z. Xu et al., 2020) (Choi, 2021). This led to an unprecedented global health and economic crisis (Humphreys et al., n.d.). This has added unprecedented challenges to countries around the world (Hoek, 2020) (Kuo et al., 2021)(Dorofeev et al., 2020)(Grida et al., 2020), Because of its widespread and long-term effect (Govindan et al., 2020a). Where logistics became the weakest point after the spread of this epidemic (Cai & Luo, 2020). One of the most obvious constraints is the low market demand for goods and services in most countries due to absolute or partial closures. This shutdown has also disrupted domestic and foreign supply chains. As a result, this pandemic is causing significant job losses, reducing demand and thus leading to a serious systemic economic crisis. (Grida et al., 2020), It showed the fragility of global supply chains (Majumdar et al., 2020)(Paul et al., 2021). This fragility and turbulence may extend for long-term periods and lead to a high degree of uncertainty (Ivanov, 2020) , They pose unique challenges to predicting the future (Cohen, 2020). The impact of this epidemic on the performance of the supply chain is clear in terms of supply, demand or logistics, and this epidemic is characterized by a rapid spread, so countries have taken preventive policies in an attempt to limit its spread. These policies have direct impacts on supply chain performance at all scales, and the extent of their impact varies from one supply chain to another according to the activities that the supply chain provides (Grida et al., 2020). In this regard, Figure (1) shows the extent to which the logistics performance contributed to the GDP in some countries before the outbreak of the epidemic in China, and indicates that the logistics performance of any country contributes significantly to the GDP, Thus, supplies make a significant contribution to supporting China's GDP before the COVID-19 pandemic, and therefore the interruption of these supplies will lead to a decrease in this support, negatively affecting GDP.

Global supply chains (GSCs) are facing supply and demand disruptions around the world. Global and local economies are severely affected by the outbreak of the Coronavirus (Singh et al., 2021) (Kim, 2020) (Meyer et al., 2021). Thus, the

availability of supply has been reduced and the imbalance with the increasing demand for basic commodities has been reduced. Although many sources of risk cannot be controlled. The COVID-19 pandemic is one of the most important problems to address, posing a major challenge to supply chains across the board (Ivanov & Das, 2020).

The United Nations (UN) launched the 2030 Agenda for Sustainable Development, which addresses various persistent challenges related to environmental degradation, climate change, eradication of hunger, and other negative consequences of different production processes. Goal 3 of the United Nations 2030 Agenda for Sustainable Development discusses the development of healthy lives and the promotion of well-being for all ages. This pandemic situation will open up new dimensions of social sustainability for individuals and industrial enterprises. Currently, most manufacturing and supply chain organizations are struggling to anticipate the negative consequences of COVID-19, as most global markets are shrinking and industrial managers are looking for new materials and practical ways to maintain production (Kumar et al., 2020).

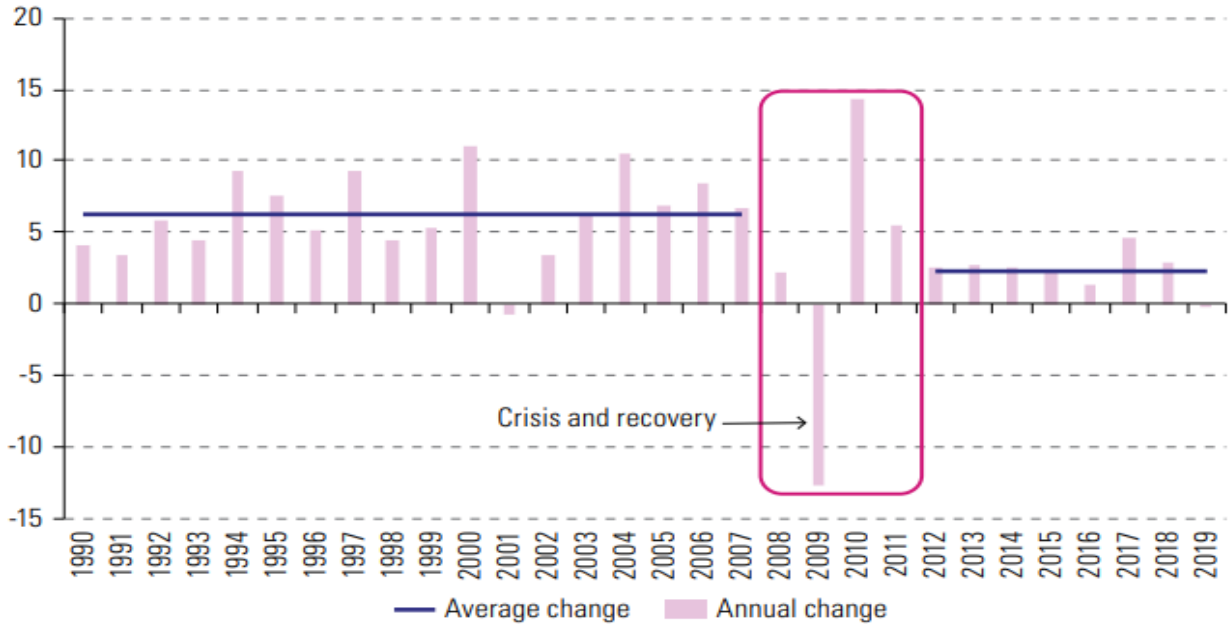

Figure2 : The impact of the Covid-19 epidemic on the change in the volume of production in the world
Source: (United Nations, 2020)

To fill the shortage of some medical materials during the spread of the epidemic, many companies, as in Table (1), have produced many medical materials as a social contribution to reducing medical supply disruptions, and identifying ways to enhance the continuity of sustainable supply chains (Sharma et al., 2020). On the other hand, he indicated (Wells et al., 2020) The COVID-19 pandemic can serve as a catalytic event in which the legitimacy and effectiveness of existing economic and political structures are challenged and reconfigured, and thus an opportunity to redefine the environmental burdens that our activities create. As well as an increased focus on creating a more sustainable and resilient supply chain. For this purpose, technological development based on artificial intelligence has provided tools and techniques for implementation in supply operations (Naz et al., 2021b).

On the other hand, the global pandemic of the Coronavirus (COVID-19) has helped demonstrate that countries are willing, able, and willing to interfere in economic and social affairs to an extent that was previously considered politically impossible. Even in those countries with a long tradition of cutting government spending, the crisis has led to a sudden change across broad sectors of public policy and attitudes toward economic intervention (Axinte & Lang, 2021).

Table 1: Manufacturing Industries before and during a pandemic

S·No	companies	Domain before the epidemic	Manufacturing products Before Pandemic	during pandemic
1	Ford	Automotive Industry	Vehicles	Modified respirator and ventilators
2	Tesla – Gigafactory	Automotive Industry	PV cells	Ventilators
3	Airbus	Aerospace Industry	Aircraft products	Ventilators
4	Mercedes-AMG High Performance Powertrains	Automotive Industry	Formula 1 engines	Continuous positive airway pressure (CPAP) machines
5	Dyson	Tech company	Vacuum cleaners and hand dryers	Ventilators
6	Ineos	Chemical company	Oil, gas, plastics Chemicals and other products	Hand sanitiser and other healthcare products
7	Gucci	Fashion	Luxury clothing	Masks
8	Zara	Fashion	Apparel	Surgical masks
9	Bacardi	Alcohol-based company	Rum	Hand sanitisers
10	Eight Oaks Farm	Distillery	Liquor	Disinfectant
11	LVMH and L'Oreal	Fashion	Face creams and perfumes	Medical disinfectants and sanitiser gels

Source: (Madurai Elavarasan & Pugazhendhi, 2020)

3. Methodology

To conduct this research, a systematic review of the literature was conducted, to extract the main pillars of this paper, which are represented first: the problems faced by logistical supplies during the Covid-19 pandemic (Sharma et al., 2020 ( )Wells et al., 2020) (Singh et al., 2021) (Kim, 2020) (Meyer et al., 2021) (Majumdar et al., 2020)(Paul et al., 2021) (Guan et al., 2020) (Chowdhury et al., 2021) (Singh et al., 2021) (Kim, 2020) (Meyer et al., 2021) (Fortune, 2020) (Queiroz et al., 2020). Second: Suggested solutions to address supply chain disruptions during the pandemic (Smith et al., 2021 ( )Alkahtani et al., 2021a) (Kuo et al., 2021) (Dorofeev et al., 2020) (Govindan et al., 2020b) (Kumar et al., 2020) (Ivanov, 2020) (Sharma et al., 2020) (Queiroz et al., 2020) (Naz et al., 2021a)(Belhadi et al., 2021) (Nagar et al., 2021) (Rewari et al., 2020) (Liu et al., 2020) (Z. Xu et al., 2020) (Singh et al., 2021). The problems faced by the supply chain in all sectors such as health, service and productivity were extracted through studies that dealt with these problems during the recent pandemic, as well as identifying the solutions that researchers reached in their studies during the pandemic. Table (2) summarizes the most important problems and solutions that hit supplies during the recent pandemic.

Table 2: summarizes the most important problems and solutions that hit supplies during Covid-19

Authors	code	Problems (P)	Authors	code	Solutions (S)
(Singh et al., 2021)	P1	- increasing uncertainty	(Smith et al., 2021)	S1	- lean systems
(Sharma et al., 2020)	P2	- decreased ability to predict supply and demand	(Alkahtani et al., 2021a)	S2	- Flexible Manufacturing - Controlling stock levels
(Majumdar et al., 2020)	P3	- low demand and imbalance	(Kuo et al., 2021)	S3	- effective management - Transparency - Telecommunications

(Majumdar et al., 2020)	P4	- the fragility and ripples of the supply chain	(Dorofeev et al., 2020)	S4	- Virtual infrastructures for remote work continuity.
(Hoek, 2020)	P5	- recovering difficulties	(Govindan et al., 2020b)	S5	- Improve supply chain design using integrated data science.
(Paul et al., 2021)	P6	- difficulties in increasing production capacity	(Kumar et al., 2020)	S6	- Flexibility and sustainability
(Sharma et al., 2020)	P7	- difficulty maintaining a smooth flow of raw materials	(Ivanov, 2020)	S7	- Preparing scenarios dealing with long-term impacts.
(Choi, 2021)	P8	- the global economic recession and the bankruptcy of supply chain partners	(Sharma et al., 2020)	S8	- Managing the relationship between buyer and supplier
(Hoek, 2020)	P9	- reduced level of readiness and adaptation to the new situation	(Sharma et al., 2020)	S9	- Flexibility - Collaboration between supplier and system - Adoption of order fulfilment strategies
			(Queiroz et al., 2020)	S	- Preparedness focus - Digital focus - Adaptation and recovery focus - Ripple effect focus - Sustainability focus
			(Naz et al., 2021a)		- Sustainability and resilience of the supply chain using artificial intelligence
			(Belhadi et al., 2021)		- Artificial intelligence
			(Nagar et al., 2021)		- machine learning - decentralization
			(Rewari et al., 2020)		- Backup stock - Computerized inventory management systems - Improve the flexibility of the supply chain

			(Liu et al., 2020)		- Demand-pull - Technology-push - Policy support
			(Z. Xu et al., 2020)		- Flexibility - Prepare plans
			(Singh et al., 2021)		- Back-up storage - Supply chain development

Many of the solutions that were extracted from the literary studies that dealt with these solutions during the pandemic are similar in content, so some of these solutions were combined and as in Table (3) and prepared in a unified list along with the problems faced by supplies.

Table 3: Summary of problems and solutions

Solution	code	Problems	code
lean systems	S1	increasing uncertainty	P1
Effective management, transparency and communication	S2	decreased ability to predict supply and demand	P2
Virtual infrastructure and remote work	S3	low demand and imbalance	P3
Using integrated data science to improve supply chain design	S4	the fragility and ripples of the supply chain	P4
Flexibility, sustainability and adoption of order implementation strategies	S5	recovering difficulties	P5
Use of long-term scenarios	S6	difficulties in increasing production capacity	P6
Managing relationship between buyer and supplier	S7	difficulty maintaining a smooth flow of raw materials	P7
Sustaining the flexibility of the supply chain using artificial intelligence	S8	the global economic recession and the bankruptcy of supply chain partners	P8
Decentralization, use of buffer stock and computerized inventory systems	S9	reduced level of readiness and adaptation to the new situation	P9

3.1. SWARA Method

The stepwise weight assessment ratio analysis (SWARA) method was presented by (Keršuliene et al., 2010). In 2010, which is made by the weighting method, the relative importance and initial prioritization of alternatives for each attribute are determined by the opinion of the decision-maker, and then the relative weight of each attribute is determined. Experts are the basic elements of the SWARA method. Experts must first be identified, experts need to consider all important aspects of the topic (Zolfani & Saparauskas, 2013). The SWARA method is one of the completely new methods. The most important criterion is given the first rank, and the least important criterion is given the last rank. The overall ranks of the group of experts are determined according to the value of the middle ranks (Zavadskas et al., 2013). The advantage of the SWARA method is its ability to estimate the accuracy of standards concerning given weights (Valipour et al., 2019) (Stanujkic et al., 2015) (Mishra et al., 2020). The results of this method can be obtained by adopting the following steps:

Step 1: The criteria (problems and solutions) are arranged in descending order according to the arithmetic mean of each criterion and according to the opinion of experts.

Step 2: Find the coefficient kj using the following equation (1)

$$Kj = \begin{cases} 1 & j = 1 \\ Sj + 1 & j > 1 \end{cases} \quad (1)$$

Step 3: Determination of recalculated weight wj

$$wj = \frac{xj - 1}{kj} \quad (2)$$

Step 4: Calculate the final weights where qj using the following formula

$$q_j = \frac{wj}{\sum w_j} \quad (3)$$

After experts evaluate the problems and solutions, the arithmetic means are calculated for each solution (S) and for each problem (P), according to the three classifications (Asia, Europe and Africa) individually for each continent, to be then arranged in descending order and according to importance as shown in the table (4).

Table 4: Descending order of solutions and problems

Africa		Europe		Asia	
solutions	Problems	solutions	Problems	solutions	Problems
S9	P8	S8	P1	S1	P3
S1	P7	S1	P8	S5	P7
S6	P1	S4	P7	S2	P9
S2	P5	S3	P6	S6	P6
S7	P9	S5	P4	S9	P5
S5	P6	S7	P9	S3	P9
S4	P2	S3	P3	S7	P4
S8	P4	S9	P2	S8	P1
S3	P3	S6	P5	S4	P2

4. Results and discussion

4.1. Asia

Undoubtedly, the Covid-19 pandemic has resulted in many challenges and problems that all countries of the world have suffered from, but these problems have affected these countries at different levels, according to the capabilities of countries and their ability to manage crises, as well as the severity of the closure and commitment to health measures imposed by before governments. There is also an important factor, which is that the industrialized or exporting countries are affected differently from those that are consuming or that depend on imports. Many Asian countries are developing countries and suffered from logistics problems mainly before the pandemic, as this pandemic has reinforced these problems. As well as difficulties in using some of the available solutions. Therefore, Table (5), shows the problems most affecting logistics during the pandemic and the most appropriate solutions to them, according to the opinion of experts from some Asian countries**.**

Table 5: Logistics problems and appropriate solutions in Asia

S	S j	K j	W j	q j	P	S j	K j	W j	q j
S1		1	1	0.40111728	P3		1	1	0.45749566
S5	0.76	1.76	0.56818182	0.22790755	P7	0.9	1.9	0.52631579	0.24078719
S2	0.7	1.7	0.3342246	0.13406326	P9	0.83	1.83	0.28760426	0.1315777
S6	0.61	1.61	0.20759292	0.08326911	P6	0.81	1.81	0.15889738	0.07269486
S9	0.5	1.5	0.13839528	0.05551274	P5	0.78	1.78	0.08926819	0.04083981
S3	0.48	1.48	0.09351032	0.03750861	P9	0.67	1.67	0.05345401	0.02445498
S7	0.42	1.42	0.06585234	0.02641451	P4	0.67	1.67	0.03200839	0.0146437
S8	0.4	1.4	0.04703739	0.01886751	P1	0.49	1.49	0.02148214	0.00982799
S4	0.23	1.23	0.03824178	0.01533944	P2	0.28	1.28	0.01678292	0.00767811

Table (5) presents the results obtained using (SWARA), through which we aim to obtain the problems most affecting supplies in Asia, as well as the most appropriate solutions to confront these problems. The problem of low demand and imbalance (P3) is one of the most influential problems in Asian countries, and agile systems (S1) are considered one of the most appropriate solutions to face the problem (P3). Agile systems rely on many tools that contribute to addressing the problem of low and fluctuating demand. The problem of maintaining the smooth flow of raw materials (P7) is also one of the major problems facing Asian countries, which stands as an obstacle to the sustainability of the industry. The best solution to this problem is flexibility, sustainability, and the adoption of order implementation strategies. On the other hand, the problem of low predictability of supply and demand (P2) is one of the problems that have the least impact on the supply of Asian countries, and the best solution to this problem is the use of data science (S4).

4.2. Europe

Countries in the European continent are among the countries most affected by the Covid-19 pandemic, and this is due to the strict closure restrictions adopted by European countries as a result of the sharp rise in injuries and the increase in deaths at very high levels. Supplies in European countries have faced many challenges, and at the same time these countries have many solutions, so these countries can face such crises compared to some Asian and African countries, but these problems and solutions differ in terms of preference from other countries such as Asian countries and African. The results are shown in Table (6) show the challenges and appropriate solutions to them. It turns out that the increase in uncertainty (P1) is one of the most common problems faced by logistics in European countries, and one of the most appropriate solutions to this problem is the sustainability of the flexibility of the supply chain using artificial intelligence (S8). As for the problem of economic stagnation and the bankruptcy of supply chain partners (P8), it is also one of the big problems faced by the supplying countries in Europe, so the agile systems (S1) are the best solution to deal with this problem.

Table 6: Logistics problems and appropriate solutions in Europe

S	S j	K j	W j	q j	P	S j	K j	W j	q j
S8		1	1	0.46414061	P1		1	1	0.47484678
S1	0.89	1.89	0.52910053	0.24557704	P8	0.95	1.95	0.51282051	0.24351117
S4	0.87	1.87	0.28294146	0.13132462	P7	0.93	1.93	0.26571011	0.12617159
S3	0.82	1.82	0.15546234	0.07215639	P6	0.87	1.87	0.14209097	0.06747144
S5	0.81	1.81	0.0858908	0.03986541	P4	0.74	1.74	0.08166148	0.03877669
S7	0.79	1.79	0.04798368	0.02227118	P9	0.74	1.74	0.04693188	0.02228545
S3	0.75	1.75	0.02741925	0.01272639	P3	0.73	1.73	0.02712826	0.01288177
S9	0.72	1.72	0.01594142	0.00739906	P2	0.54	1.54	0.01761575	0.00836478
S6	0.63	1.63	0.00978001	0.0045393	P5	0.47	1.47	0.0119835	0.00569033

4.3. Africa

Contrary to European and Asian countries, African countries did not initially record any infections, while European countries were recording record numbers of people infected with the Covid-19 epidemic, so they did not adopt a closure policy, and even after the epidemic spread to them, the closure policy was very flexible, so Its supplies were not affected as other continents were affected. At the same time, many African countries' supplies faced problems due to interdependence with Asian and European countries, but the impact of these problems was different due to the capabilities of those countries in dealing with crises. The results presented in Table (7) showed that economic stagnation

(P8) is one of the most challenging challenges affecting African countries, and in contrast, decentralization, the use of buffer stock and computerized stock systems (S9) are among the best policies that can deal with supply disruptions to those countries**.**

Table 7: Logistics problems and appropriate solutions in the continent of Africa

	S j	K j	W j	q j		S j	K j	W j	q j
S9		1	1	0.43980034	P8		1	1	0.4599944
S1	0.83	1.83	0.54644809	0.24032805	P7	0.92	1.92	0.52083333	0.23958041
S6	0.8	1.8	0.30358227	0.13351559	P1	0.87	1.87	0.2785205	0.12811787
S2	0.79	1.79	0.16959903	0.07458971	P5	0.82	1.82	0.15303324	0.07039443
S7	0.79	1.79	0.09474806	0.04167023	P9	0.71	1.71	0.08949312	0.04116634
S5	0.67	1.67	0.05673537	0.02495223	P6	0.69	1.69	0.05295451	0.02435878
S4	0.33	1.33	0.04265817	0.01876108	P2	0.48	1.48	0.03578007	0.01645863
S8	0.28	1.28	0.0333267	0.01465709	P4	0.42	1.42	0.02519724	0.01159059
S3	0.25	1.25	0.02666136	0.01172567	P3	0.39	1.39	0.01812751	0.00833855

There is no doubt that the capabilities of countries differ among themselves, even within the same continent, in terms of their ability to face challenges that directly or indirectly affect their economy and the stability of their supply chain. Therefore, the first rule that companies must understand is the dynamics and instability of the environment, preparing and adapting to all future environmental changes, and the first step for adaptation is to understand the challenges and appropriate solutions to them, as not all solutions can be used in all countries and at the level of all companies, Figure (3) shows Variation of appropriate solutions to address the problems faced by the supply of many companies during the spread of the Covid-19 pandemic.

5. Conclusions

COVID-19 is officially a pandemic that poses a significant threat to human life and economic well-being worldwide. It disrupted supply chains worldwide as a whole, causing an unprecedented humanitarian and societal emergency. So, such incidents require companies to prepare and adapt based on the nature of solutions appropriate to their circumstances and the problems they face, and this approach will also build greater responsiveness and resilience in supply chains to protect against future disruptions. To do this, supply chains must take advantage of the systems supported by data analytics, artificial intelligence, and other systems. However, this matter is not compatible with all companies in the world due to the varying capabilities and capabilities of these companies, culture and awareness, as well as the nature of government decisions that impose a total or partial closure and the spread of vaccines. Hence the discrepancies between the problems and the appropriate solutions for supplies in the Asian, Arab and African countries.

This research aims to collect the problems faced by the supply chains and the appropriate solutions to them during the COVID-19 pandemic, classify them and send them to experts from European, Asian and African countries, to evaluate them based on the conditions of their countries and companies during the pandemic. It was found that supplies in European countries face different problems in terms of the level of influence from supplies in Asian and African countries, as well as the different effects of supplies in Asian and African countries. Also, the solutions differ according to the degree of their suitability between the continents, given the differences and the circumstances surrounding them. One of the most common problems faced by European countries is the rise in uncertainty. What about Asian countries, the imbalance and disorder in demand and the shortage of raw materials represent the biggest problem, while in African countries, the problem of economic stagnation and lack of raw materials is the priority of the problems. On the other hand, the most appropriate solution for European countries to face the problems mentioned above is through designing and improving flexible chains. As for Asian countries, agile systems are the most appropriate solution, and on the other hand, decentralization and the use of computerized and reserve stocks is the best solution for African countries.

Finally, this paper is not without some limitations. The first determinant represents the nature of the evaluation of problems and solutions, as the evaluation relied on the personal opinions of experts, and the second determinant is the lack of response by many experts to whom the evaluation form was sent through e-mail, the third determinant is not covering all countries in the three continents. From this point of view, researchers can develop models specific to their countries, according to their capabilities and circumstances, to deal with any disruptions affecting their supply chains, as well as study the feasibility of some solutions and evaluate them in their countries.

6. Future Work

The stability of supplies is an important indicator of the stability of countries. In this study, the studies that were conducted during the pandemic and that worked to identify the problems or solutions that they addressed in a particular country or a specific sector were counted. The current study has adopted SWARA as a tool, and researchers in the future can expand the tools that work to find more accurate solutions in this regard, as well as conduct a study of these problems or solutions in other countries or continents that the current study did not address. On the other hand, future researchers can study ways to improve the response to disturbances faced by supply chains by adopting the proposed solutions and the extent of their contribution to addressing the problems surveyed in this study and in different environments.

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