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UNITED NATIONS SUPPLY CHAIN RESILIENCE CASE STUDY ANALYSIS OF VULNERABILITIES IN CRISIS AFFECTED REGIONS

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Abstract: United Nations is coordinating peacekeeping and crisis management activities such as UNDP with the main target to interconect humanitarian aid, security and sustainable development programs.
The transition between conflict or crisis affected area to peaceful and stability zone represents a long lasting and complex process, under permanent risk of recurrence to the initial crisis.
Wihin this sustainable development strategy, a crucial role is represented by supply chain resilience. This aspect is esential not only for humanitarian organizations but also for crisis affected population.
This case study focus on UN supply chain operational resilience by developing a comparative analysis between COVID 19 pandemic, war in Ukraine and the conflict in the Middle East. We used a methodology that a lot of specialised companies developp and invest in: risk management procedures. The main goal is to obtain proficient supply chains working without major disruptions. The state of the art is the AI which includes machine learning, natural language processing, and computer vision, enabling predictive analytics and decision-making in supply chain operations. Also, BDA helps process and analyse vast amounts of data that improve supply chain responsiveness.
Key words: supply chains, post conflict areas, sustainable development, United Nations, risk management, resilience mechanism
JEL Classification: Q56, O19, L23, D81

1. The Overall Picture of Crisis Situations Populations

Throughout history, human civilization has experienced a multitude of major calamities and crises such as: world wars or smaller-scale conflicts, natural disasters like earthquakes, hurricanes, fires, floods, or political, economic, and food crises that have led to the starvation and death of tens and hundreds of millions of people. All these disasters, which could not be stopped despite the advanced level of science and technology, have had catastrophic consequences, irreversibly influencing human society and the communities forced to confront them.

Analyzing the statistics of various types of disasters and destructive events affecting human civilization, we can note that the direction in which humanity is heading is an unfavorable one, and the speed of evolution in this dire direction is increasing—paradoxically, given technological evolution.

Thus, it is imperative to identify mechanisms and strategies that, if they cannot prevent the occurrence of the aforementioned phenomena, at least offer solutions to minimize their effects, both from the point of view of loss of human life and material damages incurred.

2. The Objectives and Missions of UN related to Crisis Situations Populations

With the end of the Cold War, but especially since the beginning of the 21st century, marked by the wars in Afghanistan and Iraq, the United Nations has made considerable efforts to create

institutional bodies and policies for the defense of peace. In 2005, the Peacebuilding Commission was established under the auspices of the UN.

Furthermore, the UN created an internal body called UNDP (United Nations Development Programme) which has a broad range of directions and objectives. (United Nations Development Programme, 2023)

- Establishing standard operating procedures in case of crisis;
- Developing centers in over 170 countries aimed at conducting specific studies
- Establishing a post-graduate educational institution called the Crisis Academy;
- Being created as a legal structure recognized at the international level.

3. The Sustainable Development Strategy for Disadvantaged Areas from the UNSDG Perspective

UNSDG, which translates to the United Nations Sustainable Development Goals, is based on the same three characteristics: the economic system, the social system, and the natural environment, with a series of specific objectives: (Nazarian & Khan, 2024)

Eradication of poverty, Eradication of malnutrition, Improvement of health status and standard of living, Increasing the quality of the education system, Gender equality, Adaptation Mechanisms to the Global Challenges of the Supply Chain.

The most important functions of a supply chain are: flexibility, redundancy, speed of adaptation, visibility, and interconnection with other mechanisms and factors.

All these functions allow the supply chain to adapt to global challenges:

- Internal factors: risk management procedures, technological and IT capabilities and tools, the level of training of personnel managing the activity flow;
- External factors: Natural disasters, armed conflicts, pandemics or social crises;
- The complexity of supply chains: This represents both a favorable aspect by ensuring a multitude of alternative and back-up possibilities, but it can also be a potential risk factor such as supply blockages;
- Norms, requirements, and regulatory policies

We can provide a series of real examples:

1. The COVID-19 Pandemic: The period 2020 - 2022 demonstrated to all humanity the very low redundancy and the high degree of risk to which society is exposed, at least regarding supply chains. (Strengthening supply chain, 2023)

2. The War in Ukraine: On one hand, we have the state of war with its inherent consequences. On the other hand, there are also indirect consequences, such as the transit of grains harvested in Ukraine through neighboring countries like Romania following the Russian naval blockade at sea. (The Russia-Ukraine Conflict, 2022)

4. Solutions Applied to Increase Resilience

Creating resilient supply chains is essential not only for the companies involved in the process but also for the societies in which they operate. Resilience implies the capacity to anticipate, to prepare for unforeseen situations so that they can function regardless of the crises. For this purpose, specialized companies have created their own strategies for risk management and increasing resilience.(Mishra & Gupta, 2024)

A number of such strategies can be mentioned: Creating alternative sources for product supply, Expanding economic operations, Creating buffer stocks and reserves, Adopting digital technology, Storing databases in cloud-based IT applications, Risk Analysis as an Innovative Tool. (Innovation in humanitarian logistics, 2023)

In recent years, a whole series of tools have been developed to improve the performance of logistical processes and particularly supply chains. One of these tools, and probably the most widespread in the field, is risk management.

Given the specific nature of supply activities, especially in conflict zones risks are multiple, with both the probability of occurrence and their severity able to reach maximum levels. (Managing risk in emergency supply chains, 2024)

The most common risks can be classified into three major categories: geopolitical, social, economic. In turn, each category can be subdivided into a very large number of scenarios, following the model of a risk tree or an Ishikawa diagram.

In table 1 we calculated the Priority-Risk-Number as a product of Severity (S), Occurence (O) and Detectability (D), based on the three above mentioned scenarios.

The whole study that integrates this part of calculation is based on a complex risk management analysis and the main results shall be published in an further project.

Table 1. Priority-Risk-Number (PRN) calculation for crisis scenario assessment

Major scenario	Risk Factors (R.F.)			R. F.	S	O	D	PRN
	1. Geopolitical	2. Social	3. Economical					
COVID 19 pandemic	Border closures	Unemployment	Transit blockage of critical products	1	3	6	5	90
				2	2	3	4	24
				3	5	3	3	45
War in Ukraine	Euro-Atlantic accession	Depopulation	Grain trade route disruption	1	2	6	5	60
				2	6	2	5	60
				3	3	3	5	45
Israeli Invasion in Gaza	Border closures	Pandemics, Famine, Depopulation	Humanitarian aid reduction	1	6	6	7	252
				2	6	6	6	216
				3	5	4	5	100

Source: own work

We can take the situation of the Israeli Invasion of Gaza as an example. The Palestinian population requires medical care, provision of food and essential products, social assistance, housing. The list can continue indefinitely.

United Nations Organization, along with other governmental or NGO, tries to come to the aid of the Palestinians but faces the following obstacles:

1. Geopolitical risks: The refusal of neighboring countries to allow the transit or political asylum. Practically, this scenario is a dead end for the Palestinian population. On one hand, massacred by the Israelis, on the other hand, they are not allowed refuge in other states. In this case, the most viable solution is represented by the intervention of international organizations like the UN. (Humanitarian Assistance in G5, 2022)

2. Social risks: Against the backdrop of a lack of critical infrastructure (running water, sewage, sanitation), we can consider the scenario of outbreaks of contagious diseases, which could degenerate into real epidemics. The lack of hospitals, medicines, minimum living conditions could, under the mentioned conditions, lead to an exponential amplification of the number of victims.

3. Economic risks: The reduction of the flow of humanitarian aid for the Palestinian or its blockage. (Singh, R. K., Gupta, 2018)

The three major categories, each with multiple scenarios, according to the previous examples, is to be be analyzed and solutions for their management shall be identified by appealing to the specific methods of Risk Management. Among the most used we can mention: PHA, risk trees, fault trees, functional trees, FMEA - Failure Mode and Effect Analysis, and the Analytic Hierarchy Process (AHP).

Within the risk analysis not just one method will be used. To increase the precision and efficiency, several tools will be used iteratively in a cyclical manner.

By appealing to the mentioned methods, using as primary input data the information stored in database servers and managing them using artificial intelligence, specialists in the field will be able to coordinate with maximum efficiency the logistical supply activities in crisis-affected areas.

5. Conclusions

This article stands out from other works in the field through its holistic analysis of the studied context. We consider that without an overall perspective on the entire scenario the efforts made to manage the crisis will not yield the desired result.

Our study mix special literature research with risk management procedures. We developped a comparative analysis between COVID 19 pandemic, war in Ukraine and the conflict in the Middle East with the purpose to show the major risks and the possible solutions for optimisation. We used also proactive and analitical instruments for improving the sustainability and adaptability of humanitarian supply chains.

The profound crises traversed by the current world, which produce millions of victims annually, represent one of the major objectives of UN. Their primary interest is the interconnection of the humanitarian aid, security, and development sectors.

For these sustainable development strategies to succeed, the creation of resilient supply chains is imperative, an aspect essential not only for humanitarian organizations but also for the affected societies. Resilience implies the capacity to anticipate, to prepare for unforeseen situations so that they can function regardless of the crises they face, ensuring an optimal flow of products and services.

For this reason, specialized companies have adopted a series of mechanisms such as risk management to allow supply chains to function as efficiently as possible.

Furthermore, by using as primary input data the information stored in database servers and managing them using artificial intelligence, specialists in the field will be able to coordinate with maximum efficiency the logistical supply activities.

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