
Crisis and Humanitarian Logistics as Opposed to Pandemic Logistics

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Abstract:

Purpose: The aim of the article is to differentiate the logistics processes directly connected with pandemics and describing them with a new terminology.

Design/Methodology/Approach: Following research methods have been adapted: analysis (disposition of the researched logistics categories), synthesis (matching the parts in a specified structure), generalization (merging the elements into a domain).

Findings: The result of the research is isolating a new domain which is pandemic logistics.

Practical implications: Implementing the research results will enable to explore, within logistic, a new scientific field which is the concept of supply chains for personal protective equipment, specialistic medical equipment, particular medicaments and most of all vaccines.

Originality/ value: A novel value of the crisis situation and crisis logistics theory, humanitarian catastrophe and humanitarian logistics as well as the course of pandemics is to identify and describe the pandemic logistics issues.

Keywords: Crisis logistics, humanitarian logistics, pandemic logistics.

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1. Introduction

Heretofore the field literature has defined such terms as humanitarian logistics and crisis logistics or logistics in crisis situations – logistics of crisis situations. The terms are used ambiguously both in theory and practice. Humanitarian logistics used to be called crisis logistics in critical situations or catastrophes (Marciniak, 2020).

There has been an effort to draw attention to the human aspect of crisis logistics, where it follows the humanitarian criteria of coming to maximum help to all in need in a possibly shortest time, with security and the highest efficiency of all logistic actions (processes) (Ficoń, 2011). According to the author of the article, however, the terms need to be treated separately and should be assigned different meanings. Taking into consideration the present and the future threats to public health in an international scope, it seems to be necessary to differentiate a third term – pandemic logistics.

The aim of the article is to separate the logistic processes connected directly with pandemics and describing them with new terminology. The main research problem is a question: do crisis logistics and humanitarian logistics differ from the issues of pandemic logistics? To find the answer to the question it is necessary to face the following detailed problems: what characterizes the crisis logistics?, what are the features of humanitarian logistics?, which logistics issues can be associated with pandemics? In the research hypothesis it has been assumed that: “A set of processes of the personal protective equipment, medical equipment, medicaments, vaccines flow, since the coronavirus (SARS-CoV-2) infection rate increase, because of its specifics, should constitute a new referent – “pandemic logistics”.

2. Materials and Methods

The research was conducted on the basis of monographs, articles, materials and announcements devoted to crisis logistics and humanitarian logistics as well as functioning of the supply chains of personal protective equipment, specialistic medical equipment, particular medicaments, new vaccines. To solve the research problems and verify the hypothesis the following research methods were adapted: analysis (disposition of the researched logistic categories), synthesis (matching the parts in a specified structure), generalization (merging the elements into a domain). The time range was determined by World Health Organization (WHO) which on 11 March 2020 recognized the epidemics of infectious disease COVID-19 caused by SARS-CoV-2 coronavirus as a pandemics and the territory as under threat (of spreading).

3. Results

A crisis situation is caused by a bunch of rapid events causing increasing influence of forces destabilizing the balance in society, lack of supplies and difficulties in its

normal functioning, which bring uncertainty and tensions and lead to uncontrolled course of events including the use of force (Makowska, 2016). Among the main situations causing crisis situation are: social disturbances, terroristic acts, natural catastrophes and technical malfunctions.

A crisis situation causing the need to implement logistic actions, usually is the result of natural catastrophe or a technical malfunction. Crisis is the culmination phase of the crisis situation, which can repeat itself several times (Otwinowski, 2010).

The actions in the scope of readiness for natural catastrophe and technical malfunction, can be divided into material readiness (e.g. building according to regulations, avoiding placing the buildings in dangerous areas, reinforcing the buildings, preparing the aid kits) and behavioristic readiness (training, early warning, insurance etc.) (Humanitarian, 2022).

The necessity to prepare for crisis situation forced the organization of crisis management, with its important part, the crisis logistics. The aim of the crisis logistics is to shape, direct and control the supply and service processes in logistic chains organized for fulfilling the needs of people who experienced a particular crisis situation. The required logistic supplies and services should be made available to those in need according to the 4Rs rule (4 “Rights”) i.e., in appropriate time, in appropriate place, in appropriate way (condition), in appropriate quantity. Fulfilling those basic criteria, primarily the “Just In Time” (JIT) rule, is the determinant of a effective crisis logistics. In the face of health and life protection, the rule of a “proper price” is not taken into consideration.

The mission of crisis logistics is to supply the necessary measures and services to all the suffering as fast as it is possible. In the situation of a limited access to ready to use resources, in a crisis situation, the range of help provided is limited to fulfilling the elementary needs to restricted extent, even for a long period of time. Providing elementary means of survival in unfavorable conditions, firstly will require the supply of drinking water and basic food supplies as well as accommodation or evacuation. Standard supplies for the suffered include:

- Water and food,
- Consumer goods (clothing, personal hygiene means, sheets, domestic appliances, cleaning materials, sources of light),
- Energy sources (solid, liquid and gas fuels) (Nowak and Walancik, 2018).

Crisis situations are diverse according to the atmospheric conditions. In low temperatures there is a need to provide the sufferers in warm clothing, shoes, sheets (duvets, sleeping bags, blankets) protective cream. During extremely high temperatures there is a need to supply tropical clothing, fans, air conditioners, sunglasses, mosquito nets, creams and sprays.

In the period of heavy rains there is a need for rain boots, raincoats, water resistant covers. In case of heavy snowfall, skis, snow shoes, sleigh are of a huge help. In territories covered by ice, there is a need to have shoes with spikes, ice axes and snow chains. During floods or landslides, tools for ground work are going to be used such as pickaxes, shovels, rakes, barrows.

Logistic services for the sufferers in a crisis situation include:

- Economic-living services (gastronomy, housing, hygienic, sartorial, shoemaking, hairdressing, commercial),
- Specialistic services (transport, transshipment, renovation) (Nowak, 2009).

Humanitarian crisis, also called the humanitarian catastrophe, is defined as a single event or a series of events, which constitute a threat to health, safety or wellbeing of a society or a significant number of people. Being triggered by an internal or external conflict, it usually occurs on a vast territory. It can be also caused by other factors that require reaction to a local, regional, national or international level directed towards particular sectors it concerns.

The consequences of a humanitarian crisis can be short term or long term and result from a natural disaster, catastrophe caused by people or complex crisis situation emerging as a result of simultaneous influence of several factors or events, which preclude access to running water, food or a safe shelter. A mass character of the negative consequences for a given population is a characteristic feature of crisis – humanitarian catastrophe (Humanitarian, 2022).

According to United Nations, catastrophe means a significant disturbance of a group or society functioning, encompassing vast losses and human, material, economic or environmental effects, which exceed the abilities of overcoming them in an unaided way (2009 UNISDR, 2009).

Humanitarian crisis caused by the following natural disasters: tsunami, earthquakes, hurricanes, floods, draughts and fires, can lead to significant decrease in natural resources and deterioration of the environment in the future as well as life standards for people, as a result of damage to properties, lack of sources of income, bodily harm and death, mental suffering (approximately 1/5 of those in need, suffer from different disorders – starting with mild fears, depression, ending with fierce, permanent states like bipolar disorder or schizophrenia) relocation of people and families and long term disturbances in everyday activities.

Being evoked by catastrophes caused by people, like wars, social disturbances, protests, conflicts and terroristic attacks, it has a great influence on physical, mental and social mood of the suffered. When the crisis causes intensified moves of people, it becomes a refugee crisis. It is evident that humanitarian crisis are interconnected, and therefore complex and difficult to overcome.

A difficult economic situation may lead to humanitarian crisis and conversely, humanitarian crisis can be a premise of an economic fall, destabilization of the state and government change, lack of food, hunger, corruption, human rights violation, violence, mass murder etc. Lack of sources of income forces women and children to take up employment, often in conditions which may bring danger upon health and life, just to receive any salary or food.

In both circumstances there is a need to bring economic help for the country to enhance the economic situation of the society. One of the most important tasks is to ensure education for the vast majority of population as the use of the abilities of the refugees brings more possibilities for them to gain income (Humanitarian, 2022).

Humanitarian logistics means coordinating the flow of people, goods and services accompanied by additional information, conditioned by a difficult situation of a society living in a certain area, caused by independent actions of an interim or persistent character e.g. natural catastrophes, to provide help but also mitigating or eliminating the events in a functional and effective way.

The actions of humanitarian logistics are divided into three phases: prevention, reaction and reconstruction (Marcinkowski, 2019). From the perspective of terminology, humanitarian logistics means a process of planning, realizing and controlling the economically efficient flow and storage of goods and materials, as well as interrelated information from the place of origin to the place of consumption in order to soften the pain of the people in difficult situations (Thomas and Kopczak, 2005).

In practice, the organization and administration of humanitarian goods, assisting people and equipment needed to set up and maintain mobile hospitals or refugee camps is brought to the foreground. The main aim of humanitarian logistics is saving human life and mitigating the suffering. The main task of humanitarian logistics is providing the essential resources gathered in humanitarian actions through organizing effective material, information and financial flows.

Creating a humanitarian supply chain requires cooperation with commercial logistic service providers. The flow is initiated by benefactors (organizations, associations, individuals), who commit their resources without a full knowledge about the actual needs of the humanitarian aid receivers. Apart from classic flows, characteristic for economic logistics, there is a need to create a flow of aid personnel and flow of knowledge (Widera, 2019).

A humanitarian supply chain is characterized as a coordinated system of interrelated entities concerned with providing humanitarian help, among which there is a permanent exchange of information, generating value in the form of products and services of a strictly humanitarian character (Marcinkowski, 2019). It has a shape of a net involving the processes of placing orders, transport, storage, resources

management, shipment tracking, reporting and liability with the aim of fulfilling the primary needs (Marcinkowski, 2017). The concept of creating humanitarian supply chains is defined by realization of the primary aim regarding the aid distribution during untypical events, which means mitigating the suffering of citizens by relocating them to the offered goods and services.

The essential flow in a chain occur after the event and is determined by the kind of the cataclysm, number of the suffered, quantity of the resources required to mitigate the effects and the ease for the entities to function in an affected area (Marcinkowski, 2019).

Pandemics is defined by the World Health Organization (WHO) as “spreading of a new disease throughout the whole world” (Piotrowska, 2021). According to the acts of law, epidemics means occurrence of infections or instances of infectious disease (disease caused by a biological pathogenic factor) in a given area, in a number significantly higher than in a prior period of time, or the occurrence of infections or infectious disease not present heretofore (Act, 2008). An ongoing or extended pandemics can lead to a humanitarian crisis in the situation of an increasing virulence, increasing infection rate, hospitalization and deaths (Humanitarian, 2022).

In the early stage of the crisis caused by COVID-19, there were difficulties connected with ensuring appropriate number of personal protection measures, indispensable medical equipment (respirators, infusion pumps, monitoring devices, laboratory equipment), vital medicaments (antibiotics, anesthetics, resuscitation drugs, diuretic pills, medical oxygen) (Dobska, 2021).

The disturbances in supply chains of personal protection measures were especially dangerous for medical personnel as shortages of appropriate equipment in a situation of a rapidly spreading of COVID-19, increased the risk of infection. Health Service personnel, who were the foreguard in the fight with coronavirus, could pass the infection on patients and coworkers. The necessity to quarantine after exposition through contact, caused temporary limitation of accessible human resources (Park *et al.*, 2020).

Insufficient medical infrastructure needed for the increased number of patients in the period of the pandemics development, required a further increase in the health protection system capacities to realize medical procedures through additional number of beds aimed especially at intensive health care, immediate purchase of personal protection measures (protective masks, disinfection fluids), temperature measurement devices and equipping hospital wards in respirators, infusion pumps, oxygen concentrators, oxygen pulse meters (Dobska, 2021).

Most of the countries initially had to solve a problem of shortages in personal protective measures and appropriate medical equipment in hospitals. In Belgium there was a rationing of disinfection measures, which were supplied only for health

service personnel. In the course of pandemics, pharmaceutical companies in Belgium started to produce the essential equipment for health entities because of a ban put upon the import of medical measures from countries from outside from European Economic Area.

In Bulgaria local authorities supported the hospitals by providing protective equipment for personnel. Public orders were centralized and Bulgarian companies started to produce personal protective measures. In Denmark regional authorities were organizing purchases of respirators. France established an airbridge with Peoples Republic of China (ChRL) in order to deliver necessary measures for health service personnel.

In Germany the purchase of personal protective measures was organized by the government, despite of the federal character of the country. The export of the measures manufactured in the country was prohibited. They were purchased in significant amounts in ChRL. In the Netherlands the government centralized the public orders and participated in purchases to gain more equipment and additional respirators for intensive care wards. The Spanish organized the production of protective measures themselves.

In Great Britain the regulations (certification) regarding the production of personal protective measures were moderated. Just as in other countries, problems with personal protective measures accessibility appeared in Poland, therefore in order to speed the supplies up, the procedure of public procurement was simplified. The Ministry of Health was directly involved in the purchase of personal protective measures and respirators.

Local authorities supported the health entities functioning in a given area. Sewing rooms were sewing masks and pharmaceutical as well as spirits industry extended the production range to manufacture disinfection measures. Medical products manufactured in Poland could not be exported. State treasury companies were organizing supplies of e.g. masks and protective gloves from ChRL. Material Reserves Agency (ARM) was a national holder of personal protective measures.

The pandemics revealed the improper preparation of the countries to face new international challenges regarding public health. The scale of demand for personal protective measures, forced the need to organize production of masks, gloves, disinfecting fluid in different entities, which could immediately take up their production in high quantities.

In the early stage of pandemics due to the shortages of personal protective measures, there was a search for producers and suppliers able to realize central orders. Often the requests were sent to Chinese government, which was at disposal of personal protective measures stocks and made them available for interested countries. Because of simplifying the public orders procedure there were instances of

purchases of equipment without necessary compliance certificates from dishonest importers, which as a result could not be used in health care (Furman et al., 2020).

Apart from problems in gaining the personal protective measures and medical equipment, there were difficulties and delays in COVID-19 vaccines' supplies. Despite assigning 12 billion dollars of public funds for preparing and production of six vaccines, the producers arbitrarily suspended or relocated the supplies to other countries against the afore-prepared schedules – as a consequence in 130 countries the distribution did not start according to a plan (Barczewski and Sykuna, 2021).

In order to avoid losses in vaccines which easily get damaged and require transport and storage in a specified temperature range, there was a need for creating specialistic, temperature controlled supply chains, which could be negatively affected by ineffective and limited infrastructure. In the 2019 report of International Air Transport Association (IATA) the loss was calculated for up to 25% of the sent vaccines caused by wrong temperature management in means of transport and related costs of over 34 billion dollars per year (Vaccines, 2022).

Among the five crucial areas of COVID-19 vaccines supply chain optimalization there were: planning (crucial for success), storage in required temperature, shipment tracking, product integrity assurance, delivery for final recipient and returns (KPMG, 2020).

4. Discussion

The analysis of logistic actions assigned for a crisis situation and humanitarian catastrophe as well as pandemics indicates that there are differences in their character (table 1).

Table 1. *Frame dissonance in logistic actions undertaken in crisis situation, humanitarian catastrophe, pandemics*

Criterion	Crisis situation	Humanitarian catastrophe	Pandemics
People	Injured	In need	Endangered
Number	Small	Big	Huge
Reaction	Immediate	Urgent	Interim
Materials	First need	Elementary	Specific
Quantity	Little	Significant	Huge
Services	Economic-living, specialistic	Economic-living	
Area	Local	Region	World
Meaning	Local	International	Global
Period	Short	Long	Limited

Source: Self-study.

All logistic processes under realization in a crisis situation, humanitarian catastrophe and pandemics, should be build upon the 7 Rs (7 “Rights”) rule. Taking into account the rich theory and practice of crisis management and humanitarian aid, following the 7Rs rule in crisis and humanitarian logistics is much simpler.

Analyzing the reaction for new threat – the outburst of a worldwide pandemics and a fast spreading of the infectious disease COVID-19 caused by SARS-CoV-2 coronavirus, it can be stated, that following the 7 Rs rule, which characterizes the role of logistics in specific measures flow, was difficult to achieve (Table 2).

Table 2. *Realization of 7 Rs rule in the specific measures flow during pandemics*

No	Requirement	Realization conditions
1.	Proper product	Difficult to achieve in the situation of shortages and interim purchases, with the risk of receiving measures and equipment without appropriate certification.
2.	Proper quantity	Lack of possibilities to fulfill the needs because of insufficient domestic production and inability to compensate them with import
3.	Proper condition	High quality required (inadequate temperature caused lasses)
4.	Proper place	Not fully manageable, especially in a global dimension because of locating the supplies to highly developed countries in the first instance
5.	Proper time	Problematic in case of long term shortages of specific measures in the market
6.	Proper consumer	Provided thanks to non-economic government procedures i.e. administrative, legal, information or moral
7.	Proper price	Not taking the cost into consideration (high rate of infections and mortality)

Source: Self-study.

5. Conclusions

Logistic actions undertaken during a crisis situation and humanitarian catastrophe as well as pandemics are diverse. Problems with the specific measures flow in the time of COVID-19 infectious disease show the common disregard for 7 Rs rule. The above mentioned dissonances in logistic activities and consumer goods violations confirm the hypothesis – justify the differentiation of a new referent of “pandemic logistics” in theory and practice.

A subsystem of pandemic logistics should be included in the structure of the public health threat reaction system to prepare for the forthcoming pandemics. The gathered resources of specific measures should be enough to cover the needs in the early stage of pandemics, and potential capabilities – enable their directed fulfillment in consecutive phases of the disease spread. The aim of pandemic logistics should include operating on global specific measures flow according to 7

Rs rule, and its mission – on-time and safe supply the necessary specific measures for those endangered and infected with coronavirus.

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