Logistics in the Context of Humanitarian Operations

Alexander Blecken

Heinz Nixdorf Institute
Fuerstenallee 11, 33102 Paderborn, Germany
blecken@hni.upb.de

Abstract. In the past decade, logistics in the context of humanitarian operations has more and more moved into the focus of logistics practitioners and academics. While humanitarian organisations have realised that a major part of disaster relief spending can be attributed to logistics and supply chain management activities associated with humanitarian operations, researchers have found that the area of logistics in the context of humanitarian operations gives rise to a number of unique and interesting challenges. This paper is meant as an introduction to the track Humanitarian Logistics at the 8th International Heinz Nixdorf Symposium. A recent natural disaster helps to elaborate the domain humanitarian operations. A number of important definitions are presented. Moreover, some of the specific characteristics and challenges of logistics in the context of humanitarian operations are described.

Keywords: Disaster Relief Logistics, Humanitarian Logistics, Supply Chain Management, Humanitarian Operations.

1 Introduction

A powerful earthquake of 7.2 magnitude on the Richter Scale affected Haiti on 12 January, at 16.53hrs local time. The earthquake happened 17km south-west of Port-au-Prince, the capital of Haiti. The initial reports suggested a high number of casualties and widespread damage. The capital of Haiti, Port-au-Prince, had been severely affected including critical city infrastructure components such as, electricity, water and phone services. Electricity was not available and communications were difficult. Immediately, emergency teams from humanitarian organisations, such as United Nations Disaster and Assessment Coordination Team had been mobilized. [1] By January 14, 26 international search-and-rescue teams had arrived on the ground and had been deployed to priority sites. At the peak of the search-and-rescue effort, there were 52 teams on the ground with 1,820 rescue workers and 175 dogs. [2] Within ten days of the incident, these teams had rescued over 130 people. [3]

Although the precise humanitarian needs were not known at first, urgent priorities included search and rescue, medical services and supplies, clean water and sanitation, emergency shelter, food, logistics and telecommunications. In

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particular, medical assistance was the priority due to a high number of people suffering traumatic injuries. [4] The United Nations estimated that 200,000 families (up to one million people) were in need of immediate shelter and non-food assistance. [5]

By January 15, flights carrying humanitarian aid were arriving in Port-au-Prince with medical supplies, medical teams, food and non-food items. A total of 180 tons of relief supplies had arrived in-country so far. [6] One of the most pressing problems in the humanitarian response of the first days was a shortage of fuel due to the destruction of Haiti's transport infrastructure. By January 16, fuel restrictions had been put in place. [7] Better estimations of the humanitarian needs only became known after some time: According to the Shelter Cluster, the number of people living in temporary shelter sites in Port-au-Prince was estimated to be as high as 800,000, on January 24. Water continued to be distributed daily at 115 sites in Port-au-Prince reaching an estimated 235,000 people. [8] Yet, hundreds of thousands of people remained in need of food and shelter. [9]

More than two weeks after the earthquakes, the numbers illustrate the massive destruction and human suffering caused in Haiti: Of the 3,700,000 people living in the areas affected by the earthquakes, some 112,000 were killed, almost 200,000 had been injured and more than 480,000 had been left displaced. 40,885 patients had been treated by 274 humanitarian organisations on the ground. 2,000,000 people were estimated to be in need of food, 1,100,000 people in need of shelter and 500,000 in need of water. [10]

2 Disasters and Humanitarian Crises

The world today has to face a number of severe problems: Some three billion people live on less than two dollars a day. Moreover, the past decade has seen an increasing number of medium to high impact disasters to which the poor are most vulnerable. The humanitarian crises caused through these disasters are frequently addressed by the international community with concerted efforts and humanitarian operations. Humanitarian operations range from short-term humanitarian relief in response to acute emergencies to medium and sometimes long-term assistance focusing on recovery and reconstruction in post-emergency contexts. Due to the substantial mobilisation and deployment of material and financial resources involved, these kinds of operations rely to a large extent on effective and efficient supply chain management.

Humanitarian operations seek to alleviate suffering and save lives of victims of natural or man-made and human-induced crises. Humanitarian organisations, which carry out these activities, have existed at least since the late 19th century, when the International Red Cross was founded on a battlefield as a reaction to the inhumane suffering and lack of provision given to the wounded. In carrying out their operations, humanitarian organisations adhere to certain principles, such as humanity, neutrality and impartiality, i.e. they deliver their services on a basis of need without any discrimination regarding religion, ethnicity or

gender. Since the first humanitarian organisations were founded, the multitude and magnitude of humanitarian operations has risen dramatically. Nowadays, these operations include services and goods to provide food, water, shelter and medical care, to protect victims of natural and man-made disasters as well as bear witness to their plight, to name just a few examples of the broad range of different operational foci.

Between the 1970s and 1990s, the number of disasters has tripled. [11] [12] It has been predicted that the number of both natural and man-made disasters will increase five-fold [13] and that world-wide costs due to these events will sum up to $64tr in the next 50 years. For Germany alone, the cost will be around $800bn. [14] In 2008 between 150-220 million people were affected by disasters. These disasters claimed more than 240,000 fatalities and between $190-270bn financial losses. [12] More than 90% of the victims of natural and man-made disasters live in developing countries. This shows that "poverty, population pressures and environmental degradation exacerbate suffering and destruction." [15] Figure 1 presents some key indicators of the effect of disasters during the past 10 years. [16]

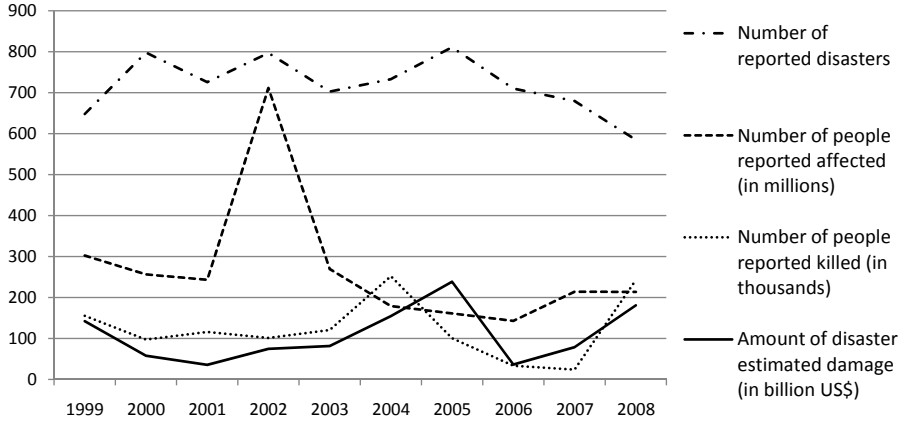

Fig. 1. Disaster indicators

The before-mentioned figures refer to disasters with a natural trigger only, and do not include wars, conflict-related famines, diseases or epidemics. However, humanitarian operations also take place during or in the aftermath of armed conflicts such as civil wars and wars between states. While wars between states have remained at a relatively low level since World War II, intra-state conflicts have risen considerably in the last decades. [17] During the past decade, the number of high intensity conflicts has risen only slightly, whereas medium intensity conflicts have doubled. Since the end of World War II, a total number of 228 armed conflicts have been recorded, of which the majority took place after the Cold War. A total number of 20 million people have been killed and 50 million injured in 160 major armed conflicts. 100 million people were forced to flee. [18]

3 Definitions

The previous two sections have illustrated the application context of humanitarian logistics with the example of a current natural disaster and with a number of figures which show that the triggers for humanitarian operations will further rise in the future. In this and the following section, the tasks and challenges of logistics in the context of humanitarian operations (or humanitarian logistics) will be elaborated. Some definitions are provided below that serve to provide a foundation for and further the understanding of the research area humanitarian logistics.

Definition 1 (Disaster). *A disaster is a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources. [19]*

Disasters can be natural or man-made, as well as complex emergencies combining man-made and natural disasters.

Definition 2 (Humanitarian Operations). *Humanitarian operations aim to preserve life and reduce suffering of members of communities in crises. They comprise the provision of material and technical aid as well as the delivery of essential services in response to situations of crises when a communitys ability to cope has been severely impeded. It is given to people in need without distinction as to race, ethnicity, creed, nationality, sex, age, physical or mental disability or political affiliation. Humanitarian operations are not motivated by making profits; however, they are based on basic human rights as formulated in International Humanitarian Law and the Geneva Conventions. Humanitarian operations are temporary in nature and aim to re-establish self-sufficiency of the affected community. [20]*

Definition 3 (Supply Chain Management). *Supply chain management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with partners in the supply chain, which can be suppliers, intermediaries, third party service providers, and customers. [21]*

Definition 4 (Humanitarian Logistics). *Humanitarian logistics is the process of planning, implementing and controlling the efficient, cost-effective flow and storage of goods, materials and equipment as well as related information, from point of origin to point of consumption for the purpose of meeting the end beneficiaries' requirements. [22]*

Interesting to note is the fact that many humanitarian organisations use 'logistics' as an umbrella term encompassing a broad variety of tasks. According to a large humanitarian organisation, the following non-comprehensive list details specific tasks covered by the logisticians in the operations: [23]

- Management and maintenance of hospitals and feeding centres in cooperation with the medical team
- Administration and organisation of the supply chain of required medical goods and equipment and other material (procurement, customs, transport, and stock management)
- Installation and maintenance of technical equipment
- Construction and maintenance of WatSan installations
- Maintenance of computers, communication systems, and IT equipment
- Responsibility for vehicle fleet and fleet management
- Recruitment, training, and supervision of national staff
- Data management
- Security reporting

Definition 5 (Humanitarian Supply Chain Management). *Supply chain management in the context of humanitarian operations encompasses the planning and management of all activities related to material, information and financial flows in disaster relief and humanitarian assistance. Importantly, it also includes coordination and collaboration with partners in the supply chain both horizontally and vertically, third party service providers, and across humanitarian organisations.*

4 Characteristics and Challenges

Anisya Thomas, executive director of the Fritz Institute, makes the case for academic contributions to supply chain management in the context of humanitarian operations, when she states: "Humanitarian logistics has much in common with corporate logistics, yet the best practices from the corporate world [...] have not crossed over. It is paradoxical that a sector, which has such extreme requirements in terms of timeliness, affordability and oversight, is so underdeveloped." [24]

Humanitarian operations with their ultimate stake of saving lives frequently take place in highly unstable and volatile environments, under great time pressure, working on poor infrastructure and under exhausting working conditions. Humanitarian supply chains, which deliver goods and services in response to sudden and slow-onset disasters as well as chronic emergencies and which strive to provide humanitarian assistance both rapidly and efficiently, are subject to specific challenges. These supply chains suffer from frequent breakdowns and interruptions in the material and information flow, which is in contradiction to the extremely short lead times required. In the following, some of the challenges of humanitarian supply chains, which set them apart from commercial supply chains, are presented. [20]

- **Uncertainty:** These supply chains need to operate in highly volatile environments as well as provide assistance in both the short and medium-term time horizons, i.e. in both emergency and post-emergency or more stable contexts. Uncertainty in humanitarian supply chains refers to uncertainty of demand, supply, personnel, and equipment as well as lead time, process instabilities, other actors in the supply chain, and financial resources. Demand

patterns are highly irregular and the environment puts unique constraints on the operations. Especially in disasters relief operations, uncertainty also includes the number of people affected, the infrastructure that is still intact, and information uncertainty. Hence, uncertainty is thus inherent to any type of humanitarian operation whether conducted during the emergency or post-emergency phase. However, the areas in which uncertainty is present shift while the humanitarian operation develops from the emergency to the post-emergency phase.

- **Earmarking of funds:** Due to the nature of how humanitarian organisations are funded, investments in research, information systems, infrastructure and other long-term investments which cannot be directly related to any concrete operation, are severely restricted. Donors frequently earmark their funds, i.e. limit the flexibility how humanitarian organisations can use these funds. Hence, donors have influence as to where and how humanitarian operations take place. However, funding for process improvement, installation of state-of-the-art information and communication infrastructure, operations' support with a long-term focus, and organisational learning are often not in the focus of donors. There is consistent under-investment in these areas which have the potential to improve the efficiency and responsiveness of humanitarian supply chains.
- **Infrastructure:** With respect to transportation infrastructure as well as communication infrastructure, it can be observed that disasters tend to happen in areas where the local infrastructure is already in a poor state. This situation can be dramatically deteriorated during and after a disaster when possibly few remaining roads cannot take the number of refugees and disaster management vehicles that pour into and out of these areas. Poor communication infrastructure prevents efficient information management and increases uncertainty. Transportation remains vulnerable to disruptions and needs to take into account the possibility of using multiple modes.
- **Human Resources:** Humanitarian logistics is affected by the lack of professionally trained logistics personnel. Logistics personnel are in the midst of numerous requirements posed by local governments and officials, donors, the media, beneficiaries, and their own headquarters. Despite recent advancements and the introduction of specialised training and graduate university courses in humanitarian logistics and humanitarian supply chain management, professional logisticians remain rare. Retention of personnel is extremely difficult considering the aforementioned challenges and requirements to logisticians. Due to a variety of factors such as a constantly high work load, high stakes, limited privacy, often low remuneration, and security concerns, staff turnover rates are high.
- **Supply Chain life-cycle:** While traditional supply chains focus on the optimisation of the different flows within the network, the challenges in the humanitarian supply chain lie more in the area of establishing and maintaining a (possibly highly vulnerable) supply chain. Some humanitarian organisations may be issue-related and therefore exist only temporarily. Thus, for each operation, a new supply chain may need to be established.

Humanitarian operations frequently take place in emergency environments, thus, supply chain activities are highly non-routine in the sense that actors in the supply chain need to be redefined anew in each context. These supply chains can frequently be positioned in an early stage in the supply chain life-cycle.

- **Coordination:** There are other factors which challenge the coordination and cooperation of organisations involved in humanitarian operations. Some of these factors include:
  - Mandate: Differing mandates and interests of humanitarian organisations, operational objectives and therefore different agendas, target communities and goals. This also includes humanitarian values such as neutrality and impartiality.
  - Structure: The organisational structures of humanitarian organisations can be incompatible and even incomparable.
  - Information: Missing or wrong information concerning programmes and resources of other organisations such as stock levels and items, transport routes and schedules, already carried out assessments as well as missing reports on similar events, lack of institutional learning, missing and inadequate documentation, especially quantitative documentation.
  - Information and Communication Technology: This includes differing frequencies and licences, missing communication technology, outdated and unreliable IT equipment, incompatible software systems etc.
  - Competition: Governmental as well as non-governmental organisations perceive themselves to be competitors of scarce financial resources. This attitude makes cooperation difficult despite being in the best interest of the beneficiaries. On a supply chain level, this problem might not be as relevant since logistics usually performs support functions in humanitarian operations and is therefore not as donor-visible as direct operations.
- **Others:** Some other characteristics and challenges of supply chain management are briefly addressed here. While supply chain management in other industries addresses the areas of procurement, production, and distribution equally, humanitarian organisations focus mainly on either the procurement or the distribution side. Production can be involved in humanitarian operations but is certainly not of major concern. Demand in the humanitarian supply chain is not only the demand for goods and services, but also the demand for personnel. The supply chains are thus involved with mass movement of goods and people. Further challenges are posed to the humanitarian supply chain in terms of complex documentation requirements, corruption, theft, special packaging requirements, and extreme time pressure to carry out the activities.

5 Outlook

During the past decade humanitarian organisations have come to realise more and more that logistics in the context of humanitarian operations is not just

a necessary expense but a key lever to achieve operational excellence. However, there is still a long way to go and large potentials for improvement remain untapped. In recent years, first executive and post-graduate courses in humanitarian logistics and supply chain management in the context of humanitarian operations have become available. The cluster approach by the United Nations has been a notable initiative to focus efforts on collaboration and coordination of humanitarian organisations in humanitarian crises. The amount of researchers dedicated to this subject has risen significantly, as has the number of scientific contributions in international conferences and respected journals. A dedicated scientific journal on humanitarian logistics and supply chain management is on the horizon. This paper intends to supplement the contributions to the track Humanitarian Logistics of the 8th International Heinz Nixdorf Symposium and spark new research in this area by delimiting the application domain and illustrate the challenges and tasks that humanitarian logisticians need to address.

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