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Insights on the Costs of Humanitarian Logistics A Case Study Analysis

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ABSTRACT

The aim of this paper is to investigate how humanitarian organizations keep track of their logistics costs. Furthermore, first insights regarding the extent of logistics costs in humanitarian operations are provided and the underlying relationships with the objectives, the forms of cooperation, and the processes of the humanitarian actors are examined. In order to answer the research questions, a qualitative case study with expert interviews in six humanitarian organizations is applied. The results show that the recording of logistics costs in practice is rather limited. The figures given in the literature are only realistic under certain circumstances – in some cases costs can be much lower. The degree of project autonomy and the disaster phase are shown to have the greatest impacts. This work provides first insights into the logistics costs based mainly on the investigation into six German organizations and, hence, is limited in its generalizability. However, since little empirical data and few scientific contributions are available in this context, the paper provides more specific evidence of the actual level of logistics costs and the underlying dependencies.

KEYWORDS: humanitarian logistics · logistics costs · humanitarian organization · case study

1. INTRODUCTION

The overwhelming challenges created by disasters worldwide, both natural and man-made, cannot be ignored. In just the past 20 years, more than 1.3 million people have lost their lives as a direct result of natural disasters and a further 4.4 billion were injured, displaced, or in need of humanitarian assistance. In the same period of time, the global economic damage is valued at about \$2.9 trillion US, mainly caused by climate-related disasters [1]. Even though the absolute economic losses are greater in high-income countries, the relative damage is far higher in low-income regions, further hampering their development. According to the UNISDR [2], climate change will increase expected losses in future. Unfortunately, not only are natural hazards triggering human suffering, but man-made conflicts are also inflicting immense harm to people and communities. Consider the situation of Syria, where 13.1 million people are in need of humanitarian assistance and more than 5.6 million have fled their homes since 2011 [3].

In all these devastating situations, urgent humanitarian assistance must be provided to support the affected communities. Particularly uncertainties regarding the trigger, time, and extent of disasters pose significant challenges to the responders and increase the complexity of humanitarian operations [4]. Relief operations are further characterized by an extensive number of humanitarian actors; during the Indian Ocean tsunami in 2004, for example, more than 700 Non-Governmental Organizations (NGOs) from about 40 different countries were involved, most of them operating independent supply chains and maintaining their own funding and operational systems [5, 6].

However, to meet these challenges, humanitarian actors, particularly NGOs, rely substantially on external financial donations. In 2017, an amount of \$27.3 billion US was allocated to international humanitarian response [7]. In this context, it is noted that logistics account for a considerable proportion (up to 80 percent) of disaster relief costs and tasks



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[8–10]. Logistics plays a crucial role in humanitarian operations. It influences the effectiveness of relief significantly and determines the speed, the coverage, and thus the costs of humanitarian organizations [11]. Unfortunately, the academic literature does not provide more detail concerning the proportion of logistics efforts in humanitarian operations. Hence, it remains unclear whether the stated numbers actually relate to one specific organization or type of disaster or which activities are included within the term logistics. There is no profound survey on the costs of logistics in humanitarian operations or of humanitarian organizations.

Therefore, this paper aims at providing clarity about the share of logistics in humanitarian operations, as well as in terms of the costs incurred. The underlying connection between the objectives, the cooperation, as well as the processes of the humanitarian actors and their resulting costs are of particular importance in this context. In addition, the reasons and obstacles for logistics cost accounting should be mentioned. The following research questions will be answered:

1. How do humanitarian organizations record their costs, particularly regarding their logistics activities?
2. Which factors are critical for the level and the relevance of logistics costs in humanitarian operations in relation to the characteristics of the respective actors?
3. Which potentials and hurdles do humanitarian organizations face in acquiring their logistics costs?

In order to examine these questions and since little empirical data and scientific contributions are available in this field of research, a qualitative case study is considered appropriate. Expert interviews were conducted in six German humanitarian organizations. Subsequently, a qualitative data analysis was performed to answer the research questions. The remainder of this work is organized as follows: After a brief introduction to commercial logistics and particularly the determination of costs, a description of humanitarian logistics and their costs, including analysis of literature, is provided. In section three, the methodological process of conducting the case study is outlined. Next, the results are presented and discussed. On this occasion, recommendations for the introduction of logistics costs accounting in the humanitarian context are given. Finally, the conclusion and an outlook are provided.

2. THEORETICAL BACKGROUND

2.1. Logistics Accounting in a Commercial Context

The existing understanding of logistics in a company or organization has a decisive influence on which areas of responsibility and competence are assigned to it. The design of the logistics cost accounting is therefore fundamentally dependent on this understanding, which has undergone a significant change over the years. Logistics has evolved from the original understanding of transportation, handling, and storage to a holistic approach, where logistics influences various areas of a company as well as the current cross-company perspective of managing supply chains [12]. Weber [13] describes a four-stage phase model for this development process, which reflects the level of logistical knowledge up to the current cross-company perspective of managing supply chains.

Nowadays, there exist different cost accounting systems, which differ according to their distinct objectives. They can be classified according to the two dimensions “time-relation of costs” and “volume of allocated costs”. A distinction is made between actual and planned cost accounting within the temporal relation and between full and partial cost accounting within the scope of cost allocation. Full cost accounting is the origin of today’s cost accounting systems. It is based on the allocation of direct and overhead costs, whereas direct costs can be assigned to a certain product directly and overhead costs can only be assigned to the products via a breakdown to cost centers and a subsequent allocation via overhead surcharges. Cost accounting is carried out in three stages: cost type, cost center, and cost unit accounting [14]. The full cost accounting system has considerable potential for improvement, particularly regarding the breakdown of overhead costs. It can be criticized that the inaccurate allocation of overhead costs leads to insufficient and unreliable information for managers. Furthermore, the differentiation of the costs, particularly for storage and transport costs, is unsatisfactory. Activity-based costing addresses this deficit by providing a methodology that enables the allocation of overhead and support costs to individual processes. It is therefore particularly suitable for the allocation of logistics costs. By assigning overhead costs to different processes, it is possible to break down the costs to the individual products according to their actual consumption. Thus, more precise information about the costs of processes, products, and customers can be generated [13].

The challenges posed by logistics cost accounting are caused by the various difficulties in entering and allocating logistics costs. As a clear understanding of the term logistics is indispensable here, different companies or organizations can have individual understandings of the term “logistics”. Taschner speaks in this context of a Babylonian linguistic

diversity, which makes comparability across company boundaries more difficult [15]. Of particular importance in this context is the problem of delimiting logistics costs. Traditionally, the areas of transport, handling, and storage are assigned to logistics. But there could already be problems of allocation here as well, as a transport process on a conveyor belt can be part of the production process, or it can be assigned to logistics. A further challenge when recording logistics costs is the way in which performance is measured. While quantitative key figures can be used in production, qualitative key figures such as reliability and customer service serve as the basis for performance measurement in logistics. The difficulty is to adequately convert the qualitative key figures into quantitatively measurable and usable cost data. Moreover, logistics includes administrative services, which are particularly difficult to include in the calculation due to their overhead cost character [13]. These problems require an additional effort that should not be underestimated in order to map the logistics costs uniformly and correctly. However, it is necessary to weigh up the costs and benefits of the degree of accuracy of logistics cost accounting on an individual company basis.

2.2. Humanitarian Logistics

Although logistics has always been involved in humanitarian operations, its status in practice and academic literature was not recognized before the beginning of the 21st century [16]. This recognition seems overdue since logistics plays a particularly important role in humanitarian operations. Logistics influences the effectiveness of humanitarian operations significantly and determines the speed, the coverage, and the costs of humanitarian organizations. The scope of humanitarian logistics is quite broad, as it is used as “an umbrella term for a mixed array of operations” [11]. Nevertheless, humanitarian logistics resembles commercial logistics in general and is defined as “the process of planning, implementing and controlling the efficient, cost-effective flow and storage of goods and materials, as well as related information [...] for the purpose of alleviating the suffering of vulnerable people” [17] as well as “[...] meeting the end beneficiary’s requirements” [18]. Both of these definitions are widely used in academic literature, e.g. by van Wassenhove [8], Kovács and Spens [11, 19], or Schulz and Blecken [20]. Remarkably, van der Laan et al. [21] avoid the additional flow-characterization of efficiency and cost-effectiveness by defining humanitarian logistics as “the process of planning, implementing and controlling the flow and storage of goods and materials as well as related information [...]”.

Humanitarian logistics includes a wide range of activities and processes, such as preparedness, procurement, transport, warehousing, and training across all disaster phases [11]. Although these tasks are closely related to those of commercial logistics,

there are significant differences which characterize the humanitarian environment and pose specific challenges [22]. Humanitarian logistics is shaped by a highly volatile and dynamic environment. As the time, the location, the type, and the size of a disaster are often unpredictable and the lead times can be very short or even non-existent, humanitarian logistics must cope with more uncertainties than commercial logistics does [23]. There are further unknowns in capabilities, personnel, process stability, and even other actors on site, especially at the beginning of relief operations [24]. In addition, humanitarian logisticians must work under great time pressure; while delays might be acceptable in the commercial context, a timely response in humanitarian operations is essential for people’s survival [8]. Hence, the ultimate ambition of humanitarian organizations is to save lives and to reduce suffering while the strategic objective in the commercial context is to generate financial returns; with the former, finances are more seen as constraints rather than objectives [23].

According to Dijkzeul and Reinhardt [25], the international humanitarian system is not consistent within its intensions, rules, and decision-making processes. Rather, it is a system characterized by low institutionalization and populated by a growing number of actors and networks. These humanitarian actors include, amongst others, Non-Governmental Organizations, agencies of the United Nations with humanitarian mandates, and the Red Cross and Red Crescent Movement [22]. However, humanitarian aid has the common goal of ensuring the survival of people in need, following the four central humanitarian principles of humanity, impartiality, independence, and neutrality [11]. According to the diversity of humanitarian actors, the terminology used in this field varies greatly, often interpreted and utilized in different ways [26]. In disaster management, there is usually a distinction between different phases, where the cyclic classification into mitigation, preparedness, response, and recovery has become commonplace [27]. Kovács and Spens [11] distinguish between the three phases of preparation, immediate response, and reconstruction. The activities cannot be modeled strictly in sequence, as they might vary, repeat, or overlap according to the disaster scenario. Development cooperation must be distinguished from humanitarian assistance as it includes long-term and sustainable measures to reduce poverty and foster socioeconomic improvements [28].

2.3. Logistics Accounting in a Humanitarian Context

Humanitarian actors are usually unable to finance themselves through income from the services they provide and are therefore dependent on external financing. In the humanitarian context, the major sources of funding for Non-Profit Organizations (NPOs) are public grants and donations. Public funds

are often subject to special conditions and, as a result, NPOs are more limited in their freedom of decision. NPOs avoid such dependencies by financing themselves with donations. The total amount received through donations is largely dependent on the willingness of the public to donate and can vary greatly over time. One issue of contention includes earmarked donations, which restrict the use of donations to a specific project [29, 30]. In addition, financing long-term projects and preventive measures is particularly difficult [31]. In the humanitarian non-profit sector, simple accounting systems are common [32]. However, it should be critically noted that most accounting methods were created for a profit-maximizing context and are therefore not entirely suitable in the humanitarian context [33]. Organizations financed by institutional donors must provide reports on the use of funds in accordance with donor requirements. The willingness to provide comprehensive disclosure is often limited, partly due to the increased formal effort involved in accounting. However, aid organizations are interested in the transparency of their costs [34]. Humanitarian actors have to deal with this conflict of interest between effort and benefit of detailed cost accounting.

In the academic literature, the issue of costs in humanitarian logistics is treated rather controversially. On the one hand, there are a number of articles that implicitly include costs in their considerations. In their overview, Leiras et al. [35] examined a total of 228 academic peer-reviewed journal articles. We evaluated these articles contextually according to their mentions of the term “cost”. This retrospective evaluation concluded that only about 15 percent of the articles do not mention the term “costs”. This shows that this issue cannot be classified as irrelevant. A frequent mentioning of costs, especially in connection with optimization models, is noticeable. On this occasion, costs are used as a target variable for optimization or for boundary conditions. These are referred to as so-called deprivation costs [36], which take into account the particularities of the humanitarian context by incorporating externalities in an appropriate fashion. However, only 17 articles provide concise information on the amount or the share of logistics costs in the humanitarian context.

A closer analysis of these contributions and their references revealed that there are a total of six primary sources, not all of which are necessarily of an academic nature. In Figure 1, the articles examined are presented, as are their corresponding citation relationships. A distinction must be made between articles that explicitly mention costs (grey) and articles not using this term but describing the logistics effort more generally (white). Here, it is not entirely clear whether the actual costs are meant or not. Further, the citation analysis reveals that there is disagreement between both interpretations along the lines of citation. Van Wassenhove [8] and Trunick [37] are quoted most frequently, with both authors stating that the share

for logistics stands at about 80 percent. Most of the other sources quote similar figures for logistics costs. It should be mentioned that none of the primary sources provide an empirical study of logistics costs, but simply present the costs in one sentence and without further explanation. It therefore remains unclear to what extent logistics costs are distinguished from other costs and whether a particular organization or catastrophe type was used as a basis for this reported percentage.

In order to examine also practitioner literature, both Tatham’s bibliography [38] as well as the KLU’s Humanitarian Logistics Database [39], with together a total of over one thousand entries, were used for further investigations. These comprehensive collections of literature on humanitarian logistics include not only academic journal entries (as it is the case with the literature review of Leiras et al. [35]), but also contributions to books and conferences as well as those from practitioner magazines or journals. The corresponding practitioner literature have been identified and afterwards the full texts analyzed in the same way as the academic literature. The results are similar to those above. Costs are mentioned in more than three quarters of the articles. Only two contributions [40, 41] refer to the level of logistics costs in humanitarian operations. These are also given here as 60 to 80 percent and lack further explanations. Context-related optimization models do not seem to be relevant from the perspective of practitioners, as there is no mention at all. The importance of cost efficiency is rather emphasized here.

It was thus shown that there are almost no empirical studies on logistics costs in humanitarian operations or aid organizations. Vaillancourt et al. [42] are an exception; they examined factors influencing supply chain costs in humanitarian health projects. The results showed that the size of the humanitarian aid intervention (in terms of the number of targeted beneficiaries) and the organizational form had a significant influence on the supply chain costs in the projects. NGOs had lower costs compared to UN agencies. In addition, it became clear that not all cost drivers mentioned in the literature had an influence. The investigations, however, were limited to the area of project costs for health interventions and, therefore, require more detailed investigations. It raises the issue of there being uncertainty regarding the exact scope and processes of logistics in the humanitarian context [11], a demarcation problem that also exists in the commercial sector (cf. section 2.1). In an effort to create a common understanding for the field, Blecken [24] has established a reference model and assigned specific areas of responsibility. However, it remains unclear what the current practices in the humanitarian organizations themselves are and what understanding of the term prevails.

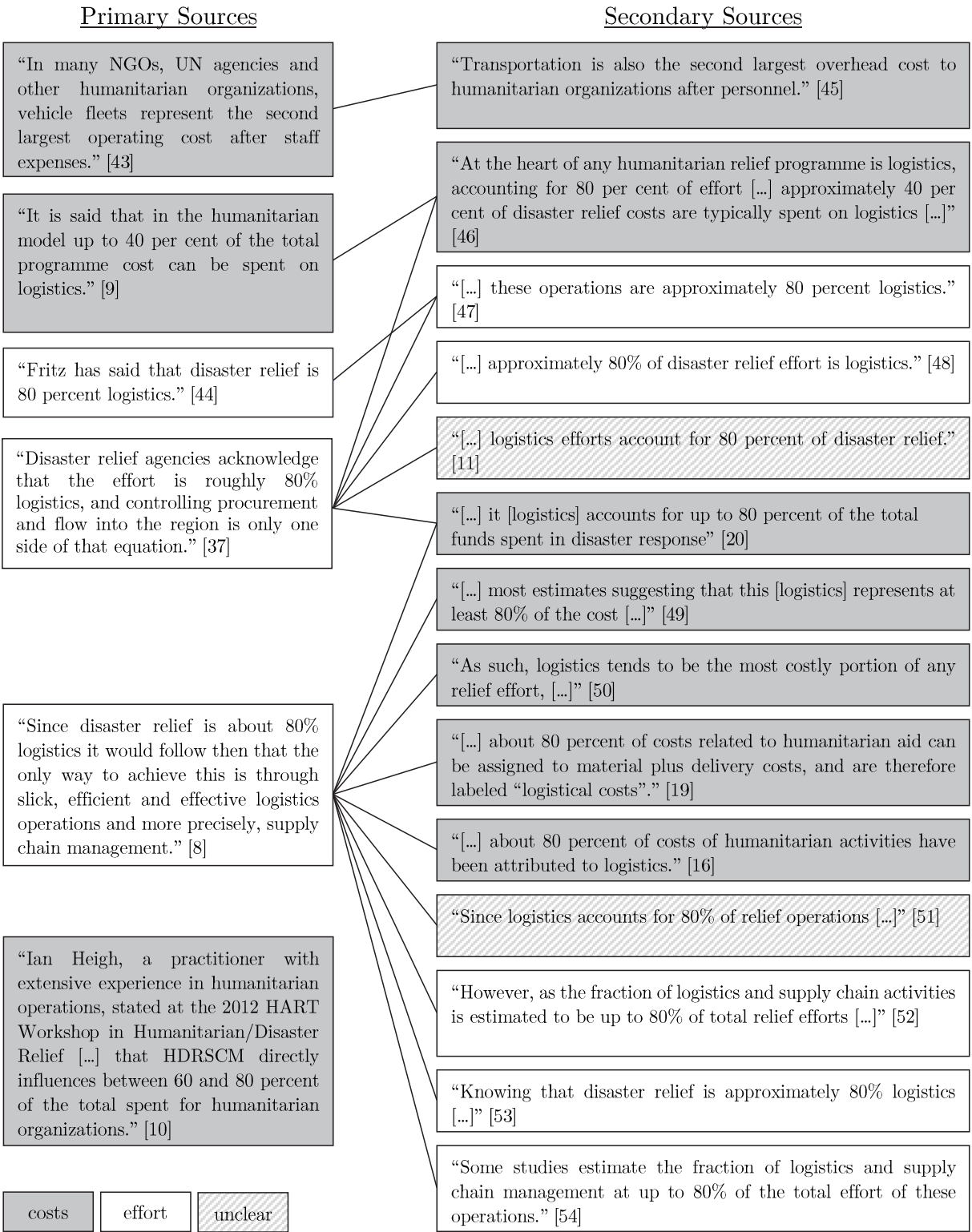


Fig. 1: Logistics Cost in Academic Literature

3. METHODOLOGY

3.1. Methodological Justification

Little scientific knowledge and no comprehensive data exists in the field of humanitarian logistics costs, as shown in section 2.3. Therefore, an open and explorative approach, such as a case study, would be appropriate to fill the research gap. According to Yin [55, p. 13], “a case study is an empirical enquiry that (1) investigates a contemporary phenomenon within its real life context, especially when (2) the boundaries between phenomenon and context are not clearly evident”. It can be applied for various research purposes and is classified into the three types: exploratory, descriptive, and explanatory case studies. An exploratory case study aims at generating research questions and hypotheses for further research [56] and is therefore particularly useful in the early stage of research [57]. However, in most cases the research process includes elements from all of the three types. Statistical generalisation is not the main objective of case study research [58]. The case study methodology is increasingly applied in logistics and Supply Chain Management [59], but remains subordinate to other research methods. According to Leiras et al. [35] and Chiappetta Jabbour et al. [60], more empirical evidence is needed in humanitarian logistics. For this reason, case study research designs are particularly recommended [61]. Given the complexity of humanitarian logistics [62], the limited knowledge of costs in humanitarian logistics, and the open, explorative research questions of this study, a case study approach is considered appropriate to meet the research needs and to generate direction for further research.

A rigorous research progress is crucial, especially when carrying out case studies, as this research methodology is subject to general and case-specific criticism [59, 63]. These critiques often center around comprehensibility and traceability, among others. Therefore, Stuart et al. [64] proposed a five-stage research process model including the definition of the research question in the first step and the instrument development in the second, considering mainly the case selection process (cf. section 3.2). These steps are followed by data gathering (section 3.3) and analysis (section 3.4) and completed with the dissemination stage.

In order to avoid methodological criticism, compliance with certain quality criteria is important here. Stuart et al. [64] distinguish between external, internal, and construct validity as well as reliability. External validity refers to the generalisation of the results of case studies and is closely linked to the selection of the cases. Internal validity refers to making the correct inferences from the data and is mainly relevant for explanatory case studies [65]. Construct validity ensures appropriate measures for answering the research questions. Multiple data sources for

triangulation, the establishment of a chain of evidence for the reader to follow the research process, and draft reviews by key informants are highlighted [65]. Finally, reliability considers the repeatability of the case study and is related to the traceability of the research, including the documentation of the research process and the data sources [59]. In the following, the process of this case study will be outlined comprehensively considering these quality criteria.

3.2. Case Selection

The selection of cases is a crucial part of the case study design. One of the main distinctions is between single and multiple case studies. Multiple case studies represent a level of replication that allows researchers to reveal differences and similarities between the various units; they can be used to show contrasting results for explainable reasons [65] and enable the identification of linkages between variables for causal understanding [66]. As the main objective of this paper is to make general statements about the costs of humanitarian logistics, a multiple case study is appropriate. The identification of suitable cases is closely related to the external validity. The cases differ sufficiently, but at the same time inherent similarities enable researchers to draw conclusions about the subject under investigation. The appropriateness of the cases selected is of higher importance than their number [63].

Vega [61] emphasizes that, particularly in research on humanitarian logistics, the definition of case boundaries is of high importance in order to ensure traceability of the results. These case characteristics should include, amongst others, the disaster phase and type, as well as the geographical location. In order to allow a certain universal validity, there should be no restriction on the type of disaster within the scope of this case study. In addition, the organizations examined should have the following similarities (literal replication): The aim of this study is to examine the costs in humanitarian logistics, especially in relation to the deployment after the outbreak of a disaster, therefore only organizations active in this post-disaster phase should be examined. The activities of the organizations examined should not be limited to a few regions but should be international. However, only organizations based in Germany will be considered, as the understanding of costs is shaped by specific terminology as well as the legal framework. Other country-specific influencing factors can thus be neglected. This restriction is justified by the desired comparability of the study results. The same applies to the legal status; only NGOs should be considered. There is no UN agency in the field of humanitarian assistance which is based in Germany. However, case studies regarding humanitarian logistics are often conducted with major international organizations [61]. Within the scope of this study, small and medium-sized aid organizations should be deliberately included as well in order to achieve greater generalizability and

to identify potential coherences. The organizations examined should further differ in their mandate and the sector in which they operate in (theoretical replication). The composition of literal and theoretical replication can be found in Table 1.

Within the database of the German Central Institute for Social Issues (DZI) [67], 76 German organizations which met the criteria stated above could be identified. Those organizations have been categorized through an analysis of publicly accessible information materials, such as the organizations' websites and annual reports, in order to ensure the theoretical replication. Thus, the theoretical replication could be ensured. It was not possible in all cases to select and contact specific interview partners within an organization. The selection of suitable experts was hence usually carried out by the aid organizations themselves. Therefore, a short description of the research project and the interview guide, reduced to the main questions, were sent as an appendix. In this way, it was ensured that the interviewee had the necessary expert knowledge to answer the research questions. Ultimately, interviews were conducted in six of these organizations.

3.3. Data Gathering

Through diverse research methods and the use of different data sources, triangulation can be ensured, which in turn enhances the validity of the research [61]. The fundamentals of this work suggest that internal data from the humanitarian organizations is of great importance when looking to analyze their costs and, therefore, a strong orientation towards the knowledge of the persons working within the organizations is necessary. Semi-structured expert interviews are an effective and flexible tool for obtaining information relevant for this investigation [68]. Following the topic of this paper, employees of humanitarian organizations can be regarded as experts who have special knowledge of logistical processes or internal cost accounting. A guideline was used to support the interviews. In this

way, the content and course of the interviews are focused on the subject areas relevant to the study and comparability of the content is ensured [69]. At the same time, however, it is essential not to restrict the course of the interview too much in order to be able to include any additional topics considered important by the expert [70]. This requirement is already anchored in the principle of openness in qualitative research. For this reason, deviations from the guidelines are not only permitted, but also necessary.

For the interviews, a guideline was designed which was used for all interviewees. The guideline content was developed according to the methodology by Helfferich [71], which is divided into the four steps of collecting, checking, sorting, and subsuming. Sorting and subsuming the questions ultimately led to a subdivision of the guideline into the following three thematic blocks: general questions about organization, understandings of terms and concepts, and questions on logistics cost accounting in the organization. In the last section of the interview, a distinction is made between two possible scenarios: The organization already carries out logistics cost accounting or has not yet implemented such a procedure in its cost accounting. Since it is not known before the interview whether and to what extent logistical costs are recorded, the third section of the guideline is divided into these two sections. The structure of the guideline and the question areas can be found in the Appendix.

All interviews were conducted by telephone or Skype. A total of ten interviews in six organizations, each lasting 20 to 50 minutes, were conducted, which are summarized in Table 2. The main interviews took place in January and February 2018. A more detailed classification of the organizations surveyed is given in section 4. In addition to the interview data, publicly accessible materials such as annual reports and homepages of the organizations were used. To clarify specific questions which arose during the process of analysis, follow-up interviews in three of those organizations took place (cf. Table 2).

Table 1: Case Selection

	Legal Status	Seat of Organization	Area	Projects (Countries)	Budget [Mio. €]	Funds (Share Public: Private)	Mandate
O1	NGO	Germany	International	85 (23)	27.7	80% : 20%	Multi-Mandate
O2	NGO	Germany	International	1212 (81)	232.2	71% : 29%	Development
O3	NGO	Germany	International	86 (44)	46.8	67% : 33%	Multi-Mandate
O4	NGO	Germany	International	422 (67)	36.1	0% : 100%	Humanitarian
O5	NGO	Germany	International	107 (46)	158.1	0% : 100%	Humanitarian
O6	NGO	Germany	International	66 (36)	15.4	16% : 84%	Multi-Mandate

Table 2: Overview of Expert Interviewed

	Field of Activity	Number of Interviews	Total Duration
E1	Emergency Response Coordinator	2	40 min.
E2	Emergency Response Coordinator	2	50 min.
E3	Responsible for Procurement, Logistics, and Crisis Management	2	55 min.
E4	Spokesman of Logistics Working Group	1	25 min.
E5	Logistics Coordinator	1	50 min.
E6	Deputy Head of Warehouse & Logistics	2	35 min.

To triangulate the results of the interviews, annual reports of all organizations identified via the database of the DZI (cf. section 3.2) were consulted. Those 76 reports were examined content-related according to the mention of logistics in general and in particular of logistics costs. In order to soften the restriction to German organizations and to enable an international comparison, at least to some extent, annual reports of organizations from other countries were additionally examined, including Austria, the United Kingdom, and the United States of America. For Austria, those organizations were selected which cooperate with the Austrian Development Agency and are listed on its website [72]. The founding members of the Consortium of British Humanitarian Agencies were elected for the United Kingdom [73] and the database of DevelopmentAid was consulted for the identification of US aid organizations [74]. Thus, a total of 115 annual reports were evaluated.

3.4. Data Analysis

A content analysis was carried out based on the qualitative data collected via interviews and additional material available on the organizations' websites. From a scientific point of view, a variety of qualitative procedures are available for the analysis of the material. Expert interviews and content analyses, as qualitative methods, are subject to general criticism when compared to quantitative research. This criticism is particularly directed towards the validity and reliability of the results obtained [55]. In the interest of qualitative research, strict adherence to quality standards should therefore be sought in order to ensure general recognition of the research results. One such systematic, rule-based procedure for the interpretation of qualitative data is the qualitative content analysis according to Mayring [75], which will be used in the following. Despite the systematic approach of the analysis and working with predefined rules, Mayring emphasizes that content analysis is not always a standard instrument with the same structure.

Instead, it must be adapted to the individual research situation with regard to the object of investigation and the research material.

The analysis technique used in this paper for data evaluation is based on the structuring of content, which seeks to extract and summarize information on specific topics and content areas from the available interview data. However, the method will not be adopted unaltered, but will be supplemented and adjusted in its approach, especially with regard to category formation. In the present work, the categories were first deductively elaborated on the basis of conceptual and theory-based preliminary considerations and applied to the material. In addition to the deductive approach, it is also possible to develop the categories inductively from the existing material. These two types of category formation are not to be understood as mutually exclusive. Such a combined approach is particularly useful for the present work, as it is not possible to foresee all content aspects due to the characteristics of expert interviews and the associated open approach to data collection.

Internal validity ensures the significance of the causal mechanisms under study. Therefore, data analysis was conducted separately by the authors and checked for plausibility with the relevant literature [55]. All steps of coding and paraphrasing were documented to guarantee repeatability and ensure reliability [65] using the software MAXQDA (version 2018).

4. RESULTS AND DISCUSSION

4.1. Main Focus of Activities and Organizational Structure

Regarding the six organizations interviewed, all are engaged in disaster relief, but in different forms. O1 is a small German aid organization, mainly financed by project-related public funds. The focus is on various sectors, including water, sanitation and hygiene, shelter, education, as well as health. Although the projects are triggered by acute disasters, the measures usually start in the rehabilitation and reconstruction phase. O1 works together with project partners, but also has its own local staff and operates country offices. O2 is a religion-based organization and one of the largest humanitarian actors in Germany. Their focus is clearly on development cooperation. However, O2 is also committed to the interests of the affected population after disasters. The organization exclusively works together with local project partners and none of their own staff is sent to projects nor do country offices exist. O3 is part of a worldwide network of national societies and is also deeply rooted in disaster relief in Germany itself. The aid provided ranges from acute emergency and disaster aid to development cooperation. The areas of focus include prevention and mitigation as well as food security and health. O3 works almost exclusively on the basis of requests from national sister organizations

and cooperates accordingly. O4 is a German network organization in which various aid organizations (such as O1) join together in order to take joint actions in the event of disasters. A clear emphasis is on acute disaster relief and the corresponding support of the member organizations, mainly in the area of fundraising, but also in project management and cooperation as well as logistics. O5 is a humanitarian organization in the health sector. As part of an international network, projects are carried out to provide medical support in the event of a disaster. Projects on site are carried out by O5, also with their own personnel. Organization O6 also focuses its work in health, but is also active in other sectors such as WASH. The smallest of the six organizations is headquartered in Germany with three international offices. It is particularly characterized by its rapid deployment in emergency and disaster relief but also runs longer-term projects.

Table 3: Interviewed Humanitarian Organizations

	Form of Procurement	Warehouses/ Logistics Services	Internal Relevance of Logistics (Costs)
O1	Local	No	Low
O2	Local	No	Low
O3	Local/Int.	Yes	Middle-High
O4	Local/Int.	Yes	High
O5	Local/Int.	Yes	High
O6	Local/Int.	Yes	High

All the organizations surveyed are internationally active to varying degrees, with none of them limiting their activities to specific regions. Due to the size of the organizations and the associated budgets, the number of countries differs (cf. Table 1). With a budget of more than € 232 million, O2 is the largest organization, followed by O5 with an annual budget of around € 158 million. The organizations O1, O3, and O4 have a budget of between € 25 and € 50 million each. The remaining organization, O6, is the smallest with an annual budget of € 15 million. With regard to the sources of funding, the picture is quite differentiated. O1, O2, and O3 largely draw their funds from public grants (between 80 percent and 67 percent). The main donors of public funds are the Federal Foreign Office, the Federal Ministry for Economic Cooperation and Development, and the Directorate-General for European Civil Protection and Humanitarian Aid Operations. O4 and O5, in contrast, are entirely borne by private donors. O6 is financed only to a small extent from public funds.

The extent of cooperation with local partners affects, among other things, the logistical activities in the organizations. The procurement strategy, in particular, is one remarkable aspect here. O1 and O2 exclusively procure goods and relief supplies on local markets. This is accompanied by the fact that they do not maintain

any warehouses and (almost) no aid transports from Germany are carried out. In contrast to exclusively local procurement, a supply of aid provided entirely by international aid deliveries is conceivable. Based on the interviews, none of the organizations surveyed can be assigned to purely international supply. Instead, there is often a combination of international and local procurement. This is the case within the organizations O3 to O6 and is closely linked to the goal of strengthening local structures. In O3, for example, it is estimated that 80 percent of procurement takes place locally. O5 mainly requires medical supplies during disaster relief operations. For reasons of quality assurance, these usually cannot be procured locally, but must be transported from international stockpiles to the area of need. Consequently, only a small number of goods are procured on regional markets. All four organizations (O3 to O6) operate their own warehouses in Germany or Europe and offer some kind of logistics services. However, none of the organizations have any significant transport capabilities of their own; they cooperate with logistics companies or other organizations. However, in the first two organizations (O1 and O2), logistics was attributed a rather subordinate role, while in the latter three (O4 to O6) the internal importance of logistics is high (cf. Table 3).

4.2. Accounting and Extent of Humanitarian Logistics Costs

Finding detailed information on the methodology for recording costs within humanitarian organization is not straightforward. Commonly, only the organizations' annual reports provide a rough indication of costs and their level. This often does not include corresponding information on logistics costs. Among the organizations surveyed, one of the six annual reports contains corresponding statements on the level of logistics costs. In two of the six reports (O1, O2), the word "logistics" is not mentioned at any point. The experts were asked to describe the implementation of cost accounting within their organizations. The information obtained does not provide a uniform picture; instead, considerable deviations can be observed in the implementation, especially with regard to logistics costs. One of the explanations for this inconsistency can be found in the context of the funding requirements set by the donors. In addition, O2 and O3 add that only evaluations of individual projects take place, but no evaluations of a complete annual budget. The level of detail in cost accounting is also often limited. The experts of O5 and O6 highlight the limited accuracy of the cost accounting. O3 emphasizes that the project costs are only roughly analyzed, too. In that organization, no internal cost accounting was carried out at the time of the survey, so that the overhead costs currently cannot be broken down according to their sources. Of the organizations surveyed, O4 to O6 carry out the most detailed cost accounting. In O4, costs are recorded

using an invoicing program by accountants; one employee is explicitly responsible for cost controlling. The implemented cost accounting system also provides more detailed information for O5. When a transaction is completed, the data, including the intended use of the goods, is entered into the system. Although no cost accounting is carried out specifically for logistics, the existing procedure enables logistics costs to be allocated when an appropriate evaluation is carried out. However, there are limits to the procedure for allocating costs. The breakdown of storage costs, for example, is only carried out using rough distribution keys based on the budget of the associated projects. Transportation costs by service agents are also entered into the system in a separate invoice but not allocated to the project for each purchase. While O4 to O6 try to calculate their logistics costs as best as possible, the logistics costs in O1 and O2 are not displayed separately; O3 does record logistics costs, but very inconsistently.

None of the experts were able to make a generally valid statement about the precise amount of logistics costs incurred during humanitarian operations. However, the experts agreed that the extent of logistics costs depends on the specific situation of the relief measures and must therefore be considered separately for each individual case. O3 also states that the amount of logistics costs depends on the phase of the operation. Even within a certain phase, no generally valid statements can be made, as the logistics costs per country can vary greatly due to the different framework conditions, such as import regulations or infrastructure. Even if the experts cannot make any statements about the specific extent of logistics costs, general assumptions could be given. O1 notes that local procurement of goods results in only low transport and storage costs and that logistics costs are therefore very low. In O1, the amount of storage and transport costs for local procurement is estimated by the expert to be around five to eight percent of the cost of goods. This low level of logistics costs is also stated by O2, which provides its assistance via local partner network structures. International procurement processes, on the other hand, such as those conducted by O3, O4, and O5, involve the highest logistics costs. In contrast, there is the statement of the expert from O6, who describes the last mile as particularly cost-intensive. The international transport and the costs for their own warehouse in Germany are rather low. O5 summarizes that disaster operations generally cause the most costs. He also stresses the high cost of international transport, especially for air freight. It is obvious that, in this context, emergency aid air freight is a crucial cost driver. O3 says that when considering logistics costs, a distinction must be made between normal humanitarian goods and emergency response units. According to the expert of O3, the air transport costs per flight for a charter flight can be in a low six-digit range (€ 100,000 – 200,000). However, these costs are subject to several influencing factors and cannot be generally assumed for all charter flights. Depending

on the existing infrastructure in the crisis region, for example, a suitable aircraft must be selected, which can easily double the costs. Goods shipped in the first few days or within the first week are usually air freight and therefore incur higher costs. The expert of O6 notes that if a standard scheduled flight can be used, the cost of excess baggage is kept within reasonable limits. With a well-established supply chain, as is often the case during the rehabilitation phase or in longer-term development aid, the availability of sea freight increases, resulting in significantly lower logistics costs. It becomes clear why the experts, as described at the beginning, cannot make a general statement on the level of logistics costs. It should be further mentioned that also under the condition of local procurement the total costs (despite lower logistics costs) can be higher than those of international procurement. An exact cost delimitation is not possible here. However, there are other arguments for local procurement, such as the support of regional structures.

Regarding the key numbers mentioned in the scientific literature, which attribute a cost share of up to 80 percent of the total costs of an aid mission to logistics, no direct derivations can be made. The expert of O4 argues that the information from the literature is misinterpreted. The expert assumes that the costs for goods are also included in the 80 percent logistics costs. The expert of O3 does not see the problem as an erroneous order of magnitude, but rather in the fact that the costs mentioned do not exclusively include the purely logistics costs in the conventional sense. The expert considers a distribution of 80 percent of the total costs for relief goods and the remaining 20 percent for structural strengthening, soft skills, and administration to be realistic for emergency relief. O4 also sees a problem in a possible misinterpretation of the data mentioned in the scientific literature. He takes the view that the 80 percent share of logistics costs should be questioned in terms of correct cost allocation. In addition, he considers the percentage mentioned to be too high if the costs of goods are not included. Within their annual reports, O5 presents some of their projects in more detail, including the cost structure. Considering the five latest reports of O5, the share of logistics (often including the costs of water and sanitation) ranges between 1 percent (Dushanbe, Tadjikistan, 2013) and 76 percent (Guiuan, Philippines, 2013), with an average of 24 percent of the total project costs. The costs of logistics here exceeded 50 percent in only one out of five projects. This clearly shows that, even within a humanitarian organization, the share of logistics costs can differ considerably and is only extremely high in particular situations.

Considering the annual reports of the other German organizations it became apparent that logistics costs, at least in public communication, play practically no role. Only one other annual report mentions logistics costs. Actually, logistics in general is not at all referred to in about two thirds of the German annual reports.

However, in 26 of the reports logistics is mentioned. In half of these cases, a person or department responsible for logistics was appointed. Thematically, logistics was named twelve times. It became apparent that logistics plays a smaller role in organizations with a higher focus on development cooperation and with lower revenue. A similar situation can be observed in the annual reports of the other countries. In the Austrian and US reports, very little reference is made to any logistical issues. Only 10 and 20 percent of the reports, respectively, refer to logistics-related content. The British reports are rather different, with logistics being mentioned in more than half of them. Several times a position is taken within the reports concerning the end of modern slavery, which also concerns logistical questions. One report mentions logistics in connection with the environmental strategy of the related organization. However, in those reports there was no specific reference to logistics costs at all. Thus, it can be concluded that, in the context of public relations work of humanitarian NGOs, logistics in general have a rather low significance and logistics costs in particular have almost none.

4.3. Motives and Obstacles for Logistics Cost Accounting

One aim of this work was to identify possible potentials and hurdles of separate accounting for logistics costs in humanitarian organizations. Therefore, the experts were asked what goals and motives they are pursuing with the implementation of logistics cost accounting. They were further asked to name and justify obstacles and problems in this context. Since not all organizations carried out logistics cost accounting, the experts should express hypothetical concerns. An overview of the results can be found in Table 4. Looking at the motives for recording and evaluating logistics costs separately, a clear distinction can be made between external and internal reasons. The experts see a high benefit related to a more detailed cost accounting system through the resulting transparency for the donors and the public (accountability). O4 describes cost transparency as an (legal) obligation which humanitarian organizations must fulfill. However, this transparency was also perceived in part as compulsive and burdensome. Internal motives can be seen in the avoidance of wastage. The optimization of logistical processes, as expressed in the opinions of the experts from O3 to O6, represents an important potential of a detailed cost accounting. O3 adds that its organization already seeks to improve individual processes by providing rough costs statistics. Closely related is the potential in increasing awareness of the costs involved in logistics, highlighted by the expert of O4. This awareness should contribute to a responsible handling of donations. Cost information from past operations can further help to better assess offers for logistics services (O6). O5 emphasizes the need to ensure traceability of what money has been spent on and points out that, in

this way, an internal overview of the organization's expenditure can be maintained.

Obstacles associated with logistics cost accounting can be divided into two areas. On the one hand, general benefits in the assessment of logistics costs are denied or considered to be too low. On the other hand, problems concerning an implementation and/or the actual execution of logistics cost accounting are stated. For O1 and O2, the logistics costs are too small and, hence, a more detailed recording and evaluation cannot be regarded as expedient. O1 states that the logistics costs can be neglected in relation to the project and personnel costs. The answers of the interviewees make clear that logistics cost accounting is not meaningful in every humanitarian organization. Especially for those organizations that do not carry out international transports and where procurement is limited to local markets, low added value is offset by increased administrative effort in recording and breaking down costs. In addition, the benefit of a logistics cost accounting is limited by the variable conditions of humanitarian operations, leading to an insufficient comparability. Since the processes cannot be repeated or standardized, O3 considers selecting appropriate key performance indicators for logistics as very difficult. He criticizes the lack of comparability between the different scenarios and states that the logistics costs are to be evaluated differently for each humanitarian deployment. Due to individual conceptions of logistics and different approaches to the provision of aid, humanitarian organizations and their logistics costs are not comparable. In the context of the actual implementation, the problem of different accounting methods was frequently mentioned. O3 addresses this issue several times. O5 agrees and criticizes the inconsistent allocation of costs within different countries of operation, even within one humanitarian organization. In addition to the difficulties of an internal, cross-project breakdown of costs, O3 considers the calculation of costs for cross-organizational assistance measures to be particularly problematic. This statement is also supported by O6, with shared resources being mentioned as an example. Furthermore, O5 criticizes the lack of suitable software on the market. The interfaces between the systems of various organizations and partners pose a further problem. He also identified the lack of internet access in disaster areas as an obstacle, particularly when using current online-based IT systems. In addition to the above-mentioned obstacles, for which it was assumed that all parties involved would be prepared to provide a more detailed breakdown of costs, it should be noted that this assumption cannot always be taken for granted. According to O3, suppliers do not necessarily provide a breakdown of their costs. Since most procurement activities are made locally, the breakdown of costs is made more difficult. In addition, socio-cultural aspects represent a further hurdle in the recording of logistics costs. O5 classifies the different languages in which

the invoices of the service providers are written as an obstacle. O3 adds that thinking in terms of cost can be very different around the world. Thus, a comparable breakdown of costs often cannot be expected for services purchased abroad.

Summarizing, it can be stated that different potentials for logistics cost accounting in humanitarian organizations could be identified within the scope of this study. However, particularly those organizations for which logistics play a rather subordinate role show a correspondingly low motivation for logistics cost accounting or emphasize the limited appropriateness and the increasing administrative effort. Furthermore, the external accounting requirements are highlighted by organizations depending on public funds, as the degree of cost transparency is directly dependent on the donors' specifications. Internal motives are mainly concerned with the possibility to improve logistical processes. Those organizations that show intrinsic motivation refer mainly to the possible challenges in implementing logistics cost accounting.

4.4. Discussion

So far, this study has demonstrated that the significance and thus the level of logistics costs for humanitarian organizations can vary considerably. This fact is often not mentioned in the literature. Instead, significant logistics costs are implicitly assumed as the starting point for further investigations. A multitude of different strategic approaches exist, which naturally leads to different forms of logistical activities being implemented. In the following, pertinent factors will be discussed which have an influence on the relevance of logistics and on the level of related costs. As a result, the humanitarian organizations can be classified according to their characteristics.

There were no relationships between the budget of an organization and the amount of logistics costs. As a small organization, the proportion of logistics costs in O1 is just as low as in O2, the organization with the highest budget and the highest number of projects. In contrast, O4 has a similar budget, but a significantly higher weighting of the internal logistics significance. The origin of funds proves to be a much stronger influencing factor. Those organizations with a high share of public funds (O1, O2, and O3) clearly refer to the challenges posed by the requirements on the obligation to provide evidence. These seem to have an influence on the way the accounts are kept and thus also on the delimitation of costs. However, they have no real influence on the level of logistics costs (e.g. O1 and O3).

Two main influencing factors on the costs of humanitarian logistics could be identified. First, the type of activity was expected to have a significant impact on the level of logistics costs. Here it can be assumed that an activity in the field of development cooperation results in a considerably lower focus on logistics tasks, which can be confirmed by the survey results. However, the picture among disaster relief organizations is still very inconsistent. Here it is worth taking a detailed look at the activities or the actual phase of humanitarian aid. The more an organization focuses on the acute phase immediately after a disaster, the more significant the logistics activities and the corresponding costs are. Air transports, which are mainly used in the initial phase, are mainly described as causing the highest costs. This also explains why O1, seeing itself as active in between emergency aid and development cooperation, tends to have relatively low logistics costs. Projects of this organization are triggered by an (acute) disaster, but tend to start in the rehabilitation phase. The markedly different costs of

Table 4: Motives and Obstacles for Humanitarian Logistics Cost Accounting

			O1	O2	O3	O4	O5	O6
Motives	External	Accountability	X	-	-	X	X	X
		Legal obligations	-	-	x	X	-	-
	Internal	Optimisation of processes	-	-	X	X	X	X
		Avoidance of wastage	-	-	-	X	x	x
Obstacles	Value	Logistics costs are too low	x	X	-	-	-	-
		Administrative effort	X	-	-	-	-	-
		Insufficient comparability (terms, discontinuity)	-	X	x	x	-	-
	Implementation	Different statements of account	-	x	X	X	-	X
		IT difficulties (software, interfaces, internet)	-	-	x	X	X	-
		No cost breakdown of suppliers/service providers	-	-	X	-	x	-
		Comprehension difficulties (lang., cost-thinking)	-	-	-	-	X	-
Lack of specialists	-	-	-	-	x	-		

(x... mentioned, X... mentioned with strong emphasis)

interventions by O3 could also be explained by the fact that this organization is active in all phases, from acute emergency relief to development cooperation. The second major influencing factor can be described as degree of project autonomy. One could also call this the degree of centralization, but this term could lead to some confusion. In logistics, the share of costs decreases with a certain degree of centralization, as economies of scale begin to emerge. However, the opposite is evident here. Different partial determinants have an influence. On the one hand, this is to be understood as the extent to which projects work independently on site. The range here reaches from almost complete project autonomy, as is the case in O2, to projects that are strongly controlled by the organization. However, sending their own employees to the projects on site, as is the case for O1, does not seem to have a significant influence on the logistics costs. Rather, the work in the projects on site is of relevance. The procurement structures play an important role: local procurement results in lower logistics costs compared to global procurement strategies. Also, the existence of self-maintained logistics structures, such as warehouses or the execution of logistics services in the homeland of the relief organization, are to be included here. Both have a clear influence on the internal significance of logistics. All in all, it can be demonstrated that, with increasing degree of project autonomy, the importance of logistics and thus the corresponding costs decrease. Considering these two influencing factors, the organizations can be described as follows: O2 is mainly active in the field of development cooperation, only occasionally implementing projects in disaster situations, with a long-term focus. The organization also shows a very strong autonomy of their projects. O1 projects are also implemented quite autonomously, although to a lesser extent than O2 projects. In addition, the focus of O1 is on post-disaster interventions, although mainly in reconstruction and rehabilitation phases. O3, O5, and O6 are active throughout all disaster phases. However, the autonomy of O3's projects is greater due to the cooperation with the local sister organization. As a network organization, O4 is mostly active in the acute disaster phase.

Other factors could be identified that seem to have an impact on the level of logistics costs. It became clear that there is no uniform understanding of the definition of logistics activities. Similarities to the developmental stages of logistics in a commercial context can be seen. The broader the concept of logistics, the more costs it covers and the higher they are, as it can be stated for O5, which has a wider-ranging understanding of logistics compared to other organizations. This fact makes the comparison of the cost structure of different actors considerably more difficult. Moreover, the fields of activity probably influence the resulting cost structure. These organization-dependent factors again can exhibit cross connections to other factors described above. An aid organization that is active in the medical

sector is more dependent on external supplies, which in turn results in less project autonomy. In the context of this investigation, however, no clear delimitation is possible due to the number of cases investigated. Finally, the extent of a disaster and the location itself also have a significant influence on the level of logistics costs, which was highlighted by the experts. This has the same effect on any humanitarian organization and is therefore independent from the actor.

Based on these findings, recommendations for action can be made which help to introduce or implement logistics cost accounting in humanitarian organizations. The first step is to determine the reasons and motives for such a cost breakdown. On the one hand, there may be external reasons, e.g. on the part of donors or cooperation partners. On the other hand, there are internal reasons, such as the improvement of their own processes, lessons learned from past operations, or the general desire to avoid wastage, which argue for a detailed cost accounting. These preliminary considerations are particularly important for the following steps, as they have a decisive influence on the corresponding actions. However, only if the considerations lead to a logistics cost accounting being considered relevant do the following steps need to be taken. The second step should be to define the relevant terms. A precise definition of which activities (perhaps across organizational boundaries) are assigned to logistics and which are not is important for the actual implementation. The following third step relates to the specific requirements of logistics cost accounting. There are strong links to the two previous steps. The reasons that spoke for an introduction also define basic requirements. For example, external requirements may have to be met. The desire for process improvement in turn requires a relatively precise cost breakdown. Here it is also important in which phase of disaster relief the organization is active and which special requirements exist on the part of the area of activity (e.g. special storage requirements). The link to the definition of logistics terms is also important. On this occasion, requirements for the cooperation partners or service providers may become evident. The fourth and final step is the consideration of the actual implementation of logistics cost accounting. A complete explanation of the implementation process is not the subject of this work, and relevant literature from the commercial context can be referred to here [13]. But according to the findings from the interviews, the following points should be considered in the humanitarian context. Especially with regard to cooperation with project partners and the many actors involved in the logistic activities, their involvement is important. Comparisons with other aid organizations, benchmarking if necessary, are appropriate at this point, also in order to promote possible joint developments. In particular, the allocation of costs should be considered. Due to language barriers and a different understanding of costs and, in view of the lack of qualified personnel, training

material regarding implementation could be necessary. Ultimately, the IT infrastructure has to be considered. Possible offline systems may be necessary. In addition, a lack of software has been mentioned, which may require their own systems or specific interfaces. With regard to the implementation considerations, feedback can be expected regularly within the two preceding steps. The entire procedure is shown in Figure 2.

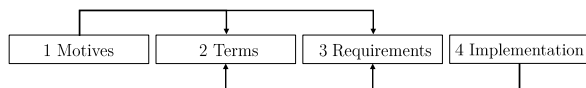


Fig. 2: Humanitarian Logistics Cost Accounting Procedure Model

5. CONCLUSION

The necessity for comprehensive assistance in disastrous situations, whether caused by natural events or brought about by human beings, is universally accepted. These humanitarian operations are conducted by a large variety of different organizations, all inhering their own strategic orientations, systems, and processes. As most of them rely on public grants as well as private donations, deliberate handling of their financial resources is indispensable. According to current academic literature, logistics can account for a large proportion of the expenditure of aid operations, which is why a more detailed examination would be important here in particular. However, there is a lack of exact figures and differentiated studies regarding the (financial) extent of logistics in humanitarian organizations. Therefore, this study aimed to examine the actual extent and the corresponding costs of logistics in humanitarian organizations as well as the underlying interdependencies in more detail. For this purpose, an extensive analysis of scientific and practical literature as well as case studies in six humanitarian organizations were carried out.

In the literature, precise information on the exact level of logistics costs in humanitarian operations is very limited. Where such information is available, a lack of contextual indications have to be complained, for example the type or the size of the corresponding humanitarian organization or respectively operation. The six organizations examined in this study also struggled with this type of information. A large number of contextual constraints would prevent general statements. However, it could be confirmed that the costs for logistics in relief operations can reach maximums of up to 80 percent of the total project costs – but only for organizations active in the acute phase after a disaster and with a low grade of project autonomy, as well as a broad definition of logistics. Rather, it became clear that a differentiated view is very important because logistics plays virtually no role at all for certain actors so that logistics costs for those can even be considered negligible. Separate cost

accounting concerning logistical activities is rather rare (RQ1). It could be shown that a variety of factors influence logistics activities and thus also the costs incurred. On the one hand, these factors depend on the disaster (e.g. location and extent of the disaster), but on the other hand, they depend on the organization and their structure. Two factors play a significant role: the time of deployment and the degree of autonomy of the projects. The more distant the time of deployment is from the actual disaster, the lower the costs for logistics are. At the same time, the more the decision-making processes in the projects are decentralized with regard to management and logistics services, the lower the costs (RQ2). In addition, this paper intended to show the potentials and hurdles of logistics cost accounting in humanitarian organizations. The motives can be structured according to internal and external motivations; of most importance are the increasing transparency and the possibility of improving processes. Obstacles arise from the limited benefit of such separate cost accounting. Moreover, difficulties with the actual implementation are stated, e.g. by a different understanding of terminologies, insufficient IT equipment, or challenges in the cooperation with the various partners of the relief chain (RQ3). To overcome these obstacles, a small procedure model for the introduction of logistics costs accounting in the humanitarian context was developed.

This work has both theoretical and practical implications for the field of humanitarian logistics. This work strongly emphasizes that a differentiated view on the topic of humanitarian logistics and in particular the logistics costs is very important. The actors in humanitarian aid are very diverse in terms of their internal structures and their organizational approaches. It can, therefore, be concluded that the identified contextual factors should be considered in future research. One-size-fits-all solutions are probably not the answer to the specific challenges in the humanitarian environment. A corresponding systematization of the humanitarian actors could be further helpful in research on the design of cooperation in humanitarian logistics. Such a classification of similar organizations in terms of their logistics cost structure is also reasonable from a practical point of view. Cooperation or even benchmarks could thus be implemented in a more targeted manner. Moreover, the procedure model of humanitarian logistics cost accounting can serve as a practical guide for organizations. Further research is necessary to validate the results with other organizations. The humanitarian clusters in which the organizations are active could be a particular focus. The influence of the organizational structure of internationally active humanitarian organizations on logistical activities and the resulting costs requires further research. Moreover, the results regarding the project autonomy can be utilized to draw specific measures in decreasing logistics costs in humanitarian operations.

LIST OF ABBREVIATIONS

DZI	German Central Institute for Social Issues
EI-6	Expert 1-6
KLU	Kühne Logistics University
NGO	Non-Governmental Organizations
NPO	Non-Profit Organizations
OI-O6	Organization 1-6
RQ1-3	Research Question 1-3
UN	United Nations
UNISDR	UN Office for Disaster Risk Reduction
WASH	Water, Sanitation, and Hygiene

REFERENCES

- CRED, UNISDR (2018) Economic losses, poverty & disasters: 1998-2017. <https://reliefweb.int/report/world/economic-losses-poverty-disasters-1998-2017>. Accessed 31 October 2019
- UNISDR (2015) Global assessment report on disaster risk reduction. United Nations, Geneva
- UNHCR (2018) Syria emergency. <http://www.unhcr.org/syria-emergency.html>. Accessed 31 October 2019
- Chakravarty AK (2014) Humanitarian relief chain: Rapid response under uncertainty. *International Journal of Production Economics* 151:146-157
- Chia E (2007) Engineering disaster relief. *IEEE Technology and Society Magazine* 26(3):24-29
- Jahre M, Jensen L-M (2010) Coordination in humanitarian logistics through clusters. *International Journal of Physical Distribution & Logistics Management* 40(8/9):657-674
- Development Initiatives (2018) Global humanitarian assistance report. <http://devinit.org/post/global-humanitarian-assistance-report-2018/>. Accessed 31 October 2019
- van Wassenhove LN (2006) Humanitarian aid logistics: Supply chain management in high gear. *Journal of the Operational Research Society* 57(5):475-489
- Whiting MC, Ayala-Öström BE (2009) Advocacy to promote logistics in humanitarian aid. *Management Research News* 32(11):1081-1089
- Day JM, Melnyk SA, Larson PD, Davis EW, Whybark DC (2012) Humanitarian and disaster relief supply chains: A matter of life and death. *Journal of Supply Chain Management* 48(2):21-36
- Kovács G, Spens KM (2007) Humanitarian logistics in disaster relief operations. *International Journal of Physical Distribution & Logistics Management* 37(2):99-114
- Ballou R (2007) The evolution and future of logistics and supply chain management. *European Business Review* 19(4):332-348
- Weber J (2012) *Logistikkostenrechnung: Kosten-, Leistungs- und Erlösinformationen zur erfolgsorientierten Steuerung der Logistik*. Springer Vieweg, Berlin, Heidelberg
- Olfert K (2013) *Kostenrechnung*. Kiehl, Herne
- Taschner A (2016) Logistikkosten bestimmen und abgrenzen. *Controlling & Management Review* 60(2):39-43
- Kovács G, Spens KM (2011) Trends and developments in humanitarian logistics: A gap analysis. *International Journal of Physical Distribution & Logistics Management* 41(1):32-45
- Thomas A, Kopczak LR (2005) From logistics to supply chain management: The path in. <http://www.fritzinstitute.org/PDFs/WhitePaper/FromLogisticsto.pdf>. Accessed 31 October 2019
- Thomas A, Mizushima M (2005) Logistics training: Necessity or luxury? *Forced Migration Review* 22:60-61.
- Kovács G, Spens KM (2009) Identifying challenges in humanitarian logistics. *International Journal* 39(6):506-528
- Schulz SF, Blecken A (2010) Horizontal cooperation in disaster relief logistics: Benefits and impediments. *International Journal of Physical Distribution & Logistics Management* 40(8/9):635-656
- van der Laan EA, de Brito MP, Vergunst DA (2009) Performance measurement in humanitarian supply chain management. *International Journal Risk Assessment and Management* 13(1):22-45
- Pettit S, Beresford A (2005) Emergency relief logistics: An evaluation of military, non-military and composite response model. *International Journal of Logistics: Research and Application* 8(4):313-331
- Beamon BM, Balcik B (2008) Performance measurement in humanitarian relief chains. *International Journal of Public Sector Management* 21(1):4-25
- Blecken A (2009) A reference task model for supply chain processes of humanitarian organisations. Dissertation. Universität Paderborn
- Dijkzeul D, Reinhardt D (2018) Das internationale humanitäre System und seine Akteure. In: Lieser J, Dijkzeul D (eds) *Handbuch Humanitäre Hilfe*. Springer, Heidelberg, pp. 77-103
- ReliefWeb (2008) Glossary of humanitarian terms. <https://reliefweb.int/report/world/reliefweb-glossary-humanitarian-terms>. Accessed 31 October 2019
- OCHA (2018) Disaster response in Asia and the Pacific: A guide to international tools and services. [https://www.unocha.org/sites/unocha/files/ROAP DisasterGuide.pdf](https://www.unocha.org/sites/unocha/files/ROAP%20DisasterGuide.pdf). Accessed 30 October 2019
- Maier SD, Beck T, Vallejo J, Horn R, Söhlemann J-H, Nguyen TT (2016) Methodological approach

- for the sustainability assessment of development cooperation projects for built innovations based on the SDGs and life cycle thinking. *Sustainability* 8(10):1006
29. Heaslip G (2010), Key funds for NGO administration often neglected in rush to get aid to victims. *The Irish Times* Aug(14)
 30. Toyasaki F, Wakolbinger T (2014) Impacts of earmarked private donations for disaster fundraising. *Annals of Operations Research* 221(1):427-447
 31. Tomasini R, van Wassenhove LN (2009) *Humanitarian Logistics*. Palgrave Macmillan UK, London
 32. Wotschowfsky S, Mairock J (2002) Rechnungslegung von Non-Profit Organisationen. *Betrieb und Wirtschaft* 23:972-975
 33. Otto R (2013) Rechenschaft und Transparenz. In: Lieser J, Dijkzeul D (eds) *Handbuch Humanitäre Hilfe*. Springer, Berlin, pp. 305-318
 34. Haavisto I, Goentzel J (2015) Measuring humanitarian supply chain performance in a multi-goal context. *Journal of Humanitarian Logistics and Supply Chain Management* 5(3):300-324
 35. Leiras A, de Brito I, Queiroz Peres E, Rejane Bertazzo T, Tsugunobu H, Yoshizaki Y (2014) Literature review of humanitarian logistics research: Trends and challenges. *Journal of Humanitarian Logistics and Supply Chain Management* 4(1):95-130
 36. Holguín-Veras J, Jaller J, van Wassenhove LN, Pérez N, Wachtendorf T (2012) On the unique features of postdisaster humanitarian logistics. *Journal of Operations Management* 30(7/8):494-506
 37. Trunick PA (2005) Delivering relief to tsunami victims. *Logistics Today* Feb:8-9
 38. Tatham, P (2016) 6.5.2016 Peter Tatham's bibliography. <http://www.hanken.fi/public/en/humlogbibliography>. Accessed 13 October 2016
 39. KLU (2019) Humanitarian Logistics Database. <https://www.the-klu.org/faculty-research/resident-faculty/maria-besiou/humanitarian-logistics-database/>. Accessed 11 November 2019
 40. Fenton, G (2012) The logistics of the last mile. *Forced Migration Review – 25th Anniversary collection* Nov:23-25
 41. Thompson DDP (2014) Key ingredients for disaster logistics. *Crisis Response Journal* 9(3):57-59
 42. Vaillancourt A, Tatham P, Wu Y, Haavisto I (2018) Humanitarian health project supply chain costs. *Supply Chain Forum: An International Journal* 19(1):70-80
 43. Disparte DA (2007) The evolution of humanitarian fleet management: The postman's parallel. *CarNation* 2:22-27
 44. Bonney J (2005) Life-and-death logistics. *The Journal of Commerce* Jan(10):6
 45. van Wassenhove LN, Martinez A (2012) Using OR to adapt supply chain management best practices to humanitarian logistics. *International Transactions in Operational Research* 19:307-322
 46. Sandwell C (2011) A qualitative study exploring the challenges of humanitarian organizations. *Journal of Humanitarian Logistics and Supply Chain Management*, 1(2):132-150
 47. Overstreet RE, Hall D, Hanna JB, Rainer RKJ (2011) Research in humanitarian logistics. *Journal of Humanitarian Logistics and Supply Chain Management* 1(2):114-131
 48. Altay N, Prasad S, Sounderpandian J (2009) Strategic planning for disaster relief logistics: Lessons from supply chain management. *International Journal of Services Sciences* 2(2):142-161
 49. Tatham P, Kovács G (2010) The application of 'swift trust' to humanitarian logistics. *International Journal of Production Economics* 126(1):35-45
 50. Trestrail J, Paul J, Maloni M (2009) Improving bid pricing for humanitarian logistics. *International Journal of Physical Distribution & Logistics Management* 39(6):428-441
 51. Balcik B, Beamon BM, Krejci CC, Muramatsu KM, Ramirez M (2010) Coordination in humanitarian relief chains: Practices, challenges and opportunities. *International Journal of Production Economics* 126(1):22-34
 52. Rottkemper B, Blecken A (2012) A transshipment model for distribution and inventory relocation under uncertainty in humanitarian operations. *Socio-Economic Planning Sciences* 46(1):98-109
 53. Charles A, Lauras M (2011) An enterprise modeling approach for better optimization modeling: Application to the humanitarian relief chain coordination problem. *OR Spectrum* 33(3):815-841
 54. Rottkemper B, Fischer K, Blecken A, Danne C (2011) Inventory relocation for overlapping disaster settings in humanitarian operations. *OR Spectrum* 33(3):721-749
 55. Yin RK (2013) *Case study research: Design and methods*. 5th ed. Sage, Los Angeles
 56. Yin RK (2003), *Case study research: Design and methods*. 3rd ed. Sage Publications, Thousand Oaks, CA
 57. Sachan A, Datta S (2005) Review of supply chain management and logistics research. *International Journal of Physical Distribution & Logistics Management* 35(9):664-705
 58. Aastrup J, Halldórsson Á (2008) Epistemological role of case studies in logistics: A critical realist. *International Journal of Physical Distribution & Logistics Management* 38(10):746-763

59. Pedrosa AM, Näslund D, Jasmand C (2012) Logistics case study based research: Towards higher quality. *International Journal of Physical Distribution & Logistics Management* 42(3):275-295
60. Chiappetta Jabbour CJ, Amorim Sobreiro V, de Sousa Jabbour ABL, de Souza Campos LM, Barberio Mariano E, Scott Renwick DW (2017) An analysis of the literature on humanitarian logistics and supply chain management: Paving the way for future studies. *Annals of Operations Research* 1-19
61. Vega D (2018) Case studies in humanitarian logistics research. *Journal of Humanitarian Logistics and Supply Chain Management* 8(2):134-152
62. van Wassenhove LN (2003) New interesting POM cases from Europe. *POMS Chronicle* 10(2):19
63. Gammelgaard B (2017) Editorial: The qualitative case study. *The International Journal of Logistics Management* 28(4):910-913
64. Stuart I, Mc Cutcheon D, Handfield R, McLachlin RSD (2002) Effective case research in operations management: A process perspective. *Journal of Operations Management* 20(5):419-433
65. Ellram LM (1996) The use of the case study method in logistics research. *Journal of Business Logistics* 17(2):93-138
66. Handfield RB, Melnyk SA (1998) The scientific theory-building process: A primer using the case of TQM. *Journal of Operations Management* 16:321-339
67. DZI (2018) What Can the Donor Advisory Service Do for You? <https://www.dzi.de/spenderberatung/what-can-the-donor-advisory-service-do-for-you/>. Accessed 26 November 2018
68. Eisenhardt K (1989) Building theories from case study research. *Academy of Management Review* 14(4):532-550
69. Mayer HO (2009) Interview und schriftliche Befragung: Entwicklung, Durchführung und Auswertung. 5th edn. Oldenbourg Wissenschaftsverlag, München
70. Meuser M, Nagel U (1991) ExpertInneninterviews – vielfach erprobt, wenig bedacht: ein Beitrag zur qualitativen Methodendiskussion. In: Garz D, Kraimer K (eds) *Qualitativ-empirische Sozialforschung: Konzepte, Methoden, Analysen*, Westdeutscher Verlag, Opladen, pp. 441-471
71. Helfferich C (2011) *Die Qualität qualitativer Daten: Manual für die Durchführung*. 4th edn. VS Verlag, Wiesbaden
72. Austrian Development Agency (2019) *Humanitäre Hilfe*. <https://www.entwicklung.at/themen/humanitaere-hilfe/>. Accessed 14 November 2019
73. Lowrie, S, Hounjet, M (2011) The Consortium of British Humanitarian Agencies: A new initiative for NGO collaboration. *Humanitarian Exchange Magazine* 50(Apr):26-28
74. DevelopmentAid (2019) *Organisations Search Page*. <https://www.developmentaid.org/#!/organizations/search>. Accessed 14 November 2019
75. Mayring P (2015) *Qualitative Inhaltsanalyse: Grundlagen und Techniken*. 12th edn. Beltz, Weinheim

APPENDIX

Interview Guideline

- I General questions about the organization
 - description of the organization’s activities in the field of humanitarian aid
 - interviewee’s area of responsibility in organization
 - term definition of emergency and disaster relief
 - financing of projects within the organization/ fund sources
- II Understand concepts
 - understanding of logistics within the organization/tasks and activities assigned to logistics
 - difference between emergency aid and development cooperation
 - “Are logistics costs specifically broken down in your organization?”
- III Yes: logistics costs are broken down
 - objectives of collecting logistical costs
 - implementation of logistics cost accounting in organization
 - evaluation and usage of data
 - amount of logistics costs
 - processes or activities causing the highest logistical costs
 - difficulties or obstacles in implementing logistics cost accounting
- IV No: logistics costs are not broken down
 - practice of cost recording in organization
 - criteria for selecting partner organizations
 - reasons for not recording logistical costs
 - advantages and disadvantages of a breakdown of logistics costs
 - future plans for separate logistics cost recording