Case Study Research in Humanitarian Logistics: Challenges and Recommendations for Action

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Abstract Providing help to people in need is the responsibility of society and does not exclude logistical issues. Especially in this area of logistics research, a strong practical orientation is of great importance. Case study research is often seen as a suitable instrument to bridge the gap between research and practice and is therefore particularly recommended. However, since the contextual influences in humanitarian operations are very diverse, this research method is exposed to specific challenges. There is a lack of a systematic consideration of these challenges and a comprehensive guideline for researchers. Therefore, this chapter aims at systematically identifying and categorizing the challenges in conducting case study research in the context of humanitarian logistics. Practical recommendations for the application of this research method will be developed to overcome these obstacles. To achieve the research objectives, a mixed-method approach was chosen. First, a systematic literature review was carried out. In addition, six interviews with experts were conducted, all of whom have extensive experience in the field of case study research in the context of humanitarian logistics. The recommendations for action are based on a qualitative and deductive methodology. The results of the study show that four characteristics of humanitarian logistics represent unique challenges for case study research and must therefore be considered particularly: the dynamic environment, the political as well as the international context, and the general complexity.

Keywords Humanitarian logistics · Logistics ethics · Research method · Case study

1 Introduction

Natural disasters cause devastating damage worldwide. In 2018, losses resulting from 315 natural catastrophes worldwide totaled approximately US$ 132bn. Despite the alarming consequences of these catastrophes for the global economy, the impact on

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human life remains the most significant challenge. Although the year 2018 was rather mild compared to previous years, approximately 11,800 people died as a direct result of the natural disasters, and more than 68 million were affected (CRED 2019). But it is not only natural disasters that cause tremendous suffering. Man-made disasters are also a significant challenge for humanitarian actors nowadays. According to UNHCR (2020a), more people are currently fleeing than ever before. The crisis in Syria has forced more than 5.6 million people to leave the country, and a further 6.6 million Syrians are registered as Internally Displaced Persons (UNHCR 2020b).

In the event of a major disaster, the difficulty is to provide sufficient emergency supplies exactly when and where they are needed. Logistics is, therefore, an essential element of any disaster relief operation and may determine the level of success of the operation. Financial expenditure on logistics can cause high costs, especially in the acute phases following the outbreak of a disaster (Hein et al. 2020). Humanitarian organizations are, therefore, under pressure to make logistics activities efficient and transparent (van Wassenhove 2006). For this reason, so-called humanitarian logistics is in the focus of an increasingly comprehensive research base that aims to address the challenges in disaster management (Kovács and Spens 2007). The scientific interest has manifested itself in the publication of articles in several journals, in special editions, as well as in a series of conferences on this topic (Kovács and Spens 2009). However, there is criticism that humanitarian logistics research lacks the necessary practical relevance (Kunz and Reiner 2012). In response to this criticism, qualitative research, and in particular case study research, has emerged in the field of humanitarian logistics as the most commonly used method (Chiappetta Jabbour et al. 2019). According to Vega (2018), transparently documented, trustworthy, and rigorously conducted case studies have the potential to contribute to advancements in humanitarian logistics research. However, his findings also show that the rigor with which such scientific papers are produced is not necessarily provided. Especially among the numerous challenges in humanitarian logistics, there is a lack of specific guidance on how to conduct case studies. This paper is thus the first to focus on the systematic analysis of the challenges in case study research in humanitarian logistics. The paper aims to identify and categorize the associated challenges and to develop practical recommendations for action. In particular, the following research questions are addressed:

RQ1: What are the challenges in conducting a case study, especially in the context of humanitarian logistics?
RQ2: How can these challenges be categorized?
RQ3: How can these challenges be addressed when conducting a case study in the context of humanitarian logistics?

To answer these explorative research questions, two methods are applied: a systematic literature search as well as expert interviews. In summary, the work provides an opportunity for researchers, humanitarian organizations, and other actors in the humanitarian sector to develop a better understanding of case study research requirements. This work is structured as follows: In the following Sect. 2, the theoretical foundations are outlined, including a brief overview of humanitarian logistics

and an introduction to the method of case study research. The methodology of this work is described in Sect. 3. The evaluation and presentation of the results will take place in Sect. 4. This paper concludes in Sect. 5 with a summary, its limitations, and an outlook on further research.

2 Theoretical Background

2.1 Humanitarian Logistics

Humanitarian logistics aims to support disaster-affected people by delivering the right material, in the right quantity, with the right quality, at the right time, and to the right place. This objective is very similar to that of commercial logistics. It is therefore not astonishing that Thomas and Kopczak (2005) define humanitarian logistics 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*". Apte (2009) specifies that humanitarian logistics is a specific branch of logistics that manages the response chain of critical supplies and services with challenges such as surges in demand, uncertain deliveries, critical time windows, and a wide operational scope. Differentiation is often made based on the phases of disaster management to systematize the tasks and requirements of humanitarian logistics. The following three phases are distinguished, among others: preparedness, immediate response, and reconstruction (Kovács and Spens 2009).

Although commercial and humanitarian logistics are closely related, there are significant differences which characterize the humanitarian environment and pose specific challenges. A considerable feature affecting the operations of humanitarian organizations is that 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; for the former, finances are more seen as constraints rather than objectives (Kovács and Spens 2007). This difference has significant influences on logistical activities. Holguín-Veras et al. (2012) note that, in humanitarian logistics, so-called social costs ought to be reduced. In contrast to commercial logistics, where externalities are neglected, and only the logistics (private) costs are considered, these social costs must include externalities. After all, not-performed logistics service in a relief operation can cause losses in human life, which could be treated as an externality in the comprehension of commercial logistics. However, in humanitarian logistics, this aspect cannot be neglected, and therefore, externalities must be considered. Moreover, humanitarian organizations often establish strict principles which determine their actions; they attempt to act with humanity, neutrality, impartiality, and independence.

Relief operations involve a multitude of stakeholders with heterogeneous needs and aims, such as the recipients of service, donors, staff and volunteers, aid agencies

and NGOs, governments, and the military (Beamon and Balcik 2008). During the Indian Ocean tsunami in 2004, over 40 countries and 700 NGOs were involved (Chia 2007) and as most of them are operating in independent supply chains and have their funding and organizational systems (Hein 2019), coordination indeed poses a major challenge (Jahre and Jensen 2010). The lack of information sharing and cooperation creates a highly dynamic, informal, and often improvised decision-making process, in contrast to the commercial sector which is featured by formal structures, standardized procedures, and clearly defined roles and responsibilities (Holguín-Veras et al. 2012). Nevertheless, Schulz and Blecken (2010) figured out that, in the humanitarian sector, the same potential benefits from cooperation can be realized as in the private sector, such as cost reduction and concentration on core competencies. Balcik et al. (2010) note that some cooperation efforts have already been undertaken, especially those mechanisms with the greatest potential for implementation (e.g. collaborative procurement and third-party warehousing). Also, joint logistics activities and partnerships between private sector companies and relief organizations are increasing.

Humanitarian logistics is shaped by an environment which is highly volatile and dynamic. As the time, the location, the type, and the size of a disaster are often unpredictable and the lead times can be very shortened or even nonexistent, humanitarian logistics has to cope with these uncertainties on demand (Beamon and Balcik 2008). The relatively steady flow of goods, characterized by repeated activities in the commercial sector, is not realizable for a once-in-a-lifetime disaster with a surge of demand (Holguín-Veras et al. 2012). There are further unknowns in capabilities, personnel, the process stability and even the other activists on-site, especially at the beginning of a relief operation (Blecken 2009). Besides, humanitarian logisticians have to work under enormous time pressure; while in the commercial context delays might be accepted, the timely response in a humanitarian operation truly can be a matter of life and death (van Wassenhove 2006). In addition, disaster situations are highly complex and chaotic. Damaged infrastructure may block access to regions and people in need. The infrastructure can be further susceptible to seasonal conditions. Transportation and storage capabilities might be damaged, and an overall lack of equipment and resources is possible. In this context, the skills of humanitarian staff should also be highlighted, as there is often a deficiency of logistics expertise and career paths (Sandwell 2011). Another considerable problem concerns the communication and information infrastructure, which is notably lacking in developing countries. However, supply chains have become more and more dependent on information (Oloruntoba and Gray 2006), which makes the corresponding infrastructure crucial for disaster management. All these uncertainties and challenges, as well as the deficits in infrastructure and capacities, must be dealt with within the context of humanitarian logistics (c.f. Table 1).

Table 1 Comparison of commercial and humanitarian logistics (Beamon and Balcik 2008; Holguín-Veras et al. 2012; Kovács and Spens 2007)

	Commercial logistics	Humanitarian logistics
Main objective	Generate financial return (reduction of private costs)	Save lives, reduce suffering (reduction of social costs)
Time effects	Delays might be accepted	Delays might result in lost lives
Decision-making/procedures	Formal structures, standardized procedures, clearly defined roles and responsibilities	Dynamic, informal, and often improvised (decision-making) processes
Logistical activities	Relatively steady flow of goods, characterized by repeated activities	Unpredictable, once in a lifetime
Infrastructure and resources	Stable and functional	Restricted/lack of equipment, resources, and skilled staff possible
Actors	Predetermined and homogeneous actors	Multitude of diverse and heterogeneous actors with complex relations
Environment	Relatively constant	Highly volatile and dynamic

2.2 Case Study Research

Case studies in the scientific sense are empirical investigations that examine a phenomenon in its real context. This qualitative research method aims to develop an understanding of a complex topic and is particularly suitable when the boundaries between phenomenon and context are not apparent. A case study is based on several sources of evidence (Yin 2009). Merriam (1998) considers qualitative case studies as an intensive, holistic description and analysis of a limited phenomenon. The phenomenon can be a program, an institution, a person, or a process. To distinguish the case study method from other research methods, Merriam (1998) emphasizes the specific characteristics of a case study: particularistic, descriptive, heuristic. Stake (1995) also deals with characteristic properties for case studies, namely that they be holistic, empirical, interpretive, and emphatic. A case has a delimiting character to its environment (Stake 1995; Merriam 1998; Yin 2009). Ragin (1992) considers this demarcation in spatial and temporal terms. Merriam (1998) describes a case as a kind of phenomenon that occurs and is influenced in a specifically defined context. Yin (2003) describes a case as a contemporary phenomenon in its real context. The researcher has little control over the phenomenon and the context. The procedure of case study research can be divided into four phases: planning, data collection, analysis, and reporting (c.f. Fig. 1).

The planning phase aims to develop a guideline for further procedure, by concretizing the design used within the case study. Yin (2009) proposes four types of designs. These types differ in the selection of the research object (case). Regarding the

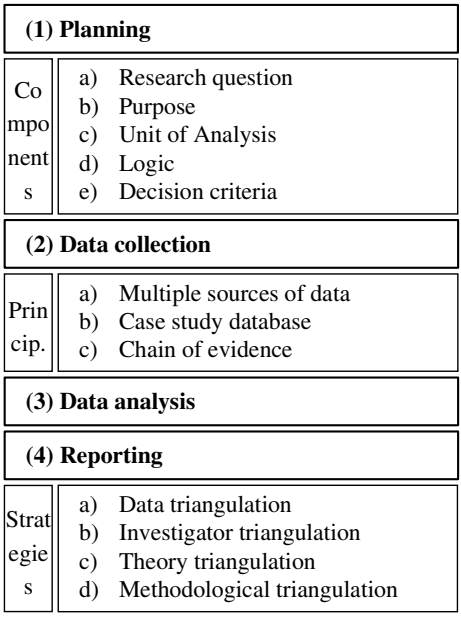

Fig. 1 Process of case study research (Modified from Yin 2003)

case selection, a decision must be made on the number of cases. Single case studies consider only one single case. In general, it is recommended to examine several cases (multiple case). A further distinction is the scope of the case. Possible design types are holistic or embedded case studies. Yin (2009) recommends choosing the design that offers the highest possible instrumentality to answer the research questions. Therefore, the strengths and weaknesses of each design should be considered. The selected design of the case study research consists of five components: research questions, purpose, unit of analysis, the logic linking the data to the purpose, and the criteria for interpreting the results. When designing the research, the researcher should ensure that these components are coherent and consistent. The first component includes the problem definition and the research objectives. To be able to develop hypotheses for case studies, a literature review should be conducted in advance. Regarding the second component, the research must have a distinct purpose. The third component is related to the fundamental problem of defining the case. The fourth and fifth components relate to planning the steps of data analysis in the case study method. The fourth component includes time series analysis and data analysis, while the fifth component requires the researcher to identify and address rival explanations (Yin 2003).

Yin (2003) points out that after the start of the second phase of data collection, minor changes can be made to the research design. For significant changes, it is recommended to return to the first step of conceptualization to redesign the case study. To capture the complexity and completeness of the case under investigation, the task of the researcher in data collection is to obtain data from multiple sources of evidence (Yazan 2015). Yin (2003) suggests using six sources of evidence: Documents, archive

data, interviews, direct observations, participant observation, and physical artefacts. While interviews, observations, and participant observation are time-consuming, they provide data which originates closer to reality. Documents, artefacts, and archive data may be partially limited in availability. Their advantage is that these secondary data sources provide supporting material. Furthermore, Yin (2009) lists principles that apply to the entire data collection process. The first principle states the use of multiple sources of evidence. Evidence must refer to the same facts for the purpose of triangulation. The second principle involves the creation of a case study database. The formal collection of evidence helps in the handling and management of data and guides the formulation of the final case study report. The third principle is the creation of chains of evidence, i.e. explicit links between the research questions, the data collected, and their conclusions (Yin 2009).

In the data analysis phase, both quantitative and qualitative evidence is examined, categorized, and tabulated (Yin 2003). Four criteria can measure the quality of the analysis. These include construct validity, internal validity, external validity, and reliability. Construct validity is achieved by triangulating multiple sources of evidence, chains of evidence, and checks by other team members. By using analytical techniques such as pattern matching, internal validity can be achieved. External validity describes the analytical generalization of findings. Reliability can be ensured through case study protocols and databases. As an overriding criterion, researchers must always respect the principle of objectivity. Compliance with the principles of proper case study research leads to a certain degree of transparency and traceability. In the final phase of report preparation, relevant target groups are identified, and the results are made available through appropriate presentations. This phase is essential for the exchange of findings and conclusions for confirmation by the case study participants.

3 Methodology

3.1 Literature Review

A systematic literature review is an essential part of a research project to analyze a specific scientific field. Using this method, a solid basis is created by identifying and subsequently evaluating all relevant literature sources (vom Brocke et al. 2009). A literature analysis should provide an overview of the research topic, develop new approaches for the research area, and uncover gaps in research (Webster and Watson 2002). Fink (2014) stresses that attention should be paid to ensuring transparent implementation. The approach of the literature review in this work combines the two approaches of vom Brocke et al. (2009) and Fink (2014) and is briefly outlined below. The steps are divided into problem formulation, concept development, implementation, and presentation of results.

Table 2 Combination of search terms and selected criteria for the literature search

Challenges in case study research	Humanitarian	Logistics
Challenge, boundar, problem, obstacle, difficult*, limitation,* OR *barrier* AND *case stud**	*Humanitarian, emergency, catastrophe,* OR *disaster*	*Logistic*, fleet management,* OR *supply chain management*
-Language: English -Publication period: no restriction -Publication medium: no restriction -Search field: title, abstract		

To guarantee a large number of matches, the five academic databases *Academic Search Complete*, *Business Source Complete*, *ScienceDirect*, *Emerald Insight*, and *IEEE Xplore* were used for the search. The selected search terms were derived from the theoretical foundations of this work and according to the research questions. They are divided into three sub-aspects, which were combined in the search. For the first aspect, "challenges in case study research", the search terms *challenge*, *boundary*, *problem*, *obstacle*, *difficulty*, *limitation*, or *barrier* were combined with the term *case study*. The second sub-aspect, "humanitarian", includes the search terms *humanitarian*, *emergency*, *catastrophe*, and *disaster*, while the third sub-aspect, "logistics", included *logistics*, *fleet management*, and *supply chain management*. Following, the different search terms were combined to one search phrase. The formulation of the search terms was supported by the online tool *LitSonar*. The search was conducted in English, without any limitation of the publication period, and carried out in the abstract and title. Table 2 summarizes the procedure of the database research process.

The search results were analyzed using a two-stage screening process. The relevance of the articles was first checked based on the title and abstracts (rough selection) and finally based on the full text (final selection). The execution of the database search, in which all three sub-aspects of the search term were used, resulted in only one relevant match. To find more literature sources, the previous phase of concept development was revised concerning the search terms. For this purpose, the theory of the degree of subject linkage could be used. In general, the degree of subject linkage indicates the extent to which the content of the respective source is related to the topic or the exact objective of the analysis (Karmasin and Ribing 2012). In the literature search, the search terms were systematically generalized in order to obtain more results. When using the subject linkage level I, the search terms as described above were used. The second level of topic linkage (subject linkage level II) only includes search terms on the challenges in case study preparation in a humanitarian or a logistical context. Subject linkage level III only includes search terms that refer to general difficulties in case study research (without reference to a specific research area). Table 3 shows the number of results per database for the search with subject linkage level III. The final results of the research process, according to the three levels of subject linkage, are presented in Table 4. A total of eight scientific articles

Table 3 Search results by database for subject linkage level III

Number of results (all search fields)	Number of results (only title)	Potential results (screening)	Final results
Academic search complete (08.12.2019)			
18,417	73	4	4
Business source complete (08.12.2019)			
8,417	35	1	1
Science direct (10.12.2019)			
58,929	86	1	0[a]
Emerald insight (10.12.2019)			
1	0	0	0
IEEE Xplore (10.12.2019)			
0	0	0	0

[a]The potential result was already included in final results of the EBCSO databases

Table 4 Results of literature review according to the level of subject linkage

		Explanation	Final results	Number
Subject linkage level	I	Sources examining case study research challenges in humanitarian logistics	Vega (2008)	1
	II	Sources in which case study research challenges in related fields (logistics without humanitarian reference or humanitarian sector without reference to logistics) are examined	Duboisa and Araujo (2007), Wood (2006)	2
	III	Sources that examine case study research challenges in other areas and without reference to a specific area of logistics	Eisenhardt and Graebner (2007), Ishak and Bakar (2014), Lloyd-Jones (2003), Malterud (2001), McCharthy et al. (2003)	5

were identified and considered in this study. The last step, the presentation of results, takes place in Sect. 4, where the relevant literature is analyzed and interpreted.

3.2 Expert Interviews

Qualitative research is generally suitable for exploratory studies in which a phenomenon has not been fully researched. It is, therefore, suitable for investigating the challenges of case study research in the context of humanitarian logistics. The

researchers are supported in their development of a comprehensive and detailed picture of the complex phenomenon. The qualitative research interview attempts to describe the meanings of central issues in the subjects' environments. The main task of the interview is to understand the meaning of the respondents' statements (Kvale 1996). With regard to standardization, interviews are divided into unstructured, semi-structured, and structured interviews, whereas in qualitative research, only the latter forms of standardization are common. For semi-structured interviews, an interview guide is prepared in advance. Corbetta (2003) states that the order in which the different topics are dealt with is left to the interviewer. Within the topic complexes, the questions can also be formulated at the interviewer's discretion. It is possible to ask additional questions that are not foreseeable at the beginning of the interview. It is not the primary goal of semi-structured interviews to test hypotheses. Rather, the aim is to explore the opinions of the interviewee (Gray 2004). In this paper, qualitative expert interviews were applied, since this enables access to the knowledge of researchers who have experience in conducting case studies in the context of humanitarian logistics. The semi-structured form was chosen because its flexibility is suitable for application in this relatively unestablished research field.

The guidelines used for the interviews followed the procedure proposed by Bell (2014). A total of five sets of questions were formed. The first set of questions deals with the context of humanitarian logistics, with the following set addressing challenges that the interviewee experienced in the case study research. In the third set of questions, the experts are asked to explain possible recommendations for action to overcome the challenges mentioned. The fourth set of questions seeks to structure the diversity of the identified problems. Questions regarding the categorization of challenges are formulated. The last set of questions summarizes the identified recommendations. The primary research question, as well as the interview course, was communicated to the experts in advance. This allows the interviewees the opportunity to prepare for the interview.

With regard to the selection of experts, intensive research was carried out using publicly available information on the experts in advance. A precondition for contacting the expert was that the researchers had expertise in the field of humanitarian logistics and case study research. The number of publications and citations on this topic were used as references. Six expert interviews were conducted in total; with this number of experts a theoretical saturation could be achieved. All interviewees work at different universities in four European countries. They all have scientific expertise on the topic. The number of publications ranges from seven to several hundred, with the number of citations ranging from twenty to several thousand. Four of the six experts have additional practical experience. All interviews took place at the end of 2019 either via Skype or WhatsApp. On average, the interviews, which were conducted in English, lasted around fifty minutes, with the lengthiest interview lasting ninety and the shortest around thirty minutes (c.f. Table 5). The interviews were then transcribed.

A qualitative content analysis was conducted to evaluate the interview data. The basic concept of qualitative content analysis, according to Mayring (2002) is to assign predefined or emerging codes to text material systematically. Coding allows

Table 5 Overview of experts interviewed

	Research area	Practical experience	Number of publications	Interview date	Medium	Duration
Expert 1	SCM, social responsibility, humanitarian logistics	Yes	10–24	04.11.2019	Skype	90 min.
Expert 2	Business ethics, marketing management, humanitarian logistics	Yes	10–24	12.11.2019	Skype	36 min.
Expert 3	SCM, disaster management, humanitarian logistics	Yes	<10	11.11.2019	WhatsApp	44 min.
Expert 4	SCM, humanitarian logistics, procurement	–	25–49	21.11.2019	Skype	32 min.
Expert 5	Humanitarian logistics, warehousing, information sharing	Yes	25–49	25.11.2019	Skype	62 min.
Expert 6	Closed-loop logistics, sustainable logistics, humanitarian logistics	–	>100	25.11.2019	Skype	28 min.

for the possibility to categorize data as it organizes the data by concepts, key ideas, or topics. This implies that coding is not only the analysis but also the interpretation of the data (Recker 20132014). Corbin and Strauss (1990) distinguish between three different coding techniques: open, axial, and selective. Selective coding, which was used in this current work, is used to put identified categories into a superordinate context. The goal is to develop a coherent category scheme. The coding and evaluation were performed using the software tool MAXQDA 2020. The results of both the analysis of the literature and the interviews are presented in the following section. The challenges of case study research will be illustrated by means of the distinctive characteristics of humanitarian logistics. The recommendations for action are outlined and clearly presented according to the individual phases of the research process (stated in Sect. 2.2).

4 Results

4.1 It's (Still) Case Study Research

The method of case study research in the context of humanitarian logistics certainly comprises particular challenges. However, the experts surveyed also agreed that the challenges in applying this case study research cannot be attributed solely to the humanitarian context but can be described as inherent difficulties of this method. Expert 6 remarks that "*it might, in general, be not entirely different to other case study research, but it would certainly have to deal with* [complex] *characteristics*". Expert 5 agrees with this thesis. Therefore, many of the challenges mentioned in the interviews and the literature can be classified as general challenges of case study research. The main issue pointed out was that in the application of the case study methodology, it is mainly the diversity of definitions that poses a problem. A lack of differentiation from other methods, such as interview studies, for example, can be seen here ("*You cannot just pick up the phone and ask a few short interviews*", Expert 5). Furthermore, a lack of rigor is identified as a key problem, which has given case study research a bad reputation. Expert 6 criticized that "*ninety percent of case study research, in general, is* […] *bad; that is just not good research*". In particular, the lack of theoretical foundation, as well as the arbitrary adaptation of the researchers' own methodologies and the lack of information on the research process (e.g. in terms of the case selection), were mentioned (Vega 2018). Expert 4 states, in this context, that "*case study research is taken too lightly*". Another obstacle is that certain circumstances make it challenging to publish case studies in scientific journals (Experts 1, 3, and 4). The limitation of the word count can be mentioned here ("'*Shrink it just* [to] *two lines and then focus on the results!*' *I do not think that this is the best way*", Expert 1).

General recommendations for action, which in their nature are certainly not unique to the context of humanitarian logistics, were given by the interviewed experts. The conscious application of case studies as research methodology and the theoretical foundation, including a definition, should precede the entire research process. In particular, a clear distinction from other related research methods such as interview studies is claimed. "*Sometimes people just do like a case and they think it is case study research without really taking into account what kind of question they want to answer, and what kind of case they're looking at, and what kind of conclusions they can make* (Expert 4). Besides, adherence to methodological rigor throughout the entire research process is elementary, as "*there is enough literature on how you should do things properly, in terms of methodology*" (Expert 6). Standard literature on the topic should be consulted and supplemented by further literature (Expert 1), such as the framework of Vega (2018). To meet the challenges of publishing, a mixed-methods approach (e.g. combining qualitative interviews with quantitative surveys) was recommended (Expert 5). All these points influence the researcher across all phases (c.f. Sect. 2.2). In the following, it will be outlined which particularities of

the humanitarian context have an influence on the conduction of case studies and how to address them.

4.2 It's Dynamic

A distinctive feature of humanitarian logistics is the dynamic and volatile environment (Beamon and Balcik 2008; van Wassenhove 2006). This applies both to the occurrence of a disaster itself and to the humanitarian actors. This dynamic poses several challenges that influence case study research. Humanitarian operations often have a project character; they can be initiated ad hoc and take place under time pressure and with limited financial resources. Dealing with these dynamics in the context of case study research is sometimes difficult, as long-term planning is not always possible. On the other hand, time windows for data collection can be indefinite and small. All this leads to the fact that the effort of case study research in this environment should not be underestimated: "*It will take more work to get to the level when you can actually start seeing things, so we understand that phenomenon that we are looking at*" (Expert 5). In contrast, the researcher's time, and also the funds available, are often limited (Experts 1 and 6). Besides, there is the problem of the right time for data collection. Collecting the data on-site and in close temporal contact with the actual event can be useful from a methodological point of view. Still, unfortunately, it is not always practicable (Expert 1). The dynamics in humanitarian aid, however, do not only relate to the event of the disaster itself; the humanitarian actors are also quite dynamic. A high staff turnover poses particular challenges (Sandwell 2011), which also have an impact on the implementation of a case study. On the one hand, there is the challenge of assigning individual items from interviews to a particular humanitarian organization. "*It is very difficult because each person that you interview, they will have worked in so many different organizations and so many different positions and places.* […] *How do you make sure what they say is really for this organization?*" (Expert 5). On the other hand, it can be challenging if the interviewee is no longer working in the same organization throughout the duration of the study. In addition, aid organizations often lack explicit logistics knowledge on the part of their staff, and there is little imagination regarding the application of theoretical models in practice ("[…] *people that take decisions, that take operational decision, are not necessarily logisticians and they might not have been trained in logistics* […]", Expert 4). Table 6 provides an overview of the challenges mentioned.

The challenges posed by the dynamic environment of humanitarian operations influence different phases of conducting case studies. The interviewed experts have identified some approaches to dealing with them. When planning a case study on humanitarian logistics, the inherent dynamics of the environment should be taken into account. This means that more flexibility on the part of the researcher's time should be included from the beginning (Experts 1 and 5). There are further reasons for this (see Sects. 4.4 and 4.5). For certain temporary research projects, e.g. within the framework of a master's program, the use of the case study as a research methodology

Table 6 Challenges caused by dynamics and recommendations for action

	Challenges	Phase	Recommendations for action
Dynamic	Long-term research processes in the humanitarian context Limited time and funds for research Small and indefinite time windows for data collection Choosing the right time for interviews High fluctuation of staff in the humanitarian sector Lack of explicit logistics knowledge in humanitarian organizations	(1)	Long-term time planning for case study process Apply for funds at an early stage Build networks within the humanitarian sector
		(2)	Use appropriate language in interviews
		(3)	Abstract the statements made in the interviews Link answers in interviews with specific organization/experience

might not be appropriate. Expert 1 considers it a more suitable methodology for advanced research programmers, such as PhDs. The high turnover of staff also has an impact on the planning process of a case study. It is recommended that a network of potential interview partners be established as early as possible. "*If you have those networks, I think that is very valuable*" (Expert 5). Regarding the lower level of logistics knowledge in humanitarian organizations, an appropriate language level should be applied. It is ultimately the task of the researcher to abstract the statements made in an interview to a scientific level (Expert 1). The recommended actions are summarized in Table 6.

4.3 It's Political

Humanitarian aid operations always take place in a certain political context. This is particularly true of conflict-based disasters. This area of tension has to be dealt with within the context of case study research (Wood 2006). Access to the objects of study might be made more difficult for political reasons and due to strong regulations. "*Governmental organizations are very restricted and very regulated. It is hard to get into its data if you do not have access to contacts*" (Expert 2). In some instances, security aspects even make this access impossible. Consideration should also be given to the question of who can collect data in such areas. "*I would not want someone, when he just has research and academic experience, to go to Iraq and start asking questions to the different actors that are typically in the field. That has some constraints and implications that can be very difficult to manage*" (Expert 3). As explained in the previous section, this can also lead to an extension of the research project. Furthermore, especially in security-related contexts, a high level of sensitivity with regard to data protection is required (Experts 1 and 2). This leads to challenges in the process of data collection as well as in reporting. Furthermore, the political dimension should not be underestimated within interviews, as political circumstances

Table 7 Challenges caused by political issues and recommendations for action

	Challenges	Phase	Recommendations for Action
Political	Difficult physical access due to political restrictions and regulations Security aspects of conflict-based disasters High-level data security aspects Influence of political circumstances on interview responses Intra- and inter-organizational power structure	(1)	Take political circumstances into account at an early stage of planning
		(2)	Compliance with data protection Involvement of different organizational entities Critical attitude towards political issues in interviews
		(3)	Critical attitude towards political issues in the evaluation of date Triangulation

can influence people's responses. "*Humanitarian Logistics is politics. So you always have a political filter on it, so if you're going to approach an organization you know there would always be people who are either* […] *scared of the political system and they don't dare to say anything or they are not allowed to say anything*" (Expert 5). The intra- and inter-organizational power structure should also not be neglected. An overview of the challenges raised by the political environment are summarized in Table 7.

Politically unstable circumstances influence the implementation of case studies. During the preparation phase, attention should be paid to this, and an awareness of the emotional requirements should be encouraged (Wood 2006). In addition, under certain circumstances, priority should be given to experienced researchers for data collection. An intensive examination of the political context is necessary here. Respect for sensitive data should always be ensured. This refers to the phase of case study planning as well as the phases of data collection and reporting (Experts 1 and 2). The political dimension in the context of interviews should not be neglected. An intensive examination in advance helps to ask differentiated questions ("*You have to be very specific in your questions*", Expert 5). A critical attitude should be adopted during the interview and also during the evaluation (Expert 6). In particular, a strong triangulation of the data should be emphasized as a useful tool. The comparison of different statements that were made at various times as well as a comparison with other sources and data helps to create facts. To ensure the reliability of the data, different organizational entities (management level, field workers) can be consulted on the same issue. The evaluation of the collected data material thus can identify contradictions or confirmations. Expert 6 summarizes it as follows: "*You have to be very critical and very often ask the same questions several times in a different way or at a different time or ask different people and triangulate*". An overview can be found in Table 7.

4.4 It's International

Major humanitarian relief missions take place in a highly international context. Up to several hundred organizations from dozens of different countries (Chia 2007) can come together in such operations. Moreover, aid workers can come from different countries and operate in a cultural environment that might be unfamiliar to them and with people whose language they may not speak. This international context also presents challenges for case study research. First and foremost, it makes physical access to data more difficult. Researchers cannot travel to any place in the world to collect data as often as they like. "*The problem is time at least for us [researchers]. For me, it is time that I do not have time to go and have access just [to] find [people in the field]*" (Expert 1). Different languages pose a challenge, especially in interviews. Cultural differences should not be ignored either and may well influence answers and should, therefore, also be taken into account when evaluating data. Expert 6 mentions jargon as another specificity of humanitarian logistics: "*[…] the humanitarian world uses an awful lot of jargon […] and understanding each other is very difficult*". Expert 6 goes on to explain that this jargon can not only vary between different organizations, but also within an organization where "*they use different words and different concepts for the same thing*". In contrast to the commercial sector, there is rarely a common understanding of concepts or terms. Table 8 summarizes the challenge caused by international aspects.

According to the interviewed experts, certain challenges regarding the strong internationality of humanitarian logistics can be met within the framework of case study research. Regarding the difficult physical access to data, Expert 6 suggests co-operating with local researchers or partners. At the same time, this improves the handling of other challenges. The language barrier in the interview survey may already be solved, and the difficulty of putting the content into the right local and cultural context is thus reduced, because "*they know the language, they know the local conditions*" (Expert 6). The influences of such cooperation extend across all phases of the implementation of case studies. Thus, attention should be paid to this already in the planning phase; positive effects can be achieved in the phases of both data collection and evaluation. To meet the challenge of the different terms and concepts, Expert 5 recommends that intensive preparation takes place: "*I think you need to be very well prepared. You need to understand all of this very well*". Table 8 provides an overview of the recommendations for action.

Table 8 Challenges caused by international issues and recommendations for action

	Challenges	Phase	Recommendations for Action
International	Difficulties regarding physical access Language barriers Cultural differences Humanitarian jargon: variety of terms and concepts	(1)–(4)	Working together with local researchers or partners Preparation across all stages of the research process

4.5 It's Complex

The final characteristic of humanitarian logistics which is mentioned in both literature and the expert interviews is its complexity. The interaction of a dynamic environment with many different stakeholders, the strong influence of political, social, and cultural aspects, and the internationality in which humanitarian aid takes place create an extremely high degree of complexity. On the one hand, this degree of complexity is a strong argument for the application of qualitative methods such as case study research. On the other hand, the complexity of the humanitarian context also creates various challenges that need to be addressed. The various aspects of complexity cannot be ignored in the context of a case study. The completeness of the researcher's perspective is particularly important and is one of the strengths of a case study. "*First of all, you need to know the context*" (Expert 5). Expert 6 states that when "*you make a model* […] *that ignores safety in an area where you have a lot of fighting going on* […] *your recommendations will be wrong because you ignored one of the most important things, which is security*". The challenges already arise in the preparation of a case study, especially the case selection and the corresponding definition of case boundaries, which is highlighted by the experts. The structuring of large and complex data sets is a challenge in the analysis phase ("*The amount of data that you get are also very complex to sort out*", Expert 2). In reporting, care should be taken to ensure that the complexity is sufficiently represented. A low degree of generalization and the difficulty of making comparisons can be the consequence here. "*In a normal environment [you already] have to be careful about […] comparing results and generalizing from them, which I think that is also true for your regular case study research*". In the humanitarian context, "*it might just be an order of magnitude more complicated*" (Expert 6). In Table 9 an overview of the context-related challenges can be found.

Adequately addressing the numerous aspects of complexity is probably the most significant challenge in case study research on humanitarian logistics ("the humanitarian context got to be very complex and dynamic and it has a lot of stakeholders and different objectives and so on", Expert 6). The experts were also able to give individual recommendations for action here, covering the various phases of the case

Table 9 Challenges caused by complexity and recommendations for action

	Challenges	Phase	Recommendations for Action
Complex	The context of humanitarian logistics in general is very complex Various aspects of complexity You need to understand the context very precisely There might be a large amount of data Low degree of generalization and comparison	(1)	Address aspects of complexity from the beginning Special attention paid to case selection and boundaries Experience in both academia and practice
		(2)	Scientific discourse with colleagues
		(3)	Address aspects of complexity adequately

study research process. When selecting the cases in the planning phase, Expert 1 notes that special attention should be paid to the case boundaries. Also, with regard to the evaluation and the presentation of results, particular emphasis should be placed on the adequate description of the complex interrelationships. Gaining experience both in academia and in practice has also been mentioned as an advantage ("I definitely think working inside an organization would make it easier", Expert 5) and certainly contributes to a better understanding of complex interrelations. Furthermore, Expert 6 recommends entering into scientific discourse with colleagues consciously. An overview of the recommendations for action can be found in Table 9.

5 Conclusions

This thesis aimed to produce an overview of the challenges in case study research in the context of humanitarian logistics. For this reason, it was examined how experts from the scientific community discuss the issue. In particular, the following research questions were addressed: What are the challenges in conducting a case study, especially in the context of humanitarian logistics? How can these challenges be categorized? How can these challenges be addressed when carrying out a case study in the context of humanitarian logistics? To answer these questions, the first step was to lay the theoretical foundations for the topics of humanitarian logistics and case study research. This was followed by a description of the applied research methods of literature review and expert interviews. Subsequently, the challenges and corresponding recommendations for action were outlined in the results section of the paper. This was done based on the characteristics of humanitarian logistics.

In summary, the research results show that the fundamental challenges of case study design relate to the lack of methodological knowledge. The lack of understanding exists at a macro (in the general scientific community) and micro (in relation to the individual scientist) level. In addition, the requirements of scientific journals and the bad reputation that the case study method is wrongly attributed make case study development difficult. Four characteristics of humanitarian logistics can describe the specific challenges posed by the particularity of the humanitarian context: first, the dynamic and volatile environment contributes to difficulties. Next, the political, as well as the international context, have to be mentioned. Finally, the high degree of complexity contributes to the fact that unique challenges in case study research in humanitarian logistics cause difficulties. These challenges relate to the different phases of the implementation of a case study. The most important recommendations for action include adherence to methodological rigor throughout the research process, early preparation with regard to financial and time planning, building a network, cooperation with local actors and researchers, promoting confidence-building, formulating questions for specific target groups, critically examining the data material, investigating possible misjudgments,

applying the triangulation approach, establishing a methodological distance, understanding methods for structuring the complex data set, obtaining advice from research colleagues, and using mixed methods.

Further research is necessary regarding the specific design of the developed recommendations for action and their systematization within the framework of a detailed procedural model. In this context, quality criteria for case studies in humanitarian logistics could be derived. These would serve both as an assistance for researchers during the implementation and for the subsequent assessment of the quality. A comparison with other research areas is also possible. However, the main purpose of this work is to encourage and support researchers in conducting case studies in the context of humanitarian logistics and to improve their quality.

Limitations regarding the validity of the results arise from the research methodology chosen. Despite careful consideration of the method, a bias in the results due to the subjective interpretation of the data cannot be excluded. The completeness of the research results cannot be guaranteed due to the high complexity and diversity of humanitarian logistics. Furthermore, the challenges identified here and the corresponding recommendations for action only refer to the specifics in the humanitarian context. For a detailed description of the methodological approach and general advice on case study research, explicit reference is made to the corresponding literature. Finally, it should be noted that research on challenges in case study research in the humanitarian logistics context still requires further research. It is certainly possible to supplement the identified recommendations for action. Nevertheless, the strategies identified in this paper can be used to support researchers advancing humanitarian logistics research.

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