

# Assessing the value of supply chain management in the humanitarian context – an evidence-based research approach

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## Abstract

**Purpose** – The research objective is to study the relevance of supply chain management in the humanitarian context, analyze supply chain expenditures and identify major cost-saving potentials and future research directions.

**Design/methodology/approach** – Our research design integrates exploratory and inductive research approaches that are based on existing literature, discussions with supply chain leaders and extensive financial data collected through field studies.

**Findings** – Supply chain management is increasingly considered as a critical success factor for humanitarian operations and amounts on average to around 75% of the total response cost. Based on our findings, humanitarian supply chains bear tremendous potential for further improvements to provide more assistance with limited resources available.

**Research limitations/implications** – In particular, humanitarian supply chains in conflict situations and procurement processes offer potential for impactful and relevant research. Whilst our study focuses on international organizations, future research should give more attention to supply chain cost structures of local actors to reveal further untapped potential.

**Practical implications** – Our findings equipped supply chain leaders with fact-based evidence of the value of supply chain management and supported them in strategic meetings with their executive management and donors. Furthermore, we identified major cost-saving potentials.

**Social implications** – For researchers (and practitioners), our findings serve as motivation to intensify their efforts in studying and enhancing supply chain management in the humanitarian context.

**Originality/value** – This paper fulfils an identified need to study and provide empirical evidence of the value of supply chain management in the humanitarian context.

**Keywords** Supply chain management, Humanitarian operations, Unmet humanitarian requirements, Fact-based evidence, Cost-efficiency

**Paper type** Research paper

## Introduction

In his seminal paper “Humanitarian Aid Logistics: Supply Chain Management in High Gear”, [Van Wassenhove \(2006\)](#), emphasizes the need for raising the profile of supply chain management (SCM) in the humanitarian context. In particular, he urges top management to recognize the value of SCM for operational success and involve supply chain staff in strategic decision-making processes. More than 15 years later, the supply chain has significantly moved up on the agendas and is commonly considered as the backbone of humanitarian operations ([Lewin et al., 2018](#)). Many humanitarian organizations have installed corporate functions at their headquarters and senior positions at

regional and country levels. Recent events such as the COVID-19 pandemic and the Ukraine crisis have brought the consequences of supply chain disruptions into our every-day life and negatively impacted humanitarian programs in many parts of the world ([GLC, 2020](#); [O’Sullivan et al., 2020](#)). This development puts the supply chain much more in the spotlight and raises expectations in regards to accountability and performance.

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In preparation for the first World Humanitarian Summit in 2016, a group of humanitarian supply chain leaders came together to elaborate on how to make their voices heard when they are invited to executive and high-level meetings. Those discussions marked the starting point for our research to explore the state and the value of SCM in the humanitarian context. When brought to executive boards, [Hoberg et al. \(2015\)](#) suggest that SCM should deliver exceptional value, quantify the value provided and excel in communicating it. Moreover, [Hoberg et al. \(2015\)](#) recommend to deliver messages that stick to executives. Traditionally, it is challenging for logistics and supply chain staff to convince others of the importance of their work ([Van Wassenhove, 2006, 2022](#); [Hoberg et al., 2015](#)). Also, the academic sector faces challenges in its effort to support humanitarian organizations with empirical research and evidence-based studies in that regard ([Kunz et al., 2017](#); [Kovács et al., 2019](#)).

Van Wassenhove's statement that 60–80% of the total response cost can be found in the supply chain ([Van Wassenhove, 2006](#)) is one of the few examples where the value of humanitarian supply chains is quantified. Communicating to the executive board in times of a continuously growing funding gap ([OCHA, 2022](#)) that SCM directly affects the majority of the organization's spend is a powerful message that sticks. Interestingly, the “60–80 statement” has never been analyzed in more detail nor has it ever been confirmed. What if Van Wassenhove's conclusion had been based on wrong assumptions? Is it true for all organizations and types of relief operations? What are main cost drivers and where exactly in the supply chain do most costs occur?

To answer those questions, to equip supply chain leaders in the humanitarian space with fact-based evidence about their relevance and to identify major cost-saving potentials, we follow a two-fold research approach that is based on an exploratory and an inductive phase ([Figure 1](#)).

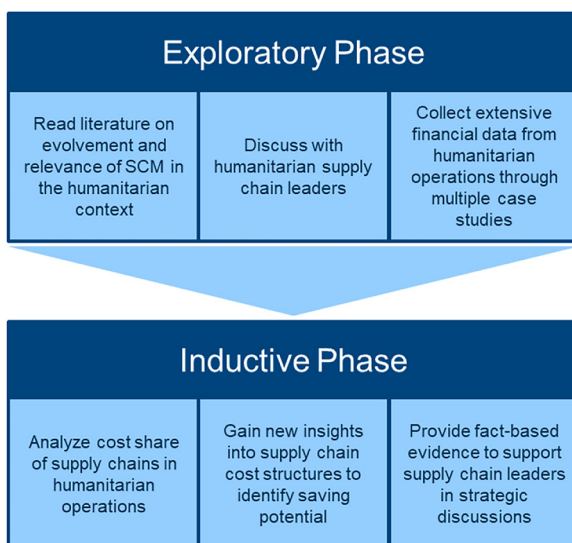
Based on our review of existing literature and reports, we start our paper with a discussion on the growing relevance of humanitarian supply chains to demonstrate the long way the sector has come since the early 2000s. Subsequently, we present our analysis of financial data amounting to EUR 276 million expenses

across 20 operations carried out by five humanitarian organizations in 14 countries between 2005 and 2018. This analysis shows that 74% of the total cost is in the supply chain, supports the “60–80% statement” and equips supply chain leaders with fact-based evidence on their value in high-level meetings with top management, donors and governments. The European Civil Protection and Humanitarian Aid Operations (DG ECHO) presented our findings in their new Logistics Policy ([ECHO, 2022](#)). The new insights into cost structures of humanitarian supply chains allow us to make practical suggestions on promising cost reduction measures. In regards to our contribution to research, we deliver empirical evidence on why research in humanitarian SCM is indeed essential. By providing a very first empirical analysis of supply chain cost, we highlight research fields with large impact and give directions for future research agendas.

### Evolution of humanitarian supply chain management: from back-office function to acknowledged backbone of humanitarian operations

In the early 2000s and before, many humanitarian organizations considered logistics and SCM a typical back-office function with little to no involvement in planning, budgetary discussions and strategic decision-making ([Van Wassenhove, 2006](#)). Ever since, the acknowledgement of logistics and SCM as a critical success factor for humanitarian operations has been steadily increasing ([Kunz et al., 2017](#); [Lewin et al., 2018](#)). During the last 25 years, the number of academic publications per year has multiplied more than tenfold ([Leiras et al., 2014](#); [Jabbour et al., 2017](#), [Burkart, 2020](#)). A dedicated journal targeting researchers and practitioners has been established and the opportunities for impactful research are considered to be larger than ever ([Besiou and Van Wassenhove, 2019](#)). Likewise, even though not at the same pace as the number of publications, the field of education has evolved, with many universities offering degree programs and specializations complemented by training providers offering courses at operational, tactical and strategic levels. Conferences such as the African Logistics Conference (ALC) and the Health and Humanitarian Logistics Conference (HHL) bring together hundreds of experts from all sectors on an annual basis to share latest findings and discuss current and future challenges and opportunities. Probably most importantly, the topic of SCM has moved higher up on the agendas of many humanitarian agencies. The advocacy work from the Global Logistics Cluster (GLC), HELP Logistics of the Kuehne Foundation and networks such as the Réseau Logistique Humanitaire (RLH) and the Humanitarian Logistics Association (HLA) has begun to pay off. For example, this became obvious during the World Humanitarian Summit in 2016, where the humanitarian supply chain was claimed to play a key role in the sector's ambition to improve assistance and effectively meet ever-increasing needs ([Lewin et al., 2018](#)). The last five years we have noticed many humanitarian organizations that have started to embed SCM in their DNA, to install senior supply chain positions in their structures and to increasingly discuss SCM topics at board level. The findings of a recent representative survey ([CHORD, 2022](#)) on the “State of Logistics and Supply Chain Management in the Humanitarian Context” confirm this

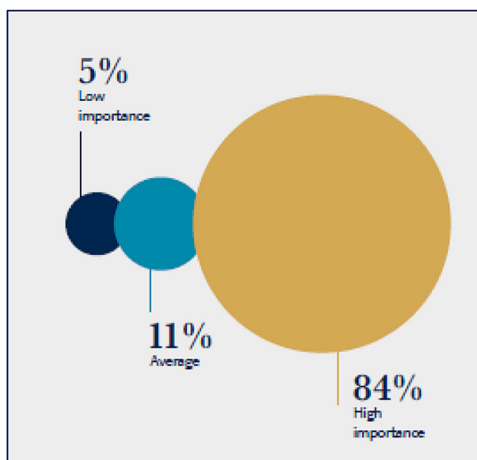
**Figure 1** Research approach



development. 84% of the 532 respondents considered SCM a highly important or absolutely essential function in the sector (Figure 2). This high recognition was consistent across the different sectors (commercial, humanitarian and governments) as well as different organizational levels (HQ, Regional, Country and Field Office) surveyed. Moreover, 55% of the respondents reported a high level of systematic investments in their supply chains (Figure 3).

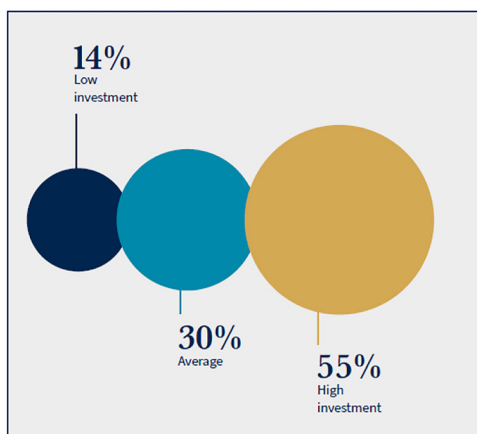
These investments are possible because of an increasing support from donors such as the DG ECHO, which states in its new Logistics Policy that “all humanitarian operations depend on logistics, and logistics should be treated as a key priority in all humanitarian projects” (DG ECHO, 2022). When highlighting the importance of the supply chain, most experts refer to its effectiveness (in regards to timely delivery) and efficiency (in regards to cost) of a response operation (Haavisto and Kovács, 2014). Interestingly, besides Van Wassenhove’s often quoted assumption that 60–80% of total emergency response cost is in the supply chain (Van Wassenhove, 2006), there is little evidence on what share the supply chain has in disaster response budgets.

Figure 2 Importance of supply chains



Source: CHORD (2022)

Figure 3 Level of supply chain investments



Source: CHORD (2022)

The growing recognition and additional funding opportunities will lead to higher demand for accountability and increase the pressure for efficient usage of funds and enhanced operational performance. In this context, gaining a better understanding of supply chain cost structures overall is an essential first step to provide further visibility and identify saving potentials.

### Supply chain expenditure analysis based on multiple field studies

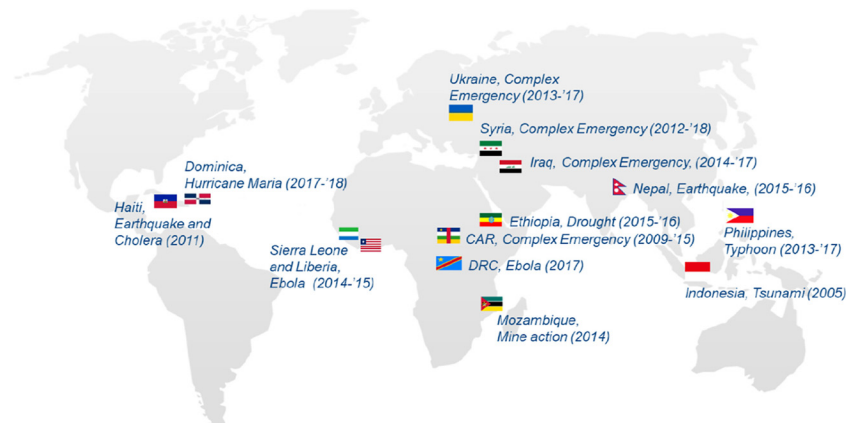
Field studies are commonly declared as a suitable method to empirically investigate real-world examples in particular in the context of SCM (McCutcheon and Meredith, 1993; Seuring, 2008; Vega, 2018; Hein *et al.*, 2020). Field studies as well as in-depth interviews and discussions with experts are essential for researchers to access rich data and understand the operational reality of humanitarian actors (Spens and Kovács, 2006; Besiou and Van Wassenhove, 2015; Baharmand *et al.*, 2022). Between 2016 and 2018, we worked with five humanitarian organizations remotely and supported them on-site in extensive supply chain expenditure analysis projects. Through this approach we were able to collect large financial data sets from their information systems and conducted interviews with over 15 senior supply chain staff from the respective organizations to cleanse, categorize, analyze and validate the data.

Overall, we collected financial data from **20 operations carried out by five medium to large size international organizations in 14 countries between 2005 and 2018** (Figure 4). The organizations have their global headquarters in Europe and operate with annual budgets of between EUR 90 million and EUR 1 billion.

We categorized the organizations’ expenses as supply chain and non-supply chain related cost (Table 1) in workshops with the participating humanitarian organizations and by building on the definition from Thomas and Kopczak (2005): “Supply chain management in the humanitarian context is the process of planning, implementing and controlling the efficient, cost-effective flow and storage of goods and materials, as well as related information, from the point of origin to the point of consumption for the purpose of alleviating the suffering of vulnerable people. The function encompasses a range of activities, including preparedness, planning, procurement, transport, warehousing, tracking and tracing, and customs clearance” (Thomas and Kopczak, 2005, p. 2). Since every organization has a different finance system in place with different terms and classifications, we defined the categories as generically enough as possible, so all expenses could be clearly identified and categorized. We included expenses for cash transfer programs in supply chain related cost as we consider those programs as outsourcing of procurement to the beneficiaries and therefore as integral part of SCM. This decision was made in accordance with the feedback received from the humanitarian organizations.

We conducted the categorization process in close collaboration and consultation workshops with the respective organizations. After receiving the raw data, we completed a first analysis to categorize the expenses. In a second step, we clarified pending questions and validated the categorization made in expert interviews.

Overall, we collected and analyzed operational expenditures of EUR 276,607,361. Following our categorization of supply chain and non-supply chain items, we found (Table 2) that the

**Figure 4** Emergency operations under study**Table 1** Supply chain and non-supply chain expenses

| Supply chain expenses  | Non-supply chain expenses                                      |
|--|--|
| Logistics and supply chain staff salaries  | Program staff salaries (WASH, Shelter, Health etc)             |
| Procurement (incl. relief items, infrastructure rehabilitation, cash transfer programs)                            | Workshops and seminars (not supply chain related)              |
| Transportation   | Management and administration support (Finance, HR)            |
| Warehousing  | Legal and license fees (e.g. lawyer and notary cost, audits)   |
| Other general supply chain expenditures (security, IT and communication, office running cost, staff traveling etc) | Donor relationship management (e.g. fundraising and reporting) |

supply chain expenses ranged between 25 and 83% of the total cost, with an **overall average of 74%** (equal to EUR 203,338,973).

Across all 20 emergencies, the percentage varies between 59% and 81%, except for the drought response in Ethiopia (47%) and the Ebola response in DRC (25%). In both cases, organization 2's focus was predominantly on supporting implementing partners in the country without having any major supply chain set-up on the ground.

When taking a closer look at the expenses in the different types of emergencies (Figure 5), we can see that conflicts come with the highest share of supply chain expenses (80%), followed by natural disasters (67%) and pandemics (64%). The security and access restrictions certainly play a major role in the high supply chain cost for operations in conflict zones. It is worth mentioning that none of the organizations under study have a very strong health focus. Subsequently, they are not necessarily at the frontline with large volumes of medical supplies, equipment and people movements, such as in the cases of WHO, UNICEF or MSF. Supply chain cost of those organizations would probably be at the higher end, in particular in their responses to the complex Ebola or COVID-19 operations with many access restrictions and supply chain interruptions in place.

In terms of the expenses by different regions (Figure 6), the Middle Eastern region is clearly impacted by operations in relation to armed conflicts in Syria and Iraq and their high share of supply chain cost (Table 2).

When breaking down the supply chain expenses (Figure 7) by different categories, procurement is by far the largest expenditure

(74%), followed by transport (14%), personnel (6%), warehousing (2%) and other general supply chain cost (4%).

It needs to be noted that the percentages of the different categories vary significantly between organizations. For example, HO1 spends on average 39% of its total supply chain expenditure on procurement and 32% on transport, whereas HO2 spends 84% on procurement and 9% on transport (Figure 8).

Based on the data collected (many inconsistencies in the way organizations capture their financial supply chain data), it is difficult to clearly define where these differences are coming from. What can be said is that the sizes of these two organizations differ (HO1 medium size, HO2 larger size) and that they generally operate in different settings (HO1 in a rather centralized setting and HO2 in a rather decentralized setting). Furthermore, the financial data for the two organizations have been collected from different relief operations in different countries. On the other side HO1, HO3 and HO4 that are of similar size, have more similar supply chain expenditures breakdowns across all disasters under study (Figure 9). This is also the case when looking only at the Nepal earthquake emergency that all three organizations responded to (Figure 10).

We also see that if local markets are not available, more international air shipments from international suppliers or global pre-positioning stocks bring up the transport cost. The same logic applies with staffing cost, since in case the organization does not have sufficient capacity in the countries, expensive international deployments are required. The procurement expenses increase if for example major infrastructure investments to rehabilitate ports or airports,



Table 2 Supply chain expenses by response operation

| Organization                      | Country                           | Emergency response operation | Time period      | Total operational cost (EUR) | Supply chain cost (EUR) | Percentage supply chain cost vs total cost (%) |
|-----------------------------------|-----------------------------------|------------------------------|------------------|------------------------------|-------------------------|--|
| Humanitarian Organization 1 (HO1) | Central African Republic          | Conflict                     | 2009–2015        | 5,068,584                    | 3,988,978               | 79   |
|                                   | Haiti                             | Cholera                      | 2010–2011        | 3,216,202                    | 2,293,958               | 71   |
|                                   | Haiti                             | Earthquake                   | 2010–2011        | 21,611,161                   | 14,376,446              | 67   |
|                                   | Indonesia                         | Tsunami                      | 2005             | 862,190                      | 612,502                 | 71   |
|                                   | Liberia and Sierra Leone          | Ebola                        | 2014–2015        | 6,679,498                    | 4,201,812               | 63   |
|                                   | Nepal                             | Earthquake                   | 2015             | 1,667,233                    | 1,025,610               | 62   |
| Humanitarian Organization 2 (HO2) | Dominica                          | Hurricane                    | 2017–2018        | 4,164,397                    | 2,732,736               | 66   |
|                                   | Democratic Republic of Congo      | Ebola                        | 2017             | 294,765                      | 75,012                  | 25   |
|                                   | Ethiopia                          | Drought                      | 2015–2016        | 2,577,238                    | 1,022,109               | 40   |
|                                   | Iraq                              | People movement              | 2016–2017        | 2,019,242                    | 1,348,330               | 67   |
|                                   | Philippines                       | Typhoon                      | 2013–2017        | 69,050,335                   | 47,154,220              | 68   |
|                                   | Syria                             | Conflict                     | 2012–2018        | 130,938,945                  | 106,062,708             | 81   |
| Humanitarian Organization 3 (HO3) | Ukraine                           | Conflict                     | 2013–2017        | 5,193,256                    | 3,043,135               | 59   |
|                                   | Nepal                             | Earthquake                   | 2015–2016        | 2,571,803                    | 1,671,697               | 65   |
|                                   | Mozambique                        | Mine action                  | 2014             | 3,896,560                    | 2,356,379               | 60   |
|                                   | Philippines                       | Typhoon                      | 2014–2015        | 6,236,333                    | 3,852,405               | 62   |
|                                   | Sierra Leone                      | Ebola                        | 2015–2016        | 3,559,154                    | 2,334,758               | 66   |
|                                   | Humanitarian Organization 4 (HO4) | Central African Republic     | Conflict         | 2014–2016                    | 1,113,067               | 801,559  |
| Nepal                             |                                   | Earthquake                   | 2015             | 5,033,331                    | 3,675,568               | 73   |
| Humanitarian Organization 5 (HO5) | Iraq                              | Conflict                     | 2014             | 854,067                      | 709,050                 | 83   |
| <b>Total</b>                      |                                   |                              | <b>2005–2018</b> | <b>276,607,361</b>           | <b>203,338,973</b>      | <b>74</b>                                      |

Figure 5 Supply chain expenses by type of disaster

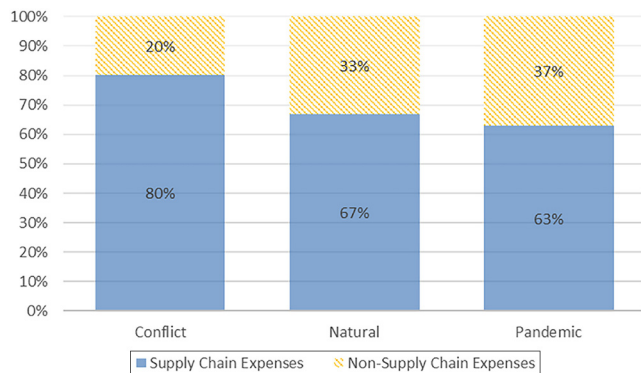
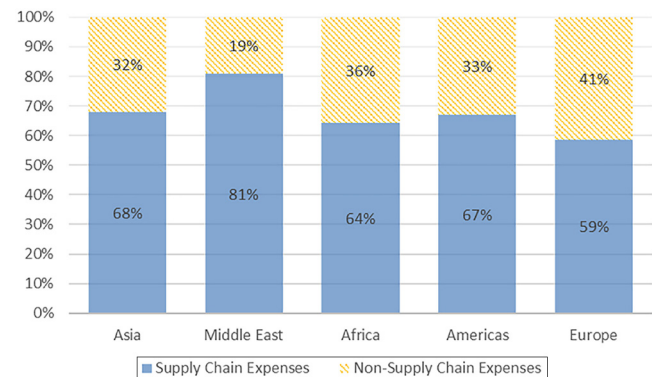


Figure 6 Supply chain expenses by geographical region



roads or bridges are required, if there are cash and voucher programs as part of the response or simply costly equipment and relief commodities are needed. Through the findings of our supply chain expenditures, we can provide empirical evidence for many widely-spread assumptions. Ultimately, we demonstrate that supply chain expenditures are driven by the local context in and around the disaster zone, the type of response, the humanitarian needs, as well as the size and operational setting of the organization.

### Discussion on cost saving potentials

Looking at the high share of procurement expenses, significant saving potential can probably be found here. Further studies would be needed, in particular in view of current discussions of

international versus local procurement or the extension of cash and voucher transfer programs (Heaslip et al., 2018a,b). Enhancing and professionalizing procurement skills of staff, gaining a better understanding of (local) markets, and improving relationships with suppliers, e.g. through framework agreements and pooling of procurement efforts between organizations, are some of the strategies humanitarian actors could invest in (Gossler et al., 2019; Bhusiri et al., 2021; Wankmüller and Reiner, 2021). One interesting case study in this context is the program that HELP Logistics and the Chartered Institute of Procurement and Supply (CIPS) set up for the Philippine Red Cross (PRC) in 2019 as part of a larger preparedness investment initiative (IFRC, 2021). 16 PRC and 4 IFRC staff attended the 6-month program that consisted of three elements, namely 1) Strategic Sourcing and Markets

Figure 7 Supply chain expense by expense category

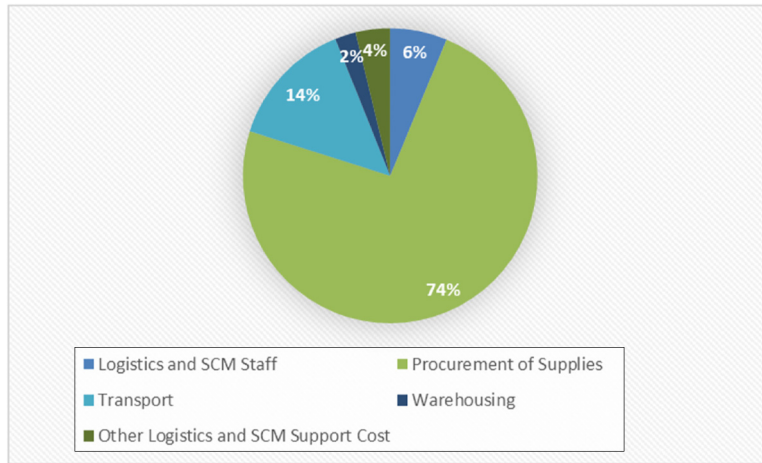


Figure 8 HO1 and HO2 procurement and transport spend across all disasters under study

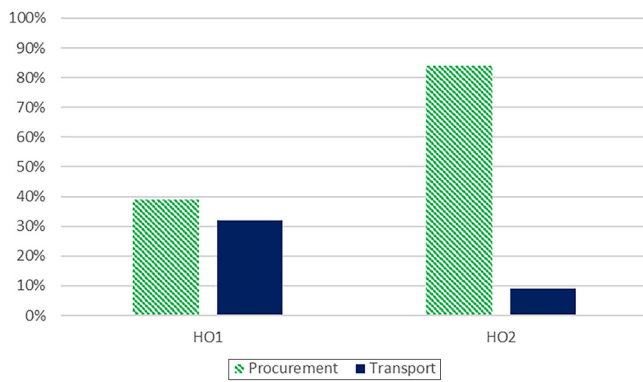


Figure 10 HO1, HO3 and HO4 procurement and transport spend in Nepal response

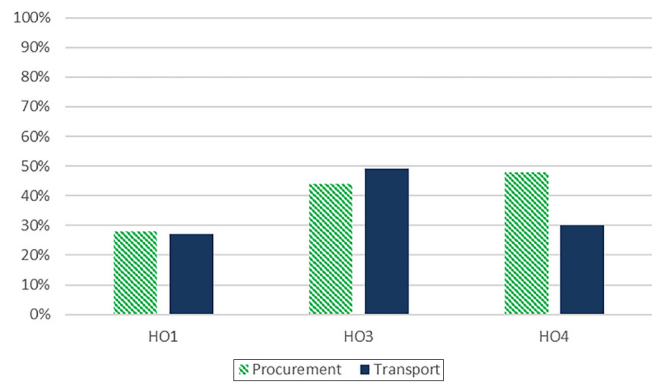
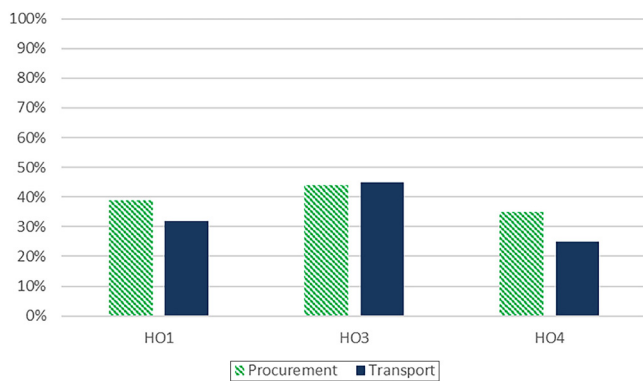


Figure 9 HO1, HO3 and HO4 procurement and transport spend across all disasters



assessment for a specific commodity. The program did not only advance the knowledge of the PRC and IFRC staff, but also triggered PRC to establish a number of new framework agreements with customs brokers and suppliers of items critical for PRC’s relief operations, fleet-related items and hygiene kits. “Based on the learnings through this activity, the PRC has started to develop framework agreements that are aiming to support effective humanitarian assistance and reduce PRC operational cost” (IFRC, 2021). Due to a growing demand for professional procurement skills, HELP Logistics is planning to roll out the program in other countries and regions such as Eastern Europe, Madagascar and the Middle East starting in Q4 2022.

With transport and personnel being the second and third largest expenditure category in the supply chain, we also see here the need for further efficiencies. To reduce transport cost, organizations have to find ways to avoid unnecessary air shipments and improve utilization of available transport capacities (RLH, 2019; Munyaka and Yadavalli, 2021; Peters et al., 2022). Enhanced supply chain planning has tremendous potential to bring down operational cost and improve performance overall (Peters et al., 2022). A team around WFP’s supply chain planning unit has won the Franz

Assessments, 2) Contract Management and Framework Agreements, and 3) Supplier Relationship Management. Each element included a two-day training session followed by practical assignments, where the participants had to apply their newly acquired knowledge and run for example a market

Edelmann Award 2021 on the innovation they have brought to the sector in this field (INFORMS, 2021). To avoid planes and trucks going half empty (or even worse), organizations pooling and sharing their supply chain services can make a real difference. The Global Logistics Cluster, the Réseau Logistique Humanitaire (RLH) or Atlas Logistique are strongly moving into this direction and aim to bring coordination to the next level.

When looking at personnel cost, recent studies have found that international deployments can be 5–15 times more expensive than local staff in equal positions (HELP, KLU and ACF, 2018). Investments in supply chain education (at university and practitioner levels) have tremendous potential to enhance competencies of local staff as well as future talent (Kovács and Spens, 2011; Allen *et al.*, 2013; Heaslip *et al.*, 2019) and to reduce the dependency on costly international experts (HELP, KLU and ACF, 2018).

Our expenditure analysis has shown that supply chain costs are particularly high in relief operations caused by armed conflicts. Overcoming access and security restrictions is a challenging and costly task. Local organizations have commonly a better understanding of the local context and stronger relationships with authorities and communities (Sheppard *et al.*, 2013; Matopoulos *et al.*, 2014). As seen in Syria and currently in the Ukraine, local organizations such as the National Red Cross and Red Crescent Societies can bring significant improvements and often take a leading role in the response (SJAC, 2019; Ukrainian Red Cross, 2022). Enhancing the supply chain capacity of those organizations (as well as supporting them in their efforts to stay neutral and impartial, which is often a challenge in conflicts) should be high up on the agenda of preparedness and intervention plans.

For more detailed analysis and cost optimization efforts, we clearly identify in our expenditure studies the need for better and more consistent capturing, classifying, labeling and referencing of financial logistics and supply chain data in the organizations' information systems (Peters *et al.*, 2022). In the best case, organizations would consider sharing these data to allow real collaboration and enable pooling of supply chain services. IT systems such as the LINK system developed by Action Contre la Faim (ACF) and shared with other NGOs are one step in this direction and certainly bear potential for making the supply chain more efficient (RLH, 2019; Falagara *et al.*, 2020; Peters *et al.*, 2022).

## Conclusion

Based on the results of our expenditure analysis, we can re-confirm that SCM does indeed play a key role in the overall cost-efficiency of humanitarian relief programs. Moreover, we demonstrate that Van Wassenhove's (2006) statement on 60–80% of the response cost being in the supply chain holds true for the extensive financial data under study. Subsequently, only a small percentage of cost savings in the supply chain will have a strong impact on the overall budgets. Therefore, the supply chain has a great potential for humanitarian programs to deliver more assistance with limited resources available. Executive levels should be aware of this fact and include SCM staff in their decision-making processes right from the start. Supply chain leaders on the other hand need to make sure they join

those strategic meetings with a clear message on the value they can add to the organizational success.

For researchers, our findings serve as motivation to intensify their efforts in studying SCM in the humanitarian context. With the first empirical study of SCM cost of different organizations operating in different missions in different countries, we identify that optimization of procurement activities and supply chains in the context of man-made disasters is particularly relevant. While all organizations under study have a large share of their total expenses in the supply chain, there are major differences in their spend on the different parts of the supply chain. More research will be needed to study those differences to ultimately support humanitarian organizations to identify the most impactful saving potentials and optimize their response cost. Since all five organizations under study have their headquarters in Europe, they represent the traditional international setting. In view of the growing relevance of local actors, further insights into supply chain cost structures of local organizations are needed to get a better picture of the humanitarian sector at large and identify further saving potentials.

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