

# Toward a common humanitarian supply chain process model: the Frontline Humanitarian Logistics Initiative

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## Abstract

**Purpose** – This study focuses to develop a common humanitarian supply chain process model (HSCPM) that enables effective enterprise resource planning (ERP) systems for NGOs, and the study also investigates the role of modularity as a dynamic capability that supports creating such model.

**Design/methodology/approach** – A multifocus group study was performed as part of a larger project, the Frontline Humanitarian Logistics Initiative, aiming to establish a common data model that would serve as the backbone of humanitarian ERP systems. Fourteen international humanitarian organizations (IHOs) participated in the process, reaching a consensus on the structure of the process model.

**Findings** – An HSCPM was proposed based on the consensus reached across IHOs. Four degrees of customization differentiating between “generic,” “tailored,” “specific,” and “unique” processes are presented and discussed.

**Research limitations/implications** – The findings show modularity applied to process as a mean to create dynamic efficiencies and position the modular process model within the dynamic capabilities framework, supporting supply chain responsiveness and expanding the literature on supply chain management (SCM), dynamic capabilities, and humanitarian logistics.

**Practical implications** – This research proposes a consensus-based data model, facilitating the advancement of ERP systems in the humanitarian context and lays a foundation for interoperability among ERP systems across diverse IHOs.

**Originality/value** – First attempt to elucidate the specific characteristics and unique processes defining an HSCPM, this study reached an unprecedented consensus for the humanitarian sector, setting the base toward an industry standard.

**Keywords** Process design, Humanitarian logistics, Modularity, Humanitarian supply chain, Supply chain responsiveness, Process modularity

**Paper type** Research paper

## 1. Introduction

Saving lives and reducing the suffering of affected populations are the primary goals of humanitarian organizations despite the complex characteristics of the context in which humanitarian aid is delivered (Schiffling *et al.*, 2022)—such as, extreme uncertainty (Day, 2014);



time pressure (Dubey *et al.*, 2019); a considerable number of stakeholders with different views, objectives, and capability levels (Hilhorst *et al.*, 2019); and inadequate administrative or governmental structures (Day *et al.*, 2012). Logistics and supply chain management (SCM) have been considered the “backbone” of humanitarian operations (Lewin *et al.*, 2018), constituting an average of 74% of total costs (Stumpf *et al.*, 2022). Thus, international humanitarian organizations (IHOs) can respond to external disruptions based on their supply chains’ capacity to react to sudden changes (L’Hermitte *et al.*, 2015) which in the academic literature is known as supply chain responsiveness.

Supply chain responsiveness “denotes the capability of a firm to deploy resources available along the supply chain to identify and react to market changes” (Kim and Lee, 2010, p. 964) and is linked to an organization’s structure, resources, abilities, and capabilities, and their reconfiguration within changing environments (Richey *et al.*, 2022). Supply chain responsiveness is recognized as a function of organizational dynamic capabilities, embedding the root of responsiveness in organizational processes (Singh *et al.*, 2019). Therefore, IHOs’ ability to respond is largely related to their supply chain processes. The academic literature has investigated humanitarian supply chain (HSC) processes from a performance measurement perspective (see Abidi *et al.*, 2014), with less attention paid to process models (e.g., Blecken, 2010), the role of information systems (Gavidia, 2017), or how these models and systems (particularly enterprise resource planning; ERP) allow interorganizational collaboration and coordination (Falagara Sigala *et al.*, 2020). Simultaneously, process modularity has been demonstrated to support supply chain responsiveness in terms of activation, deactivation, and resequencing of processes to improve responsiveness by eliminating time-consuming nonessential tasks, relieving bottlenecks, and facilitating resource allocation and prioritization (Saïah *et al.*, 2022). Despite great technological advances in the past decade, IHOs lag behind in terms of information systems to manage their operations (Altay and Labonte, 2014; Comes and Van de Walle, 2016). Systems such as Helios (Oxfam), LINK (ACF), or Unifield (MSF) share similarities with other ERPs but often lack integration and effective alignment of field, headquarters, and other IHOs (Falagara Sigala *et al.*, 2020). Thus, humanitarian ERP systems need to support both supply chain responsiveness and links across IHOs. Recently, research has established some of the unique features of humanitarian operations and their requirements for ERP systems (Falagara Sigala *et al.*, 2020; Kolioussis *et al.*, 2022), repeating call by Blecken (2010) for common humanitarian process models serving as backbone of ERP systems. Such is the purpose of this research, leading to the following two research questions:

- RQ1. How does process modularity support the establishment of a common process model for the humanitarian sector to ensure supply chain responsiveness?
- RQ2. How would the establishment of a common process model for the humanitarian sector enable more effective ERP systems for IHOs?

A multifocus group study was designed to support a group of IHOs forming the Frontline Humanitarian Logistics Initiative, seeking to establish a common data model on top of which humanitarian ERP systems could be built. The study created a common humanitarian supply chain process model (HSCPM), defined specificities of HSC processes, and suggested a modular structure that enables process module (re)combinations within and across organizations, supporting both supply chain responsiveness and collaboration across IHOs.

The article is structured as follows. Section 2 reviews the literature on supply chain processes and modularity, and process modularity in HSCs, before presenting the methodological considerations in Section 3. Section 4 focuses on the findings from the study, while Section 5 discusses these findings in light of the literature. The article concludes with some limitations and further research.

## 2. Theoretical background

### 2.1 Supply chain processes and modularity

Supply chain management highlights the importance of processes that connect functions and various supply chain members (Croxtton *et al.*, 2001), whereby processes structure activities between supply chain members (Lambert *et al.*, 2005). Core business processes, initiated outside an organization, and supportive processes, creating the conditions to carry out core processes, are distinct (Aguilar-Savén, 2004).

Cooper *et al.* (1997) and Lambert *et al.* (1998) established the first supply chain management framework (SCMF) with seven supply chain business processes as key components: customer relationship management, customer service management, demand management, order fulfillment, manufacturing flow management, procurement, product development and commercialization, and returns channel. The supply chain operations reference (SCOR) model, a somewhat different process model, was proposed by the Supply Chain Council (SCC) in 1997 (Stewart, 1997). SCOR defines following four processes: plan (demand/supply management and plan infrastructure), source (sourcing/material acquisition and source infrastructure), make (production execution and creating infrastructure), and deliver (demand, order, warehouse, transportation, and installation management and delivering infrastructure), and returns process was added later as the fifth process.

Process reference models not only define interfaces across organizations, facilitating process modeling, optimization, and redesign, but also collaboration and ERP implementation, drawing on the commonalities of processes across organizations and forming the basis of common data models. However, despite their premise of creating a cross-industry framework to evaluate and improve supply chain performance (Stewart, 1997), an “industry standard” has not yet been established (Lambert *et al.*, 2005). Organizations constantly redesign their business processes to align their operational practices with changing business requirements (Ackoff, 1962). Aldin and de Cesare (2011, p. 19) discussed “process mining” to discover patterns that help organizations to “understand common “chunks” of organizational behavior that can be specialized and instantiated when required.” Fine (1998, p. 145) described these process “chunks” as modules, offering modularity as a strategy for industry-specific process development or customization.

Fine *et al.* (2005) defined process modules as “standardized groups having few strong ties,” which are autonomous and can be quickly (de)activated, decoupled, or resequenced, according to changes in the environment (Vickery *et al.*, 2016). Process modularity is achieved when process components or subprocesses “can be reconfigured with little loss of function” (Schilling and Steensma, 2001). For this to occur, modular systems must rely on hidden design parameters, i.e., the module as a “black box” only complying with general rules and otherwise remaining entirely free, and visible design rules that integrate the modules into a system as a whole (de Waard and Kramer, 2008). Visible design rules, or visible information, can be divided into following three parts (Baldwin and Clark, 1997):

- (1) The *architecture* defines modules, as parts of the system, and their functions, and aims to find the right structure, enabling the best system decomposition and minimum interdependencies.
- (2) The *interfaces* that describe interactions between modules and aim to reach easy plug-and-play through standardization.
- (3) The *standards* that test modules’ conformity to the design rules and performance measurement and aim at counterbalancing the performance advantages of specific combinations (synergies).

Across organizations, these visible design rules must be followed for processes and process modules to link up, whereas there can be hidden design parameters within modules that are not communicated beyond the boundaries of the module. In that sense, process modules can evolve autonomously while keeping standard interfaces (i.e. general rules) to other modules in order to support the overall structure (Pil and Cohen, 2006).

## 2.2 Process modularity in humanitarian supply chains

The application of modularity in HSCs is logical, considering their disruption-prone context and complexity of simultaneously managing emergency relief and continuous aid activities (Jahre *et al.*, 2009). However, existing research on process modularity in HSCs is limited, as most studies focus on products' modularity. For instance, Chandés and Paché (2010) talk about "modular survival," referring to standard survival kits as a basic component of reaction for HSCs, and Scholten *et al.* (2010) refer to "modules" as a product design principle that enables postponement and leads to agility. Process standards and modularity have been studied within specific IHOs, for, e.g. Jahre and Fabbe-Costes (2015) focused on the emergency response units of the International Federation of Red Cross and Red Crescent Societies and linked their modularity with supply chain responsiveness, improving the latter. The only study exclusively about process modularity in the humanitarian context is that of Saïah *et al.* (2022) who empirically demonstrated that modular processes and a modular structure at MSF allow for the reconfiguration of processes in response to a disruption, ultimately achieving supply chain responsiveness. However, the authors neither specified its application in other IHOs or as an industry standard nor the supply chain processes specific to humanitarian IHOs.

Several attempts made to define HSC processes (Fontainha *et al.*, 2022) differ in levels of detail and numbers of processes, ranging from 5 (Çelik *et al.*, 2015; Franke *et al.*, 2013) to 115 processes (Blecken, 2010). Their architecture focuses either on HSC functions (e.g., assessment, procurement, warehousing, transport, distribution, and evaluation) or thematic processes (e.g., recognition of the disaster occurrence, search, and rescue, (re) establishment of infrastructure in the response, and demobilization) (Fontainha *et al.*, 2022). Other differences are either in terms of context (i.e., specific to a disaster type) or different actors and their perspectives (e.g., governments, international aid network, or other stakeholders). Regarding ERP systems for HSCs, the adoption of information systems has been slower in IHOs than their commercial counterparts. Initially, individual IHOs transitioned from paper-based systems to generic productivity software and independent systems for various functions, which lacked the ability to generate crisis-specific responses and provide full integration within IHOs and across HSCs (Gavidia, 2017).

Behl and Dutta (2019) noted the importance of process analysis and models that allow for HSC standardization. Blecken (2010) suggested several benefits of process models and a process management approach for response operations, including the promotion of a common and unified process language within and between IHOs, transparency, better cooperation and communication, promotion of best practices, and use of more efficient and effective processes. The existing standards need to be adapted for HSCs due to the specificities of the context in which they operate. The multitude of contexts demands a balance between general and specific processes. Therefore, an HSCPM must be general enough to be used by practitioners across different contexts but specific enough to fit HSC requirements (Fontainha *et al.*, 2022). De Vries and Van Wassenhove (2020) confirmed such a perspective related to the importance of general models instead of specific models for practitioners.

Importantly, what is regarded as generic or common across IHOs, are also the features of a process that needs to be added to a reference model for the humanitarian context, and by

extension, to their common data models and information systems. That said, there is still no consensus on an industry standard for the humanitarian sector (Fontainha *et al.*, 2022), or how such a common data model should look like.

### *2.3 Process modularity as a dynamic capability for humanitarian supply chains*

The dynamic capabilities framework by Teece (2007) offers a pathway to firms for achieving and sustaining a competitive advantage in an ever-changing environment. Dynamic capabilities involve leveraging a firm's specific competencies to address environmental changes (Teece *et al.*, 1997). Capabilities can be viewed at two levels: the base level, encompassing ordinary capabilities, and the higher level, comprising dynamic capabilities. Ordinary capabilities consist of routine activities, administration, and basic governance that allow an organization to efficiently pursue a production program or a defined set of activities (Teece, 2018), and dynamic capabilities define a firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments (Teece *et al.*, 1997).

Modularity has been recognized as creating "dynamic efficiencies" (Sanchez and Mahoney, 1996, p. 74), and product modularity has been positioned as a dynamic capability (Teece *et al.*, 1997). Within the strategic management literature, product modularity has been investigated in terms of its impact on innovation and technological transition (MacCormack and Iansiti, 2009), organizational modularity, and the mirroring hypothesis (Karim, 2006, 2012) in relation to knowledge management (Karim, 2012; Ravishankar and Pan, 2013). Fixson (2005) acknowledged the potential of modular process architecture as a dynamic capability in SCM, focusing on the development of such a modular product architecture. Jahre and Fabbe-Costes (2015) expanded this research to logistics system networks, suggesting that modularity is a potential source of adaptability for dynamic flexibility. Fine (2009) extended the perspective of modularity as a key to competitive advantage in dynamic environments. Eckstein *et al.* (2015) further extended the view of product modularity as a dynamic capability that positively moderates supply chain adaptability and agility, thereby enhancing overall firm performance. Vickery *et al.* (2016) position product modularity as a dynamic capability antecedent that increases product launch speed. The dynamic capabilities perspective has also been explored to investigate product modularity as a key to competitive advantage in the supply network (Jin and Edmunds, 2015), as a technological and innovative competitive advantage (Park *et al.*, 2018; Wang and Feng, 2019), and to achieve increased sustainability (Vos *et al.*, 2018). However, the application of the dynamic capabilities framework to process modularity remains limited.

Utilization of dynamic capabilities as a theoretical framework has been increasing in the context of HSCs to explore the relationship between dynamic capabilities and supply chain responsiveness; however, even by 2021, it remained limited in the context of HSC management (Polater, 2021) despite its benefits in dynamic, time-bound environments (Teece, 2018). As the literature expands, a better understanding of the role of dynamic capabilities in enhancing responsiveness in the humanitarian context is anticipated, which will inform strategies and practices for achieving more effective and efficient HSC operations (Schilke, 2014; Singh *et al.*, 2019).

## **3. Methodology**

This is a multifocus group study performed as part of a larger project, named the Frontline Humanitarian Logistics Initiative, that sought to establish a common data model to serve as the backbone of humanitarian ERP system(s). A collaborative research approach (Sabri *et al.*, 2019). For this, a series of preliminary meetings were held between the lead organization and

the academic team to codevelop the purpose and scope of the project, define research questions, establish the most suitable method for answering the research questions, co-define the action plan, and evaluate project outcomes.

The multifocus group method was chosen for its relevance for both research and practice and to ensure that the results of the study would inform subsequent data models and ERP development. Focus groups method is a research technique that “collects data through group interaction on a topic determined by a researcher” (Morgan, 1996, p. 130) and can be used to refine a conceptual model and understand the associations between variables to validate a conceptual model or guide a series of case studies, as the group sessions allow for the confirmation of case study design with regards to topics, scale, and scope (Krueger, 1998). Multifocus groups are especially useful to help elicit the requirements of information systems (Wu *et al.*, 2023), as they enhance the features of single-focus groups by engaging more interaction through iteration, generate abundant data, and lead to a more comprehensive understanding.

### 3.1 Data collection

The Frontline Humanitarian Logistics Initiative started with a “learning exercise” conducted among 14 participating IHOs, resulting in realizing the need for a common HSCPM. The Project Charter (denoted as Doc1), the elucidation of the Project Goals (Doc2), and the results from the Learning Exercise (Doc3) were provided as inputs for the multifocus group study.

The study started with the collection of extant process descriptions from IHOs that had any. Internal documents from eight IHOs included supply chain process mappings and descriptions, supply chain and logistics guidelines, standard operation procedures, and ERP manuals. Together, they formed the base of an initial understanding for this study that was conducted between April and July 2020 with a panel of 19 HSC experts (logistics directors, head of supply chain, ERP managers, or logistics project managers) with over 10 years of experience on average at both the headquarters and field levels (Table 1). The represented IHOs are globally recognized with extensive international operations, considerable experience, and broad expertise spanning preparedness and emergency response and the

No	Position	Organization	Experience
1	Senior Supply Chain Specialist	Action Against Hunger	12 years
2	Senior Information System Specialist	Action Against Hunger	14 years
3	Senior Supply Chain Specialist	ACTED	7 years
4	Senior Supply Chain Specialist	ACTED	14 years
5	Senior Supply Chain Specialist	British Red Cross	36 years
6	Senior Supply Chain Specialist	Concern International	2 years
7	Senior Supply Chain Specialist	Concern International	6 years
8	Senior Supply Chain Specialist	Catholic Relief Services	14 years
9	Senior Supply Chain Specialist	Catholic Relief Services	7 years
10	Senior Supply Chain Specialist	Danish Refugee Council	4 years
11	Senior Supply Chain Specialist	FHI 360	3 years
12	Senior Supply Chain Specialist	Goal	14 years
13	Senior Supply Chain Specialist	Handicap International	12 years
14	Senior Supply Chain Specialist	Islamic Relief Worldwide	9 years
15	Senior Information System Specialist	Marie Stopes	5 years
16	Senior Information System Specialist	Norwegian Refugee Council	16 years
17	Senior Supply Chain Specialist	Norwegian Refugee Council	14 years
18	Senior Information System Specialist	Oxfam	10 years
19	Senior Supply Chain Specialist	Save the Children	18 years

Source(s): Authors own creation

**Table 1.**  
Participant profiles



management of protracted crises. The study comprised one initialization (iteration 0), three two-hour sessions, and one closing-session webinars. Table 2 summarizes the iterations, the process levels they addressed, and the number of participants in each iteration.

Data from various iterations are henceforth referred to with their iteration and respondent codes (e.g., R0 for a statement of Participant R during iteration 0). Excel-based questionnaires were issued and analyzed before each webinar and between iterations.

Delphi step	Description	Process level addressed	# NGO represented	# Participants
Iteration 1	In the first iteration, the initial input of the first iteration was the version 0 of the process model, resulting from the Gioia. This preliminary version was presented as a starting point for discussion in the first webinar. (Webinar 1). During that webinar, participants provided feedback on level one processes, brought up level 2 processes that were of particular importance to them and starting to reach a consensus on the overall arching structure of the process model	L1	15	20
Questionnaire A	Following the webinar input and additional analysis, the research team asked participants in Questionnaire A to respond to the level of relevance and importance of both Level 1 and Level 2 of the process's model and L1 Data Entity Groups of the data models, including the accuracy of the terminology, using a 4-point Likert scale. Results were normalized using the respondent's confidence and analysed using the mode (i.e., response that occurs most)	L1 and L2	6	n/a
Iteration 2	Participants were presented with the results in Webinar 2, refining the overall structure of the model. Discussion including the overall agreement merging two level one processes, adding another level one process, adapting most level 2 processes and refining terminologies	L1 and L2	8	12
Questionnaire B	Following webinar 2 input, the Process Model was refined. The updated Level 1 and Level 2 processes and L1 Data Entity Groups were re-submitted for evaluation to participants in Questionnaire B. An important level of consensus was achieved at this point for the Process model	L2	8	n/a
Iteration 3	The agreement in the questionnaire enabled to reach a full verbal consensus on all remaining topics and on level 1 and 2 process definition within 45 min of Webinar 3. The remaining of the third webinar focused on the data model based on the process model	L2	12	15

**Table 2.**  
Delphi iterations'  
participation and  
responses

**Source(s):** Authors own creation

### 3.2 Data analysis

Initially, internal documents collected prior to the study were analyzed. The Gioia methodology for structuring data (Gioia *et al.*, 2012) was selected to organize the data into first-order concepts (Level-3 tasks), second-order themes (Level-2 subprocesses), and aggregated dimensions (Level-1 processes). The structured and rigorous process of this method helps to identify themes and patterns in textual data and provides clear guidelines for data coding and analysis, ensuring consistent and reliable interpretation of data. Although it can be time consuming and potentially subjective, the use of a three-round with multifocus group included the premise of a longtime engagement with the project and avoided subjectivity through validation of the project stakeholders.

Business process modeling notation (BPMN) was used to compare and consolidate HSC processes (Blecken, 2010). True to the collaborative research approach, a common starting point for analysis was agreed upon with the IHOs, resulting in a combination of related sector and industry (SCOR model) initiatives. Thus, the initial analysis contrasted the existing processes of the eight IHOs with SCOR and Blecken's reference models (see Table 3). The goal of this initial analysis was to identify common features of all IHOs in terms of content and structure.

While organizing the processes at the task level, as recommended by BPMN, similarities, and differences across IHOs were identified alongside differences in ontologies. "Level-3 tasks" were used as a basis for analysis and discussion; however, full details of tasks were never disclosed to all participants. All tasks linked to SCM were organized in an initial HSCPM draft "Version 0," in modular (Level-1) processes and (Level-2) subprocesses, following the SCOR model.

For data analysis during each iteration of the study, different techniques were combined based on the purpose of each type of data. First, thematic analysis (Braun and Clarke, 2006) was used to analyze the gathered documentation and categorize the processes according to previous academic and practitioner literature, allowing the emergence of new themes absent in the literature. Its results led to Version 0, which were further confirmed with the online questionnaires. Using four-point Likert scale, the respondents were asked to assess the relevance of the proposed process and their level of confidence regarding the topic, allowing definitive answers from participants (Fink, 2003) and avoiding the presentation of a middle option that can be more popular but not suitable for decision-making (Fowler, 1995). The results were analyzed using descriptive statistics to identify the central tendency in the responses. Finally, the recordings from each iteration were transcribed and coded with the help of NVivo, a qualitative data analysis software, using two levels of coding (Miles and Huberman, 1994). The open coding identified the processes with no consensus, deserving further attention due to either uniqueness or complexity. Participants confirmed a number of processes many of which were left for further discussion in the following iterations. The axial coding focused on the specificities of why no consensus was achieved for certain processes, identifying the reasons behind the uniqueness of a certain process for an IHO or sector and relating it to similar processes with similar characteristics.

## 4. Results

The need for a common HSCPM was recognized as a necessary bedrock for multiple improvements identified by the sector for HSC activities. The lack of ERP systems specifically tailored to HSC management was acutely realized, too. This gap seemed largely rooted in the distinct characteristics of the humanitarian sector, rendering commercial ERPs incompatible. As this study outlines, in 2019, most IHOs relied heavily on spreadsheet-based systems due to the unique requirements of the industry, which starkly diverged from commercial logistics solutions (see Falagara Sigala *et al.*, 2020), which proved to be



**Table 3.**  
Analysis of the  
common features  
across organizations  
and commercial model

Process framework V0	SCOR	Blecken	NGO A	NGO B	NGO C	NGO D	NGO E	NGO F	NGO G	NGO H
Planning	Plan - P	Assessment	x	x				x	x	
Procurement	partially Source - S	Procurement	x	x		x	x	x	x	x
Warehousing	Deliver - D	Warehousing	x	x	x	x	x	x	x	x
Transport	Deliver - D	Transport	x	x				x		
Distribution, donation and loans	partially Deliver -D	Distribution	x	x	x	x	x	x	x	
Kit management	No Equivalent	No Equivalent	x	x		x				
Return loans and closure	Return - R	Limitation: Return	x	x	x	x		x		x
Asset management	No Equivalent	Limitation: Asset Maintenance, Repair Overhaul	x	x	x				x	x
Operations support	Enable - E	Operations Support	x	x				x	x	
Reporting	Enable - E	Limitations: Coordination, HR Reporting	x	x				x	x	
<b>Source(s):</b> Authors own creation										

inadequate in catering to the logistic challenges inherent in humanitarian operations, particularly in austere environments and rapid demand surges (Doc1). Furthermore, the absence of such ERP systems compromised a multitude of vital operations, such as planning based on relevant information, tracking goods from donors to beneficiaries, ensuring finance integration, and maintaining an audit trail, among others (Doc3).

The need for a process model tailored to the humanitarian sector was the clear conclusion of the initiative's preparatory work, echoed with considerable fervor in the section titled "*Let's talk processes!*" (Doc3). This sentiment reverberated by numerous participants during the preiteration webinar, as they conceded that customization or configuration issues pertaining to processes are a common stumbling block for all IHOs. These specificities are particularly pronounced in humanitarian logistics (R0). Before the webinar, specific requests for process tailoring that cater to the sector's unique characteristics were received in areas such as warehousing, supply planning, procurement, distribution/beneficiary tracking, reporting, and asset and fleet management. A representative example of the critical process divergences between commercial and humanitarian sectors, and even within IHOs, can be found in the handling of in-kind donations. "*In-kind donations are vital for some organizations, not so much for others. Handling in-kind donations in commercial software often requires extensive customizations*" (Doc3).

The same documents also specified the expected benefits of a common HSCPM and revolved around visibility, collaboration, and interoperability factors. The development of a process model would contribute to improve data visibility across field and headquarters operations, facilitate better planning, and augment record keeping and reporting to donors (Doc3). Such a model could expedite mutual understanding and collaboration (Doc1), potentially fostering safe and transparent data sharing with stakeholders (Doc3). The project's aim was to establish a common language and data model as a foundation for collaboration in humanitarian logistics. Interoperability, in tandem with collaboration, is also pivotal, as IHOs strive to align with organizational capabilities such as ERP via compatibility (Doc1). As stated by one participant in iteration 1, "*one [goal of the project] is to support the optimization of aid flows by enabling interoperability, because this process and data model will enable different systems to talk to each other*" (R1). More than mere interoperability, humanitarian ERP systems can allow for inter-IHO supply chain visibility, thereby contributing to the sector's ability to discuss detailed stock levels and materials in the pipeline and, thus, coordinate their efforts holistically.

#### 4.1 A modular process model design for supply chain responsiveness

Both the design of the process model and the definition of its objectives were critical for the inception and refinement of the HSCPM. The initial design was stipulated to be a "reactive, dynamic solution" (Doc2) aiming at promoting a "cross-sector, cross-stakeholder way of working" (Doc2). Its core principles were encapsulated in the triad of "*standardization, simplicity, importance*" (Doc. 2). The intention was to craft a model tailorable to most IHOs considering the unique characteristics of the sector and remaining simple and adjustable to be easily used by all stakeholders, while supporting IHOs' responsiveness.

Among the participants, modularity was seen as a consensus design choice that was integral for developing a common HSCPM. Initial discussions focused on the overall structure, i.e., building blocks, of the model. Participant R voiced this notion, saying, "*We shall come up with the building blocks within humanitarian logistics, which would help everybody across all of these initiatives.*" (R0). Similarly, participant E stated, "*This is the building blocks and then it can be customized or adapted to each organization.*" (E1). By the end of the first iteration, a consensus regarding the modular structure of the model, encapsulated under the term "building blocks," was reached.

The benefits of a modular design—independent modules that could be easily reconfigured, combined, skipped, and resequenced—were expressed through iterations and unanimously agreed upon among the participants. Participant J operationalized it as “*It’s just that for certain items, you don’t go through the full thing.*” (J2). The modular design was also associated with the desire for simplicity throughout the process model. The idea was to ensure that the complexity inherent in a complete model would not obstruct the development or use of simpler applications. “*It’s all in the system designed in such a way that people can actually use it*” (L1).

The modular design of process model was developed following the conceptual modularity requirements, namely *architecture*, defining the modules’ structure that brings the best system decomposition and minimum interdependencies, *interfaces* describing the interaction between the modules and *standards* upholding to the design rules (cf. Baldwin and Clark, 1997). Achieving consensus on the process model *architecture* was the most complex and time-consuming action throughout the iterations, particularly regarding defining the Level-2 subprocess modules. Discussion and debate were a significant part of this process, with various examples illustrating the complexities involved. Identifying what should or should not be a module, what module should be merged or dissociated from each other was far from trivial. For example, the debate held in the second iteration around Level-1 procurement resulted in the process being split into two modules: 2a for procurement of goods and kits and 2b for procurement of services and works. At first, a respondent assumed, “*Procurement [is] procurement; it doesn’t matter what you buy.*” (J2). However, the distinction between procuring tangible and intangible consumables became more evident as Participant R noted, “*The receipt of a procured service actually works rather differently [than goods] and would also require different information and data sets to complete that. So, whereas I appreciate the procurement process itself might look quite similar, I think consecutive smaller processes of receipt and completing that connecting to payment would actually be different and that the same would be for works.*” (R2). Further expounding upon the differences between documentation, tasks, steps, and qualitative evaluation, Participant R added, “*If it’s a workaround with paper outside of the system, then we need to recognize it as a different process.*” (R2).

Another relevant question in each module was whether to capture market assessment as a step or as a stand-alone module. Discussion on this question was prompted when participant P questioned about the representation of market assessment in the process model. Participant J suggested that the representation of market assessment should be adaptable to the organizational structure of different entities. This included options for having it under the cash planning group, the procurement toolbox, or as part of a cooperative effort between IHOs for market assessment as stated by J1.

Further refinements to the modular architecture of the model were based on additional input. For instance, participant S suggested that aid diversion should be considered a separate-level process due to its significance to IHOs. Another example referred to the multiple combinations of Level-2 processes that can be (de)activated for distributions: “*what is particularly between different organizations is the line of who does what. It is quite a moveable feast*” (L1).

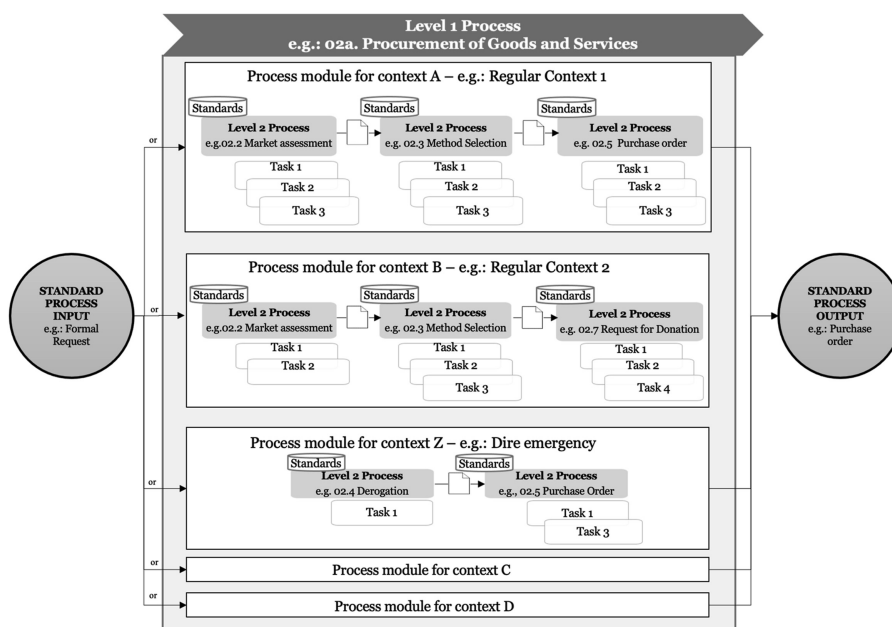
*Interfaces* between each module were embedded in the data model for digital inputs and outputs, and the description of the physical inputs and outputs of each process. The clarification and consensus reached for each data needed against the process model ensured easy plug-and-play and reconfiguration. As stated in the Project Charter, the aim was to ensure common understanding and applicability: *knowing we are fundamentally talking about the same underlying concepts (. . .) from knowing that a “Delivery Docket” in one organization is a “Waybill” in another.*” (Doc1).

Lastly, *standards* within the modular design of the process model are expressed through the commonly agreed-upon terminology and definitions of each module. As participant R1

noted, “While each organization may have our own version of a “warehouse,” all of us can still agree on the basics of what it is and what it does.” (R1). Standardization within the process model was established during the pre-iteration phase. It is noteworthy that “The idea of an NGO reference model and humanitarian standards have been around for quite a bit longer . . . . A quite big, coordinated effort is going on and what we’re doing with this project is basically contributing to that effort.” (R0).

The vast experience of the participants helped developing clear standards and defining boundaries of each module. An example of the Level-1 module for the procurement of services and works is enlightening. The standards incorporated were quickly outlined as the participants illustrated the scenario where “there are items that go and some that don’t go into the warehouse.” (L1). A similar level of consensus regarding standards is illustrated in the distribution process, as explained by one participant, “It doesn’t matter if it’s distributed for consumption, works, or construction (. . .) and that’s part of logistics as well.” (J1).

The success and relevance of the modular architecture were clear as participants described different combinations of modules that would fit their organization in general or different contexts or scenarios within their organization in which certain Level-1 or Level-2 processes would be (de)activated, as conceptually represented in Figure 1. An example is to deactivate the warehouse module. “Obviously, it’s difficult to have services stored in a warehouse, but then you just don’t use the warehouse module for services.” (J2). Distribution also comes with different options; thereby, different Level-2 processes for them, activating either “05.03 External distribution,” opposed to the option “05.02 Outsourced distribution” was summarized by L1 as, “We might just contract the whole thing out.” (L1), or a combination of both. Other examples include more complex changes in process activation due to time pressure in emergencies. “Let’s assume I receive a 40-foot container worth of medicine. Obviously, [in emergencies] I will have to receive it at face value, basically according to a packing list as I won’t have time. It takes quite a few days to do a physical count. So, I was thinking is a



Source(s): Authors own creation

**Figure 1.**  
Representation of the  
dynamic use of the  
modular structure  
offered by the HSCPM

process allowing to do like a good receipt as a packing list and then you can do a stock adjustment" (S2).

More elaborate descriptions of reconfiguration examples refer to consortium settings. "[Talking about] joint procurement, in terms of process flows, I can see it being a more reconfigured there (. . .) Or maybe it's about where you are in the consortium or if you're the lead essentially. (. . .) Is everybody else essentially working independently from a logistics perspective? Or, are you doing logistics for the people, in which case you're donating at the end of it, at the end of the supply chain process? (. . .) Like I'm buying a stock like we do in Syria, right? We buy tons and tons of flour or tens of thousands of food kits. And we buy some of them for us and some of them for the partners. So, we do one purchase and then, you know, there's 40 000 for us and 20 000 worth going to that partner. But it doesn't need to happen until you get into the warehouse and then it's a donation." (L1). These examples illustrate the adaptability and versatility of modular architecture in accommodating diverse organizational scenarios and needs. The modular structure is represented in [Figure 1](#).

Aforementioned descriptions of module activation, deactivation, and resequencing illustrate the process modularity offered by the HSCPM. The expected strategic benefits of the HSCPM revolved around *adaptability*, *flexibility*, and *agility*, contributing to IHOs' overarching need for supply chain responsiveness. Thereby, the data showed that the HSCPM should support aforementioned three elements of the responsiveness view (cf. [Richey et al., 2022](#)).

The *adaptability* requirement is vital in fast-changing operational environment. It is considered swiftly deployable and efficient in facilitating operational scalability. The model should streamline the balancing act between stringent rules and flexibility, exceptions, thereby bolstering adaptability by ensuring utilization of same platform in global or smaller-scale operations (Doc2).

The model should allow for *flexibility* through easy process adjustments, considering the requirements for adaptable planning and replanning according to varying circumstances. Its influence on supply chain process implementation in the field, including adaptive procurement and distribution processes, is significant. An HSCPM would ease and "support transition from "push" shipping humanitarian kits [emergency processes] to "pull" resourcing per development context [development processes]" (Doc2).

Finally, the adoption of the HSCPM would also support the overall *agility* through a clear, identified path for process reconfiguration according to changes in the environment, as expected long-term benefits include "simple short-term replanning under highly volatile circumstances" (Doc2). This allows for effective process alignment during phases of continuous reprioritization based on arising opportunities and concerns (Doc2). The combination of these expected strategic benefits contributes to the overall need for supply chain responsiveness identified by the sector, echoing responsiveness view of SCM by [Richey et al. \(2022\)](#).

#### 4.2 Introducing a common humanitarian supply chain process model

This research led to unanimous approval and consensus on HSCPM among all participating IHOs, making it an unprecedented accomplishment. Level-1 processes garnered unanimous agreement from the participants, regardless of their geographical location, organizational size, or mandate. Additional processes, deemed too specific or exceptional to certain geographical contexts, were identified through iterative discussions. Each process was meticulously analyzed and honed to meet the specificities of the humanitarian sector, with due consideration given to differences across IHOs and the commercial sector. These unprecedented validation and endorsement mark the first time that a supply process model, tailored to the specific needs of IHOs, which has received a comprehensive approval and is

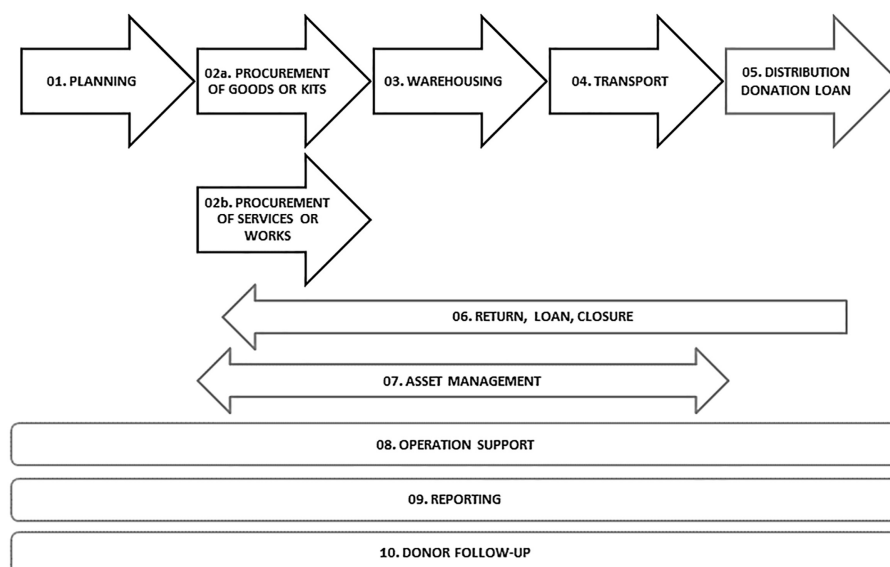
ready for widespread adoption. The final Level-1 processes resemble the SCOR model in that they follow material flows (Figure 2).

After three iterations, it was agreed upon in the final webinar that the HSCPM comprises 10 Level-1 processes and 80 Level-2 (sub)processes (Table 4). Table 3 shows the resultant HSCPM and how consensus was reached through the iterations.

In the HSCPM, each process has a precisely agreed-upon definition—delimiting the role of the process. Level-2 processes were unanimously understood as modules comprising smallest bundle of Level-3 tasks with clear purpose, function, input(s), and output(s). A modular structure was agreed upon to ensure the adequate tailoring of the model to each IHO. Level-2 processes were designed to be adaptable, reconfigurable, and even mergeable. Even if most IHOs do not use all 80 Level-2 processes at all times, they all agree that HSCPM represents their existing processes. Sector-specific technical language—an important contribution to the sector—was adopted throughout the HSCPM (see Appendix 1). As Participant E concluded, “We found in a number of these meetings that a lot of the questions are just around the terminology.” (E3). The data model was built from this process model according to the data input and outputs of each Level-2 process.

#### 4.3 Specificities of humanitarian supply chain processes

While the need to tailor commercial processes to the humanitarian sector was evident from the beginning of the Humanitarian Logistics Initiative, the extent of the process specificities linked to the humanitarian context was only presumed. The early assumption of the Humanitarian Logistics Initiative was that 60% of the processes within the HSCPM would not present drastic specificities, 30% of processes would be “sector specific,” and only 10% would be “organization specific” (Doc3). Instead of drawing comparisons with commercial practices, HSCPM is designed primarily to focus on the unique aspects of HSC processes. A comprehensive analysis of the processes revealed the required degree of customization and



**Source(s):** As available on <https://nethope.org/programs/digital-inclusion/frontline-humanitarian-logistics/>

**Figure 2.**  
The validated HSCPM  
processes as currently  
in use in the Frontline  
Humanitarian  
Logistics Initiative



Process model			# NGO agreeing QuA	# NGO agreeing It 2	# NGO agreeing Qu B	# NGO agreeing It 3
Level 1 processes	Level 1 process descriptions	Level 2 processes				
01 Supply and Logistics Planning	The processes associated with determining needs and actions to achieve supply chain objectives	01.01 Needs Assessment for goods, kits, services or works from program and/or operation management	4	to update	4	12
		01.02 Review and Update of Needs Assessment for goods, kits, services or works	4	to update	4	12
		01.03 Order and Procurement Planning	3	to update	3	12
		01.04 Financial Planning	5	to update	6	12
02a Procurement of goods or kits	The processes associated with ordering, delivery, receipt and transfer of: a. goods or kits b. services or work	02.01 Procurement planning of goods or kits	6	8	7	12
		02.02 Markets assessment of goods or kits	N/A	added	8	12
		02.03 Procurement method selection	5	8	8	12
		02.04 Procurement derogation validation	N/A	added	7	12
		02.05 Purchase Order management for goods or kits	5	8	8	12
		02.06 Invoice matching and payment	6	8	8	12
		02.07 Donation (Request for in kind donation)	N/A	added	1	12
		02.08 Procurement planning of services or works	added	8	7	12
		02.09 Markets assessment of services or works	added	8	7	12
		02.10 Procurement method selection	added	8	8	12
02b Procurement of services or works	The processes associated with ordering, delivery, receipt and transfer of: a. goods or kits b. services or work	02.11 Procurement derogation validation	added	added	8	12
		02.12 Purchase Order management for services or works	added	8	7	12
		02.13 Confirmation of service delivered	added	8	8	12
		02.14 Invoice matching and payment	added	8	8	12
		02.15 Donation (Request for donation of service or works)	5	8	8	12

**Table 4.**  
HSCPM processes and  
subprocesses after 3  
iterations as validated  
within the Frontline  
Humanitarian  
Logistics Initiative

(continued)

Process model			# NGO agreeing QuA	# NGO agreeing It 2	# NGO agreeing Qu B	# NGO agreeing It 3
Level 1 processes	Level 1 process descriptions	Level 2 processes				
03 Warehousing	The processes associated with storing and managing the inventory of goods or kits	03.01 Warehousing planning	3	to update	7	12
		03.02 Reception of goods or kits	6	8	7	12
		03.03 Reception for direct delivery	N/A	added	8	12
		03.04 Reconditioning	3	8	8	12
		03.05 Assembling kits	6	8	8	12
		03.06 Disassembling kits	6	8	8	12
		03.07 Stock transfer	6	8	8	12
		03.08 Outgoing goods or kits	6	8	8	12
		03.09 Stock count	6	8	8	12
		03.10 Kits monitoring	6	8	8	12
		03.11 Stock disposal	6	8	8	12
04 Transport	The processes associated with managing fleet, carriers and LSPs, selecting modes of transportation and routes, as well as placing/loading goods	04.01 Transport planning	5	8	8	12
		04.02 Inbound transport of goods	5	to update	6	12
		04.03 Outbound transport of goods	5	8	8	12
		04.04 Transport of People (Last-mile in-country transport)	N/A	added	8	12
05 Distribution Donation Loan	The processes associated with performing order management and order fulfilment activities, donations and loans	05.01 Plan delivery distribution	5	to update	2	12
		05.02 Outsourced distribution	5	to update	1	12
		05.03 External distribution	4	to update	2	12
		05.04 Internal distribution	3	to update	2	12
		05.05 Donations (outbound)	6	to update	2	12
		05.06 Loans (outbound)	5	to update	8	12
		05.07 Aid diversion recording	N/A	added	1	12
06 Return Loan Closure	The processes associated with moving goods back from a customer through the supply chain to address defects in product, ordering, or to perform upkeep activities	06.01 Return to supplier	5	to update	2	12
		06.02 Return received loan to owner	6	8	8	12
		06.03 Delivery return from distribution	6	8	8	12
		06.04 Loan return reception	6	8	8	12
		06.05 Closure	6	8	8	12
07 Assets	The processes associated with procuring, allocating, maintaining and monitoring assets required to operate the supply chain ( <i>assets include cars and fleet</i> )	07.01 Asset Management planning	5	8	8	12
		07.02 Asset reception and registration	6	8	8	12
		07.03 Asset assignment	6	8	8	12
		07.04 Asset follow-up and maintenance	5	8	8	12
		07.05 Asset transfer	6	8	8	12
		07.06 Asset loan	5	to update	8	12
		07.07 Asset loan return	5	to update	8	12
		07.08 Asset donation	6	8	8	12
		07.09 Asset disposal or auction	5	to update	8	12
		07.10 Return/Closure	6	8	8	12

(continued)

Table 4.

Process model			# NGO agreeing QuA	# NGO agreeing It 2	# NGO agreeing Qu B	# NGO agreeing It 3
Level 1 processes	Level 1 process descriptions	Level 2 processes				
08 Support	The processes associated with establishing, maintaining and monitoring support resources	08.01 Manage sector requirement	1	to update	8	12
		08.02 Performance Management	2	to update	2	12
		08.03 Data Management	4	to update	2	12
		08.04 Human Resources Management	3	to update	2	12
		08.05 Contract Management	6	to update	2	12
		08.06 Regulatory Compliance Management	6	to update	2	12
		08.07 Risk Management	6	to update	8	12
		08.08 Finance Alignment Management	6	to update	8	12
		08.09 Technical Logistic Process	4	to update	2	12
		08.10 Audit	5	to update	7	12
09 Reporting	The processes associated with querying sources to capture data needed to inform internal and external stakeholders and support decision making	09.01 Reporting–Planning	5		8	12
		09.02 Reporting–Procurement	N/A	added	3	12
		09.03 Reporting–Warehousing	6	8	7	12
		09.04 Reporting–Assets	6	8	8	12
10 Donor follow-up	The processes associated with the management of donors funding: associating each good or service with a specific source of funding through the entire supply chain	10.01 Donor Funding Compliance	6	added as a process	8	12
		10.02 Donor Funding–Procurement Tracking			2	12
		10.03 Donor Funding–Warehousing Tracking			3	12
		10.04 Donor Funding–Distribution Tracking			4	12
		10.05 Donor Reporting			2	12
		10.06 Consortium Funding–Procurement Tracking			8	12
		10.07 Consortium Funding–Distribution to Beneficiaries Tracking			4	12
		10.08 Consortium Funding–Distribution to Partners Tracking			3	12
		10.09 Consortium Reporting			4	12
		10.10 Donor Funding–Aid Diversion avoidance and reporting			3	12

**Note(s):** “added” is indicated when the need for process creation as independent module emerged  
“to update” in indicated when no consensus was reached but detailed feedback on how to adjust the module  
“Qu” stands for questionnaire, “It” for Iteration

**Source(s):** Authors own creation

Table 4.

the particularities of each, concentrating on eight of the processes, leaving out “08.Support” and “09.Reporting” since they are less material to SCM.

Starting with the Level-2 processes and their Level-3 tasks, four degrees of customization could be distinguished: (1) “*generic*”—processes with little to no customization needed to

align with the humanitarian sector, (2) “*tailored*”—processes with similarities across sectors that needed some core adjustments to fit the humanitarian sector, e.g., a different terminology or task structure, (3) “*specific*”—common processes across IHOs that do not exist in most other industries, e.g., managing donors or loans between organizations, and (4) “*unique*”—processes that exist only in a minority of IHOs but are sufficiently important to be represented for further adoption by others. Out of the 80 subprocesses in the HSCPM, 25 were generic, 15 tailored, 18 specific, and 22 unique.

On the more aggregate level, six of the ten Level-1 processes presented a majority of generic and tailored subprocesses, making them predominantly “classic,” called *customized processes*, while the remaining four had a majority of specific or unique subprocesses, making them primarily *humanitarian specificities for supply chain processes*. Table 5 details the four customized Level-1 processes and shows the degrees of customization of their Level-2 subprocesses along with illustrative quotes that show their source from discussions versus surveys of the study.

Process “01. Supply and Logistics Planning” is the only one with all Level-2 processes tailored. Despite the difference in terminology between IHOs, the panel reached a consensus on the supporting role that SCM plays in their organizations for “program” or “operations” departments. Program and operations hold the decision-making role regarding the nature of the planned activities, the number of beneficiaries targeted, and the choice of aid delivery mode (modality and mechanism). As opposed to demand management in the commercial sector, no forecasting activities existed in the statistically agreed-upon sense of the term. The commercial process of anticipating flow of goods was customized as a “needs assessment for goods, kits, services, and works from program and/or operation management.” The budget limitations at IHOs also required the customization of the subprocesses “order and procurement planning” and “financial planning” that include the prioritization of activities due to earmarking in the HSCPM, i.e., where donors constrain the use of their funding to specific purposes that require financial tracking.

The most obvious customization required from the procurement process was its division into two distinct modules: 02a. Procurement of goods and kits and 02b. Procurement of services and works. This division allowed for more flexibility and better alignment with current practices of IHOs. On a detailed level, two needs for customizing the procurement process—“request for donation” as a form procurement and “procurement derogation validation”—further existed, first being unique to the sector but common to all IHOs. Requests for donations are common emergency settings, whereby IHOs can reach out to their suppliers or other IHOs for in-kind donations, such as specific materials and services that would rather not be bought. Second subprocess captured situations in which procurement cannot follow public procurement regulations, as may occur in some emergency settings with high time pressure due to security issues or existing monopolistic suppliers. Despite those customizations, seven out of fifteen procurement processes—including “procurement method selection,” “purchase order management,” or “invoice matching and payment”—were generally accepted as aligned with most commercial firms. Four additional subprocesses required minor adjustments to align with the humanitarian sector, especially those regarding procurement planning activities linked to scenario planning and funding, and regarding “market assessment,” to include kits and hiring services and works.

The “03. Warehousing and Inventory Management” (WIM) process was similar to that of other industries, with seven of eleven subprocesses identical to warehousing in any sector. The physical flow of goods within a warehouse is generally simple and follows either “good warehousing practices” (GWPs) or “good distribution practices” (GDPs) of the healthcare sector. The only two minor distinctions were the “stock transfer” subprocess linked to earmarking and the three subprocesses associated with the management of kits. Stock transfer activities were linked to tracing each item with the original donor. A surprising

Customized supply chain processes

01 Supply and Logistics Planning

Level 2 Processes: 4/4 Tailored

- Tailored    01.01 Needs Assessment  
              01.02 Review and Update of Needs Assessment  
              01.03 Order and Procurement Planning  
              01.04 Financial Planning

“For me planning sits fundamentally with programs. I don’t do needs assessments. The programs do all of that. They come and tell me what they want to buy. ( . . . ) Supply chain planning, it’s addressing what comes out of programs, and is saying, now you’ve worked out what you want to buy, we need to go and do the whole strategic sourcing piece” It2\_ParticpantL

“The supply plan is, as previous colleague talked about, it’s the responsibility of the program to design it and provide logistics. And we do the procurement planning. So, for me level one is replanning. And all the plans change with time. So, whatever we planned for six months, in two months’ time, we’ll see what has changed and we need to rethink and modify the supply plan.” It2\_ParticipantP

02a Procurement of goods or kits

Level 2 Processes: 3/7 Generic - 2/7 Tailored – 1/7 Specific 1/7 Unique

- Generic    02.03 Procurement method selection  
  
              02.05 Purchase Order management for goods or kits  
              02.06 Invoice matching and payment  
  
Tailored    02.01 Procurement planning of goods or kits  
              02.02 Markets assessment of goods or kits  
  
  
  
  
  
  
  
  
Specific    02.04 Procurement derogation validation  
  
  
  
  
  
  
Unique    02.07 Donation (Request for in kind donation)

“If you want to help somebody and you can give them an NFI-kit or you can give them some cash vouchers or you can build a house for them. Right? First one is goods. The second one is the service and the third one is works.” It1\_ParticipantE

“Procurement is procurement, it only makes minor difference when we talk about items details.” It2\_ParticipantS

“I see procurement as procurement, it doesn’t matter what you buy, it should be the same principle, same modalities, same type of data that anywhere else.” It2\_ParticipantJ

“Our purchases are potentially much, much more wide reaching than most commercial organizations. Like tomorrow I might build a school. The next day I’m buying a thousand tons of wheat flour, and the next day I’m buying a generator, and tomorrow I’m purchasing the services of someone to train on market surveys.” It3\_ParticipantL

“There is the national market, the regional market, the international market, which all have their own supply chain. And I think we create problems for ourselves if we imagine there is but one market, it is always, to my mind, always markets, which need different sorts of assessment.” It3\_ParticipantE

“We need to look at derogations and how to handle those.” It2\_ParticipantJ

“I was going to say that we need to look at derogations and how to handle those.”

“Because donations required pro-forma invoice. It’s a declaration that the goods are for humanitarian purposes, identify the consignee sites, that there is no financial transaction that could be sold before a free donation in a humanitarian response operation. And when you’re looking to clear through customs, they would look for that documentation.” It3\_ParticipantR

**Table 5.**  
Detail of customized  
processes

(continued)

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Customized supply chain processes

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*02b Procurement of services or works*

Level 2 Processes: 4/8 Generic - 2/8 Tailored – 1/7 Specific 1/7 Unique

Generic	02.10 Procurement method selection	“I think the procurement of a service works rather differently (opposed to physical goods), and that requires different information, different datasets to complete. So, whereas I appreciate the procurement process itself may be quite similar, I think consecutive processes of receipt and completing that connecting to payment would actually be different and that the same would be for works.” It2_ ParticipantR
	02.12 Purchase Order management for services or works	
	02.13 Confirmation of service delivered	
	02.14 Invoice matching and payment	
Tailored	02.10 Procurement planning of services or works	“Services and works are generally purchased under one-off contracts rather than using POs – this nuance might be worth a discussion as I think that is a key difference to how commercial procurement works” QB_NGO_H
	02.09 Markets assessment of services or works	The point is that there are items that don’t go into the warehouse. That go through procurement, but don’t go into a warehouse because their services or construction where we might not purchase supplies, we might just contract the whole thing out, so the supplier gets their own supplies” It1_ ParticipantL
Specific	02.11 Procurement derogation validation	“For services, such as renting, we just need to call out our need for a derogation process and items associated with derogation process.” It2_ ParticipantL
Unique	02.15 Donation (Request for donation of service or works)	“So, it seems like we (Participant’s NGO) are the only one needing request for in-kinds donations” It2_ ParticipantT

*03 Warehousing*

Level 2 Processes: 7/11 Generic - 1/11 Tailored – 3/11 Unique

Generic	03.01 Warehousing planning	All participants reached a global consensus Questionnaire A regarding warehouse management process and activities. All participants agreed by unanimous vote at the second iteration that these processes were clear and similar to commercial organization
	03.02 Reception of goods or kits	
	03.03 Reception for direct delivery	
	03.04 Reconditioning	
	03.08 Outgoing goods or kits	
	03.09 Stock count	
	03.11 Stock disposal	“Any shipment coming to the warehouse. It’s against specific budget. That we spent in that budget belongs to the donor. So we would need a stock transfer possibility.” It2_ ParticipantS
Tailored	03.07 Stock transfer	
Unique	03.05 Assembling kits	“There is a comment in the chat window about kitting and dekitting is part of the warehouse. (comment from It2_ ParticipantG)
	03.06 Disassembling kits	
	03.10 Kits monitoring	
		“On the kits. I would agree that it could go into the warehouse. Because it’s an activity within the warehouse. Basically.” It2_ ParticipantS

(continued)

Table 5.

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Table 5.

Customized supply chain processes		
<i>04 Transport</i>		
Level 2 Processes: 3/4 Generic 1/4 Unique		
Generic	04.01	Transport planning
	04.02	Inbound transport of goods
	04.03	Outbound transport of goods
Unique	04.04 Transport of People (Last-mile in-country transport)	

“For transport, our only difference are the modes. We are talking about roads, about flights, in some countries, we even have in our system animal, because in some locations the transport has to be done by mules. But that’s not very important. Just, the mode is the only thing that changes” It2\_ParticipantS

“Beside fleet management, which is taking care of moving people back, left, right and center and all this stuff, the transportation of goods from A to B is basically standard.” It2\_ParticipantJ

“The description does not explicitly mention the issue of transportation of ‘staff’ (e.g., program staff)” QuA\_NGO\_O

“Transportation of staff brings up a relevant issue for a lot of us, and that’s safety and security.” It2\_ParticipantS

“About transportation of staff, it is really the transporting of stuff within the country, for example, from the office to the field” It2\_ParticipantJ

Source(s): Authors own creation

element was the demotion of kitting from a Level-1 process to three Level-2 processes within WIM, i.e., assembling, disassembling, and monitoring kits. Kits were originally identified as a unique aspect of the sector, with a strong impact on humanitarian response and preparedness activities for some IHOs. However, respondents agreed that the use of kits was specific to a limited number of organizations and kit management was a small process within warehouse management activities. For the generalizability of the model, the three kit modules within the warehouse management process can be activated or deactivated according to the use of kits in each IHO.

Finally, the transport process has the least sector specificities, mostly due to the multitude of international standards across transportation modes. Three subprocesses, “transport planning,” “inbound,” and “outbound transport” of goods were “generic.” Even the associated data were akin to those of most sectors’ processes, due to the international standardization of transport documentation, such as waybills, packing lists, and insurance policies. Some contextual constraints may limit the available solutions but remain embedded in transport planning. A unique process for some IHOs is the last mile in-country transport of people that, for the most part, falls into the responsibility of logistics, as all vehicle movement might have to be done autonomously by the IHO for security reasons. Thereby, transport includes the movement of not only freight but also people.

Four further processes presented a larger extent of specificities related to the humanitarian sector, becoming truly humanitarian-specific processes (Table 6). All four were linked to the core nature of the donor-funded aid delivery mandate of IHOs. These are the ones that, for this context, also include donations and loans, the returns process to include loan closures though otherwise being rather skimmed down, concerning assets, and for donor reporting and follow-up.

IHOs provide aid for free to beneficiaries in multiple forms. This differs immensely from commercial sales activities and renders SCOR-like “Deliver” process inapplicable. The “05.Distribution, Donation and Loan” process covers the scope of activities common to IHOs but without any commercial equivalent. A clear distinction was made between planning distribution in the logistic sense versus what IHOs’ programs plan in terms of identifying and

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Humanitarian supply chain processes

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*05 Distribution Donation Loan*

Level 2 Processes: 3/7 Specific - 4/7 Unique

Specific 05.01 Plan delivery distribution  
05.05 Donations (outbound)  
05.06 Loans (outbound)

"Distribution is for me that's a plan where we look at the commodity available for us, whether we have it totally in our warehouses or sitting with our supplier and defining where those commodities are going to go in terms of the beneficiaries mostly."

It3\_ParticipantS

"Like the others, we have distribution as something that mostly is handled by programs. So yes, we need to plan once they decided."

It3\_ParticipantL

Unique 05.02 Outsourced distribution  
05.03 External distribution  
05.04 Internal distribution  
05.07 Aid diversion recording

"You can have outsourced distribution, for me it's called partner of distribution, so we buy, and the partner distributes. External distribution, we buy and distribute directly. Then internal, we don't really do that because we don't really do the stuff that you would use within your NGO." It3\_ParticipantL

"But the outsourcing of distribution is really not within our approach" It3\_ParticipantE

"External for us does not have to go directly distributing to beneficiaries, that's how I interpreted that one. We don't make the distinction with outsourced. I did have to think about this. For us, it might be sort of irrelevant in process times because it's not a special process." It3\_ParticipantP

*06 Return Loan Closure*

Level 2 Processes: 2/5 Generic - 3/5 Specific

Generic 06.01 Return to supplier  
06.03 Delivery return from distribution  
Specific 06.02 Return received loan to owner  
06.04 Loan return reception  
06.05 Closure

"I read that as receiving items back from distribution, which is fairly common in my experience." It2\_ParticipantL

"Loan and donation information and processes are quite different from shipping." It2\_ParticipantR

All participants reached a global consensus Questionnaire A regarding Return Loans and Closure process and activities. All participants agreed that Return, Loans and Closure was specific but clear across the sector

*07 Assets*

Level 2 Processes: 8/10 Specific - 2/10 Unique

Specific 07.01 Asset Management planning  
07.02 Asset reception and registration  
07.03 Asset assignment  
07.04 Asset follow-up and maintenance  
07.06 Asset loan  
07.07 Asset loan return  
07.08 Asset donation  
07.10 Return/Closure

"About inventory and assets in our world, they are completely different things, inventory is stuff in a warehouse or stock that we give to programs, assets are things like laptops, cars and they're not typically things we load or return and the broken or whatever, or it's a call to send it back to a donor. So, I think that just needs to be a separation." It2\_ParticipantT

"Donors generally have a value level (for whether something is an asset). So, if it's an attractive thing or it's of a certain value, then it is. ( . . ) You don't have depreciation or anything like that. It's just a cost and items to manage." It2\_ParticipantE

"We classify our assets differently. Our fixed assets are things that have a financial value, such as a car or a building, which you can capitalize against if you own the vehicle. But we have a plethora of other assets are not capitalized against because they're just expenses like laptops or copy machines. But in our world, assets cover a plethora of everything from could be upwards of 200 books to like 20 grand." It2\_ParticipantL

Unique 07.05 Asset transfer

"Assets are associated with donor funding. We need a process for adapting the allocation" It2\_ParticipantS

07.09 Asset disposal or auction

"I think auction is a subset of disposal, basically, because you can dispose of multiple ways." It2\_ParticipantJ

(continued)

**Table 6.**  
The four humanitarian  
processes

Table 6.

Humanitarian supply chain processes		
<i>10 Donor follow-up</i>		
Level 2 Processes: 10/10 Unique		
Unique	10.01 Donor Funding Compliance Tracking	<p>"In a private company that most of these systems are based on money. Money is money. It doesn't matter whether it's Mrs. Jones or Mrs. Smith to buy the goods, you don't care where the money come from. In the humanitarian sector, the big knot is to figure out what was money that came from Mrs. Jones. Mrs. Jones needs to be able to track that all the way out to that kid that got what thing. Mrs. Smith's need to do the same. And you need to keep those two donations separate all the way through, which you don't have to do in a commercial system, but we need to be able to do that in a humanitarian system." It1_ParticipantJ</p> <p>"The major difference is where does the money come from. "Money is tainted", if you can call it that in the in the humanitarian world, whereas if you're a pharmaceutical, it's the lot production number that you can track throughout. So, we all have our processes around tracking a lot, a donation." It1_ParticipantL</p> <p>"You are reporting to the donor on the various elements like procurement, warehousing, you know, different kinds of funding and how they have been utilized." It3_ParticipantS</p> <p>"One thing as well which would need to be kept in mind Is collaborations and consortiums. You know, donors coming out and saying we will give you a monster donation. They don't want to deal with small donations. They want to give monster donations and we have to team up and make a consortium" It1_ParticipantJ</p>
	10.02 Donor Funding–Procurement Tracking	
	10.03 Donor Funding–Warehousing Tracking	
	10.04 Donor Funding–Distribution Tracking	
	10.05 Donor Reporting	
	10.06 Consortium Funding–Procurement Tracking	
	10.07 Consortium Funding–Distribution to Beneficiaries Tracking	
	10.08 Consortium Funding–Distribution to Partners Tracking	
	10.09 Consortium Reporting	
	10.10 Donor Funding–Aid Diversion avoidance and reporting	
<b>Source(s):</b> Authors own creation		

targeting beneficiary groups and scheduling distribution to them. To ensure aid delivery despite dire conditions, the nonprofit goal in emergency settings also created unique collaboration practices—such as loans of goods and services across one another—among IHOs. These were added to the HSCPM. Some other distribution subprocesses were defined in a way that allowed IHOs to activate and deactivate them as they deemed fit, benefiting from the modular design of the HSCPM while capturing the potential differences in distribution mechanisms used by different IHOs. Some IHOs manage direct distribution to beneficiaries represented in “05.03External distribution,” whereas others outsource distribution to local implementing partners or third parties, captured in “05.02Outsourced distribution.” Some IHOs also deliver items across their own locations, which, to allow for better tracking and reporting, requires an additional “05.04 Internal distribution” process, whereas some operate a dedicated aid diversion process to keep track of any distribution issues, especially in line with mandate or donors’ requirements.

The returns process was also considered fully humanitarian, as reverse logistics flows are dominated by the return of loans and excess goods that come back from distribution points but are not initiated by customers or beneficiaries. Another unique process, “closure,” included all logistics activities to terminate operations in a specific program or country. Terminating an IHO’s operations in a location often results in handing over activities to another organization or local authority, reflected within the process of “06.Return, Loans and Closure.”

IHOs often need to take along items that facilitate deliveries. An emergency setting may not have the necessary facilities, vehicles, and equipment to operate or may have destroyed such facilities in the first place. Thus, IHOs may bring in “assets,” ranging from vehicles, generators, and laptops to tents for offices and warehouses. “Asset management” has a

unique meaning in the sector, unrelated to the commercial understanding of the term linked to asset valorization and depreciation. The asset management process in the humanitarian sense relates to the tracking, maintenance, repair, and eventual loan of equipment, leading to detail process “07.Assets” as the third humanitarian-specific process.

In addition, differing from commercial settings, where financial flow comes from sales, all financial income is provided by donors. IHOs are required to track and report which funding has been used where and for which purpose, but earmarking may also require them to match the selected purposes of a donation with the actual use of a donor’s funding. The logistics activities linked to the management of donor requirements have few equivalents in the commercial sector essential to IHOs, leading to the creation of a dedicated process. “10.Donor follow-up” includes only unique Level-2 processes. Even though accountability and transparency to donors are common to all IHOs and represent a core difference between commercial and HSC processes, there is no unified way to handle donor follow-up. Requirements between IHOs and donors vary. The consensus reached was that donor funding follow-up should be pursued for goods throughout the supply chain. From planning to procurement to the shelves in the warehouse, each item should be traced back to a specific funding by a specific donor, following a set of requirements for a given purpose. A separate subprocess was defined for consortium funding since joint deliveries require a specific follow-up.

In essence, the HSCPM required varying degrees of customization across both high-level processes and subprocesses, which was guided by unique requirements of the humanitarian context. The characterization of processes as generic, tailored, specific, and unique served as an effective tool in fostering a shared understanding among IHOs. It facilitated an appreciation of the distinct features within their operational contexts and allowed for the consideration of the diverse options available across the sector. This ensured that HSCPM effectively addressed and accommodated the varying operational realities of different IHOs.

## 5. Conclusions and avenues for further research

### 5.1 Theoretical contribution

This study forges a comprehensive understanding of the distinct characteristics and processes required to construct a common HSCPM. Process modularity enables the distinction between generic and unique processes, thereby enabling both consensus and possibility of activating specific process modules for specific operations and IHOs. The approach was refined from groupings by [Blecken \(2010\)](#), further distinguishing between tailored, specific, and unique processes for specific IHOs only. This enables HSCPM’s application not only across IHOs but also to each specific IHO, allowing for a consensus. Building on previous studies focused on individual IHOs (e.g. [Falagara Sigala et al., 2020](#); [Saïah et al., 2022](#)), this study focused on the aspect of consensus. Modularity approach and various levels of processes and subprocesses supported the establishment of a common HSCPM that addressed [RQ1](#). Being able to activate–deactivate different (sub)processes for specific operations or IHOs echoes the expectations of IHOs of a modular design of the HSCPM that enhances adaptability, flexibility, and agility—key elements that resonate with the view of [Richey et al. \(2022\)](#) about supply chain responsiveness.

Since this study explicitly identifies the required customizations of supply chain processes to fit the humanitarian sector, it facilitates the development of more effective ERP systems for IHOs ([RQ2](#)). Degrees of customization extended not only from generic, tailored, specific and unique processes but also to various levels of these processes, thereby providing the necessary detail for the common data model the IHOs were interested in as a backbone to humanitarian ERP systems.

The process modules not only clarify the uniqueness of the sector but also expose the operational variety across IHOs. This study extends its theoretical contribution to the

dynamic capability framework, providing an operational model that aids IHOs in dynamically adapting to rapid contextual shifts, thereby contributing to the literature on ERP implementation. It sheds light on modularity as a means of creating dynamic efficiencies (Sanchez and Mahoney, 1996) and positions it within the dynamic capabilities framework in support of supply chain responsiveness. It also elucidates specific characteristics and unique processes that define an HSCPM explicitly designed to bolster supply chain responsiveness in the humanitarian sector. The developed consensus-driven HSCPM stands as a significant contribution, setting a unique precedent as a unanimously approved and validated model tailored to cater to the specific needs of IHOs.

A few issues stand out in the specifics of the humanitarian context. Many of the customizations stem from the decoupling of financial from material flows in the humanitarian context and various specificities of donations, ranging from in-kind to earmarked, leading to the need for a specific Level-1 process to manage donor relationships and adjustment of many of the subprocesses from procurement to delivery (now distribution, donation, and loan). Many specificities of humanitarian ERP systems have been pointed out by previous conceptual process models (Blecken, 2010; Fontainha *et al.*, 2022; Gavidia, 2017) and studies with individual IHOs (Falagara Sigala *et al.*, 2020; Jahre and Fabbe-Costes, 2015; Saïah *et al.*, 2022); the contribution of this study is to posit them across IHOs, including the level of detail on which (sub)processes are used across versus which are specific to some IHOs only. Given that HSCPM is a consensus model for the humanitarian sector, it can be considered a first step toward an industry standard.

Certain limitations of the study prevail. While the study was part of a Frontline Humanitarian Logistics Initiative to develop a common data model, the resultant HSCPM laid the foundation for IHOs to do so. Further work is needed to develop a common data model and the actuation of humanitarian ERP systems. That is currently on-going as following development of the Frontline Humanitarian Logistics initiative, and its performance can be assessed only after its development and adoption. Furthermore, the study was delimited to IHOs, not including UN agencies. Even though they operate in the same humanitarian sector, some adjustments to the HSCPM might be necessary to UN-specific criteria and processes.

Moreover, the lengthy duration of ERP rollout, coupled with the dynamic and rapidly evolving nature of the humanitarian sector, necessitates a periodic review of the HSCPM. Emerging trends such as localization and cash-based interventions may require adjustments to the HSCPM. After all, as Ackoff (1962) highlighted, for other industries, also IHOs constantly need to redesign their processes to align with changes in their operational environment.

### *5.2 Managerial implications*

First, the Frontline Humanitarian Logistics initiative and the HSCPM pioneer the establishment of a consensus-based data model that facilitates the advancement of ERP systems tailored to the humanitarian context. This HSCPM lays a foundation for interoperability between ERP systems across diverse IHOs and facilitates shared supply chain visibility among IHOs, overcoming the constraints posed by humanitarian sector specificities. By enabling IHOs to access shared information on stock levels and pipeline data, the HSCPM reduces redundancy and enhances operational coordination.

Second, the HSCPM represents a significant practical contribution due to its genesis from, and subsequent validation by practitioners within the field. This unprecedented study offers clear process mapping specifically tailored to meet the constraints and requirements of IHOs. This includes the crucial need to track the utilization of donor funding. Importantly, the modular architecture of the model directly supports the dynamic operational needs of IHOs, allowing for the flexible adjustment of processes in response to changing contexts and emergencies. The modular design of the HSCPM not only supports the various operational needs of the IHOs but also offers the flexibility to activate–deactivate specific processes or

subprocesses based on distinct operational contexts. Several IHOs from this initiative reported using HSCPM for their process mapping and are currently using it daily.

Moreover, the shared HSCPM serves as a powerful tool for collaboration and communication among IHOs. It operates as a “Rosetta stone” for the humanitarian sector, clarifying terminology and delineating who is responsible for what, enhancing mutual understanding and promoting effective coordination.

Finally, the practical utility of the HSCPM within the Frontline Humanitarian Logistics Initiative is underscored by its current use in guiding three major ERP software companies in the customization of their products for humanitarian purposes, with an estimated deployment in IHOs by 2028. These developments were steered by Nethope, the original IHOs involved in the Frontline Humanitarian Logistics initiative. Considering the proven benefits of ERP implementation in enhancing visibility, improving stock accuracy, and promoting performance and interoperability (Falagara Sigala *et al.*, 2020), the HSCPM is poised to deliver significant benefits for the sector. Future research is invited to further scrutinize the contribution of these tailored ERP systems to cross-IHO supply chain visibility and gauge their impact on facilitating a more coordinated humanitarian response.

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## Appendix

Toward a  
common  
HSCPM: the  
FHL initiative

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S ID	Thesaurus term	Thesaurus terms Preferred term ID (blank if preferred, N/A if unknown)	Most relevant PL1 process group
T00001	Identify Project Needs		01 Supply and Logistics Planning
T00002	Plan Operational Requirements	T00001 Identify Project Needs	01 Supply and Logistics Planning
T00003	Review Consumption		01 Supply and Logistics Planning
T00004	Review Material Usage	T00003 Review Consumption	01 Supply and Logistics Planning
T00005	Material List	T00006 Standard List	01 Supply and Logistics Planning
T00006	Standard List		01 Supply and Logistics Planning
T00007	Supply Channel	T00008 Sources of Supply	01 Supply and Logistics Planning
T00008	Sources of Supply		01 Supply and Logistics Planning
T00009	Reorder Schedule		01 Supply and Logistics Planning
T00010	Chronogram	T00009 Reorder Schedule	01 Supply and Logistics Planning
T00011	Delivery Plan		01 Supply and Logistics Planning
T00012	Program Requirements		01 Supply and Logistics Planning
T00013	Procurement Plan		01 Supply and Logistics Planning
T00014	Market Assessment		01 Supply and Logistics Planning
T00015	Needs Assessment		01 Supply and Logistics Planning
T00016	Supply and Logistics Planning		01 Supply and Logistics Planning
T00017	Warehousing Plan		01 Supply and Logistics Planning
T00018	Order Request		02 Procurement
T00019	Requisition	T00018 Order Request	02 Procurement
T00020	Cash advance	T00021 Cash Purchase	02 Procurement
T00021	Cash Purchase		02 Procurement
T00022	Call for Tender		02 Procurement
T00023	Invitation to Tender	T00022 Call for Tender	02 Procurement
T00024	Request for Proposal	T00022 Call for Tender	02 Procurement
T00025	Issue PO		02 Procurement
T00026	Send PO to supplier	T00025 Issue PO	02 Procurement
T00027	Supplier		02 Procurement
T00028	Vendor	T00027 Supplier	02 Procurement
T00029	Framework Agreement		02 Procurement
T00030	Purchase Agreement	T00029 Framework Agreement	02 Procurement
T00031	Blanket Order	T00029 Framework Agreement	02 Procurement
T00032	Request for Quote		02 Procurement
T00033	Bid Request	T00032 Request for Quote	02 Procurement

(continued)

**Table A1.**  
The Frontline  
Humanitarian  
Logistics initiative  
published thesaurus

S ID	Thesaurus term	Thesaurus terms Preferred term ID (blank if preferred, N/A if unknown)	Most relevant PL1 process group
T00034	Purchase Order		02 Procurement
T00035	Contract		02 Procurement
T00036	Goods Purchase Order	T00034 Purchase Order	02 Procurement
T00037	Services Contract	T00035 Contract	02 Procurement
T00038	Long Term Agreement (LTA)		02 Procurement
T00039	Blanket Purchasing Agreement (BPA)	T00029 Framework Agreement	02 Procurement
T00040	Procurement Method		02 Procurement
T00041	Direct Purchase		02 Procurement
T00042	One Quote		02 Procurement
T00043	Waiver		02 Procurement
T00044	Tender Process		02 Procurement
T00045	Comparative Bid Analysis		02 Procurement
T00046	Packing Slip	T00048 Packing List	03 Warehousing
T00047	Shipping List	T00048 Packing List	03 Warehousing
T00048	Packing List		03 Warehousing
T00049	Goods Reception	T00050 Manage Inbound Goods	03 Warehousing
T00050	Manage Inbound Goods		03 Warehousing
T00051	Repackaging	T00052 Reconditionning	03 Warehousing
T00052	Reconditionning		03 Warehousing
T00053	Convert Stock to New Packaging	T00052 Reconditionning	03 Warehousing
T00054	Physical Reconditionning	T00052 Reconditionning	03 Warehousing
T00055	Stock Cards	T00056 Inventory Cards	03 Warehousing
T00056	Inventory Cards		03 Warehousing
T00057	Record Goods Out		03 Warehousing
T00058	Issue Stock	T00057 Record Goods Out	03 Warehousing
T00059	Release Item to Dispatch	T00057 Record Goods Out	03 Warehousing
T00060	Discrepancy Report		03 Warehousing
T00061	Conduct Account Alias Receipt	T00060 Discrepancy Report	03 Warehousing
T00062	Stock Count		03 Warehousing
T00063	Stock Reconciliation	T00062 Stock Count	03 Warehousing
T00064	Cycle Count	T00062 Stock Count	03 Warehousing
T00065	Physical Annual Count PIC	T00062 Stock Count	03 Warehousing
T00066	Delivery Verification	T00067 Account for Waybill Difference	03 Warehousing
T00067	Account for Waybill Difference		03 Warehousing
T00068	Perform Account Alias Issue	T00067 Account for Waybill Difference	03 Warehousing
T00069	Quality Assurance		03 Warehousing
T00070	Technical Inspection	T00069 Quality Assurance	03 Warehousing
T00071	Kitting	T00072 Assemble Kit	03 Warehousing
T00072	Assemble Kit		03 Warehousing
T00073	Kits Details	T00074 Kit Components	03 Warehousing
T00074	Kit Components		03 Warehousing
T00075	De-Kitting	T00076 Disassemble Kit	03 Warehousing
T00076	Disassemble Kit		03 Warehousing
T00077	Buffer Stock		03 Warehousing
T00078	Safety Stock	T00077 Buffer Stock	03 Warehousing
T00079	Picking List		03 Warehousing

Table A1.

(continued)

S ID	Thesaurus term	Thesaurus terms Preferred term ID (blank if preferred, N/A if unknown)	Most relevant PL1 process group
T00080	Kit Management		03 Warehousing
T00081	Kit Monitoring		03 Warehousing
T00082	Stock Transfer	T00083 Dispatch to Partner	04 Transport
T00083	Dispatch to Partner		04 Transport
T00084	Shipping documents		04 Transport
T00085	Delivery documentation	T00084 Shipping documents	04 Transport
T00086	Internal Distribution		05 Distribution
			Donation Loan
T00087	Material Usage	T00086 Internal Distribution	05 Distribution
			Donation Loan
T00088	Delivery Requirements		05 Distribution
			Donation Loan
T00089	Logistics Requirements	T00088 Delivery Requirements	05 Distribution
			Donation Loan
T00090	Supply Requirements	T00088 Delivery Requirements	05 Distribution
			Donation Loan
T00091	Logistics Plan	T00011 Delivery Plan	05 Distribution
			Donation Loan
T00092	Supply Plan	T00011 Delivery Plan	05 Distribution
			Donation Loan
T00093	Stock Transfer Request		05 Distribution
			Donation Loan
T00094	Transfer Order	T00093 Stock Transfer Request	05 Distribution
			Donation Loan
T00095	Distribution Plan		05 Distribution
			Donation Loan
T00096	Beneficiary Distribution	T00095 Distribution Plan	05 Distribution
			Donation Loan
T00097	Distribution Type		05 Distribution
			Donation Loan
T00098	External Distribution		05 Distribution
			Donation Loan
T00099	Outsourced Distribution		05 Distribution
			Donation Loan
T00100	Goods Received Note		06 Return Loan Closure
T00101	Receiving List	T00100 Goods Received Note	06 Return Loan Closure
T00102	Asset Procurement Planning	T00103 Planning Asset Acquisition and Replacement	07 Assets
T00103	Planning Asset Acquisition and Replacement		07 Assets
T00104	Asset Registration		07 Assets
T00105	Record Asset	T00104 Asset Registration	07 Assets
T00106	Assign Asset	T00108 Allocate Asset	07 Assets
T00107	Custodian	T00108 Allocate Asset	07 Assets
T00108	Allocate Asset		07 Assets
T00109	Dispatch Asset	T00108 Allocate Asset	07 Assets
T00110	Asset Management		07 Assets
T00111	Asset Monitoring	T00110 Asset Management	07 Assets
T00112	HR Management		08 Support
T00113	Monitor Resources (Staff)	T00112 HR Management	08 Support

Source(s): Authors own creation

Table A1.