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# How Autopoietic Cybernetics Can Contribute to Humanitarian Supply Network Operations

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This work has not been submitted for any other degree or professional qualification.

Furthermore, this thesis is the result of my own independent work.
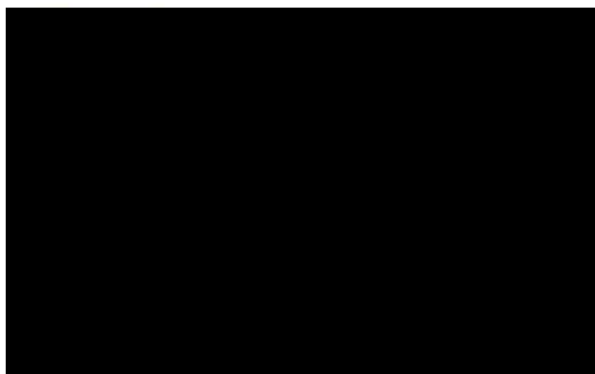
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ABSTRACT

Purpose: This research examines whether an autopoietic cybernetic model can assist in achieving greater effectiveness and efficiency in the humanitarian supply chain paradigm. It demonstrates how Systems Thinking is required to achieve a holistic view of humanitarian supply operations, to resolve the issues and challenges arising through the complexity inherent in humanitarian supply networks.

Research Approach: This research considers the complexity of humanitarian supply chains in terms of control and information flow, and how commercial supply chain management theoretical models have been used in an attempt to resolve humanitarian supply chain issues. These models have proven largely unsuccessful in unstable, highly volatile, austere situations with often-conflicting stakeholder agendas. Even with adaption, they contribute little to the humanitarian environment. There is currently no single framework that captures humanitarian supply networks as bespoke and separate entities, reflecting their own unique complexity, challenges and issues. And as a result, a theoretical problem exists.

Findings and Originality: Primary data from semi-structured interviews is analysed using grounded theory and documentary narrative analysis is applied to abstract data derived from a bespoke meta-synthesis process. The output from each data set is subjected to iterative triangulation. A theoretical case is then constructed and a conceptual framework through which the roles, challenges and information flows that occur within humanitarian supply networks is identified. By taking a holistic approach, this research takes a new perspective in the critique of existing frameworks. Specifically, by taking a systems thinking approach to the humanitarian supply chain paradigm, the Viable Systems Model (VSM) is considered as the conceptual basis of a supply network system in a harmonious, steady state, augmented by an adapted Soft Systems Methodology (SSM) concept model to bring it back into alignment when it loses equilibrium as a result of uncoordinated decision-making and unforeseen challenges. The inability to collect ethnographic data in global locations during 2020 and 2021 is resolved by creating a meta-synthesis process whereby 'abstract' primary data in the form of 'most likely case scenario' is derived from existing secondary sources to produce a theoretical case. It is a form of reverse grounded theory which takes its academic rigour from the principles of grounded theory.

Research Impact: For the first time, systems thinking has been applied across the whole humanitarian supply chain paradigm. It demonstrates the lack of bespoke supply chain theory and posits that no existing model gives a holistic understanding of the humanitarian supply chain where vertical and horizontal information flows, stakeholder engagement and business processes are captured together. Furthermore, the meta-synthesis process to derive abstract primary data is presented, which could be further developed as a methodological concept.

Practical Impact: By combining VSM and SSM into a single conceptual framework, not only could humanitarian supply networks function as a single system, but the combination of these two systems concepts allows the system to cybernetically self-regulate: humanitarian supply chain management as an autopoietic social system. Challenges regarding control and governance exist in practical terms but these could be resolved through a general acceptance of the concept and adoption of working practices that build on existing shared values, common understanding and mutual organisational respect, and through a process of co-creation.

Key Words: Humanitarian Supply Chain; Supply Networks; Complexity; Flow of Information; Systems Thinking; Soft Systems Methodology; Viable Systems.

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PUBLICATIONS

During the period of this research, the following contributions were made to the publications and conferences listed:

Duddy, D.G., Stantchev, D.S. and Weaver, M. (2017) *How does the beer distribution game help us to understand humanitarian supply chains?* Logistic Research Network Conference, Solent University, Southampton, 6-8 Sep 17.

Duddy, D.G. (2019) Supply Chain Disruption in Afghanistan and West Africa: A Military and Humanitarian Perspective. In O'Sullivan, S. (2019) *Supply Chain Disruption: Aligning Business Strategy and Supply Chain Tactics* (p.133-143). London, Kogan-Page.

Duddy, D.G., Stantchev, D.S. and Weaver, M. (2019) *The Applicability of Commercial Supply Chain Models in Humanitarian Supply Chain Thinking.* Logistic Research Network Conference, University of Northampton, 6-8 Sep 19.

Weaver, M., Tan, H. and Duddy, D.G. (2019) *Towards 'Systemic Sustainability': Assessing the OR Contribution.* The Operational Research Society OR61 Conference, University of Kent, 3-6 Sep 19.

Duddy, D.G., Weaver, M. and Stantchev, D.S. (2022) *The Applicability of Autopoietic Cybernetics in Humanitarian Supply Chain Thinking.* Logistic Research Network Conference, University of Aston, 7-9 Sep 22.

Duddy, D.G., Stantchev, D.S. and Weaver, M. (2023) *The Humanitarian Supply Network: A Paradigm Problem and a Big Idea*. Logistic Research Network Conference, Heriot-Watt University, Edinburgh, 6-8 Sep 23.

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GLOSSARY

3PL	Third Party Logistics
4PL	Fourth Party Logistics
ALNAP	Active Learning Network for Accountability and Performance
APOD	Air Point of Disembarkation (Airport or Airfield)
AAR	Applied Abstract Reasoning
BVL	Bundesvereinigung Logistik (German Logistics Association)
C^3	Coordination, Cooperation and Collaboration
C&I	Customs and Immigration
CATWOE	Mnemonic used in Soft Systems Methodology
CARE Int	Cooperative Assistance for Relief Everywhere International
CAFOD	Catholic Aid for Overseas Development
CCCM	Camp Coordination & Camp Management Cluster
CILT	Chartered Institute of Logistics and Transport
CSCMP	Council of Supply Chain Management Professionals
CSR	Corporate Social Responsibility
DEC	Disaster Emergency Committee
DERC	District Ebola Response Centre (Sierra Leone 2014/15)
DRO	Disaster Relief Operation
FCDO	Foreign, Commonwealth and Development Office (UK Govt)
FLB	Forward Logistics Base
GSCF	Global Supply Chain Forum
HLA	Humanitarian Logistics Association
HN	Host Nation
HNPW	Humanitarian Networks and Partnerships Week (OCHA-sponsored)
HRO	Humanitarian Relief Organisation
HRR	Humanitarian Response Review
HSC	Humanitarian Supply Chain
HSCM	Humanitarian Supply Chain Management
IASC	Inter-Agency Standing Committee (of the UN)
ICRC	International Committee of the Red Cross
IFRC	International Federation of Red Cross and Red Crescent Societies
IDP	Internally Displaced Person
IGO	International Governmental Organisation
INGD	Instituto Nacional de Gestão e Reducao do Risco de Desastres
INGO	International Non-Governmental Organisation
IOM	International Organisation for Migration

IrishAid	Irish Agency for International Development
LC	(Global) Logistics Cluster
LO	Liaison Officer
LSP	Logistic Services Provider
MEAL	Monitoring, Evaluation, Accountability and Learning
MLH	Main Logistics Hub
MLM	Materials Logistics Management
MSF	Médecins Sans Frontières (Doctors Without Borders)
NERC	National Ebola Response Centre (Sierra Leone 2014/15)
NGO	Non-Governmental Organisation
OCHA	The UN Office for the Coordination of Humanitarian Affairs
ODI	Overseas Development Institute
OR	Operational Research
POC	Point of Contact
POD	Point of Distribution
SAR	Search and Rescue
SCM	Supply Chain Management
SCOR	Supply Chain Operations Reference model
SD	Systems Dynamics
SME	Subject Matter Expert
SOP	Standard Operating Procedure
SPOD	Sea Point of Disembarkation (Sea Port)
SSM	Soft Systems Methodology
TCE	Transactional Cost Economics
UN	United Nations
UNDSS	United Nations Department for Safety and Security
UNHCR	UN High Commissioner for Refugees
UNICEF	UN International Children's Emergency Fund
UNJLC	UN Joint Logistic Centre
USAID	United States Agency for International Development
VSM	Viable Systems Model
WASH	Water, Sanitation and Hygiene
WFP	World Food Programme
WHO	World Health Organisation
WVI	World Vision International

CHAPTER 1

INTRODUCTION AND BACKGROUND

'There is nothing more common than to find
considerations of supply affecting the strategic lines of
a campaign'

Carl von Clausewitz (1993), Vom Kriege

1.1   Introduction

Disasters, natural and man-made, have been a common occurrence throughout history, but despite having its roots in the formation of the League of Red Cross Societies in 1919, it has only been since the Second World War that the international community has been sufficiently advanced as to make the provision of effective, coordinated disaster relief a truly global possibility. Throughout the twentieth century, aid programmes have been implemented by International Non-Governmental Organisations (INGOs) and international development agencies of governments from the developed world where aid has been collated, moved and distributed to those suffering from the effects of natural disasters, medical pandemics and armed conflict. The scale of these operations has varied widely, but all have involved the element of logistics: the procurement, movement and distribution of food, materials and basic infrastructure commodities. Many aid operations are planned at the strategic level of an aid organisation with the logistic effort being mustered in-country, often on an ad hoc basis, by practitioners drawn from the different disciplines within logistics. Until recently, there has been a lack of vertical coordination within aid operations, where the strategic planners have had little understanding of logistics and logisticians on the ground have had little visibility of the strategic plan; in recognising this, Tomasini & Van Wassenhove (2009b) applied the term 'firefighting' (p.42). This approach seems to have persisted because, inter alia, it was not seen as inhibiting relief whilst at least contributing something to a highly complex situation. The United Nation's (UN) Cluster concept, formally adopted in 2005 in the aftermath of the SE Asia 2004 'Boxing Day' tsunami, has seen the various strategic elements of aid operations being vested in various UN agencies.

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While UNICEF became responsible for the Water, Sanitation and Hygiene (WASH) Cluster and WHO for the Global Health Cluster, the UN's Inter-Agency Standing Committee (IASC) placed the Global Logistics Cluster (Log Cluster) in the custodianship of the World Food Programme (WFP). While this arrangement has made a marked difference at the field practitioner level in providing a coordination mechanism for the logistic information management and provision of logistic service support, it has only recently begun to provide a practical link between logisticians in the field and those at the strategic level in organisations' head offices. It is noted that while stakeholders like WFP have representatives with some basic logistic knowledge at executive board level, board members with a formal education in the field of logistics and supply chain management are very rare.

Before any attempt can be made to investigate logistic issues within the humanitarian aid environment, it is necessary to understand what is meant by the term *humanitarian logistics*. From there, the humanitarian supply chain can be identified, and an understanding can be gained of what is meant by humanitarian supply chain management. Bennett (2016) addresses the term 'humanitarian' as 'activities motivated by the desire to help others and emphasises altruistic motives rather than the specifics of their manifestation' (p.47). There is also differentiation between humanitarian response action and development work, with 'the former corresponding to emergency assistance and the latter to programmes aiming at longer-term change' (p.47). This research accepts both these definitions and focuses on emergency humanitarian action as opposed to enduring humanitarian development operations.

Howden (2009) suggests that within the discipline of logistics there are functions such as warehousing, transportation, asset and building management, procurement and information technology; and makes a distinction between these logistic support services and the supply chain they are supporting.
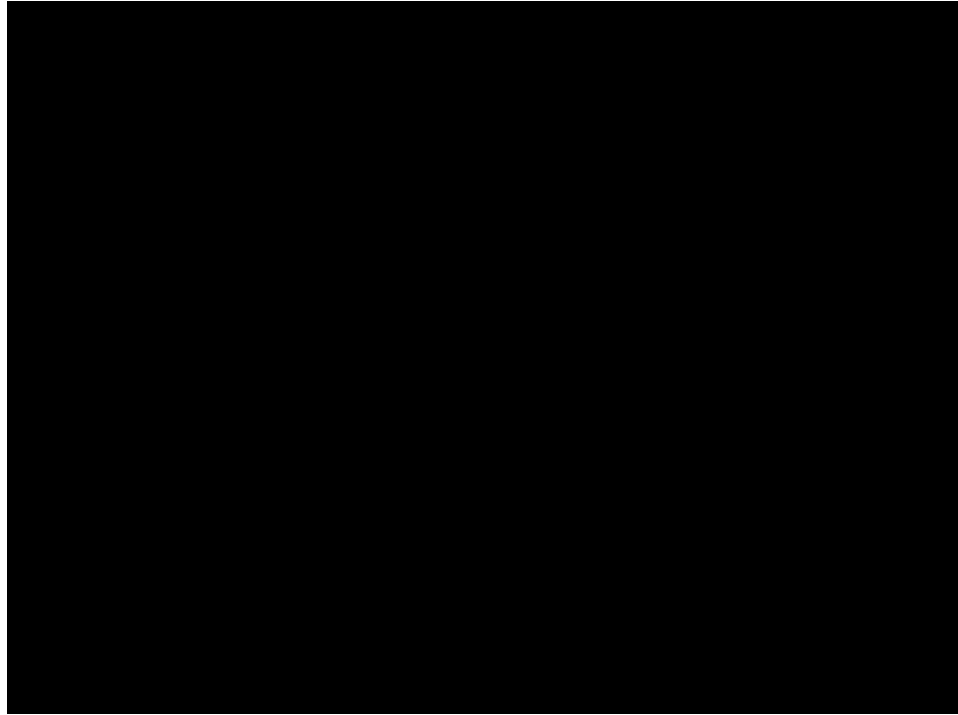
Figure 1.1   Humanitarian Logistics and Humanitarian Supply Chain Flows. (Howden, 2009).

In Chapter 2, several definitions of the terms logistics and supply chain are reviewed, but it is widely accepted that humanitarian logistics can be considered as the support service paradigm through which the humanitarian supply chain, made up of individual donor, control and beneficiary components, flows. Tomasini & Van Wassenhove (2009b) suggest that when referring to the elements of a supply chain in terms of the '3 Bs' of *Boxes*, *Bytes* and *Bucks*, there are also *Bodies* and *Brains*. The addition of this is considered as being critical to the humanitarian sector, not least because each time a supply chain is deployed as part of a disaster relief operation (DRO), the required skills need to be quickly reconfigured. It is recognised that 'every supply chain is new and different' (p.5) and that the term *Bytes* refers to the flow of information which allows the *Brains* to move the *Boxes* bought with the *Bucks* to help the *Bodies*.

1.2   Origins of Interest, Research Rationale and Content

Many logisticians involved in DROs in conflict areas and areas of medical emergency have become aware of the challenges faced by relief organisations in getting relief supplies to those in need in the condition and quantities intended by the donors and required by the subject matter experts

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(SMEs) on the ground. To satisfy these two needs, there has to be a secure flow of materials to those in need as identified by the SMEs and a flow of information back to donors to allow the effort to be coordinated, controlled, evaluated and ultimately sustained. In the wake of the 2004 Boxing Day tsunami, there has been increased interest in the way logistics is applied to disasters by both researchers and practitioners. Cozzolino (2012) points out that the tsunami provided evidence that the effectiveness of the emergency aid response hinges on logistic speed and efficiency, thereby increasing the awareness of the crucial role of logistics in DROs (p.6). During the 2014/15 Ebola crisis in Sierra Leone, the Log Cluster contributed significantly to the operation while working closely with donor organisations such as the Canadian and Chinese governments, INGOs and the UK's Foreign, Commonwealth and Development Office (FCDO), but it appeared to suffer from a lack of support from top level managers within these partner organisations, both in terms of material and information flows. Strategic level support can only be provided if partner organisations have top level managers with the appropriate knowledge. Tomasini & Van Wassenhove (2009a) recognise that whilst humanitarians at the field operations level are often the most informed and knowledgeable in terms of local priorities, 'knowledge transfer at the supply chain level must be both vertical and horizontal; in other words, within different levels of an organisation as well as among the different organisations in the same supply chain' (p.121). Importantly, they note that unlike commercial supply chains, humanitarian operations are not judged on their speed and costs, but rather by their impact. Chandes & Paché (2010) suggest that there is a considerable body of work on managing logistic operations in a humanitarian context, but less on strategic readings of humanitarian supply chains. In Christopher & Tatham (2011), Rachel Dowty recognises the efforts of Non-Governmental Organisations (NGOs) in reporting but describes how NGO reporting of successful aid distribution often omits details of ethical challenges such as bribery, extortion and theft. It is suggested that bureaucratic demands for obscure or non-existent forms and paperwork probably defeat more humanitarian operations than violence directed at relief workers. In the same publication, Tatham & Hughes contest that 'NGOs must [also] ensure that

appropriate information is readily available to meet the demands of the donor community' (p.69), and presumably this includes back-briefs on where resources are being lost from the supply chain. In referring to Beamon & Balcik (2008), the frequent inability to shop around for the best deal when in a disaster relief situation is recognised, and that this situation tends to result in an unregulated monopoly becoming established. Tatham & Hughes quote Sawhill & Williamson (2001) when asking a fundament question: 'How can you measure such an abstract notion as to alleviate human suffering?' (p.70).

It is not clear whether any of the methods of dealing with this in the commercial world, as described by Leigh (1982) at the time when supply chain management was first emerging as a discipline, are pertinent to the humanitarian environment, but European Commission (2008) attempts to lay down contemporary processes for their areas of operation. Howden (2009) explains that the key decision makers within the humanitarian supply chain are the donors who are funding the operation and that many NGOs regard the donor as the customer in the humanitarian supply chain. In commercial supply chains, the end recipient decides what supplies they require, and fulfilment can be easily evaluated by monitoring the receipt of these supplies. However, in humanitarian operations, since supplies are often determined by a donor's external assessment of the needs of the beneficiary, evaluating fulfilment can present a challenge because under such circumstances additional analysis must be undertaken to determine if these needs have been met by the supplies provided. This is achieved through the flow of information but where SMEs make the assessments, the information becomes more consistent and more easily understood. In considering losses from the supply chain, ergo, losses to potential beneficiaries, Giddens (1992) captures contributions from several academics who address such issues as the nature of business crime; the bureaucratisation of the world; hunger and the politics of world food supply; and the existence of greedy nations. Any lack of propriety and security of relief supplies poses a serious threat to relief operations for several reasons. Some of these are picked up by Boin et al. (2010) who posit that getting public bureaucracies to adapt to crisis circumstances is a daunting, even impossible task, and that a compounding

feature of many contemporary disasters is their increasingly politicized nature. Buchanan & Huczynski (2010) comment on power and politics, where relief efforts and in-situ political behaviours collide and stresses the importance of understanding an environment holistically as well as the role leadership can play.

Overstreet et al. (2011) underline the rationale for continued research in this area by suggesting a path for future researchers to follow when conducting research into the unique field of humanitarian logistics. It is noted that there are many factors which can impact upon humanitarian supply chains, thereby complicating an operation. In this context, Kottak (2012) describes cultural colonialism as one, where internal domination by one group and its culture or ideology is exerted over another. An example of this is the clan based political / Paramount Chief System in Sierra Leone which adversely affected the Ebola response effort in 2015 (Ross, 2017). Akhtar et al. (2012) conclude that coordination does not guarantee success in all situations because organisations may face coordination challenges such as cultural and structural differences. Yaziji & Doh (2009) insist that, in keeping with the Hobbes and Locke social contract theory, a social contract exists not just between the governments and the population, but also with non-state players like NGOs. 'Governments have sovereign powers to impose their will; NGOs don't and have only indirect influence [on donors]' (p.43). Therefore, a close relationship between NGOs and donors may be the only leverage they have over a [troublesome] government and they imply that a model on how this can be achieved would be valuable. They also observe that 'advocacy NGOs work to shape the social, economic or political system to promote a given set of interests or ideology' (p.8); therefore, it is necessary to identify and differentiate between NGO groups, particularly those who would be prepared to involve themselves in political spheres.

Tomasini & Van Wassenhove (2009a) had already identified Akhtar's issue of humanitarian coordination when they considered the associated obstacles that need to be overcome. Diversity of structures; funding; costs; branding; and leadership are considered contentious, and it is concluded that

'[humanitarian] actors do not have an explicit mandate or reason to be coordinated. In the private sector, companies are driven to coordinate their actions to protect their revenues and profit margins, whereas in the humanitarian sector, such clear and easily measurable drivers do not exist' (p.84). However, perhaps such drivers do exist; and perhaps it is just that they are currently not considered to be of paramount importance, together with the fact that adverse effects caused by a lack of coordination can be mitigated easily as there is no clear ownership of collective actions (i.e. owning or controlling the supply chain). John et al. (2020) suggest that coordination is essential in achieving organisational effectiveness, operational efficiency and financial propriety, particularly in the area of local procurement. Tomasini & Van Wassenhove (2009b) define information management as the fusion of visibility (the pipeline); transparency (the process); and accountability (parties/performance). The use of the 'SUMA' humanitarian supply management system methodology model (PAHO, 2000) gives a clear and concise illustration of the areas of the supply chain that lie in which of the above spheres of influence. In this model, the key zone is the *Central Level* and therein, the ability to physically mechanise the *Reports* function. Above the *Central Level*, commercial best practice could be appropriate in many cases.

Whilst much research has been undertaken by the Fritz Institute in particular, this is an area of research which is worthy of further development. Over recent years, the commercial business world has been increasingly exposed to some of the supply chain challenges facing humanitarian organisations through increasing participation in contracted logistic solutions in conflict zones. Although primarily in support of military effort, businesses are encountering dilemmas and conflicts and Lynch (2009) highlights this.

Lysons & Farrington (2006) assess supply chain performance and ethics in detail and conduct an in-depth examination of fraud in the procurement process. Looking at the other end of the supply chain conduit, many of the findings can be applied to the disbursement of humanitarian relief commodities. O'Sullivan (2019) picks up this theme in his examination of

disruption in humanitarian supply chains. In its Humanitarian Response Review of 2005, the UN's Office for Coordination of Humanitarian Affairs (OCHA) found that one of the most frustrating problems that was faced on an inter-agency level was the inability for commodities to clear customs at national ports of entry. A combination of a lack of understanding of customs procedures and uncertainties related to stockpile availability compounded the general problems of moving personnel and commodities. It also noted that the level and frequency of training for its volunteers and professional staff was insufficient, but it hoped that greater coordination from the WFP-based Joint Logistics Centre, now the Log Cluster, would provide the tools to remedy the situation, However, reviews and reports since 2005 show that this has not happened. UN (2005) identifies three strategic drivers for improved performance within the humanitarian logistic discipline: close relations with the host nation at governmental and local levels to resolve customs and transport issues; accountability of the international response system and transparency within the various agencies in terms of stockpile visibility; and the development of a coordinating communications system, ideally using radio and telecommunications. Today's technological advances offer even more options when developing an in-country connectivity network.
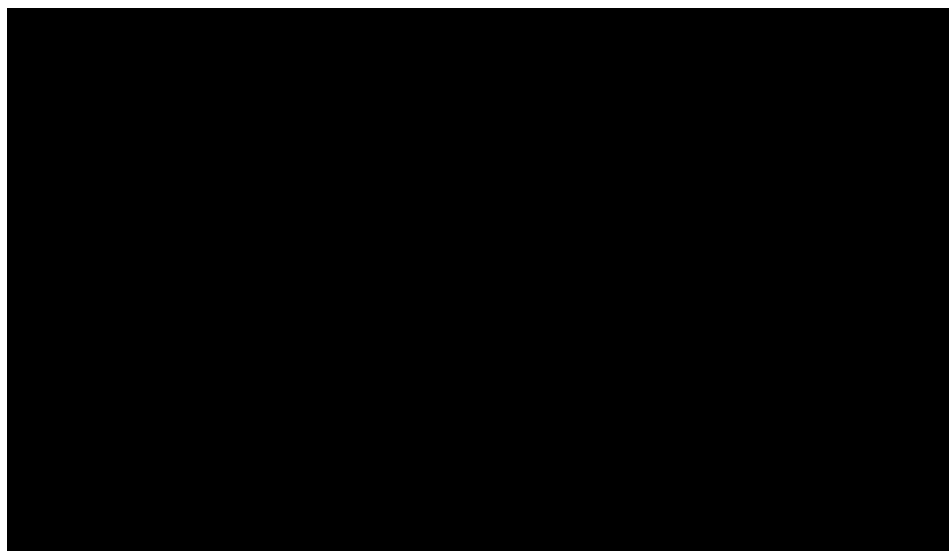
Figure 1.2   Sustainability Value. (Hart & Milstein, 2003).

These same strategic drivers are identified in the Sustainability Value model by Hart & Milstein (2003) where the integration of stakeholder view into

business processes is given the term Product Stewardship. The integration of the logistic findings in UN (2005) led to the structured development of the Log Cluster which is now responsible for delivering sustainable value in the form of strategic coordination for logistic issues during disaster relief operations.

1.3   Delimiting Research Boundaries

It is important to make early note of the nature of the subject of this research. Humanitarian logistics means many different things to different people and therefore it is essential that any research conducted in this field is conducted within clear and firm boundaries. While the relevant definitions of logistics and supply chain management are examined in the literature review, it is necessary to set boundaries within which this research will be conducted. Considered in its broadest form, this research will initially examine the humanitarian supply chain as described by Howden (2009) in Fig 1.1, but in addition to the aid delivery process, it will audit the strategic management within humanitarian supply chains, together with the education, training and information flow inherent to it. It will ask questions that pertain to the integrity of humanitarian logistics and how the additional elements within the supply chain can support purely logistical functions. It will also challenge Howden's model in light of contemporary thinking and understanding in the context of logistic efforts supporting humanitarian relief interventions.

While this research must consider the role various stakeholders play in the delivery of material and information through a humanitarian supply chain, it will not concern itself with the detail of how specific supply chains are designed, nor will it attempt to examine the minutiae of day-to-day humanitarian logistic operations such as warehouse or vehicle fleet management. Comparisons will be drawn between existing humanitarian logistics thinking and the more developed concepts of commercial logistics. While there may be some similarities between humanitarian and military logistics, not least the unstable operational environment and risk of impact from political or military conflict, it is not intended to draw comparisons between them. Military logistics is a highly specialist field focused on getting war-like natures such as ammunition, military rations and equipment to fight a

campaign in a specific way; human beings are not necessarily the priority. Despite military logistic thinking increasingly taking the humanitarian aspects of conflict into account, this area is not yet mature enough for this research to use it in direct comparison.

This research will consider strategic management in terms of the humanitarian supply chain environment and contribute to existing knowledge by examining hitherto unaddressed challenges facing humanitarian logistic practitioners.

This research focuses on aid delivery process, strategic management and planning sphere and the area of governance and performance management, with education, training and information flow inherent to all three of these tenets, individually and holistically. Within each of these tenets exists a plethora of functions, processes and procedures, some of which that are common to two or more of the three tenets, that allow the supply chain to function efficiently and effectively. It is widely accepted that governance provides direction, guidance, assurance and evaluation within a business or operation, but what governance means in real terms varies along the humanitarian supply chain due to variations in professionalism, culture, experience and exposure to scrutiny. Governance must therefore take into consideration the make-up of the supply chain, the level of professionalism and experience of its stakeholders, the cultural differences between stakeholders and the needs (as opposed to the aspirations or desires) of its beneficiaries. This research considers humanitarian supply chain governance as being social, cultural and political in nature, where all of its stakeholders have a responsibility to adhere to good governance. It assumes that governance in stakeholder organisations exists and functions in a manner which facilitates mutually beneficial stakeholder relationships and the passage of information. Therefore, while governance and performance management will not play a key role in this research, regular reference will be made to both.

1.4   Research Aim and Objectives

Much empirical evidence exists which shows that there are considerable problems and challenges within humanitarian supply chains, creating inefficiencies that contribute to waste and ineffectiveness. Where several humanitarian supply chains exist in the support of a single operation, it is suggested that a supply network exists, but such networks are rarely, if ever considered to be systematic in nature. The aim of this research is to explore whether treating multiple, complex supply chains in a disaster relief operation as a network system would better facilitate stakeholder engagement and the resolution of supply challenges and issues in order to achieve maximum effectiveness and efficiency in the delivery of humanitarian aid.

Specifically, the objectives of this research are to:

- Identify the challenges and issues encountered in the delivery of supplies during emergency disaster relief operations;
- Ascertain how more holistic thinking could help to capture the impact of such challenges and issues on other stakeholders within the complexity of the humanitarian supply chain environment;
- Determine what concepts, methods and practices could be adopted to overcome these complexities holistically;
- Develop and validate a conceptual framework which addresses the challenges specific to humanitarian supply chains.

The following processes will be used to support this research:

- Map the complexities of the humanitarian supply network to gain greater understanding of the nuances of managing each integrated supply chain;
- Disentangle the elements of these complexities to establish where the opportunities for information flow exist within the supply network;
- Establish to what degree information flow is enabled by coordination, cooperation or collaboration;
- Develop a method of dealing with complexity issues where they threaten the integrity of the relief operation.

The key output of this research is a conceptual framework to allow NGO and donor organisation stakeholder groups to better contribute holistically to the humanitarian supply network as it supports relief operations, and therefore it can be considered as applied research. The framework will be refined using extant and emerging logistic practices to address issues currently encountered by humanitarian organisations and validated for feasibility criteria through rigorous academic process design. Testing the usability and utility of the framework in an appropriate supply chain environment falls outside the scope of this research.

Definitions play a significant role in understanding humanitarian supply chains as there is conflicting use of terminology with some terms borrowed from commercial practice and misaligned in humanitarian parlance. The development of a common language will not just serve as a baseline for researchers but will also be a valuable tool for practitioners. Even the term 'supply chain' is open to review as it is possible that 'network' or 'system' may be more appropriate.

Following on from the gaps identified in the literature, the four key questions this work will pose are:

- What is available in terms of tools, established thinking and empirical practitioner experience to identify humanitarian supply chain challenges and complexity issues?
- What methodologies or approaches can be used to examine the complexities in the humanitarian supply chain in a holistic rather than reductionist manner?
- What extant traditional and contemporary approaches attempt to address humanitarian supply chain complexity; in what way do they succeed or fail?
- Which accepted approaches could be applied to help overcome existing humanitarian supply chain challenges and issues?

In their definition of reductionism and holism, Ponte et al. (2016) suggest that they represent two opposite philosophical approaches to problem solving:

'While the former is based on the "divide and conquer" paradigm (breaking down the problem into simpler and smaller parts), the latter underscores the idea that systems must be viewed as a whole and not as collection of parts' (p.83).

It is anticipated that traditional supply chain logic may not help to better understand the humanitarian supply network and that to make any sense, existing models such as the Supply Chain Operations Reference (SCOR) model and Lambert would require significant adjustment. Existing literature (Campos et al. 2019; Lewin et al. 2018; Schiffling et al. 2020b) makes frequent reference to complexity as a characteristic of humanitarian operations and their supply chains but there are indications that the key issues and challenges facing humanitarian supply chains involve the flow of information and the transactions that facilitate the movement of materials and goods. A principal outcome of this research will be identifying what would have to change to create an environment where coordination, cooperation and collaboration was common-place and a default setting for stakeholder organisations in their planning and execution of humanitarian operations. This in turn will significantly contribute to the development of a process framework and a set of guidelines which can be used by humanitarian supply chain practitioners.
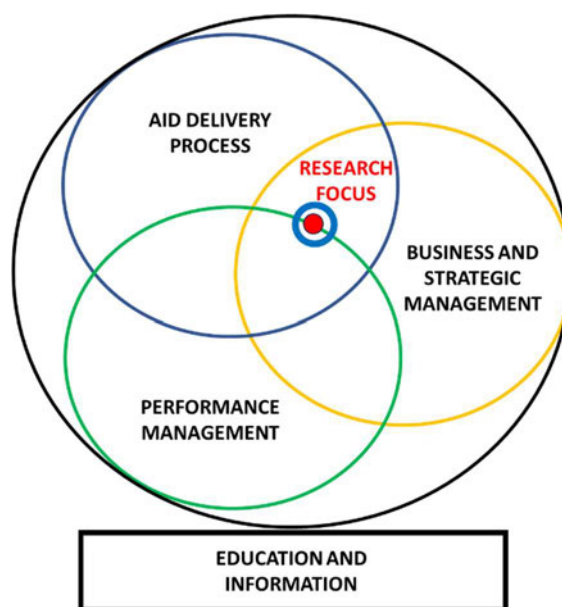
Figure 1.3   Research Boundaries: Target.

Having set the aim and objectives of this research, the target area is now apparent and lies between the aid delivery process and strategic management, informed by governance and underpinned by education and training.

1.5   Methodology: The Means of Research

Silverman (2020) offers guidance in the collection of qualitative research data, particularly in the use of research protocols which guide an interviewer in delivering a more informal, flowing pattern during an interview. Researchers are encouraged not to ask questions directly to avoid the interviewee being led or creating bias in their response, thereby adding additional rigour to the research. A system of triangulation is suggested to assess the accuracy of respondents' answers across a number of interviews (p.109). Sokolowski (2000) reminds us that when someone speaks, it cannot be assumed that they have necessarily applied thought to what they say (p.105), and therefore care must be taken in any form of discourse. When undertaking observation, Van Steenberghen (1970) refers to the 'essence of cognition' (p.41) which can be applied in analysis if confronted with having to separate that which is *'elaborated'* from what is *'real'*.

How a researcher understands and perceives the world will guide them towards a certain methodological approach. If a positivist approach were to be taken in research focused on a societal paradigm, the methodology would become limited and restricted to being objective and fact-based, and it would not be possible to rationalise and analyse the knowledge gained in an inductive manner. As this area of study pertains to the sociology of knowledge, Berger & Luckmann (1966) suggest that what is important is 'what people "know" as "reality" in their everyday lives, and that "knowledge" rather than "ideas" must be the central focus for the sociology of knowledge' (p.27). In a humanitarian environment, with players from different cultural and ethical backgrounds trying to work coherently together, there will be many versions of reality and of the truth: indeed, philosophically, there will be many truths.

Bell et al. (2019) describe interpretivism as having a contrasting epistemology to positivism by suggesting that positivism seeks to *explain* human behaviour whilst interpretivism seeks to *understand* it. Bryman et al. (2021) consider how individuals make sense of the world around them and how in particular 'the philosopher should bracket out preconceptions in his or her grasp of the world' (p.25) and identifies this intellectual view as being that of Alfred Schultz and his anti-positivist position of Phenomenology. Morgan & Mooney (2002) comment on the work of Edmund Husserl and his description of phenomenology as being 'a more deep-seated attempt to analyse the very senses and meanings which we constitute through our acts' (p.13). Hence, phenomenology is interpretivist in nature, and it is possible that this research could move in this direction because it seeks to make sense of the phenomenon of human behaviour in the humanitarian supply chain paradigm. Robson & McCartan (2016) suggest some research methods available to social scientists to allow the generation of data to analyse in this way, including ethnographical interviews, periods of observation in the field and possibly conducting an ethnographical case study. Writing in Denzin & Lincoln (2003) and taking the 'participants rather than subjects' concept a step further, Brydon-Millar et al. look at Participatory Action Research (PAR) and go as far as to say that 'those who have been systematically excluded from knowledge generation need to be active participants in the research process, especially when it is about them' (p.564). In Denzin & Lincoln (2018), a more recent edition of Brydon-Millar et al. is reviewed, noting that 'the goal of PAR is to solve concrete community problems by engaging community participants in the inquiry process' (p.319). Therefore, qualitative research conducted into the humanitarian supply chain paradigm and engaging with managers and practitioners at all levels could constitute participatory action research, particularly if it involves observation or ethnographic study. Looking at ways in which qualitative methods can be augmented, Robson & McCartan (2016) suggest that, taking surveys as an example, 'it is possible to go beyond the descriptive to the interpretive' (p.249), thereby indicating that typically positivist research methods can be adapted to use in qualitative studies. Methodologically, interpretivist research generally accepts that sample sizes will be smaller than they would be for

positivist research, but this allows the researcher to take a deep view of the data. The richer data makes findings more difficult to reject and by their nature, interpretive findings are subjective and therefore promote further debate and enquiry.

1.6   Research Design: The Relationship between Processes and Methods

The conceptual basis of this research is in existing literature: vertical and horizontal information channels exist but do not function coherently. Therefore, the starting point of this research is an exploration of human activity and interaction, behaviour, perception and value judgements in challenging, often hostile environments, and to examine these challenges, issues and practices. This examination will be subjective in nature and therefore will take the form of qualitative research.

As this research is not seeking to prove a hypothesis or determine an outcome through simulation, e.g. model building to test a theory, neither mathematic modelling nor experimental research would be appropriate. Since surveys are more appropriate to qualitative research, statistical testing is also not appropriate in this case, although a carefully structured survey, together with case evidence and literature, can provide iterative triangulation.

Grounded Theory, for example, can be applied to both qualitative and quantitative research and intrinsically involves deriving a substantive theory from data to form to a grounded formal theory. Grounded Theory as described by Glaser & Strauss (1968) can be difficult to apply in qualitative research but the approach taken by Strauss & Corbin (1990) and subsequently Charmaz (2014) focuses on qualitative study, and therefore may prove an appropriate way to analysis the data collected.

Research Objective	Process	Methods	Outcomes
Identify the challenges and issues encountered in the	Literature review of existing contributions following the Kunz	Extensive ranking and subsequent reading and analysis of relevant	Evaluation of the material and subsequent determination of

delivery of supplies during emergency DROs.	and Reiner Content Analysis Process.	information from books, academic articles and NGO evaluation reports.	gaps in existing knowledge. Reconsideration of the Research Questions in light of this outcome.
Ascertain how more holistic thinking could help to capture and overcome the complexities found in the humanitarian supply network.	Compare the humanitarian logistic C^3 practices to those in the commercial sector and look at different NGO organisations to uncover examples of best practice.	Review existing literature from the commercial sector and engage with businesses whose logistic practices are similar to those of NGOs. Engage with NGOs recognised for C^3 working practices.	Analysis of methods, processes and procedures from commercial businesses and successful NOGs which may be incorporated into the process framework.
Determine what concepts, methods and practices can be adopted to address these challenges and issues.	Engage with NGO practitioners and strategic management to establish what degree of degree coordination, cooperation and collaboration (C^3) exists which allow the flow of material and information to behave in the way they do.	Sampling to study decision-making processes in several organisations and environments; secondary data examination to corroborate this; semi-structured interviews and use of secondary data to study processes and challenges on the ground.	Semi-structured interviews of stakeholders drawn from designated target groups to determine how C^3 enables material flows along the supply chain and the information flows both along the pipeline and vertically within stakeholder organisations.
Through rigorous academic process design and validation of feasibility, produce a conceptual framework that addresses the challenges found in humanitarian supply chains.	Test the framework to determine whether more beneficial outcomes are reached.	Apply the framework to scenarios from research experience and NGO evaluation reports or other appropriate triangulation processes.	The production of a feasible framework that can make sense of humanitarian supply chain complexity which can contribute to the management of a robust and transparent humanitarian supply chain in unstable environments.

Table 1.1   Research Processes, Methods and Outcomes Summary.

1.7   Limitations on Study and Implications on Methodology

Methodologically, this research will explore human activity and interaction, behaviour, perception and value judgements in challenging, often hostile environments, and will therefore be subjective in nature. Compared to taking an objective, positivist approach, the sample sizes are likely to be small and

this could be considered as a limiting factor. However, it is generally accepted that most humanitarian supply chain practitioners operate in a similar way, not least because they often move from one organisation to another, and they tend to learn principles, practices and methods from each other. This means that even a small sample can be considered representative. Any use of observation as a method will have to be carefully planned to ensure ethical standards are upheld and to ensure bias due to perceptions of the researcher towards the participants is kept to the minimum. Whilst reviewing the literature, it was noted that some post-operational reports commissioned by INGOs were not as objective in terms of criticism as they perhaps should have been. Some accounts are more positive than the researcher's first-hand experience of certain operations. Such organisational bias must be factored into findings.

There will be potential limitations and barriers to accessing the data. Travel to unstable regions may be difficult in practical terms such as personal security issues, travel restrictions and granting of visas. Even if in-country access is achieved, access to specific individuals or organisations could be difficult and may rely on potentially fickle in-country contacts. In practical terms, limitations to this research include:

- the ability to physically get to a geographical location where a humanitarian operation is being conducted;
- encouraging the gatekeepers of such operations to give access to personnel who are engaged in a busy operational role;
- the ability to physically move around in the operational environment, possibly constrained by political, security or financial considerations;
- the ability to gain access to the strategic level of supply chain management in NGO and donor organisations.

Failure to get access to key individuals for observation, interview and rich picture workshops could result in a dependence upon secondary material: case studies, journal articles and evaluation and performance reports. Although this would not be catastrophic, it could impair the research in terms of its ability to contribute a new and unique insight to the body of work

already in existence. To mitigate against such a risk, measures to ensure access to high quality primary source material include forging relationships through networking opportunities, attendance and presenting papers at relevant conferences, and offers to carry out independent research on behalf of NGO and donor organisations.

1.8   Structure of the Thesis

This thesis follows a conventional structure with a literature review being followed by a justification of methodology, description of data collection and analysis and the production of a conceptual model to be validated for its feasibility. The research focuses on how a holistic approach can be taken to resolving problems that occur amongst the complexity of humanitarian supply chain networks and considers how cybernetics could contribute to the conceptual framework. The term 'cybernetics', derived from the Greek word *kybernetes*, was given to the new science of 'communication and control' in the 1940s (Jackson, 2019). This thesis demonstrates the requirement for a Systems Thinking approach that is focused on organisational cybernetics.

1.9   Summary

The highly complex and dynamic humanitarian operational environment often experiences a lack of cohesion between strategic level planners and operational logistic practitioners. The Global Logistics Cluster was established to bridge the gap but appears to lack the direction and vigour that was initially anticipated. This research defines the elements of the humanitarian supply chain, analyses its stakeholders, identifies the challenges faced by the stakeholders in their interaction with the supply chain and examines how information, materials and people flow along the supply chain. It considers how stakeholders interact and what issues arise from this interaction, and it explores how governance in the context of the humanitarian environment can support the outcomes of a relief effort. This work employs phenomenological research methods and uses semi-structured interviews to gather primary data to compare with secondary data, in order to develop a framework to be utilised by NGO and donor organisation stakeholder groups.

This research contributes to knowledge because it is **Original**, **Relevant** and **Significant**, and it has identified gaps in the governance and strategic management of humanitarian supply chains.	
Original	This research is original in that it identifies the challenges and issues arising in the flow of information and material in humanitarian supply chains and examines how the behaviours and goals of individual stakeholders contribute to these challenges and issues. It considers the flow of materials and information horizontally along the supply pipeline and vertically within stakeholder organisations, between field operatives and strategic management at board level. Given the likelihood of multiple supply chains operating under the umbrella of a single DRO, this research defines the term 'supply chain' and determines whether in the humanitarian context, 'supply network' or 'supply system' would not be more appropriate. The primary contribution is achieved by taking a Systems Thinking approach to the humanitarian supply network paradigm to achieve a holistic view of the issues that arise and the solutions that could be delivered. Existing literature reveals that little previous research has been conducted in terms of a systems approach. Due to Covid-related travel restrictions, all data has been collected online and this necessitated the development of an original, bespoke meta-synthesis process to construct abstract primary data for documentary narrative analysis. The research maps the whole humanitarian supply network and presents a conceptual framework, which for the first time in this field of study, is grounded in systems theory and methodologies.
Relevant	Stakeholder organisations are under constant pressure to deliver value for money and as a result, consultant reviews and evaluation reports regarding humanitarian operations are routinely conducted. Existing literature shows that shortfalls exist in the effectiveness and efficiency of humanitarian supply chains contributing to a DRO, and the flow of material and information comes in for particular scrutiny. This research is relevant because it considers the key logistic challenges being faced throughout the humanitarian environment from key stakeholders' perspectives and takes a holistic view of issues raised to add value in an original way.
Significant	This research is significant from an academic perspective because it examines humanitarian supply chains using a new theoretical approach, taking a holistic view of the challenges and issues faced by stakeholders. From a practical perspective, it is significant because it forms the bedrock for the development of a process framework and a common language which can help humanitarian logistic-ians and strategic planners to interact effectively to resolve the issues found in humanitarian supply chains. Through collaborative working and a holistic under-standing of the network of supply chains, humanitarian supply chain stakeholders will be able to deliver aid to the point of need at the right time, in the right quantities, to the right place, every time. This will be a contribution to good-practice and future humanitarian logistics planning and policy, but also function as a yardstick and a guide in dealing with ethical challenges within the supply network.
Gaps	The principal gap identified in this research is the lack of theoretical basis for the management of humanitarian supply chains and therefore the ability for issues arising in the humanitarian logistic environment to be resolved using existing models and frameworks. Models and frameworks that currently exist are ostensibly borrowed from commercial supply chain thinking. Due to the distinct complexities encountered in the humanitarian environment, a holistic rather than a reductionist view needs to be taken maintain the integrity of both horizontal and vertical information flows in humanitarian supply chains.

Table 1.2   The Originality, Relevance and Significance of this Research.

CHAPTER 2

HUMANITARIAN SUPPLY CHAINS
AND THE APPLICATION OF GOVERNANCE

*'If I have seen further, it is by standing on the
shoulders of giants.'*

Sir Issac Newton (1676)

2.1   How Existing Literature Contributes to the Research Process

Bryman & Bell (2019) suggest that it can be used to develop the research
question and may suggest additional research questions; this view following
on from Maylor & Blackmon (2005) and McNabb (2008). Burns & Burns
(2008) intimate that by 'taking a critical view of what has been done, pulling
disparate strands together and identifying relationships and contradictions
between previous research findings' (p.47), the literature review can become
a critical analysis of collated and integrated information. Overstreet et al.
(2011) indicate that there are many such strands waiting to be pulled
together. Therefore, this literature review seeks to identify and analyse the
challenges in the management of humanitarian supply chains and pull these
strands together to provide a conceptual base for empirical research. Ashby
et al. (2012) observe that socially, supply chain management is expected to
enforce a firm's values and standards with its suppliers (p.506), so it is
appropriate that this research should examine whether the same is true for
the management of the humanitarian supply chain.

2.1.1   Literature Review Process

Dodgson (2017) suggests that one component of assessing the
methodological rigour used in a literature review is to determine how
completely and transparently the author has detailed the review process
(p.115). In this work, the rationale of Booth et al. (2016) has been applied to
determine which review method was most appropriate; limitations in terms of
time, availability of quality material and type of source were considered; and
the key words, terms and synonyms used in the search of articles etc. were

identified. Booth et al. (2016) advise researchers to consider thematic analysis as a method of synthesising and analysing primary qualitative data because this method has been widely used in systemic reviews 'that address the questions about people's perspectives and experiences' (p.227). Dodgson (2017) describes this type of literature review as a 'scoping review'. However, in adopting thematic analysis, this research also adapts the four-step literature content analysis process developed by Kunz & Reiner (2012) for use in the analysis of qualitative data. Here, it is suggested that content analysis is particularly suitable for conducting a literature review because 'it helps to identify the conceptual content of a field by analysing documents in a structured and reproducible way' (p.121).
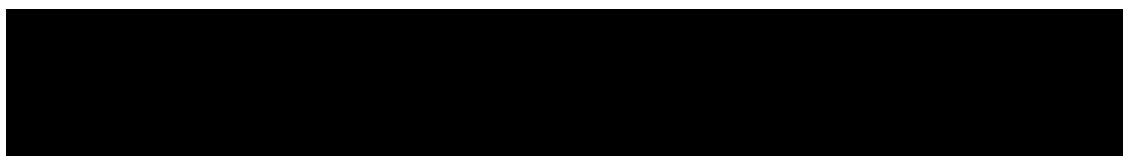
Figure 2.1   Process Model for Content Analysis. (Kunz & Reiner, 2012).

2.1.2 The Structure of the Literature Review

Over the past two decades, technology has significantly changed the way supply chains work, but it has also changed the way we think about them. Therefore, significant changes in practices, theory and concepts are to be expected. From an epistemological point of view, most literature concerning humanitarian supply chains is subjective in nature because the author has been examining and commenting on a human activity which is subjective by its nature. Also, most literature has taken a cross-sectional approach to time since individual events, decisions and interventions have been the typical subject of study. Therefore aetiologically, there is little consideration of causality in primary data which would be more prevalent if a more positivist approach was to be taken. Chapter 3 discusses this in the context of research methodology in greater detail.

2.1.3 The Scope of the Literature Review

During the initial scoping of the literature, primary themes were identified and recorded, providing the spectrum of bodies of knowledge to be bounded and more detailed reading to be targeted.
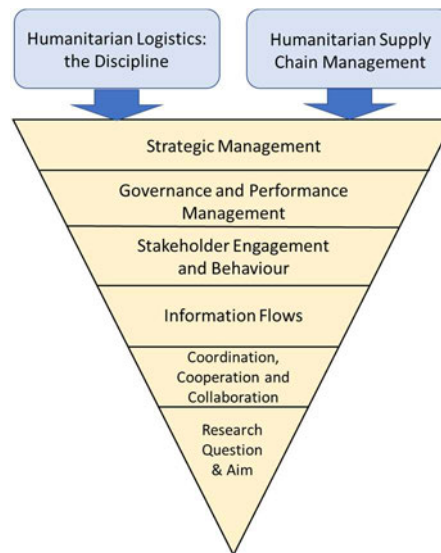
Figure 2.2   Using the Literary Review to Focus the Research Question and Aim.

Burgess et al. (2006) note the paucity of academic articles on humanitarian logistics prior to 1985, followed by a rapid growth in the 1990s; this demonstrates that the field is relatively new. Given the relative immaturity of this research field and therefore the limited applicability of early contributions, Kovács & Spens (2011) suggest that early literature considered humanitarian logistics as a subset of commercial logistic and supply chain thinking; most early research followed this view. It notes that it was only in the aftermath of the SE Asia 2004 Boxing Day Tsunami that humanitarian logistics began to be considered as a distinct field of its own and at this point came under professional scrutiny for the first time. This provides a neat boundary for subject specific literature; only by exception are journal and professional publication articles written before 2005 considered. McLachlin & Larson (2011) highlight that it was the response to the January 2010 earthquake in Haiti which saw humanitarian logistics viewed as a distinct discipline by OCHA in the evaluation of the crisis response. For this reason, 2010 is taken as the datum line for NGO post-operational evaluation reports. However, while these two key dates heralded the concept of humanitarian supply chain

management as a distinct discipline in academia and in NGO organisations, traditional supply chain thinking has often been applied in the examination of challenges and issues. This, however, may not always have been appropriate.

The subject of humanitarian supply chain management is niche and there is currently only one academic journal dedicated to it: the Journal of Humanitarian Logistics and Supply Chain Management. However, a great deal of literature on the subject is to be found in many other journals, including those dedicated to operational research, economics and manufacturing technology. Guideline and training documentation held in such depositories as NGO resource libraries and the resource centres such as the Fritz Institute, the Active Learning Network for Accountability and Performance (ALNAP) and the Humanitarian Logistics Association (HLA) are also reviewed. While it is recognised that the judgements, conclusions and outcomes of such publications can easily be weighted in favour of the commissioning organisation, they can serve as a source of corroboration when confirming the occurrence of specific events.

The literature review is designed to take account of core (primary) literature and wider (secondary) literature. The initial search of the primary literature focuses on the definition of humanitarian logistics and how supply chains are currently managed in a humanitarian context. Within this body of literature, several key terms emerged which led to secondary literature being explored: strategic management, governance and performance management, stakeholder engagement and the degree to which stakeholders understand the eccentricities of humanitarian supply chains. From these emerged two specific areas of interest: the flow of information between stakeholders and the degree to which they are prepared to work collaboratively, cooperatively or in a coordinated manner. From this secondary literature, further key terms emerged which in turn led to other articles on the subject being identified. Following on from the primary literature, the following key areas of interest emerged from the secondary literature.

Bodies of Knowledge	Key Areas of Interest	
Strategic management	Strategic planning	Understanding of the supply chain concept and deliverables
	Coordination and collaboration	The role and extent of coordination and collaboration
	Supply chain information flow	Assessment of effectiveness and efficiency of management structures
	Vertical information flow	Examination of effectiveness
	Supply chain ownership and control	Roles and responsibilities in the supply chain
Governance and performance management	Humanitarian and corporate supply chain governance	Determining existence or requirement
	Humanitarian logistics performance management	Determining existence or requirement
	Ethical challenges facing humanitarian supply chains	Benchmarking behaviours likely to impact on deliverables
Stakeholder engagement	Stakeholder behaviour	Ownership, power, control and impact
	3PL / 4PL* stakeholders	Streamlining of aid delivery
Understanding humanitarian logistics	Vertical and horizontal information flows	Confirm a basic understanding at all levels
	Education and training	Degree to which personnel are educated or trained

* 3PL / 4PL: Third Party Logistics Provider / Fourth Party Logistics Provider.

Table 2.1   Filtering Framework Summary.

From the initial four bodies of knowledge, five key areas of interest were identified and articles addressing these areas became the focus of review. Following analysis, more specific areas of research were identified (above in green) and a more detailed evaluation of the material was undertaken. By analysing the literature relating to these specific areas of the humanitarian supply chain, it was possible to establish whether a gap in knowledge was apparent for each area. Fig 2.2 shows that using this process allows the researcher to revisit and confirm the detail of the research question and confirm the specific research area where a gap in the knowledge exists. In this case, governance and performance management, and stakeholder engagement fall outside scope because there much research attention is paid to these areas due to pressure by donors, inter alia, for humanitarian relief organisations (HROs) to demonstrate adherence to governance frameworks and performance measurement. However, it is recognised that

future reference will be made to both these areas as a certain degree of overlap exists between them and the areas of coordination, cooperation, collaboration, and the flow of information. This process also provides for the validation and confirmation of the initial aim and objectives which become gradually more focused. By using the well-established Kunz & Reiner (2012) process, the broad scope of the research topic has been identified through the literature and from this, key areas have emerged revealing a gap in knowledge around the flow of information. In particular, challenges in coordinating DROs have become apparent, as too has an apparent lack of will for organisations to work in cooperation with each other or collaboratively.

2.2   Perspectives and Challenges

In presenting a definition of humanitarian logistics and supply chain management, it is important to define what is meant by logistics and the supply chain, both in the commercial and humanitarian contexts. Rather confusingly, Larson & Halldorsson (2004) offer four options from which to choose, depending on one's personal perspective:
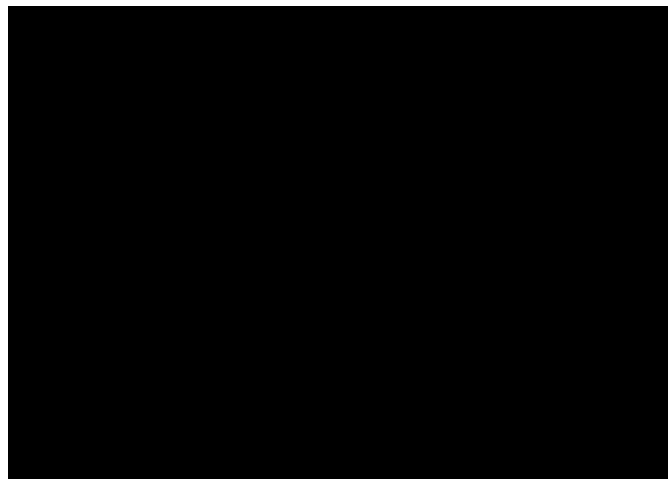
Figure 2.3   Perspectives of Logistics versus Supply Chain Management. (Larson & Halldorsson, 2004).

The 'traditionalist' view is that logistics encompasses all of supply chain management while the 'unionist' view is diametrically opposite to this. A third view is that one can merely re-label logistics to supply chain management with the fourth view recognising that the two disciplines indeed have common functions and aspects, but that both also have different functions and

aspects. Since the work of Larson & Halldorsson (2004) was published, there has been a refinement of the definitions of logistics and supply chain management but as Kovacs et al. (2018, p.257) demonstrate, these four views remain relevant. Neither Larson & Halldorsson (2004) nor Kovacs et al. (2018) offer a view on which of the four is correct, but both warn the researcher that given their fluidity, it is wise to put clear boundaries on the study. The Council of Supply Chain Management Professionals (CSCMP, 2018) take the unionist view that 'supply chain management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities' and 'logistics management is that part of supply chain management that plans, implements and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements'. Lysons & Farrington (2006) reflect on the 'relabelling' view that logistics and supply chain management are synonymous but offer the developed view held by the UK's Chartered Institute of Logistics and Transport (CILT) that 'the management of logistics makes possible the optimised flow and positioning of goods, materials, information and all resources of an enterprise. The supply chain is the flow of materials through procurement, manufacture, distribution, sales and disposal, together with the associated transport and storage' (p.101). Both agree that the application of logistics is essential to the efficient management of supply chains. This is the 'intersectionist' view and it is the view this research takes.

Writing in Christopher & Tatham (2011), Pettit et al. quote the Fritz Institute definition of *humanitarian* logistics as 'the process of planning, implementing and controlling the efficient, cost-effective flow and storage of goods and materials, as well as related information, from the point of origin to the point of consumption for the purpose of alleviating the suffering of vulnerable people. The function encompasses a range of activities, including preparedness, planning, procurement, transport, warehousing, tracking and tracing and customs clearance' (p.115). Following this logic, it is through the supply chain that materials and information flow. The processes to effectively

and efficiently manage the commodity pipeline borne by the supply chain sit at various governance levels and may be controlled by a variety of organisations in the supply chain. Pettit et al. (above) demonstrate that the management of these processes constitutes the supply chain management concept. Tomasini & Van Wassenhove (2009b) further develop this key theme of flow when comparing the supply chain flows of the commercial sector with the humanitarian sector, suggesting that, in addition to the commercial flows of material, information and finance, 'in a humanitarian supply chain there also exists people, knowledge and skills' (p.4), highlighting the manpower deployed to implement a humanitarian supply chain and the need to be able to adapt because each supply chain is new and different. These contributors all suggest that when examining the humanitarian supply chain (HSC), the tools used in examining a commercial supply chain are of limited use. However, there is evidence that earlier contributors saw humanitarian supply chain management (SCM) as a subset of commercial SCM. Thomas & Mizushima (2005) defined humanitarian SCM by misquoting the CSCMP definition above: 'humanitarian logistics is preliminarily defined as "the process of planning, implementing and controlling the efficient, cost-effective flow and storage of goods and materials, as well as related information, from point of origin to point of consumption for the purpose of meeting the end beneficiary's requirements".' By simply substituting the words 'end beneficiary' for 'customer', it appears that the rather important implications of doing so are not fully appreciated, as this research addresses in section 2.2.3 below.

Chandes & Paché (2010) are among the first to recognise the challenge when attempting to describe the emerging discipline of humanitarian logistics using hitherto traditional models because the 'manufacturing perspective and service perspective is not necessarily relevant' (p.322). It is explained that humanitarian logistics is a service because it provides assistance not just to the victims of a disaster, but also to those providing the relief; however, it also parallels the manufacturing sector 'as the delivery process requires a great deal of material and technological resources, notable in terms of transportation, handling and warehousing of products'.

Lindgreen et al. (2013) also look at how humanitarian supply chains compare with commercial supply chains and recognise that NGOs are subject to challenges in terms of relationships and interaction which are not normally experienced in the business world. Given that NGOs can be involved in both simple and complex supply chains, no suggestion is made as to how contemporary business thinking can assist the humanitarian logistician. Van Hoek & Harrison (2002) examine the role of outsourcing and collaboration in the context of 'global coordination / local operation', but such an approach in the field of humanitarian logistics would require careful risk management such as that advocated by Dornier et al. (1998). Thomas & Kopczak (2005) identify synergies between the challenges faced in commercial and NGO supply chains, and these are reflected by Stoddard et al. (2009) in the Humanitarian Policy Group article on providing aid in insecure environments.

In acknowledging that humanitarian logistic efforts are set up temporarily with specific functional elements in mind, Dubey & Gunasekaran (2015) make a clear distinction between commercial and humanitarian supply chains: 'the humanitarian logistics involved in relief chains is primarily reactive, guided by the ad hoc design; the logistics involved in commercial supply chains, in contrast, vary between proactive and reactive, guided by four factors: quality, cost, time and risk' (p.65). Yuste et al. (2019) consider that 'commercial logistic systems are fundamentally driven by profit and are designed to align producers with customers' (p.5), whereas in the humanitarian context, the alignment must be between two different stakeholders: the donor and the beneficiary. This in turn poses the question of who the customer is in the humanitarian context; a question this research will explore in more depth.

In comparing performance measurement in commercial and humanitarian logistics, Lu et al. (2016) concede that while there are similarities between the two, such as planning and transportation, but recognise that they still 'differ on demand pattern, objective, stakeholders, structure, complexity and operating environment' (p.223). This is chiefly because the operational environment is not just highly fluid and often hazardous, but the demand

which can change rapidly as the extent of disaster unfolds is often met by an escalation in donor engagement. Approaching this comparison from a different angle, Maon et al. (2009) state that while 'differences between commercial and humanitarian supply chains certainly exist' and consider that 'the skills and competencies required to excel in commercial supply chain and logistics management generally are the same skills and competencies that are needed to carry out disaster relief operations' (p.150). This is not an unambiguous point as it could therefore be argued that commercial skills and competencies merely form the basis of what an aspiring humanitarian logistician needs to develop to excel in humanitarian supply chain and logistics management. Indeed, Maon et al. (2009) seem to suggest that this is the case through their observation that 'the agility, flexibility and rapid response capabilities of disaster relief supply chains should offer key lessons for corporations that increasingly need such skills' (p.158). Vojvodic et al. (2015) identify two basic characteristics which distinguish humanitarian from commercial supply chains. Where commercial supply chains can often experience a level of demand uncertainty, the degree of uncertainty is largely limited by market research and oversupply can be mitigated through other marketing activities such as sales promotions. It would be unusual for a commercial supply chain to be established without there being a supplier in existence and it is relatively rare for commercial supply chains to experience a lack of supply; however, it is often the case that humanitarian supply chains experience not just a lack of supply but also a lack of supplier.

2.2.1 Humanitarian Supply Chain Design Fundamentals

The 2004 Boxing Day Tsunami marks the point in time when humanitarian logistics in general and supply chains in particular became widely viewed as a discipline in itself, separate from that of the commercial sector. In the wake of the disaster, practitioners and academics began to ask how disaster aid could be better provided. Various institutes and logistic conferences recognised that contemporary commercial supply chain processes and procedures were insufficient to address the issues and challenges; one such conference in 2007 gave rise to the establishment of the Journal of Humanitarian Logistics and Supply Chain Management. Pettit &

Beresford (2009) identify leadership as an important element of a humanitarian supply chain's design, and Dubey & Gunasekaran (2016) highlight that supply chain culture is an important construct in successful supply chains but that there has been little study conducted into how supply chain culture contributes to the effectiveness of humanitarian supply chains. Dubey & Gunasekaran (2016) list the actors within a humanitarian supply chain as being governments (both host nation and neighbouring / international), the military, aid agencies, NGOs, donors and private companies. Dubey (2022) advances this view by suggesting that the design and management are 'the most critical aspects of humanitarian supply chains' and acknowledging that while most contributions address the mechanics of humanitarian relief operations, believe that 'the elements of HSC design are not well understood in an integrated manner' (p.1). This would suggest that humanitarian supply chain design and management needs to be viewed from a new perspective. Specifically, he advocates 'analytical, conceptual, empirical studies relying on survey-based data, qualitative studies (i.e., multiple-case-based studies, action research, graph-theoretic approach, grounded theory, or ethnographic approach), or to an extent unique conceptual works that help push the theoretical boundary' (p.3). In taking such a new perspective, Kovacs & Moshtari (2019) suggest that humanitarian studies should be more aligned with real-world problems rather than esoteric models and theories. This research strives to meet the challenges laid down by Dubey (2022) and Kovacs & Moshtari (2019).
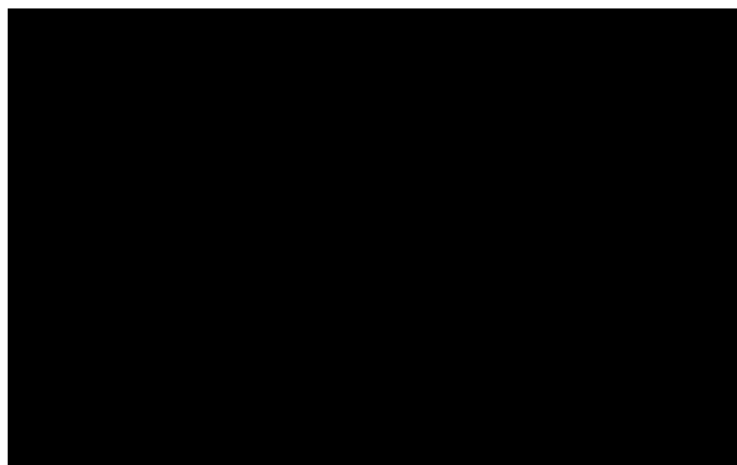
Figure 2.4   Generic Supply Chain Strategies in the Commercial Sector (Christopher, 2011).

Altay (2008) observes that 'supply chains are usually designed to minimize cost, maximize throughput or minimize response time' (p.125) and that the private sector long recognized that different product lines require bespoke supply chain designs. Figure 2.4 summarizes generic supply chain strategies within the private sector but can also be used to show how it is of limited use when describing the strategies of humanitarian supply chains. The suggestion is made that they face 'the challenge of minimizing response time *and* minimizing costs' (p.125).

Due to the inherent unpredictability and short response times of humanitarian operations, one might suppose that disaster aid would fall into the lower right quadrant of Figure 2.4, but like commercial supply chains, different product varieties follow different strategies. Altay (2008) gives the example of pre-packaged food aid for emergencies which is 'mainly standardized using staples and could be procured and stocked well before a disaster occurs, and this suggests a lean supply chain that can be planned and optimized ahead of time. In contrast, portable decompression chambers are used to treat crush syndrome victims after earthquakes for which the demand is unpredictable and delivery lead times must be short'.

Van Wassenhove (2006) draws attention to the similarities and the differences between humanitarian and commercial supply chains. It is argued that the Vicious Circle of Logistics is accentuated in DROs by a general failure by many stakeholders to understand the complexities of these operations and the supply chains which support them.
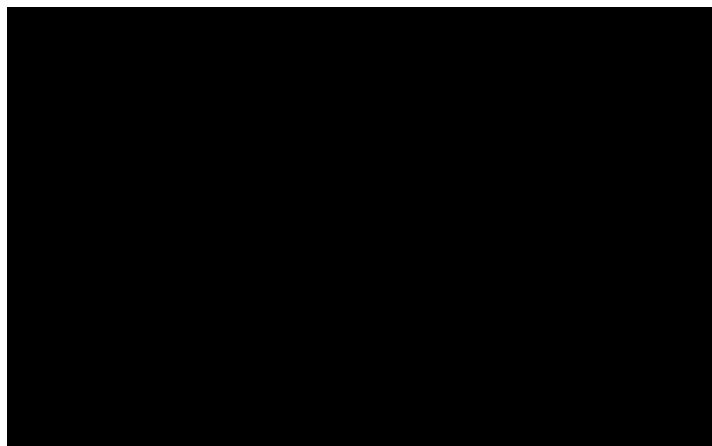
Figure 2.5   The Vicious Circle of Logistics. (Van Wassenhove, 2006).

Van Wassenhove (2006) is an early advocate of coordination, cooperation and collaboration in the humanitarian supply chain environment and highlights the cross-learning opportunities posed by working with commercial supply chain managers and practitioners. It is noted that 'despite the fundamental differences between logistics in the private and humanitarian sectors, there is a lot of overlap' (p.486); it is also recognised that 'although humanitarian logisticians can learn from and work with private sector logisticians, their work in the context of a natural or man-made disaster is very different from logistics in the business context. As numerous DROs have shown, the biggest hurdle facing humanitarian logistics teams has been the sheer complexity of the operating conditions within which they had to work in order to supply aid to those affected' (p.477). The importance of coordination, cooperation and collaboration is studied in depth by Wankmüller & Reiner (2019) who understand them to be fundamental in reducing impediments and disruption in humanitarian supply chain management. A theoretical basis for these three terms is offered, which this research abbreviates to 'C^3'.

Van Wassenhove (2006) is also an advocate of Operational Research (OR) and suggests that 'OR would therefore seem a perfect fit in the field of humanitarian logistics: there is a disaster (real-life problem) where logisticians are tasked with getting aid out to those suffering (people dealing with the problem) and as quickly as possible (systems requiring analytical input)' (p.488). Here, views on the future contribution of OR seem to imply that it is worth considering the humanitarian space as a complex system. The humanitarian space is defined using the principles humanitarian organisations live by: humanity, neutrality and impartiality.
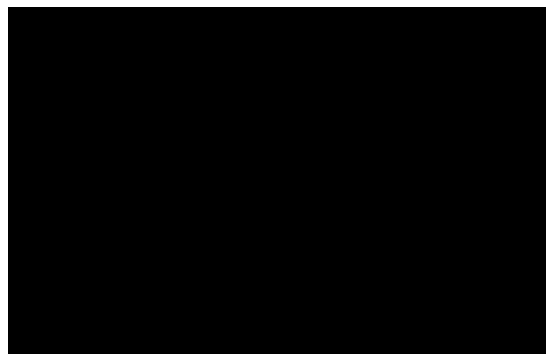
Figure 2.6   The Humanitarian Space. (Van Wassenhove, 2006).

Burgess et al. (2006) refer to OR, or at least a form of systems thinking, when they posited that 'a systems perspective would suggest SCM to be an all-embracing management framework' (p.708) and by consolidating work by others, a set of seven constructs for supply chain management is described: leadership; intra-organisational relationships; inter-organisational relationships; logistics (the movement of materials and entities in the supply chain); process improvement orientation; information systems; and business results and outcomes. These seven pillars are equally applicable to the HSC but Dubey & Gunasekaran (2016) state that since HSC design decisions include the social, behavioural and physical/structural design elements, the humanitarian supply chain should be examined in terms of agility, adaptability and alignment. Dubey et al. (2019) develop the idea of OR and how it can be utilised to encourage mutual understanding among DRO stakeholders through the Tatham & Kovacs (2010) concept of 'swift trust'.
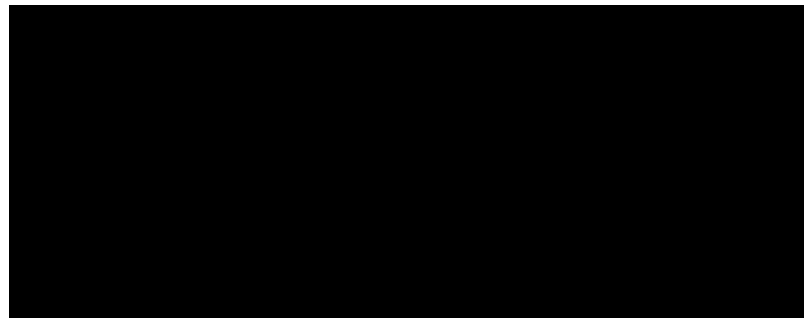
Figure 2.7   Swift Trust. (Dubey et al., 2019).

Jahre et al. (2009) question whether traditional models that focus on improving efficiency and reducing costs can or should be applied for the temporary and non-commercial systems that characterize humanitarian logistics. It is suggested that more research is needed in different areas of humanitarian logistics, and that 'research needs to take the distinctiveness of the operational environment of humanitarian aid into account' (p.1009); some research into this area has since been undertaken (Merminrod et al. 2013; Jensen & Hertz, 2016; Makepeace et al. 2017; Schiffling et al. 2020a). Specific areas to be explored are identified and include what coordination mechanisms and which organizational structures and processes can be recognised in the different parts of humanitarian aid and how these relate to

theories / models applied within the area of logistics. Three key dimensions of the humanitarian supply chain for future research are intimated: permanent and temporary networks; vertical and horizontal coordination; and centralised and decentralised structures (Rodríguez-Espíndola et al., 2018c). Vaillancourt (2015) offers a theoretical framework for the consolidation of humanitarian logistics, but by looking a individual functions within the domain, it takes a reductionist view.

Ramsden (2014) offers an analytical understanding of the humanitarian supply chain environment by comparing generic business and humanitarian supply chains. In essence, he finds that business supply chains are inherently predictable, profit and efficiency focused, encourage learning and improvement, and comprise of stakeholders who share common interests. Humanitarian supply chains are considered unpredictable and unstable, and are flexible and agile, but where there is little time or incentive to review or measure performance. Stakeholders are numerous and have many different interests. Ramsden (2014) also reflects business' view that humanitarians are ideological and inefficient while humanitarians view the intentions of the business world with great scepticism.

2.2.2 Reductionism v Holism

Reductionism and holism are diametrically opposite perspectives that taken in problem solving. While reductionism takes the approach that a problem should be broken down into its constituent parts and by resolving each part, the whole problem will be resolved, holism takes the view that systems should be considered as a single entity and not as a collection of components. In terms of supply chain management, Ponte (2016) suggests that 'when reductionism is applied to SCM, the overall strategy is obtained as a sum of the individual strategies of the companies that [comprise] the supply chain (local optimisation), while in a holistic context, those individual strategies are the result of an overall strategy defined by collaboration (global optimisation)' (p.171). It is suggested that increasingly, supply chains founded on stakeholder relationships and close engagement, and that taking a reductionist approach brings lower overall performance and greater overall

costs. Local optimisation is considered to be a major source of inefficiency and the view that contemporary commercial supply chains are systems is now widely shared and the term 'system' is increasingly synonymous with humanitarian supply chain management (Piotrowicz, 2018; Yuste et al. 2019; Sweeney & Waters, 2021; Wankmüller & Reiner, 2021). Applying the logic of Ponte (2016), it would be erroneous to apply reductionist thinking to the problems that arise in a humanitarian supply network because inefficiency and increased costs would ensue. Given the networked nature of the stakeholders and the established role of the Global Log Cluster in coordinating the global efforts of global players, it is appropriate that global optimisation rather than local optimisation, holism rather than reductionism, should be the approach taken when considering the humanitarian supply network.

2.2.3 Management Model Underpinning Aid Delivery

Kovacs & Spens (2007) consider that the primary processes inherent to supply chains of demand management, supply management and fulfilment management have been understood for many years. Going back further in time, McEntire (1999) lists other processes supporting the delivery of aid as preparation, monitoring and coordination, and information flow. Tomasini & Van Wassenhove (2009a) echo this, listing their three primary processes as preparedness, response and collaboration, both with communities and the private sector. Acknowledging the challenges humanitarian supply chains experience regarding uncertainty in demand, Goenzel & Heigh (2015) raise the issue of the timeliness of donations by observing that 'donors typically release funds after the onset and ramp up aid in the immediate aftermath' (p.17). Not only is this contrary to the principles of preparedness, but they suggest it can also lead to the organisational planning between technical programmes and the supply chain being overlooked.

The temporary nature of humanitarian supply chains is recognised by Merminrod et al. (2013) who appreciate that each DRO will require a specific resource configuration, calling on customised or standard resources, temporary or not. Such resources include the processes by which an aid

organisation will respond to an emergency, and Natalie Fabbe-Costes is quoted when referring to the 'plug and play / unplug' use of standard operating processes and procedures. Jahre & Fabbe-Costes (2015) acknowledge that standardisation and modularity support responsiveness through agility; however, it is not just off-the-shelf processes and procedures they advocate, but also standardised and modular products and services and collaboration. Of note is that 'inter-organisational standards improve interoperability' when an organisation is able to integrate with 'heterogeneous partners' systems' (p.353).

Looking wider than just the response phase of DROs, Cozzolino (2012) develops the Disaster Management Cycle by Tomasini & Van Wassenhove (2009b) by breaking down the response phase into immediate response and restoration, the latter being where the priority is to preserve life: 'time saved means lives saved'. The reconstruction phase is annotated as 'Sustain Life: costs saved mean more lives helped' (p.10). Adiguzel (2019) breaks down the disaster management cycle in two, either side of the onset of the disaster. Pre-disaster prevention activities such as mitigation of losses and losses, preparedness, prediction and early warning are considered to be 'risk management' and post-disaster activities such as response, impact analysis, intervention, improvement and restructuring as 'crisis management' (p.220).
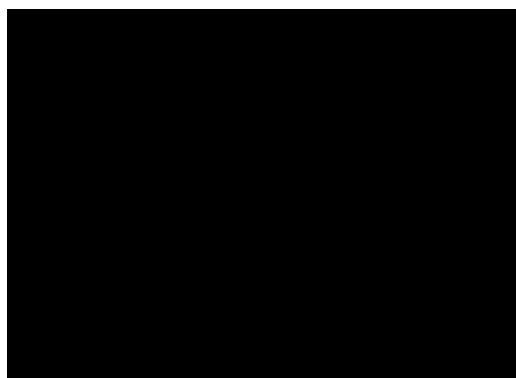
Figure 2.8   The Disaster Management Cycle. (Cozzolino, 2012).

Cozzolino (2012) describes the mitigation phase as referring to 'laws and mechanisms that reduce social vulnerability. These are issues that relate to the responsibilities of governments and do not involve the direct participation of logisticians' (p.8). However, as aid organisations come in for increased

scrutiny and a degree of what Bauhr et al. (2013) refer to as 'aid fatigue', there is increasing emphasis being placed on organisational reputation and post-event image; this is an area where logisticians have direct participation.

2.2.4 Different Perspectives

Determining the identity of the customer in a humanitarian supply chain might appear to be slightly pedantic, but it serves as a useful example of how stakeholders and academics can view a single element of it from different and evolving perspectives. As with commercial supply chains, the humanitarian version begins with commodities entering from a variety of well-defined sources, most from individual, organisational or governmental donations, others purchased by NGOs with funds allocated to a specific operation, or from funds made available by the host nation. However, there are differing opinions as to the identity of the customer.

The literature offers varying perspectives. In Christopher & Tatham (2011), Tatham & Hughes (2011) allude to a 'final customer', while Schiffling & Piecyk (2014) suggest that the customer can be found in the guise of the donor and the beneficiary. Whilst it is acknowledged that in focusing on performance management and the balanced score card, Schiffling & Piecyk (2014) concede that 'customer value created in humanitarian logistics is ultimately not financial' (p.207) but suggest that it is expected that supply chains deliver 'maximum output for the customers' investment' (p.207). The idea of the customer investing financially in the supply chain reflects the definition of a commercial supply chain customer in Forrester's Beer Game as illustrated below. However, given that the donor places no demand on the humanitarian supply chain and the beneficiary invests no funds in the humanitarian supply chain, it is difficult to see how either could be 'the customer'.
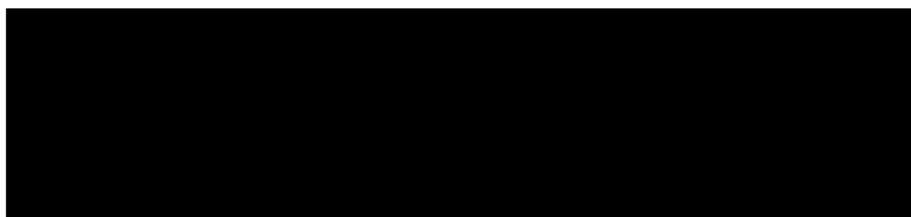
Figure 2.9   The Elements of the Beer Distribution Game. (Forrester, 1958).

Following Forrester's logic in Fig 2.9, the commercial customer is clearly the one who places a demand upon the supply chain by investing in it: (s)he orders the beer, receives the beer and pays for it.

Using this example of the customer, the evolution of perspectives is epitomised by a series of linked publications. Oloruntoba & Gray (2006) state categorically that the customer is the *donor*; however, Oloruntoba & Gray (2009) describe the customer as 'the *aid users* (also known as "victims")'. But then, Oloruntoba & Kovács (2016) concedes that increasingly 'community participation is slowly making the *end-user's* input relevant to decision-making' (p.713), but does not specify whether the end user is active or passive, i.e. the clinician administering the vaccine or the person receiving it. So, the perspective held by one contributor has evolved over a 10-year period. Makepeace et al. (2017) asked practitioner participants in a survey to identify the customer in a humanitarian supply chain and discovered that from both the technical programme cohort and the logistics cohort considered the customer to be the beneficiary.

Maull et al. (2012) define the customer by characterising their actions in terms of direct and surrogate interaction and independent processing. They describe the customer perspective as 'focusing on the chain of interactions of the customer with the service providers' and beg the question, 'How does the customer realize value from the supply chain?' (p.73). This corroborates Forrester's view that the customer interacts with the supply chain, something that rarely occurs with humanitarian supply chain donors once they have transacted the donation, and virtually never happens with beneficiaries, the vast majority of who have no technical knowledge of what is required to alleviate an emergency situation. Even if beneficiaries did possess the knowledge, they could be incapacitated to the extent that they would not be physically able to interact with the supply chain. However, as Duddy et al. (2017) recognise, there is one figure that does place demand on the supply chain and does so from a position of financial authority: the subject matter expert at the coal face who not only represents the beneficiary but knows exactly what is required to alleviate their suffering. This may be a

humanitarian clinician, nutritionist or refugee camp engineer, and in this study it is this actor for whom the term 'customer' is used.

2.2.5 Context and Challenges

Existing literature which seeks to impart an understanding of the humanitarian supply chain by its very nature, gives great insight into the context in which humanitarian supply chains operate and many of the challenges which face HSC practitioners. They may be established as a contingency planning output waiting to be taken off the shelf of an INGO programme cell; they may be bespoke to a specific operation during its preparation phase; and they may be hastily cobbled together in response to an unforeseen event. Furthermore, having been activated, a humanitarian supply chain may operate during the initial emergency relief phase, into the reconstruction phase and beyond, to a permanent or semi-permanent development phase. Munslow & Brown (1999) refer to this transition concept as the relief-to-development continuum. During its life cycle, it will be tailored to the prevailing operational conditions, but there are humanitarian supply chains which still operate in West Africa and Asia that were first established decades ago.

Disaster relief operations have been carried out in the most diverse geographical conditions across the globe. From regional tsunamis and floods to localised earthquakes and mud slides; from wide-spread African crop failures to Middle Eastern civil war and inherent refugee crises; from regional disease epidemics to mass exodus for economic or political reasons. It is easy for one to assume that DROs only occur in 'third world' countries but, by definition, they occur in any country that doesn't have the internal ability to deal with the disaster without outside assistance. Just as humanitarian supply chains change with time, they also vary in length. Some stretch from private donor organisations and governments in Europe, SE Asia and North America to affected towns, cities or provinces in individual countries whilst some may stretch only from a medical store in a neighbouring country to a hospital in the affected country. Even supply chains within a single country can be considered humanitarian supply chains, for example, where vehicles

or transportation services are purchased in-country with international aid funding. It is by reviewing the existing literature on these aspects of humanitarian logistics that we can explore the juxta position of commercial and humanitarian supply chains in a humanitarian context and uncover the challenges they pose.

Para 2.2 above details the principal differences between commercial and humanitarian supply chains, and it is therefore no surprise that humanitarian supply chain stakeholders can face markedly different challenges from those faced by their commercial counterparts. Writing in O'Sullivan (2019), Duddy describes shared challenges such as stakeholder behaviour, breakdowns in communication, compressed timelines due to unforeseen circumstances and supply chain disruption caused by political, economic or environmental factors; but the challenges specifically faced by humanitarians primarily fall into two categories: physical challenges dictated by the environment and contextual challenges dictated by the behaviour of stakeholders. Physical challenges lie outside the control of the supply chain stakeholders while contextual challenges result from the actions of stakeholders, either internal or external to the individual supply chain.

The literature addresses aspects of ownership and control, the role and influence of donor organisations and the flow of materials and information. Sandwell (2011) is quite explicit when he refers to donors frequently demanding their aid be directed to a particular beneficiary group, and often in a manner that undermines the strategic aid plan. He reflects the frustration experienced by strategic level programme and logistic planners in many NGOs. Meanwhile, Maxwell et al. (2012) reveal perceptions, gaps and challenges regarding corruption in humanitarian assistance, much of which had already been identified on the ground by Willetts-King & Harvey (2005). In addition to highlighting the importance of coordination in DROs, Altay (2008) looks at how NGOs conduct contingency planning in areas of the world where assistance is most likely to be needed. The importance of coordination and the need for efficient passage of information is highlighted by both Akhtar et al. (2012) and Tomasini & Van Wassenhove (2009a). The

need for frameworks to be developed to assist logistic practitioners is acknowledged by Overstreet, et al. (2011), D'Haene (2015) and Carroll & Neu (2009), but attention is drawn to the issues of ownership and control by Kovacs & Spens (2009), MacLachlin & Larson (2011) and Christopher & Tatham (2011). For example, an aspect of inventory strategy which is more important in the humanitarian supply chain than in the commercial world, where tight control must be exercised, is the dynamics of Push and Pull logistics; Oloruntoba & Kovacs (2015) look at this in some detail and Chandes & Pache (2010) consider this in the wider context of NGO reaction and collective action. However, to recognise which of these strategies is applicable in a particular set of circumstances requires coordination throughout the supply chain. To switch from Push to Pull (or vice versa) when the time is right not only requires coordination, but a level of cooperation and an appreciation of the ramifications.

In addition to Altay (2008) reiterating the challenges identified by Fritz Institute in 2005 of 'a lack of recognition of the importance of logistics, lack of professional staff, inadequate use of technology and limited collaboration' (p.123), the view is taken that there are fourteen challenges in the humanitarian supply chain, including a need for capacity building for preparedness, high personnel turnover, uncertainty of demand and supply, and unreliable influx in information. Comment is made on donors' propensity to 'tag donations with specific spending targets and want to see that their donation has been spent accordingly' (p.126). A common thread that links the ability to prepare, the tackling of personnel turnover, the demand and supply situation and the wishes of donors is the flow of information. Charles et al. (2010) consider uncertainties in the humanitarian supply chain and suggest that increased agility in supply chain design can meet many of these challenges, but supply chains can only react to clearing uncertainty with accurate information. Van Wassenhove & Pedraza Martinez (2012) echo Altay's observations, explaining that in addition to 'low volunteer skills, high rotation of personnel and poor infrastructure add to the challenges', and that 'security problems and very limited reliable information are additional constraints' (p.308). In terms of insufficient consideration of the strategic

importance of supply chain and logistics functions, Kovacs & Spens (2009) and Maon et al. (2009) are in complete accord; the latter put this down to 'the value-oriented culture and management of most disaster relief agencies, combined with a tacit knowledge in disaster relief agencies' (p.153). Oloruntoba & Gray (2009) list challenges which fall into these two categories: physically, insufficient supplies and inadequate transportation and warehouse capacity in the affected area; and on the contextual side, inadequate preparation and planning, difficulty in accessing the needs of beneficiaries, unjust supply distribution and coordination issues. However, a possible solution in the form of customer-focused supply chains that rely on the flow of accurate information is also suggested.

Kabra & Ramesh (2015) focus on a lack of coordination in humanitarian supply chains and reflect on the factors which affect coordination practices that they feel can also be viewed as barriers, such as funding, diversity of stakeholders, donor expectations, resources and information flows; solutions to overcome barriers to coordination are offered in Table III. Their research profiles logistic and technical actors, and while the academic level of qualification is considered, it is not specified whether the players' studies and experience are rooted in a humanitarian or commercial environment. Both Kovacs & Spens (2009) and Bealt et al. (2016) consider collaboration as a significant issue affecting humanitarian supply chain effectiveness and efficiency. The former cites a case where stakeholder theory was used to mitigate resulting challenges in Ghana while the latter examine the impediments to inter-agency collaboration at HQ level, citing research in the commercial domain which may help to alleviate the reluctance of humanitarians to collaborate. It is ironic that many of the challenges identified by McEntire (1999) as facing humanitarians continue to arise in a range of more contemporary literature (Kaynak & Tuğer, 2014; Prasanna & Haavisto, 2018; Sapat et al. 2019; Yáñez-Sandivari et al. 2021).

2.2.6 The Theoretical Problem

Even though they share critical functions such as procurement, transport and warehousing, there are significant differences between commercial and

humanitarian supply chains. A wealth of knowledge and experience of commercial supply chains has developed since the term supply chain was coined in 1982 and several models have been developed to help understand the supply chain and elements of it in a commercial context. However, this is not the case for humanitarian supply chains. Models borrowed from the commercial world, such as the SCOR Model and the model designed for the Global Supply Chain Forum (GSCF), as described by Cooper et al. (1997) for integrating and managing business processes across the supply chain, have been applied to specific elements of the humanitarian environment. Whilst they can be applicable in the management of transport assets or the procurement of storage facilities, they often fall short when applied to an entire supply chain operating in highly volatile political situations and austere infrastructure conditions with a well-meaning, enthusiastic volunteer workforce that is not necessarily trained for the job they are undertaking.

Habib (2011) and Tabaklar et al. (2015) confirm that there is a lack of supply chain theory and several contributors have used Value Chain theory by Porter (1985) as their basis (Christopher, 1992; Chopra & Meindl, 2015; Lysons & Farrington, 2006; and Grant et al. 2006). Haberberg & Rieple (2001) developed value chain analysis to be applied to service organisations and with the recognition that even this would need to be adapted if it were to be of use to non-competitive organisations such as in the public sector. Wikström & Normann (1994) considered the value contributions of stakeholders to public sector and third sector businesses in its Value Star, but all these models are of limited use to the humanitarian sector.

Overstreet et al. (2011) observe that humanitarian operations are complex but reiterate that the field of supply chain management has little specific theoretical basis. Instead, SCM relies on several models and frameworks which link into what Sweeney et al. (2015) describe as the Four Fundamentals Construct and theoretical foundations such as Porter's Value Theory, Commons' Transactional Cost Economics (TCE) Theory and Freeman's Stakeholder Theory, as shown below in Fig. 2.10; these three theories are applied consistently in commercial supply chain scenarios.
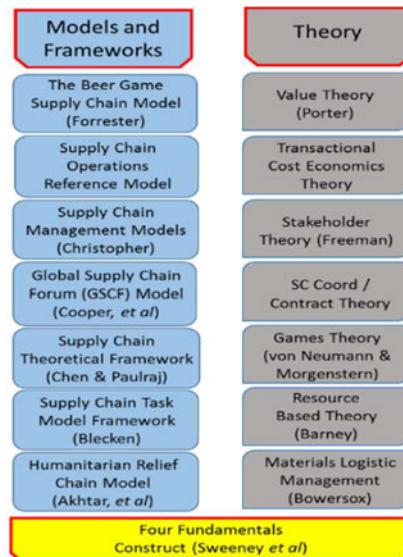
Figure 2.10   Humanitarian Supply Chain Theoretical Base.

However, with the developments in specific humanitarian supply chain management, other theoretical bases are now being considered including Macneil & Macauley's Channel Coordination Theory, which is derived from Relational Contract Theory, Von Neumann & Morgenstern's Games Theory and Barney's Resource-Based Theory. Despite being grounded in industrial and commercial economics, these have contributed to the concept Bowersox et al. (1985) refer to as Materials Logistics Management (MLM).

While each of the models above contribute much to commercial supply chain thinking, none of them can be applied to the humanitarian environment without alteration or adaption. Therefore, in the absence of a bespoke humanitarian model and the limited applicability of commercial models, a theoretical problem exists.

The applicability of existing commercial supply chain logic is limited when addressing the issues of the humanitarian supply chain.

2.3 Critique of Existing Frameworks

Considerable literature exists which describes the design of humanitarian supply chains as bespoke (Altay, 2008; Besiou et al, 2011; Charles et al. 2011; Cozzolino, 2012; Olorundoba & Kovacs, 2015; and Pettit & Beresford, 2009), and by inference, suggest that by attempting to map a humanitarian supply chain, only a general description could be produced. In concurring that humanitarian supply chains are designed to meet the needs of each operation, others map the design in terms of their qualities: agility, adaptability and alignment (Bhattacharaya et al. 2016; Dubey & Gunasekaran, 2016; and L'Hermitte et al. 2016).

Seven models and frameworks have been identified in the literature which have either been used to analyse specific areas of the humanitarian supply chain or have been adapted locally for use in analysing the humanitarian supply chain. All were initially developed for use in commercial supply chain management and there appears to be no single framework that encompasses the humanitarian supply chain as a bespoke and separate entity, reflecting its own unique challenges and issues.

2.3.1 The Challenge of Mapping

For the reasons given in para 2.2.1, this research takes the 2004 Boxing Day Tsumani as a datum for its literature; little that was written on humanitarian supply chains before this date has stood the test of time. In the years immediately after this event, attempts at translating some of the parlance and practice of the commercial sector for the humanitarian environment (Altay, 2008; Howden, 2009; Kovacs & Spens, 2007; and Tomasini & Van Wassenhove, 2009b) provided an initial base for refinement. However, as Oloruntoba & Kovacs (2015) demonstrated when it was observed that 'humanitarian aid is governed in a range of ways in which the donor is almost always at the centre' (p.709), it is generally acknowledged that mapping strategic management and governance from the commercial sector to the humanitarian sector is challenging. This is because commercial supply chains are founded on and bounded by profit, propriety, accuracy in fulfilling commitments, transparency in relationships and an understanding that to

succeed, the demand placed on the supply chain by the customer must be satisfied. In satisfying that demand, businesses must be lean and agile, effective and efficient, and they must protect and promote their reputation and brand. While the economic conditions in commerce can be highly unpredictable, great store is set by political and societal stability. These are unusual characteristics for HROs, not least because efficiency tends to be aspirational, profit plays no role, reputation is less important than effect, and political and societal instability is expected.

2.3.2 Applicability of Existing Models

Chopra & Meindl (2015) offer several detailed frameworks and models illustrating such diverse supply chain processes issues as decision-making, responsiveness, strategic fit and in-transit merge networks; but all of these detailed models flow from the strategic view taken by Forrester (1958) when he identified the five supply chain stages in his Beer Distribution Game (see Fig. 2.9). These five components of Suppliers, Purchasing, Production, Distribution and Customers (or variations thereof) are not just reflected in the framework foundation of Chopra & Meindl (2015) but are also the basis of the 'internal supply chain' described by Chen & Paulraj (2004). However, Chen & Paulraj (2004) use this model only to illustrate the five elements of the commercial supply chain in its most basic form, for an organisation operating an internal supply chain. It is acknowledged that for a more complex supply chain, the model can only act as a strategic guide because it fails to identify to role of supply chain management, the influence of support services such as technology and transport and the importance of coordination.
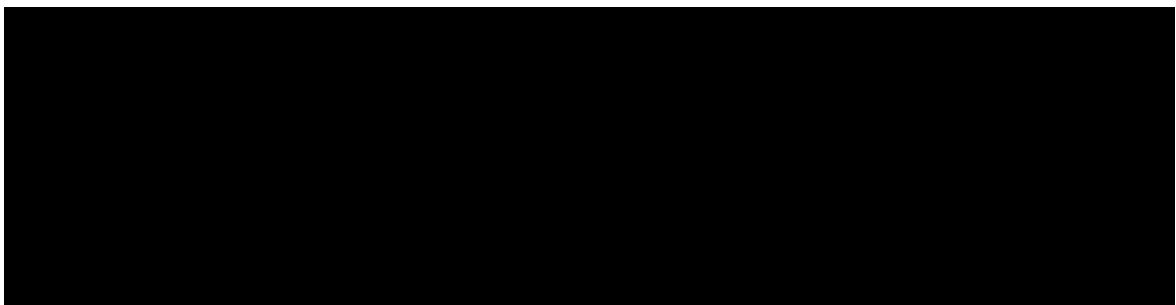
Figure 2.11   Internal Supply Chain. (Chen & Paulraj, 2004).

Ironically, as shown below in Fig 2.12, the original version of this model was initially developed by Christopher (1992) and included the critical element of the flow of information, which both Chen & Paulraj (2004) and Chopra & Meindl (2015) omit.
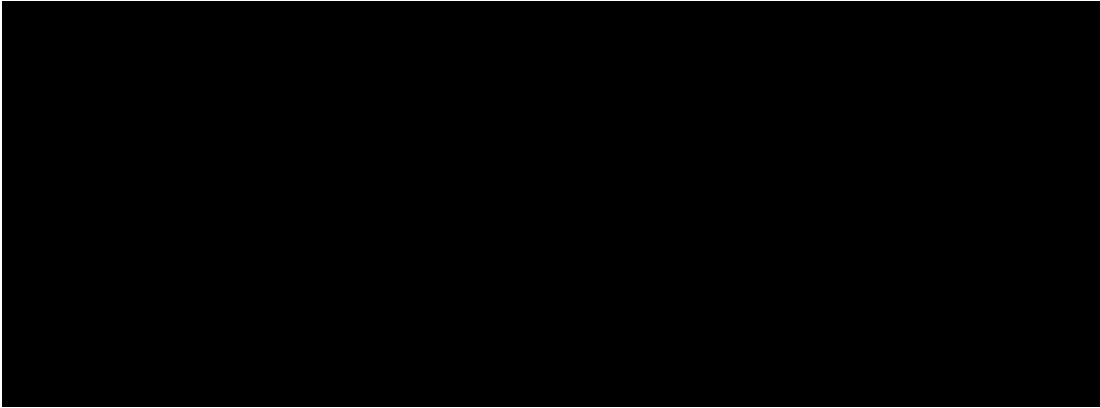
Figure 2.12   The Supply Chain Process. (Christopher, 1992).

Christopher (2011) later further develops these five components and derives models for competitive advantage; logistic management process; strategic inventory; the order cycle; and the grocery flow model. All are focused on commercial supply chain activities, satisfying a customer who places the demand on the supply chain and bears the cost of the supply chain. Whilst the original model acts as a mainstay in strategic SCM, these other derivatives have little to offer the humanitarian supply chain.
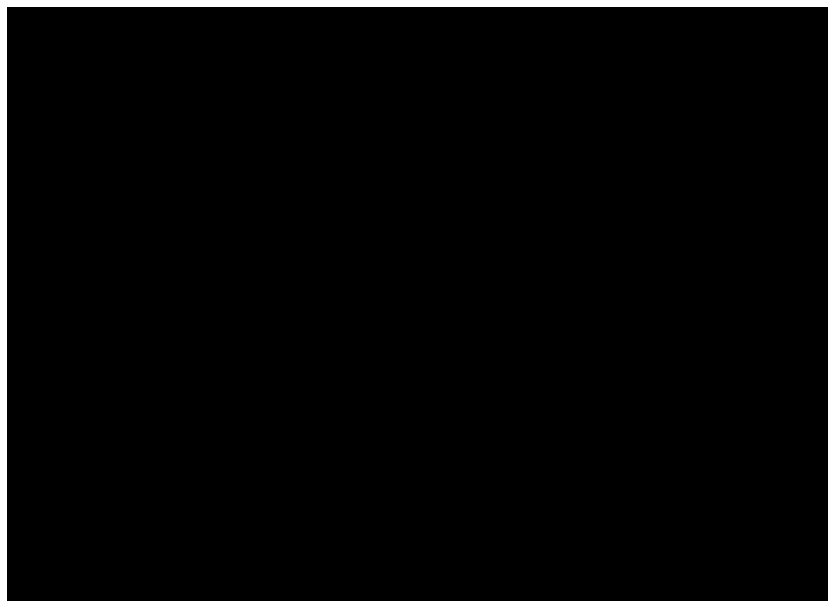
Figure 2.13   The Global Supply Chain Forum Model. (Cooper et al. 1997).

The first appearance in the literature of a model capable of dealing with process detail and complexity in a commercial business is provided by Cooper et al. (1997) in the model above. It emphasises the importance of information flow and acknowledges that there can be several suppliers and several customers. However, its attention to customer relationship management, manufacturing flow management, product development and commercialisation, and returns are heavily focused on delivering profit; these are business strands that are not important in not-for-profit organisations. It does, however, reflect the multiple supplier concept that exists in humanitarian supply chains and in suggesting two customers, it captures the enigma that exists in a DRO: who is the customer? With considerable relabelling, Cooper et al. (1997) can be adapted for humanitarian use, but it would still lack the multi-dimensional feature of vertical information flows within stakeholder organisations and horizontal flow along the supply chain which are captured in some later models.
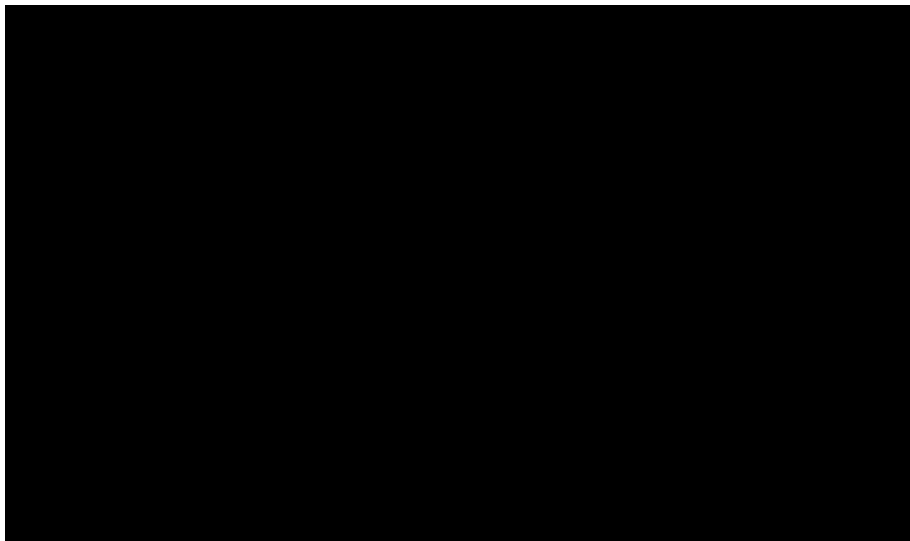
Figure 2.14   External Supply Chain. (Chen & Paulraj, 2004).

Taking the simple internal supply chain model in Fig 2.11 a step further, Chen & Paulraj (2004) consider the complexities involved in integrating several organisations into one supply chain. By identifying the complexities of supply chain management in the boxes outside the circle and linking them to the considerations and management processes inside the circle, this framework begins to address the role of other stakeholders outside the usual

'Supplier – Manufacturer - Customer' terms. However, again it is focused on commercial practice, but it could be adapted for use in the humanitarian context relatively easily.

Environmental uncertainty, information technology and customer focus can be directly imported into the humanitarian context, perhaps with the addition of considerations regarding partner organisations. Within the circle, the inclusion of strategic planning as a distinct process alongside coordination and logistic integration is a game-changer and directly applicable to the HSC. However, this model falls down slightly when it comes to considering the essence of supply chain management in the humanitarian sense. This, however, is merely a relabelling exercise. Interestingly, the Chen & Paulraj (2004) commercial supply chain model introduces the concept of performance measurement, a process that, at the time of writing was not considered important but has increased significantly since (Ojiako et al., 2022). Ojiako et al. (2022) find that the purpose of performance management systems in complex multi-stakeholder commercial organisations is unclear. In humanitarian supply networks where complex multi-stakeholder relationships are routine, the focus of, and the ability to carry out performance measurement and management during specific operations is questioned. It is suggested that it is more important to understand overall organisational performance and operational effect rather than to direct manpower into non-delivery tasks (Moshtari, 2016; Abidi et al., 2020; Modgil et al., 2020). It is noted that one tool replied upon by aid organisations is the post-operational writing of independent Monitoring, Evaluation, Accountability and Learning (MEAL) reports. However, performance management and measurement is outside the scope of this research.

The SCOR model was developed by a corporate consulting firm in the mid-1990s as a model to describe supply chain activities involved in the satisfying of customer demand. Widely adopted by commercial business, it develops the five stages described by Christopher (1992) into six management processes of Plan, Source, Make, Deliver, Return and Enable. Similarly, it lends little to understanding the humanitarian supply chain, but it has been

used as the basis for development. Given the 'make' and 'return' processes, this tool was clearly developed for use in a commercial context, but Van Wassenhove & Pedraza Martinez (2012) adapt the SCOR model for the humanitarian environment by relabelling the processes as Response Planning, Mobilisation, Donations and Procurement, Transport, Stock Asset Management and Final Delivery, contributing to two of the four phases of a DRO: preparedness and the operational response.
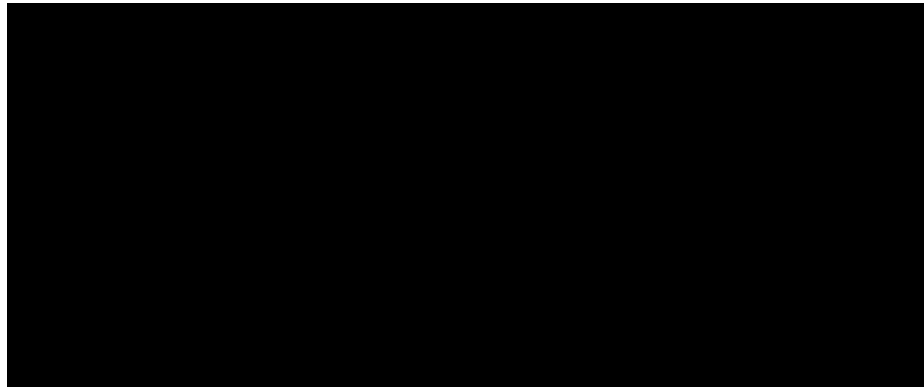
Figure 2.15   Relief Supply Chain. (Van Wassenhove & Pedraza Martinez, 2012).

This model recognises the importance of cooperation and information flows, but it fails to capture stakeholder activity and complexity in stakeholder relationships, particularly in terms of the vertical flow of information and the holistic nature of coordination. Such models based on five, or in this case six business processes (Forrester, 1958; Christopher, 1992; and Chopra & Meindl, 2015) remain restricted to defining the humanitarian supply chain in a strategic sense; although it does this well.

2.3.3 Development of a Bespoke Solution

The earliest example of a bespoke humanitarian supply chain model is offered by Blecken (2010), whose view of business processes within the humanitarian supply chain captures, for the first time, the essence of vertical and horizontal information flows. The tasks an aid organisation needs to perform at the global, regional and local level are recognised, from the point of initial assessment to delivery, and his four management processes of assessment, procurement, warehousing and transport are underpinned by an operational support element and connected by a method of reporting:

information flow. This model seems to have credence with UN agencies who appear to emulate this in their current task planning models (WHO, 2016).
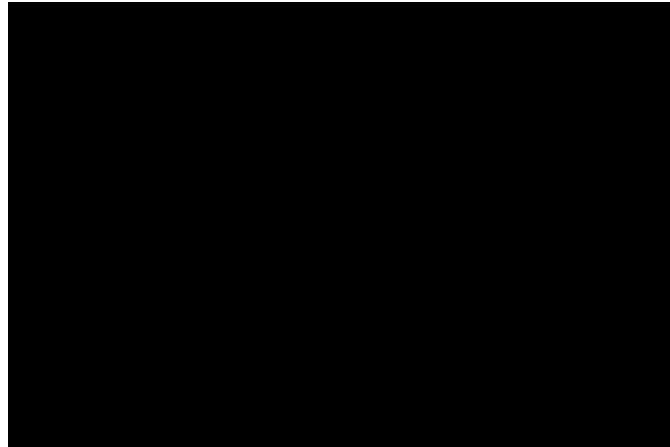
Figure 2.16   Reference Task Model Framework. (Blecken, 2010).

While Blecken (2010) may not have broken out some of the management processes as granularly as Van Wassenhove & Pedraza Martinez (2012), and the business processes may not be as well articulated as theirs, his model is a valuable multi-dimensional skeleton upon which to build process detail and environmental complexity.
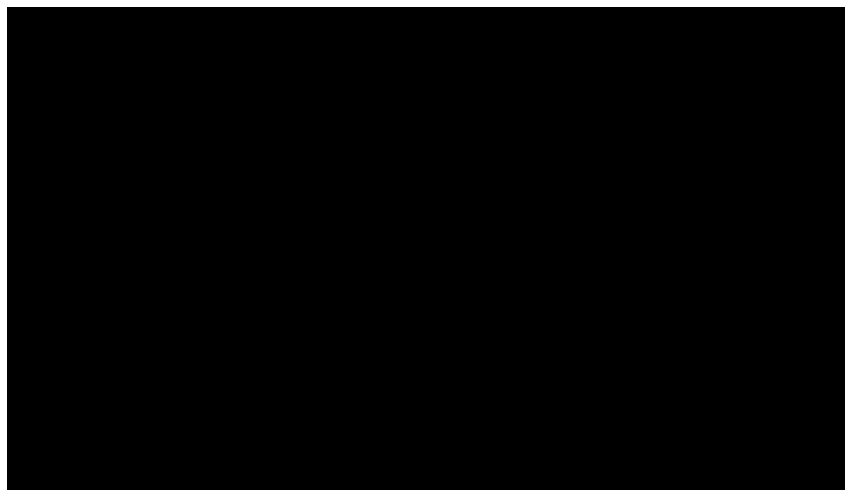
Figure 2.17   Structure of Humanitarian Relief Chains. (Akhtar et al., 2012).

In their description of a relief chain, Balcik et al. (2009) map the material supply flow, but Akhtar et al. (2012) take this a stage further by looking at information flow within the paradigm, as well as implying omni-directional information flows, and they take an outward facing perspective by focusing on the media and the role it plays in supporting reputation, transparency and

accountability. They also map the flow of material in terms of goods being delivered to the operational environment and money disbursed by aid organisations in the form of local purchase. However, there is little detail on coordination, the multiplicity of NGO organisations and donors, and the complexity of cooperation and collaboration or vertical strategy and decision-making within stakeholder organisations. It could be argued that this is a reductionist view of a humanitarian supply chain.

The 'humanitarian logistics chain' structure model by Farahani et al. (2011) demonstrate how an NGO internal supply chain might be developed from that of Chen & Paulraj (2004) by attempting to capture the dynamics of the humanitarian supply chain.
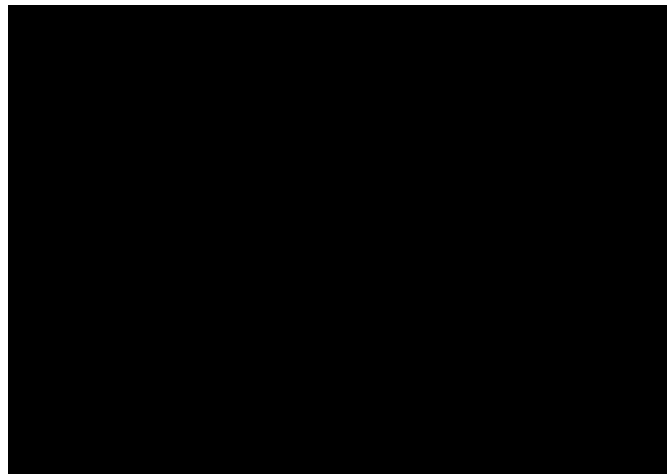
Figure 2.18   Humanitarian Logistics Chain Structure. (Farahani et al., 2011).

This model is further developed by Duddy et al. (2017) by considering the complexity of multiple donors dealing with a variety of global and regional NGO organisations, who in turn are also conducting their own local procurement, and it incorporates a SME customer embedded in a local NGO to act on behalf of the beneficiary. However, it does not capture the multi-dimensional nature of the flow of information intimated by Blecken (2010). Unlike Fig 2.18 which focuses on logistic functions and geographically sited physical entities, Fig 2.19 is a model which, for the first time, distinguishes between the actors operating at the strategic level, those that are enabling the supply chain at the operational level and those that are delivering at the tactical level. It demonstrates that there are interfaces between each, across

which a single channel of information must flow. It recognises the role of the Log Cluster in coordinating the myriad of players and the need for a simplified forward supply channel with subject matter experts from local NGOs dealing directly with beneficiaries. The further development of this model is at the core of this research.
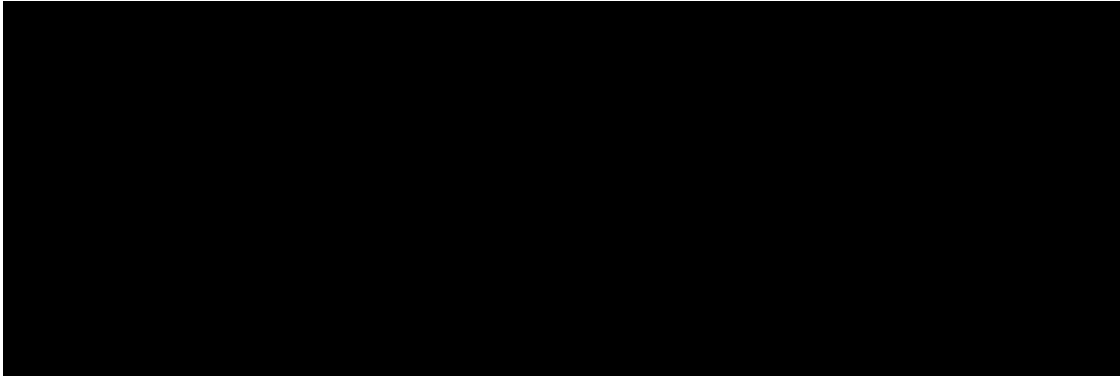
Figure 2.19   Simplified Humanitarian Supply Chain. (Duddy et al., 2017).

2.3.4 Development of the Frameworks

Early modelling of the supply chain concentrated on the business processes involved in forging raw materials into products and getting these products to the customer. As clearer definition was given to supply chain management and logistics (Howden, 2009; and Chandes & Paché, 2010), the business processes were largely taken as read, and focus switched to the supply chain management functions such as those expressed by Cooper et al. (1997). This set the scene for an in-depth examination of supply chain enablers such as technology and the role of stakeholders and other actors. The importance of the flow of information was evident from early contributions but not necessarily understood by later iterations of the source model, but the multi-dimensional nature of information tends to typify the humanitarian supply chain more than its commercial counterpart. As a result, the early work of Christopher (1992) is clearly the genus of Blecken (2010)'s model, while the Van Wassenhove & Pedraza Martinez (2012) model bears all the hallmarks of the SCOR model.

Model	Advantages	Disadvantages	Applicability
Forrester (1958)	Reflects the management processes	Developed for commercial business	None; already developed into an HSC applicable form
Christopher (1992)	Reflects the management processes	Developed for commercial business	None; already developed into an HSC applicable form
SCOR Model (c.1996)	Easily translated into an HSC form. Rich in process support detail	Only focuses on strategic processes	Some; requires translating by an experiences HSC manager
Cooper et al. (1997)	Gives depth of detail and acknowledges information flows	Commercially focused; significant relabelling required	Limited in its current form but a sound basis if relabelled
Chopra & Meindl (2015)	Reflects the management processes	Developed from Christopher as a foundation for other detailed commercial processes	None
Chen & Paulraj (2004) - External	Takes account of other stakeholders and could be developed to cover supply networks	Doesn't deal with vertical and horizontal information flows	Good starting point from which to develop a multi-dimensional model
Blecken (2010)	Multi-dimensional and includes an embryonic consideration of information flow. Captures the three levels of operations	Lack of management process detail	Excellent basis from which to develop a model which covers the complexity of the management aspects of the supply chain
Farahani et al. (2011)	Maps the length of the HSC in terms of logistic functions.	Describes a single supply chain without acknowledging the complexities of the existence of others.	Good starting point from which to develop a multi-dimensional model
Van Wassenhove & Pedraza Martinez (2012)	Effectively the HSC version of SCOR; evidence that it has been adopted by NGOs	Doesn't deal with vertical and horizontal information flows	Good starting point from which to develop a multi-dimensional model
Akhtar et al. (2012)	Recognises diversity in supply sources and the need for information flows	No recognition of coordination or stakeholder engagement	A basis for demonstrating material flows but little else
Duddy et al. (2017)	Captures complexity and the three levels of operations	Implies, but doesn't specifically address information flows	Good starting point from which to develop a multi-dimensional model

Table 2.2   Existing Model Applicability to the Humanitarian Supply Chain: A Comparison.

2.3.5 Relevance and Implications

The models based on the five business processes as introduced by Forrester (1958) and developed by Christopher (1992) and Chopra & Meindl (2015) only have a relevance to the design of humanitarian supply chain operations if they are relabelled; they do stimulate the debate over the definition of the customer. This definition is of some importance because in both commercial and humanitarian scenarios, the customer is the focus of supply chain activity and therefore the customer's identity is paramount to humanitarian supply chain design. Information flows will not necessarily begin or culminate with the customer, but the needs of the customer will be core to the subject of the information flowing around the supply chain's stakeholder network. Therefore, even though some of these models now contribute little to how humanitarian organisations support those in need, they are still capable of generating questions such as, 'Who is the customer?' and 'Are we talking about a supply chain or a supply network?'. Whilst the SCOR model is essentially based on the five process models, it introduces the notion of planning which implies that organisational hierarchy has a fundamental role to play in supply chain activities. Firmly grounded in commerce, the SCOR model as translated by Van Wassenhove & Pedraza Martinez (2012) introduces this extra dimension of decision-making and is also articulated by Blecken (2010).

Both the model presented by Cooper et al. (1997) and the one developed from it by Chen & Paulraj (2004) pre-date the 2004 Tsunami datum line, but each take a fresh view of the commercial supply chain, providing a deeper understanding by taking a more holistic approach. A holistic view is not taken by Akhtar et al. (2012), who concentrate on the flow of material rather than the flow of information and the coordination of activities. There is little recognition of stakeholder engagement, but their model can be read as a one-dimensional map of the supply chain. The Farahani et al. (2011) model takes no consideration of stakeholder engagement or information flow, but Duddy et al. (2017) attempt to achieve a holistic view of the humanitarian supply chain by acknowledging stakeholder complexity in Fig 2.19, but recognition of the vertical flow of information is implied rather than specified.

The implication of this analysis of the literature is that there is no bespoke supply chain theory to guide academic analysis or the activities of humanitarian supply chain practitioners. It demonstrates that the existing models are primarily extractions from commercial supply chain thinking and that those which currently seek to address specifically humanitarian issues are translations of commercial models.

2.3.6 Theoretical Gap

No model exists which gives a holistic understanding of the humanitarian supply chain where vertical and horizontal information flows, stakeholder engagement and business processes are captured together. The literature shows that this cannot be achieved by translating directly from commercial models, so even if the most applicable existing model in terms of detail were to be translated to address the challenges of the humanitarian paradigm, this would only be a first step in filling the theoretical gap. Instead, a sustainable holistic humanitarian model needs to be developed from first principles.

2.4 Enabling the Passage of Information

In his observations of information flows, Vilalta-Perdomo (2010) identifies three elements which must be in place to enable the passage of information within an organisation and between stakeholder organisations. Firstly, there needs to be a way of collecting data and experiences, which are described as the sensor. In operational terms, this may be routine acquisition requests, incident reports or customer feedback. There must also be a way of interpreting this data alongside existing higher-level data, to give the newly gathered data context within the greater domain. This step will probably be performed at line-management level within a single organisation or by a coordination cell at regional or global level within a UN agency or major INGO. Finally, there needs to be a way to have the resulting process performed and improved by others, thereby justifying the passage of the information in the first place. This will probably require the involvement of senior management, strategic vision and organisational power to facilitate changes in processes, procedures and even organisational culture. Through observation, Vilalta-Perdomo (2010) has identified the need to consider not

just horizontal information flows along a supply chain, but vertical information flows within stakeholder organisations and strategic partnerships.

Bashir et al. (2022) explain that most projects form part of a wider programme of inter-dependent projects but that from a broader programme management perspective, information flows and their associated processes are not always fully understood without having an understanding that they may span multiple projects. Most projects are subdivisions of a larger activities where 'process issues can arise in individual tasks or work packages at a relatively micro level but where information and its management offer immediate practical value' (Bashir et al, 2022; 21).

Mason-Jones & Towill (1999) present an early recognition of the importance of information flow in SCM and while Overstreet et al. (2011) list a plethora of areas within humanitarian logistics ripe for further research, the one thread that links them all is the flow of information. Paulraj et al. (2008) introduce the notion of network governance within which they see communication as a relational competency. They document the role of network governance and how sustainable competitive advantage is derived from inter-organisational passage of information. In their description of stakeholder theory, Freeman et al. (2010) highlight the importance of the passage of information and refer to it as being essential within the 'transactional environment' (p.69).

Existing literature suggests that there is a need for closer examination of vertical and horizontal information flows within humanitarian supply networks (Bharosa et al. 2010; Preece et al. 2013; Altay & Labonte, 2014; Dubey et al. 2020a) and how information flows are aided by coordination, cooperation and collaboration (Kabra & Ramesh, 2014; Tatham et al. 2017).

Coordination	Collating information and making it available to management and stakeholders for decision-making, often when there is no formal agreement between stakeholders to work closely together.
Cooperation	Organisational relationship where stakeholders share a common goal but retain organisational independence.
Collaboration	Organisational relationship where stakeholders share a common goal, resources, responsibility and risk.

Table 2.3   The C^3 Stages.

In this research, coordination is defined as the collection and processing of information and making it available to management and stakeholders ostensibly for the purpose of decision-making. There is no executive function necessarily inferred by the coordination of information. Coordination is important where there is no formal stakeholder relationship between actors in a single operational environment. Cooperation is defined as the relationship between stakeholder organisations where there is a consensus in the determination of a common objective and in working together to achieve that common objective, but where each stakeholder retains control of their own resources and may have separate, or at times conflicting individual targets and goals. Collaboration is defined as the relationship between stakeholders where they work together, share common objectives, targets and goals, and openly share resources, including information.

2.4.1 Network Information Flows

When we consider humanitarian relief operations as taking place in a transactional environment, it is easier to understand why information flows between stakeholders in the environment are essential. In their consideration of commercial supply chains, Paulraj et al. (2008) conclude that organisations succeed through the sharing of tacit, critical information and that an open, frequent flow of information facilitates a greater understanding of complex competitive issues. The frequent exchange of information on strategic and operational matters is believed to 'foster greater confidence, build cooperation and trust, and reduce dysfunctional conflict' (p.47). However, Dominguez et al. (2022) draw attention to the barriers that can hinder the implementation of information strategies, including information leakage, the distortion of information and unbalanced gains between stakeholder organisations. It is suggested that a positive approach to network information flow has a positive effect on a business' bottom line, and there is a logic that this approach could be used to benefit humanitarian supply chains. Akhtar et al. (2012) note that given the complexity of humanitarian supply chains, there are advantages in planning and supply chain operations being coordinated and propose this is done by suitably trained and competent chain coordinators who understand the challenges involved in

coordinating stakeholders in the humanitarian environment. Altay & Pal (2014) reflect on the utility of the Global Log Cluster and their research indicates that an information hub makes diffusion faster. Their results also show that 'information quality is an important factor in resource utilization, and if cluster leads act as information filters, information moves faster, and resources are better utilized' (p.1022). Picking up on the theme of coordination, Jahre et al. (2009) offer comprehensive definitions of horizontal and vertical coordination, while Schultz & Blecken (2010) define vertical and horizontal cooperation.
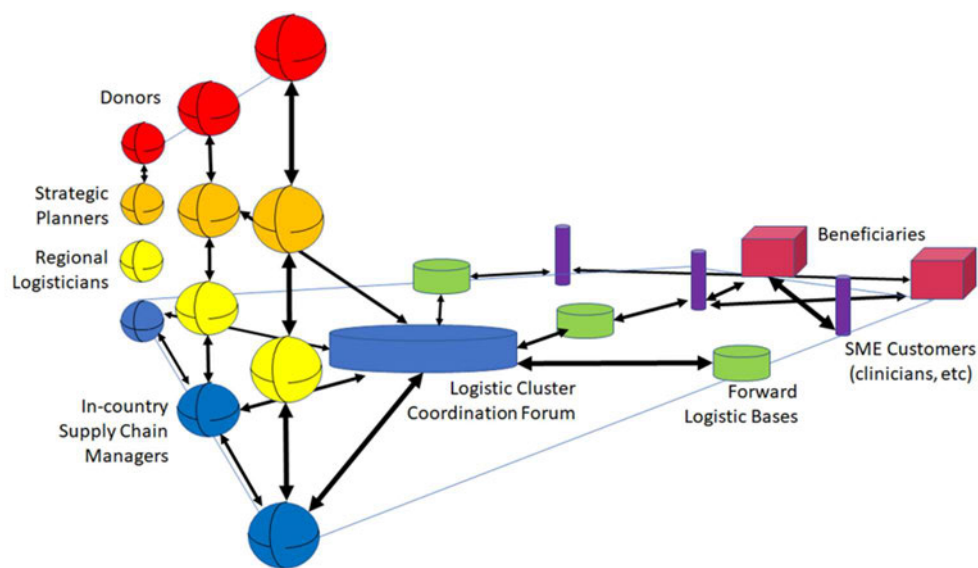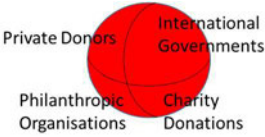
Figure 2.20   Information Flows Concept Model in a Simplified Supply Chain.

Based on the simplified humanitarian supply chain at Fig 2.19, the diagram above shows how information flows from individual donors and through a DRO at the strategic and regional levels to the in-country supply chain managers. It also shows the horizontal information flowing between the various stakeholders on the ground and through the Log Cluster. Each of the stakeholder balls above comprise four quadrants reflecting four inherent functions, as shown in the table below:

Donors	

60

Strategic Planners	Programme Planning · Supply Chain Management · Coordination · External Partners
Regional Logisticians	Project Planning · Supply Chain Management · Coordination · External Partners
In-country Supply Chain Managers	Logistic Planning · Supply Chain Management · Coordination · External Partners

Table 2.4   The Functions of Vertical Stakeholders.

Altay & LaBonte (2014) suggest that 'intergovernmental organisations such as the UN generally promote coordination via unified, linear and hierarchical structures, also known as "systems" models, whereas INGOs tend to focus instead on more flexible and horizontally oriented processes and structures, also known as "service" models of coordination' (p.554). They also describe how humanitarian information flows 'generally operate via four related channels: within humanitarian organisations; between those organisations; from individuals to humanitarian organisations; and from humanitarian organisations to individuals' (p.555). This research considers how INGOs can make use of both hierarchical and process structures by coordinating vertical and horizontal information flows.

2.4.2 Vertical Information Flows

It appears that within some humanitarian organisations such as UN agencies, donor governmental departments and some larger INGOs, the relationship between the strategic level of management (planners and programmers in particular) and the operational logistic team at the same headquarters can experience frustration and challenges, and that this can cause friction at the tactical level on the ground. Research by Makepeace et al. (2017) reveal the pronounced difference in attitudes at the Logistics / Programmes interface where a level of programme elitism appears to exist at the expense of the reputational ability of the logistic team. Finding that logisticians were

prepared to become fully engaged with strategic planning, Programme staff involvement in logistical activities was considered at best ad hoc and, at times, even reluctant. 'The prospect of involving logisticians more in programme activities seemed to be greeted as a novel idea, with scepticism rather thinly veiled by polite enthusiasm' (p.44-45). They remark that the reluctance of programme staff to contribute to their research was both indicative and problematic, and that logisticians were significantly more likely to aspire to engage in vertical collaboration with programmers and planners than programmers and planners where with them.

Janvier-James (2012) concurs that vertical integration can generate greater supply chain efficiency. Rietjens et al. (2007) consider the vertical flow of information which occurs in military operations and cites ISAF operations in Afghanistan as an example. It is concluded that vertical information systems contribute to improved coordination within both military and civilian organisations, but the 'minimalist approach to coordination' taken by some smaller NGOs is recognised. However, the ISAF model is of NGOs acting in a subordinate manner to one another in a vertical structure, a condition that this is difficult to realise and sustain, whereas this research considers the vertical structures of each distinct organisation and the vertical flow of information within them.

2.4.3 Horizontal Information Flows

Looking at logistic service providers in commercial supply chains, Hingley et al. (2011) consider how supply chain ownership and the balance of power affect the horizontal flow of information and concludes that the more complex physical distribution management becomes, the more important horizontal collaboration between stakeholders becomes. Akhtar et al. (2012) express horizontal coordination as different organizations coordinating with each other and managing interdependencies at the same level, and suggests that terms such as 'linkages, alliances, value-added chains and partnerships are examples of horizontal collaboration' (p.86). Jahre et al. (2009) recognise that these linkages and partnerships may belong to different supply chains and that the challenge is to make use of any overlap to achieve economies of

scale. In their UN report on humanitarian responses in the wake of the 2004 tsunami, Adinolfi et al. (2005) find instances where horizontal information flows simply did not exist and cites a situation where the 'sharing of [stockpile and procurement] information or clear indications of availability for use beyond the individual organization holding the stock was consistently missing. There were, in some instances, general statements in this regard but little clarity on procedures' (p.46). Referring again to the ISAF operation in Afghanistan, Rietjens et al. (2007) cite the role of the Afghanistan Information Management System in coordinating horizontally between military and civilian stakeholders, a role filled by the Log Cluster in purely civilian emergency response operations. The horizontal passage of information is considered as 'lateral coordination' and the importance of experienced liaison officers as operational coordinators is stressed. Cruijssen et al. (2007) deal with logistic horizontal cooperation in the commercial world and while much of the findings such as partner selection and the determination and division of gains is not applicable to the humanitarian environment, aspects such as the importance of having a trustworthy relationship and the risk and effects of opportunistic behaviour are highlighted.

2.5 C^3 is Key

In common with Wankmüller & Reiner (2019), the term C^3 in this research specifically refers to the coordination, cooperation and collaboration:

- Coordination of activities and information within the supply chain;
- Cooperation between stakeholders; and
- Collaboration by stakeholder organisations at strategic, regional and local levels to deliver a common goal.

Coordination is the base level of interaction where information is shared but where stakeholders begin to facilitate one another's activities and share resources, then cooperation is considered to be taking place. With collaboration being the step beyond cooperation, where activities and resources are effectively pooled in pursuit of a common goal, these three levels are referred to as the C^3 Scale.

2.5.1 Coordination

In the aftermath of the 2004 Boxing Day Tsunami, many organisational shortcomings were identified in disaster relief operations. Adinolfi et al. (2005) remark that 'the effectiveness of coordination is still a subject of continuing concern, debate and dissatisfaction' (p.46), and this heralded the establishment of the UN's cluster system. Defined in the context of this research as the collection and processing of information and making it available to stakeholders, coordination is a function of the primary supply network stakeholder (owner) or nominated coordination stakeholder. Coordination does not require, although it does benefit from, a formal relationship between stakeholders; for example, an agreement to cooperate or collaborate, but it does require stakeholders to share critical information. As Maghsoudi et al. (2018) note, for complex, multi-agency supply networks, the default stakeholder for coordination is the Log Cluster which acts as a brokerage for information and holds regular coordination meetings on the ground, attended by all other stakeholders. Jahre & Jensen (2010) recognise that information management and exchange is a core activity for the cluster and suggest that 'it is possible for the Log Cluster to take on the responsibility for running an entire supply chain' (p.662), although for practical reasons this would only apply to a WFP supply chain. Noted also is the lack of coordination between clusters at the time of writing, but Jensen & Hertz (2016) suggest that this is no longer the case. Both Vojvodic et al. (2015) and Castañer & Oliveira (2020) view the coordination function in supply chain management as critical, considering it of equal importance to the six familiar SCM functions of sourcing; demand management; inventory management; production management; supply chain design; and transport & warehousing. Akhtar et al. (2012) extoll the advantages of coordination and highlight the specific competencies of the coordinators and challenges in coordination. Dubey (2022) examines the issue to coordination among disaster relief actors and concludes that this area 'remains one of the most pressing concerns'. He encourages researchers should 'pay detailed attention to governing mechanisms', and advocates 'the building of a comprehensive understanding of the coordination mechanism' (p.5). Rodríguez-Espíndola et al. (2018a) catalogue the reasons why coordination in DROs is challenging:

- Involvement of several actors;

- Absence of standardisation among organisations;

- Donor independence;

- Appearance of self-initiated participants;

- Human and material resources from multiple participants and jurisdictions.

The coordination concept model in Fig 2.21 shows how an operational lead organisation coordinates the actions of stakeholders on the ground while maintaining close contact with the respective stakeholder organisation's strategic management level.
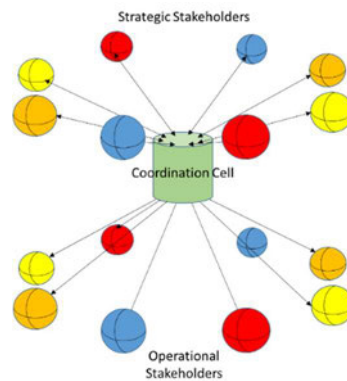
Figure 2.21   Coordination Concept Model in a Simplified Supply Chain.

The colours and description of the stakeholders in Fig 2.21 follow the convention illustrated in Table 2.4. This model allows stakeholder organisations to pursue their own goals and operate within their own values and standards while still taking consideration of other stakeholders and providing them with information which will streamline the operation as a whole. Through such coordination, stakeholders' decisions are quickly disseminated, enabling others to make timely decisions of their own and shape their own operations to maintain efficiency and effectiveness. Note that operational stakeholders in this model do not engage directly with each other and as a result, it would be unusual for an organisation's strategic management to become involved in lateral coordination activities.

Rietjens et al. (2007) consider vertical and horizontal coordination, both of which are pertinent to this research and Balcik et al. (2009) suggest that coordination 'may refer to resource, cost and information sharing, decision-making or the division of tasks' (p.23). It is also noted that some humanitarian organisations use the terms 'coordination' and 'collaboration' interchangeably, as also noted by Kaynak & Tuğer (2013), but this research makes a significant distinction between these two terms. Balcik et al. (2009) comment on the need for coordination mechanisms in the relief community, between international actors, local actors and the private sector and recognise the benefit of coordinating the functions of the supply chain, supporting the view of Vojvodic et al. (2015) above. Vega & Roussat (2015) identify three specific roles that LSPs can play in humanitarian supply networks: those of operator, coordinator and partner.

2.5.2 Cooperation

In describing cooperation, Castañer & Oliveira (2020) contrast it to coordination and suggest that while 'coordination refers to the joint determination of common goals, cooperation refers to the implementation of those goals' (p. 984). So, in cooperating, each stakeholder retains control of their own resources and may have separate, or at times conflicting individual targets and goals. Schultz & Blecken (2010) define cooperation as a relationship which 'embraces all forms of inter organisational interaction that are rooted in common intentions and lead, via negotiations, to agreements whereby partners are and remain legally, and with certain restrictions, economically independent' (p.638). Some of the benefits of and impediments to cooperation are highlighted. Cruijssen et al. (2007) break down the benefits of cooperation to those derived from horizontal cooperation and those from vertical cooperation, while Freeman et al. (2010) reflect on stakeholder behaviour and declare that the phenomenon of competitive advantage is a system of cooperation.

The cooperation concept model at Fig 2.22 shows how operational stakeholders engage with each other but still rely on a coordination component, normally provided by the operational lead organisation, to

coordinate decision-making. The coordination base is essential to ensure the flow of information, particularly where stakeholders have different goals, targets and values.

Stakeholders supported by a
Coordination Base
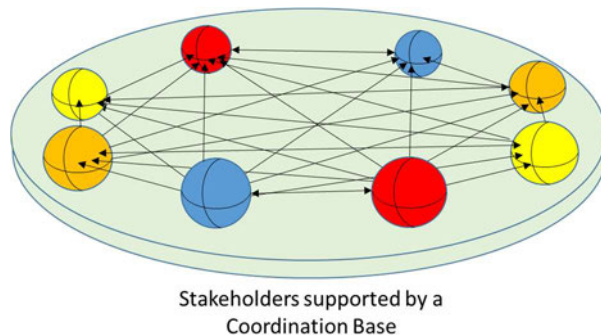
Figure 2.22   Cooperation Concept Model in a Simplified Supply Chain.

Upon this base, each stakeholder exercises custodianship over their own resources, only sharing them with another stakeholder whose ethics, operational parameters and objectives they also share. It is likely that once a strategic decision has been taken for a stakeholder organisation to work cooperatively with others, decisions regarding individual instances of cooperation activity are likely to be made on the ground by in-country (lower-level) managers.

2.5.3 Collaboration

A collaborative relationship between stakeholders is where they are fully embedded with each other, share common objectives, targets and goals, and openly share resources. The willingness to collaborate reflects a high degree of trust and commitment where the stakeholders place greater importance on the project or mission at hand than they do on their own self-interest. That is not to say that collaborative working leaves organisations open and vulnerable, but it does involve a high level of mutual understanding and potential business compromise. Wagner & Thakur-Weigold (2018) state that while 'collaboration is an omnipresent concept in commercial supply chain management' (p.1131), this is not the case in the humanitarian domain. Sheu & Pan (2014) find that the willingness to collaborate varies among NGOs and cite one reason for not doing so as the risk of losing competitive

advantage by attracting media attention. A framework for a relief supply collaboration approach is proposed, which this research examines. L'Hermitte et al. (2016) suggest a mutually strong link between collaboration and agility, particularly at strategic level capability, where collaboration is critical to building agility and where it is necessary to be agile to be able to adapt to a collaborative shape. This echoes the findings of Sheu & Pan (2014) in terms of an NGO's willingness and ability to adapt their routine operations to dovetail into a collaborative relationship with another, distinctly different organisation. Kampstra et al. (2006) observe that 'you cannot collaborate with a party that lacks the genuine desire to collaborate' (p.312) but concede that genuine collaboration is a difficult state to achieve, citing a series of challenges including fear of external pressure, financial cost and organisational design. Prakash & Deshmukh (2010) offer a definition of general collaboration as 'a negotiated cooperation between independent parties by exchanging capabilities and sharing burdens to improve collective responsiveness and profitability' but go on to express inter-organisational collaboration as 'a process in which organisations exchange information, alter activities, share resources and enhance each other's capacity for mutual benefits and a common purpose by sharing risks, responsibilities and rewards' (p.54-55). The former general definition intimates that collaboration is a step beyond cooperation (Wankmüller & Reiner, 2019), while the second definition is adopted for this research as being particularly applicable to multi-agency humanitarian operations where agility is key (Dubey et al. 2021).

Stakeholders supported by a
Cooperation Envelope
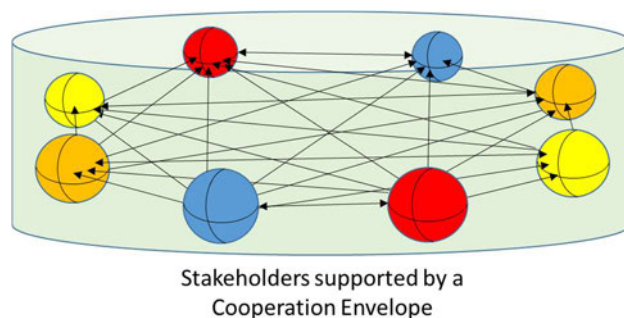
Figure 2.23   Collaboration Concept Model in a Simplified Supply Chain.

The collaboration concept model in Fig 2.23 shows how stakeholders with a shared goal, shared targets and shared values engage with each other in a

shared space, supported by a cooperation envelope, normally provided by the operational lead organisation.

In this instance, stakeholders will have already agreed the parameters of the shared space at a strategic level of management and will have given lower-level managers and individual practitioners the authority to work closely with the collaborative partner, within the limits of their own organisation's standing operating procedures. A memorandum of understanding is likely to exist to permit all stakeholder staff to work together within a cooperation envelope, where individuals are comfortable with cooperating fully with staff from other organisations with few or no routine guidance or constraints being placed on individual activities from a strategic management level.

Citing literature in relationship marketing, Paulraj et al. (2008) make the link between collaboration and communication, stressing how 'collaborative communication is critical to fostering and maintaining value-enhancing inter-organisational relationships' (p.45) while Brafman & Beckstrom (2006) refer to centralised and decentralised systems and the effects of coercion, power and influence on collaboration, albeit in commercial business relationships. Hingley et al. (2011) explore commercial physical distribution management and the role of 3PL and 4PL providers and consider the linkages within and between these commercial businesses which facilitate collaborative working. However, this research focuses on humanitarian supply networks in which UN agencies, INGOs and IGO agencies are the primary stakeholders; 3PL and 4PL providers are only considered where they operate on behalf of an IGO.
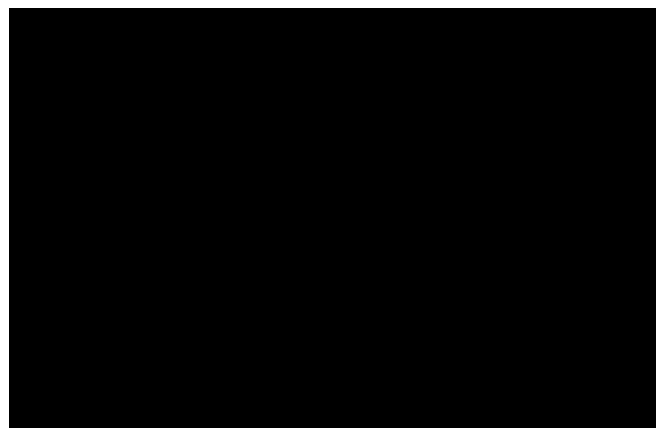
Figure 2.24   Vertical and Horizontal Collaboration. (Jahre & Jensen 2010).

As an expression of a commercial supply chain, Jahre & Jensen (2010) divide collaboration into the horizontal and vertical planes, describing vertical collaboration as seeking competitive advantage within a single supply chain and horizontal collaboration as forging relationships with competitors and other external organisations. The simplicity of this typology suggests that it too could be applicable in humanitarian supply chains.

In looking at collaboration in humanitarian supply chains, Prasanna & Haavisto (2018) introduce the terms 'institutional logics' and 'collective identities', and the role these play in helping to forge collaborative relationships. Four elements that lead to collaboration are offered: trust, mutuality, information exchange and openness and communication, and a framework for organisational culture in humanitarian supply chain collaboration is presented, but this only considers the roles of suppliers and buyers. Encouraged by Piotrowicz (2018), this research seeks to take a more holistic view of collaboration rather than the more reductionist focus of Prasanna & Haavisto (2018), and in doing so, identifies a significant hurdle to achieving the mutuality and openness identified by Prasanna & Haavisto (2018) in their collective identities: that of mutual governance. Since few, if any stakeholders would welcome the burden of assuming an authoritative role in the collaboration of humanitarian actors, similarly, few would wish to be 'governed' by another stakeholder. Therefore, any form of mutual governance would have to be organic to the paradigm; transparent and accepted; mutually benefiting. It would need to be autopoietic.

Maon et al. (2009) make an early connection between commercial and humanitarian supply chains and whilst acknowledging that differences certainly exist, suggests that skills and competences needed for one are the same for the other. This view is at odds with later contributors (Wankmüller & Reiner, 2021). Maon et al. (2009) are quick to note that sharing supply chain expertise, technology and infrastructure 'is a way to demonstrate [a commercial partner's] good corporate citizenship' (p.150): corporate social responsibility (CSR). The benefits to both parties are identified, particularly the lessons commercial supply chain managers can learn in terms of the

agility, flexibility and rapid response capabilities of humanitarian supply chain practitioners. However, writing in 2009 and citing an article from 2000, Maon et al. (2009) predict that 'cross-sector collaborations among non-profits, corporations and governments will likely intensify' (p.161), but in real terms they have not; perhaps due to the absence of autopoietic governance among the collaborative partners.

2.6   Strategic Management

The strategic management of supply chains is well covered by the literature, but the majority of contributions focus on commercial supply chains. In their interpretation of McKinsey's 7 Ss, where the structure of an organisation must fit with other elements such as strategy, shared values, systems, staff, [leadership] style and [employee] skills, Johnson et al. (2011) use benchmark organisational strategic restructuring to meet emerging challenges and changes in circumstances and emphasise the importance of communication and collaboration in the commercial world, an approach much echoed by Waters (1999). This highlights an important work strand for this research. In business, a start point for diagnosis is often a measurement of value, and in logistic terms, tends to involve Value Chain theory as developed by Porter (1985). However, the strategic management of humanitarian supply chains is less well documented, making it an area fertile for new research. Invariably, humanitarian supply chains are more complicated since they can consist of multiple procurement channels, ad hoc and fluid storage and distribution methods, and simultaneous but diametrically opposite logistic processes which can switch at short notice, such as Push/Pull, Just in Time/Just in Case and Forward/Reverse supply chain models. This is fundamentally different from commercial supply chains.

In terms of the strategic management of a humanitarian supply chain, Jahre et al. (2016) consider the three most important factors as being demand characteristics, logistics and the political and security situation. Makepeace et al. (2017) look closely at organisations' strategic level planning as well as management and remark on the need for mutual understanding of the supply chain by both logistic staff and programme staff in the headquarters of aid

agencies. Maon et al. (2009) explore 'value-oriented culture' but note the often-strategic failure to acknowledge the importance of logistics. They contrast the qualifications and experience of an organisation's permanent staff members with those who have volunteered to assist in an operation: 'members of disaster relief agencies often appear resourceful, talented, and hardworking; however, the many volunteers, often temporary, come from various professional backgrounds which may involve crisis management and disaster relief operations only indirectly' (p.155). They suggest that 'neither the various backgrounds of the volunteers nor the altruistic organisational culture provide a basis for the development of efficient and efficient supply chain management or process integration'. The research conducted by Blecken (2010) into the strategic management of humanitarian supply chains and the processes which aid agencies have in place to manage them found that even basic strategic management steps where often not in place. For example, he highlights that 48% of his sample group of organisations did not have supply chain process documentation in place. He notes that when this documentation was available, it tended to be restricted to procurement processes and transportation, with only a few warehousing and storage processes documented.

Strategic management tends to be exercised at the top level of each stakeholder organisation and manifests itself in the form of vertical information flows down to the organisation's practitioners on the ground. However, there is little strategic management connected to the horizontal flow of information along the supply chain, not least because there is an issue regarding ownership and control. Perhaps controversially, Bennett (2016) recommends that the IASC decentralises leadership, policy development and strategic-level decision-making, ideally to regional level, and that UN agencies and large NGOs 'reorient their strategic priorities away from direct implementation and service delivery and towards a more enabling function' (p.71). To a degree, Bhattacharaya et al. (2016) support this reorientation notion by advocating that strategic decisions and supply chain design takes place within aid programmes to facilitate the transfer of resources between stakeholders to make the supply chain more efficient.

They also promote NGO investment in infrastructure and legacy initiatives to improve the lives of those affected, after the relief operation has ended.

In responding to a disaster, Kovacs & Tatham (2009) illustrate below how finance, organisation, logistics, personnel and communication are the five strategic considerations the programme and supply elements of an NGO need to generate operational capability. They also recognise the importance of prepositioned inventory and framework contracts with suppliers in the overall strategic plan; a feature of the Preparedness phase of the Disaster Management Cycle at Fig 2.8.
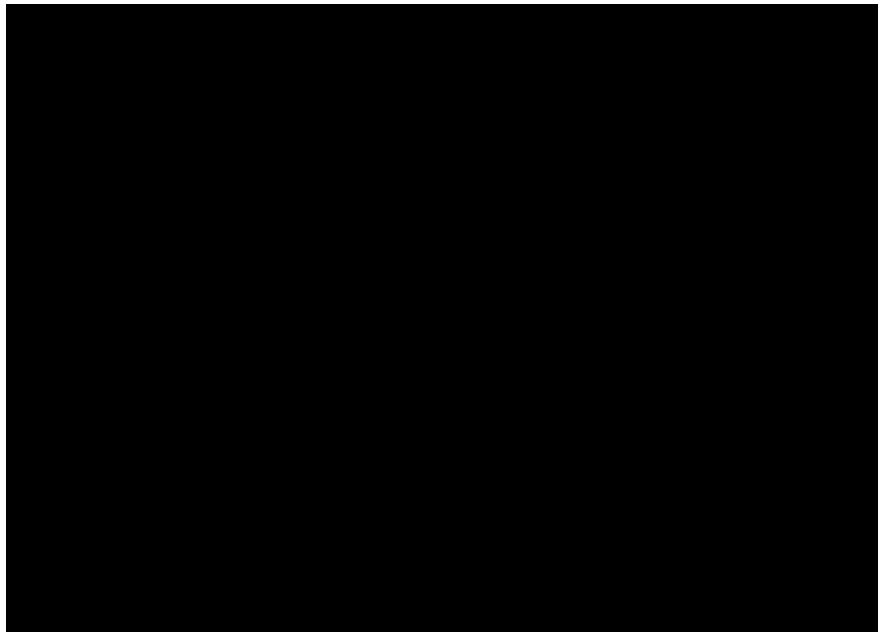
Figure 2.25   The Humanitarian Approach to Capability Management. (Kovacs & Tatham, 2009).

2.6.1 Complexity

It is without question that some commercial supply chains can be exceedingly complex, as Sarpong (2014) describes at length in his research into the food supply chain at the heart of the UK horse meat scandal of 2013. In commenting on the issue befalling traceability in food supply chains, Sarpong (2014) notes that 'the food industry has become so sophisticated and supply chains so complex and global that it is often much harder to monitor' (p.272). However, one could argue that even with their level of complexity, commercial supply chains are no longer 'owned' by a single

stakeholder, they are more controllable because of the business need to be transparent and accountable, where a loss of either can have a detrimental effect on a company's bottom line. The complexities both induced and inherent in humanitarian supply chains are more pronounced as well as more nuanced. Rodríguez-Espíndola et al. (2023) point out that 'complexity is the reason urgency becomes the main priority over other aspects, such as responsibility' (p.2) in humanitarian operations. Often, each stakeholder organisation will introduce a separate, distinct supply chain tailored to its specific goals and needs. For example, a cold chain is most likely to be operated as part of a WHO supply chain because of the need to store medicines at a cool temperature. A supply chain involving heavy air lift is likely to be operated as part of a WFP supply chain because the UN Humanitarian Air Service is part of the logistic component coordinated by the Global Log Cluster under the custodianship of WFP, and that as a result, the air service is partially funded through WFP.

With multiple supply chains supporting one operation, a supply network arises, and Ergun et al. (2014) make the connection between this additional complexity and the need for robust coordination. Ruesch et al. (2022) observe that 'the nonlinear and complex dynamics among [HROs] during disaster response makes observing the different boundary conditions difficult (p.1985). Van Wassenhove & Pedraza Martinez (2012) discern that the operating conditions faced by humanitarian logistics are complex and include supply and demand uncertainty and a high degree of decentralization. The differences between commercial and humanitarian supply chains are explored and detail the factors which make the humanitarian version quite distinct. Such is the level of complexity in the humanitarian supply network that they lay down the gauntlet to researchers in OR to find solutions to the complex problems faced by humanitarian aid agencies. Rodríguez-Espíndola et al. (2023) also propose a role for OR, and despite a focus on the wider scope of humanitarian disaster operations management, it is suggested that decision-making within the humanitarian logistics field would benefit from increased collaboration by practitioners at all levels.

Under the banner title of 'complexities of humanitarian logistics' and illustrating their point in Fig 2.26 below, Overstreet et al. (2011) describe humanitarian logistics is an incredibly challenging process where 'a great deal of the practitioner-oriented literature stresses the complex nature of disaster relief' (p.117).
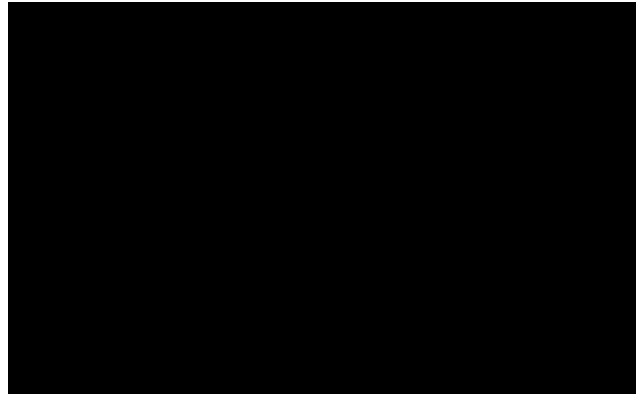
Figure 2.26   The Complexities of Humanitarian Logistics. (Overstreet et al., 2011).

While Goshorn & Usswald (2014), Jahre et al. (2016) and Schiffling et al. (2020a) allude to the obvious complexities arising from the security and political situations in high-risk environments, Akhtar et al. (2012) outline horizontal and vertical attributes of the humanitarian supply chain, and finding that when humanitarian organisations act in a coordinated manner, they are able to manage a number of complex relationships effectively and efficiently in their response to disasters. Environmental instability is also a feature of the research conducted by Olorundoba & Kovács (2015) and is seen as a significant difference between humanitarian and commercial supply chains. Bharosa et al. (2010) refer to the dynamic nature of the humanitarian environment and recognise that deciding and acting in a disaster response situation is a 'challenging process for each individual, because everyone is faced with severe time-pressure and a flood of information that may be inaccurate or out-dated by the time a decision or action takes place. Such a complex, intense and information-rich environment can easily result in cognitive overload at an individual level' (p.51).

Altay & Labonte (2014) associate complexity with the chaotic nature of damage, but also suggest the factors below as being key to contributing to complexity:

- Supply chain issues: uncertainty in demand and supply;
- Funding issues: donors with specific targets;
- Needs assessment and procurement: accuracy and timeliness;
- Management of information: information systems and connectivity;
- Coordination issues: supply chain ownership, control and management;
- Infrastructure and network design: enabling the supply network through available infrastructure;
- Standardisation issues: lack of conformity and modular solutions;
- Operational issues: resource availability and consignment-specific issues;
- Personnel issues: qualification, experience and turn-over.

Also mentioned are ethical issues such as discrimination, corruption and ethnic bias which add to complexity, and attention is drawn to the potential benefits and the pitfalls encountered in accepting military assistance.

Kumar & Singh (2021) conduct a detailed examination of humanitarian supply chain complexity and suggest the application of Industry 4.0 technology as a coordination tool. They describe such an application as nascent and argue that 'It may be used to integrate the systems of stakeholders involved in HSC, data processing and information sharing and for improving traceability of items' (p.8).

2.6.2 Cultural Considerations

Global humanitarian interventions invariably involve stakeholders from different cultural backgrounds coming together for the common good, often deploying personnel into countries where the cultural norm varies so greatly with that of their own background and experiences that individuals can become culturally disorientated, leading to faux pas at best and antagonism, intolerance or conflict at worst (Krishna & Daniel, 2021). Indeed, the United Nations Department for Safety and Security (UNDSS) includes cultural awareness and understanding in its Basic Security in the Field training course, specifically to make humanitarians working for them aware of the

pitfalls of misunderstanding cultural differences, eccentricities and sensitivities. Cultural perceptions throw different views and opinions on ethical and moral judgement, in that an aid worker from one cultural background may consider the actions of another, or those of affected people to be either unethical or immoral. Although focused on the ethical values of commercial consumers towards multinationals, Chipulu et al. (2015) note the different value systems between religious and non-religious individuals, while they remain similar across religions. This finding could help aid workers with or without religious backgrounds to better understand the value systems in the environments in which they find themselves.

Taking an academic view, Willitts-King & Harvey (2005) group stakeholders into three broad camps: the aid effort, comprising donors and relief providers; national governments, public officials and authorities within the affected state; and the affected people, often referred to as the victims. In studying the risk of corruption in humanitarian supply chains, it is suggested that while inefficiency is likely to occur anywhere along the supply chain, it is more likely to occur in-country and involve national or local NGOs, due to a lack of information and technological support. It is also considered that fraud and corruption may also occur here for the same reasons and the inherent lack of accountability, it is national governments, public officials and authorities that are most prone to corruption, bribery and the wielding of deontic power. However, CDA (2011) point out that it is difficult to define what corruption is because 'what looks like corruption to one person may be considered a traditional practice to another' (p.2). Topics as corruption in beneficiary selection, perceived waste, 'middlemen and sticky hands' and 'boomerang aid' benefiting aid staff and their organisations are included. Ways in which opportunistic and systemic corruption can be fought are offered, but much is viewed from the organisation's North American cultural and values stand-point. Bailey (2008) applies a broader perception of corruption, recognising cultural differences and sensitivities but also appreciating perceptions of donors and the resulting effects on image, future funding and media scandal. As a result, INGOs are considered reluctant to talk about corruption openly. Aware that corruption is 'notoriously hard to quantify', corruption is defined as

'the abuse of entrusted power for private gain' and includes financial corruption such as fraud, bribery and kickbacks under this umbrella.

Bauhr et al. (2013) consider how corruption causes aid fatigue amongst donors and how it can be used by foreign governments as an excuse to reduce their foreign aid budgets, but despite remarking on the 'surprising lack of literature on how recipient country corruption affects support for foreign aid' (p.569), the findings show that the relationship between corruption and aid fatigue is highly nuanced.
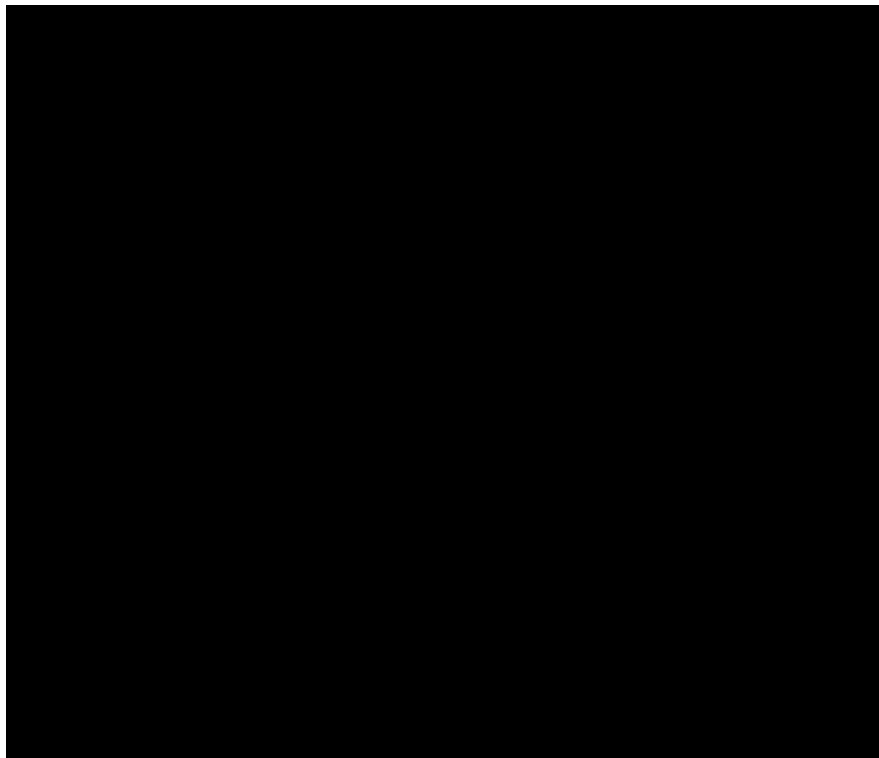
Figure 2.27   Variables Affecting Risks of Corruption. (Ewins et al., 2006).

Ewins et al. (2006) consider the whole issue of culture, ethics and morality to be highly complex and must be considered in terms of what factors exist in the context of each relief operation which may affect the risk of corruption. In addition to political, social and cultural conditions, the risk of corruption is considered to vary depending on the type of relief being delivered and the governance measures and behaviour of aid organisations. Their work looks at corruption risk assessment and corruption mapping in detail and the findings are predicated on the fact that a humanitarian aid operation is in itself a complex aid delivery system.

2.6.3 Stakeholder Engagement

As in any supply chain, stakeholder engagement and positive behaviour are key. Even the simplest commercial supply chain consisting of one producer, one supplier and one customer will have more than just three stakeholders:

- Supplier employees;
- Transport actors in the transportation of components or raw materials to the producer;
- Producer's employees including management and production staff;
- Transport actors in the transportation of finished goods to the customer;
- The customer;
- External actors affected by the supply or consumption process, e.g. local residents near the production plant, local road users.
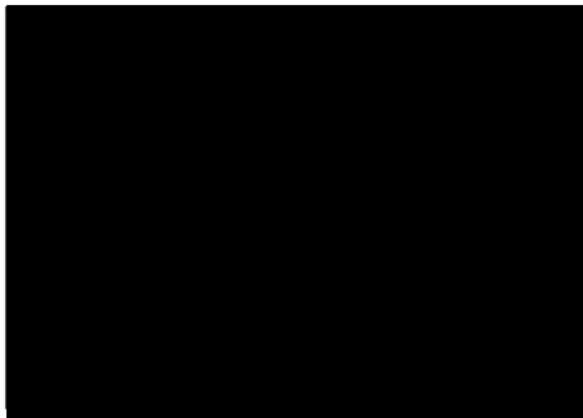
Figure 2.28   Stakeholder Analysis Matrix. (Adapted from Mendelow, 1986).

With the growing complexity of supply chains and the accepted complexity of humanitarian supply chains, before considering how stakeholders engage and then behave, it is important that they are first identified. Notwithstanding that individual stakeholders may vary widely between humanitarian supply chains, stakeholder groups can be identified in a holistic manner as not result in a reductionist viewpoint. To assist in identifying and categorising stakeholders, Mendelow offers his stakeholder analysis matrix.

It is recognised that stakeholders will have their own perceptions, attitudes and goals, and that these can be at loggerheads with other stakeholders in

the supply chain (Christopher et al. 2002). However, they consider that the level of loyalty and commitment shown any one stakeholder to another can be measured using their stakeholder relationship ladder.
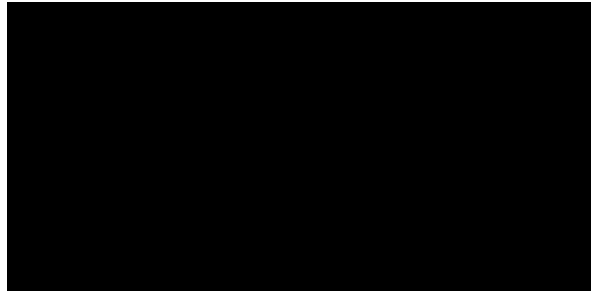
Figure 2.29   The Relationship Ladder of Loyalty. (Adapted from Christopher et al., 2002).
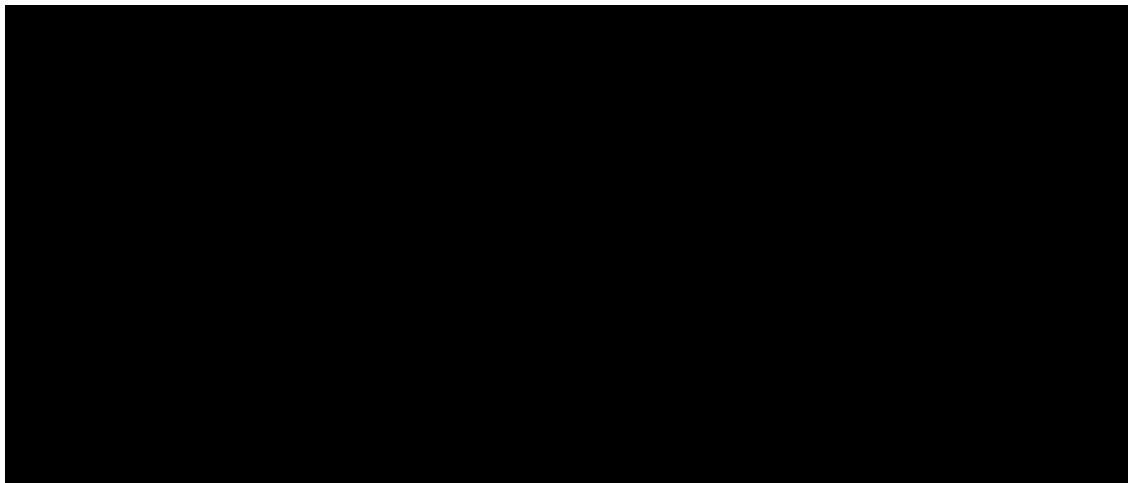
Table 2.5   The Relationship Ladder of Loyalty Definitions. (Adapted from Christopher et al., 2002).

Kampstra et al. (2006) recognise that the relationship between two stakeholders must first have reached a certain level before collaboration can begin, often characterised by advocate or higher in the ladder of loyalty above. Kampstra et al. (2006) contend that 'you cannot collaborate with a party that lacks the genuine desire to collaborate' (p.312) and the factors which drive successful stakeholder engagement include the attitude of stakeholders, a perception of equality between partners and whether the duration of the relationship is expected to be ongoing or limited. For instance, the research findings conducted of Vega & Roussat (2015) indicate that commercial organisations with CSR programmes are important stakeholders with which to have a relationship. It is suggested that a commercial logistic

service provider is more likely to become engaged in supporting a humanitarian operation when it can benefit from the CSR dividend such engagement brings. Hampden-Turner (1990) introduces the concept of 'vicious and virtuous circles', where a vicious situation similar to that of Fig 2.5 exists, or a virtuous situation prevails where the culture of the organisation either 'promotes normality … or carefully notes what informal activity among the decentralised [stakeholders] is of most value to customers' (p.31). In the humanitarian environment, this can manifest itself in the form of an engaged stakeholder acting without prompt at a time of loss of communications, purely because its level of engagement and collaboration is such that it knows, understands and wants to contribute positively to the supply chain as a holistic entity. Midgley (2013) suggests that the concept of vicious and virtuous circles should be taken into consideration when assessing relationships within the context of the four systems thinking skills (Fig 6.2).

Looking at supply chain challenges purely in a humanitarian setting, Kovacs & Spens (2009) contemplate the application of stakeholder theory by considering the origins of challenges 'in terms of coming from an input/output environment' (p.518). An important observation by Ororuntoba & Gray (2009) leads us to understand that 'information integration and sharing, coordination and resource sharing, process and procedural alignment' can only evolve where a trusting relationship between stakeholders exists (p.497). Tatham & Kovacs (2010) look much deeper into the area of stakeholder trust and look at what they describe as traditional trust and swift trust, where humanitarian partners operating in hastily formed networks rely on both the trustworthy reputation of the partner organisation but also on a quick assessment of individuals' ability, integrity and benevolence. In the last decade, a greater understanding of how swift trust contributes to stakeholder engagement and enables cooperation and collaborative working has been gained (Dubey et al. 2019; Dubey et al. 2020b; Schiffling et al. 2020a). Argollo da Costa et al. (2012) identify the international community as one of the three broad groups of stakeholders that humanitarian organisations have

a responsibility towards, and that they do this via media channels, sharing information concerning their relief operations.
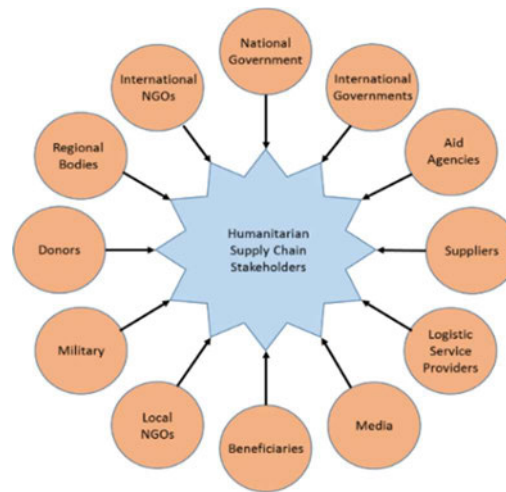
Figure 2.30   Humanitarian Supply Chain Stakeholders.

2.7   Supply Chain, Network or System?

There is growing evidence that the supply of goods to humanitarian operations today should be seen more as a supply network rather than a supply chain. Following the introduction of the phrase 'supply chain network' into common parlance, Tatham & Pettit (2010) recognise that the term may not be particularly well known or understood, but Janvier-James (2012) embraces it, taking the view that 'integrating the connections of the supply chain into a network improves the flow of goods and information in the organisation' (p.199). Tatham & Pettit (2010) cite several authors in their agreement that the phrase 'supply network management' rather than 'supply chain management' is a more accurate reflection of the reality found in humanitarian scenarios. Zhoa & Xia (2014) describe how network interoperability is an essential element of networks and that interoperability is best achieved through collaboration and the resulting interoperability of partner systems. In their qualitative study, Jahre et al. (2016) identify demand characteristics, logistics and the policy and security situation as the factors which influence the design of what they refer to as a humanitarian supply network. The importance of infrastructure as an enabler is stressed, not just for physical operations but for communication and coordination. Oláh et al.

(2018) recognise the propensity for 'the management of links between supply chain members to be carried out by logistics service providers' (p.128) and argues that this is a clear indication of the existence of a 'supply chain network' (p.131). However, the term supply chain network conflates the two-dimensional with the three-dimensional and increasingly, contributors have moved away from it to supply network, thereby recognising that a supply network can comprise any number of supply chains (Anaya-Arenas et al. 2014; Ransikarbum & Mason, 2016; Sapat et al. 2019; Medel et al. 2020; Mutebi et al. 2022). Cannella et al. (2018) consider the implications of supply chain management decision-making in terms of stakeholder collaboration and operational efficiency, and also refer to the 'supply chain network' but by connecting such an entity to 'fuzzy systems', it is clear that they are referring to a three-dimensional concept.
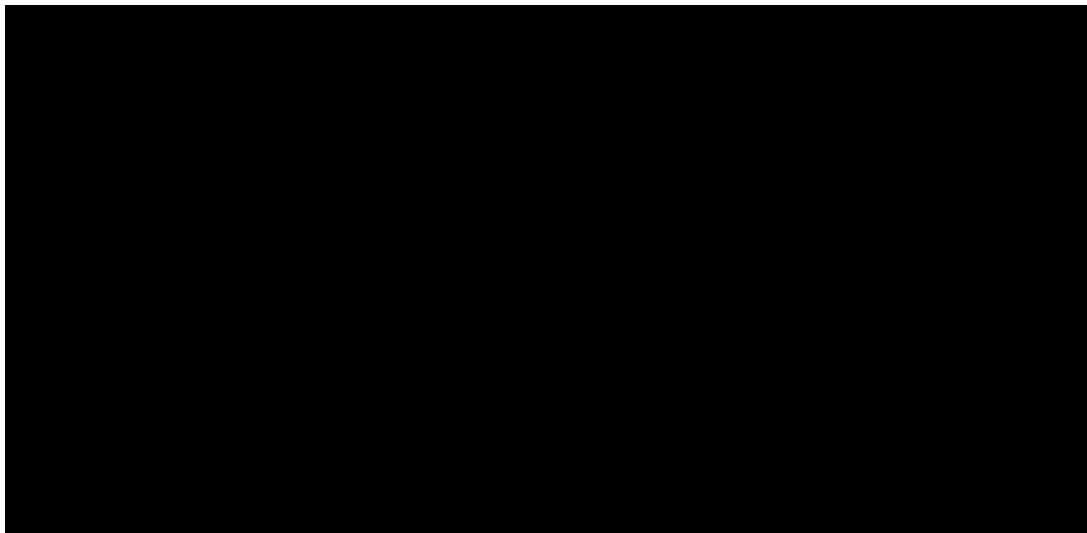
Figure 2.31   Framework for Network Design (Jahre et al. 2016).

Looking specifically at the management of humanitarian vehicle fleets, Besiou et al. (2011) suggest the use of systems dynamics (SD) as a suitable modelling and simulation methodology when exploring the uncertainty and complexity of humanitarian systems, but Diedrichs et al. (2016) believe that SD can only be applied to specific supply chain functions (e.g. vehicle fleet management or the management of information as a coordination tool), but not to the whole humanitarian supply chain management discipline. Maull et al. (2012) suggest applying systems thinking to a supply chain, albeit a simple supply chain like that servicing the requirements of a wedding event;

this approach is guided by Checkland (1991) and focuses on weltanschauung, boundaries, hierarchy and mechanisms of control.

In describing the 'single system' of direct transaction between a commercial provider and the customer; and the 'dual system' between a humanitarian donor and an NGO and then the NGO and the recipient, the complexity of the humanitarian supply chain reflecting the funding, stakeholder relationships and the in-country context is acknowledged, where infrastructure, resources and societal instability can severely affect aid delivery (Carroll & Neu, 2009; Mangan & McKinnon, 2019). Senge (1990) describes Systems Thinking as a discipline for seeing the structures that underlie complex situations. For this research to see the structures that form the basis of the humanitarian supply chain paradigm, it is considered appropriate to take a holistic view. Little if any research appears to have been conducted into the humanitarian supply chain using a holistic thinking approach as its theoretical base, despite the Nassimbeni & Sivadasari (2005) contribution in New & Westbrook (2005) suggesting a strong correlation between supply chains and Systems Thinking. Li et al. (2010), Hearnshaw & Wilson (2013), and Bowersox et al. (1985) all concur. Zhang et al. (2018) explain that due to the 'fast changes of the global economy and the increasing pressure of market competition, [commercial] supply chain systems have become complex dynamic network systems' (p.1). and research in the commercial sector is gathering momentum. However, research into treating the humanitarian supply network domain as a system is some way behind and to date, none have considered the paradigm as a single entity (Schiffling et al. 2020b; Anjomshoae et al. 2022) Therefore, it seems logical to look at existing concept models and frameworks through a lens which takes account of the different perspectives of stakeholders, the system in which they operate, the relationships between them and the boundaries within which they operate.

Altay & Labonte (2014) describe humanitarian response settings as complex systems 'due to the fluidity of the post-crisis environment, the influx of actors producing an unregulated operating landscape and the unpredictable impact of interactions between the complex systems these actors come to constitute'

within the broader disaster response environment (p.553). Using the term 'system' in conjunction with humanitarian relief operations is becoming more common (Altay et al. 2023). Hearnshaw & Wilson (2013) opine that taking a linear view of sequential dyadic relationships 'grossly oversimplifies and distorts the realities of modern supply chains' (p.441) and that they have now moved away from being simple chains to complex adaptive systems. In their paper, they consistently refer to 'supply chain systems'. However, Maull et al. (2012) are the first to study service supply chains through a systems thinking lens, and in introducing the term 'co-creation', considers that the creation of value in a supply chain is systemic in nature.
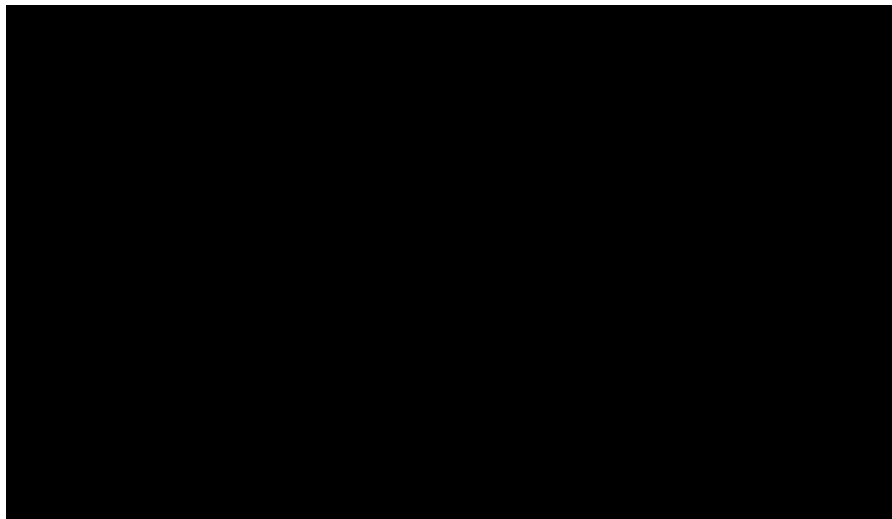
Figure 2.32   A Systems Model (Maull et al., 2012).

A representation of a system (Fig 2.32) using Checkland's five features of a system is offered: boundaries, hierarchies, mechanisms of control, inputs and outputs. A point worthy of note is that in contrast to Fig 2.32, none of the existing models examined in para 2.3.2 make any mention of control mechanisms. Perhaps this is a telling omission given the important role control and governance plays in both commercial and humanitarian supply chain management. At present, there is no 'control system' in the humanitarian supply network paradigm, not least because the paradigm has yet to be viewed as a system, but where it is viewed as a system, that control element needs to be autopoietic, as identified in para 2.5.3 above.

So far, the literature is exposing the flow of information as being an essential element in a humanitarian supply chain, and that individual supply chains exist in the same environment, working towards shared goals as part of a multi-organisational relief operation. The highly complex nature of the humanitarian environment has been described by many contributors and the systemic nature of supply chain operations in the humanitarian context is now evident. In recognising the complexities inherent in the humanitarian supply chain, Tabaklar et al. (2015) examine the lack of theory and present a comprehensive literature review which lists the numerous OR-based theories which are felt could perhaps be applied to humanitarian supply chains. Alongside the expected theories focusing on stakeholders, inventory control and resources, they identify systems theory. It is therefore appropriate that the flow of information in such a complex environment should be viewed as a management information system, but not of a traditional, conventional design to improve operational performance in routine, programmable tasks. Instead, the information flows within a humanitarian supply network or system would have to be structured in such a way as to cope with the fuzzy problems that arise in this setting. Vilalta-Perdomo (2010) considers the application of Decision Support Systems (DSS) because 'problems are continually changing; problems need to be resolved quickly; analysis, transformations and projections are required; and the mechanisms for solving the problems are less concerned with long-term efficiency and more concerned with rapid implementation and robustness' (p.62). Besiou & Van Wassenhove (2011) consider the use of systems dynamics but while this model assists in decision-making in specific complex humanitarian supply chain functions, its applicability to the whole humanitarian supply network is limited. Harpring et al. (2021) develop the idea of applying systems dynamics in the humanitarian context, but its application is reductionist: the management of individual problems arising during DROs in Yemen through the analysis of causal loop diagrams. They encourage further research to investigate whether their model could be extended beyond the recognised limitations of their study. The complex adaptive systems framework has been considered in the humanitarian context (Schiffling et al. 2020) but as Hearnshaw & Wilson (2013) explain, this framework is more suited to commercial supply chains

because 'channel leader firms [stakeholders] can exert their influence' (p.445). This level of stakeholder influence is unlikely to be tolerated by other humanitarian actors. Puche et al. (2016) examine the role of information flows in tackling commercial supply chain bottlenecks and suggest the application of VSM to resolve such situations. VSM is conceptually based on the workings of the human body and the components and functions that are required to maintain the viability of life; it reflects a system that is unitary in nature. Flood & Jackson (1991) describe it as 'an arrangement of five functional elements that are interconnected through a complex of information and control loops' (p.90) and it is this emphasis on information and control that makes it highly appropriate for the analysis of the flow of information within a system. Jackson (2019) offers up systems models which he categorises into being applicable in unitary, pluralist and coercive scenarios. An emancipatory systems approach would not be appropriate for the humanitarian paradigm since it is not, nor does it expect to be, a coercive domain. However, where a unitary system encounters an issue or conflict and becomes pluralist in nature, Jackson (2019) suggests that there could be a role for the Soft Systems Methodology framework (SSM). This is further examined in para 6.2.4.

2.8   Research Gaps and Boundaries

Early in this literature review it became apparent that there is a gap in supply chain theoretical knowledge. Hearnshaw & Wilson (2013) have taken steps to fill this gap for commercial supply chains by embracing previous theory based on dyadic analysis, transactional cost economics, agency theory and relational exchange theory. A more holistic view is taken by considering the supply chain as a whole system with a multitude of connections and connection types. However, as Tabaklar et al. (2015) reiterate, there is no such theoretical approach in the field of humanitarian logistics which, evidentially in the literature, is a distinctly different discipline when compared to commercial supply chains. Sweeney et al. (2015) lay a theoretical base for supply chain management in general in their Four Fundamentals construct but admits that 'the construct could be further built upon with a view to contributing to the development of a new theory that facilitates deeper and

richer understanding of SCM' (p.68). These two contributions identify a gap in SCM knowledge for which they project solutions, but neither is applicable in the humanitarian supply chain domain. Instead, there remains a lack of understanding of how humanitarian supply chains function as systems in terms of management and processes, both of which are enabled by the flow of information and the relationship between stakeholders. None of the humanitarian supply chain contributions reviewed consider the whole humanitarian supply chain management domain as a system and none take a holistic view of the challenges and issues faced by practitioners on the ground. It has become evident that the models developed for understanding commercial supply chains (Weaver et al. 2018; Jagustovic et al. 2019) are not being applied in the humanitarian world and this begs the question: why? There is a gap in knowledge as to how information flows enable humanitarian supply chains to function effectively and efficiently and how stakeholder relationships contribute to this. There are examples where elements and components of the humanitarian supply chain have been examined (Schiffling et al. 2020b; Besiou & Van Wassenhove, 2021), and where models have been adapted, adopted and developed to resolve isolated issues but no one has looked at humanitarian logistics through a systems thinking lens to resolve issues which are created in vertical supply chain structures but manifest themselves in horizontal supply chain structures. Only through taking a holistic view can the ramifications of decision-making in one area be resolved when they materialise in another area. Many contributors use the term 'supply chain', some use 'supply network' but the term 'supply system' is rare. This research will determine the most appropriate term in the humanitarian context.

The literature reviewed suggests that there are many elements and components to the humanitarian supply chain and that these include supply chain management, governance and performance, supply chain design in terms of its agility and leanness, stakeholder behaviour and the involvement of logistic services providers in 3PL or 4PL arrangements. As topics of study, these are all extremely broad and therefore fall outside the scope of this research. However, whilst not specifically described as such, it appears that

the flow of information is the lifeblood of all these elements and components, providing them with the nutrients to support a healthy body of active limbs which procure, move, store and distribute relief items. It is also clear that this passage of information occurs in the context of stakeholder relationships and therefore, when studying the flow of information, stakeholder communication is integral. Therefore, stakeholder communication in the context of coordination, cooperation and collaboration is within the scope of this study.

2.9   Conclusion

The literature demonstrates the connection between strategic planners and programmers and their organisation's logistic practitioners, as well as the inter-agency connections between logistic practitioners on the ground. Only by taking a holistic approach to examine the humanitarian supply network can the information which flows vertically through the hierarchical structures of stakeholder organisations and horizontally between stakeholders be fully understood. Several models exist which provide an understanding of various aspects of humanitarian supply chains, but these are largely derivatives of earlier commercial supply chain models, and none take a holistic view. Existing models examine the humanitarian supply chain in terms of the functions of SCM, and therefore only a reductionist view has been achieved.

The many challenges faced by humanitarians can be largely resolved through the accurate flow of information, as this underpins stakeholder relationships by promoting trust, accountability and transparency, but it also allows the strengths of individual partners to be focused on areas that may not otherwise be apparent, thereby developing the agility of the system. By examining humanitarian supply chains in terms of agility, adaptability and alignment, a more thorough understanding can be gained of how they work as a system. It is therefore appropriate that this research takes a Systems Thinking approach to the challenges of the humanitarian supply network, and by doing so, it will be poised to answer the questions of whether it is a humanitarian supply chain, supply network or supply system, and who controls it.

2.10 Confirmation of Research Aim

Through conducting this literature review, it is apparent that a significant issue in the humanitarian supply chain construct is the willingness or ability of stakeholders to cooperate or work collaboratively in complex operational environments; an issue that stems from inefficiency in the flow of information, both horizontally along the supply chain and vertically within stakeholder organisations. Therefore, the aim of this research is to explore whether treating multiple, complex supply chains in a disaster relief operation as a network system would better facilitate stakeholder engagement and the resolution of supply challenges and issues in order to achieve maximum effectiveness and efficiency in the delivery of humanitarian aid.

CHAPTER 3

THE PHILOSOPHICAL PARADIGM

*'We would be in a nasty position indeed if empirical
science were the only science possible.'*

Edmund Husserl (1913)

3.1   The Research Process

Before embarking on research, it is essential that the researcher has a deep
and academically robust understanding of the research topic and the process
to be employed to plan the research project, collect and analyse the data,
construct a conceptual framework and formulate a conclusion. The process
begins with establishing the problem; this has been addressed in the
literature review. In planning the research design, the research approach and
philosophical position are established. Determining the sample involves
careful consideration of the methods available and the feasibility of the
researcher to conduct data collection and analysis: interviewing a sample
size over 20 may not be feasible, but a survey or questionnaire sample size
of 5 will probably yield little worthwhile data.
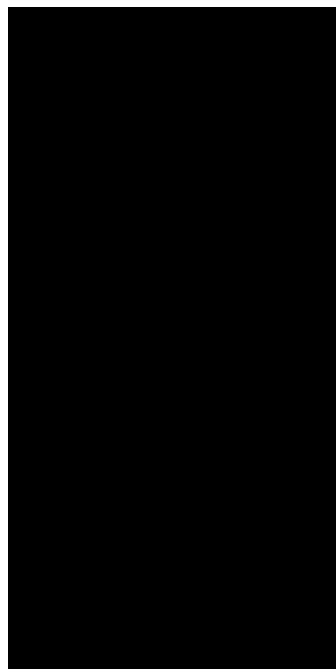
Figure 3.1   The Research Process. Adapted from Zikmund (2000).

Within the 'Planning a Research Design' box above, Beech (2005) provides the detail of how to conduct the planning with his self-explanatory research methodology design building blocks.

Figure 3.2   Research Methodology Design Building Blocks. Beech (2005).

3.1.1 The Research Onion

The flow chart above reflects a well-established process for conducting academic research (Bell et al. 2019; Cooper & Schindler, 2014; Robson & McCartan, 2016). However, Saunders et al. (2016) present a more integrated view of the process in their Research Onion diagram, capturing the spectrum of possibility relating to the steps which need to be considered during the collection and analysis of the data.

By firstly considering research philosophy, the researcher can assess how they themselves feel about taking a particular approach to the project. For example, a researcher with a strong political view may decide to approach their project with an aspiration of giving their research a particular axiological or aetiological focus. Their aspiration to develop knowledge of specific values or to attribute cause is likely to influence their approach to theory development, methodological choices and research strategies.
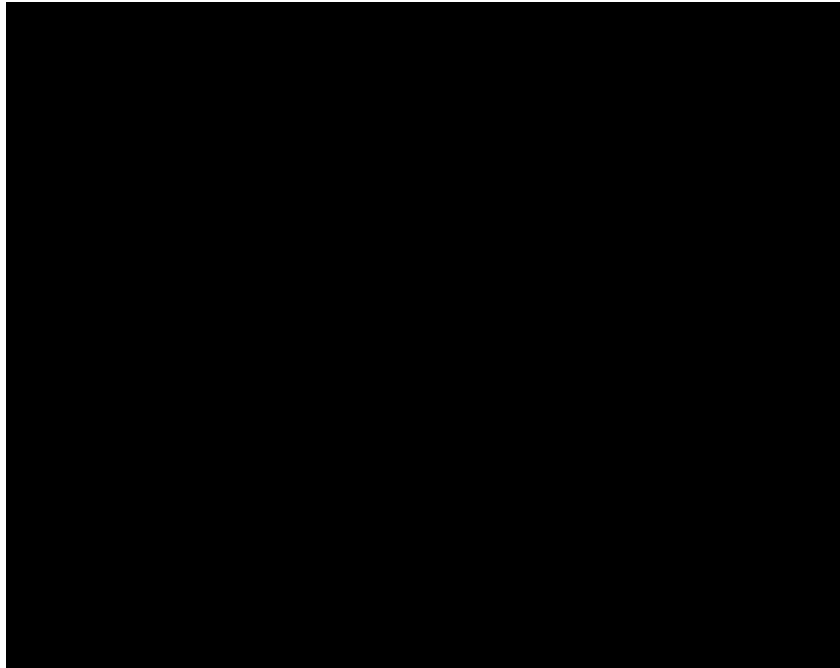
Figure 3.3   The Research Onion. Saunders et al. (2016).

3.1.2 Confirming the Research Question

With the discovery of the problem through conducting the literature review, and the confirmation of the aim in the conclusion of the literature review, the research question is now confirmed:

By examining the flow of information in humanitarian supply chains, how can greater coordination, cooperation and collaboration between humanitarian supply chain stakeholder organisations contribute to a more effective and efficient delivery of humanitarian aid?

3.2   Research Philosophy: Philosophical Considerations

Saunders et al. (2016) describe ontology as referring to 'assumptions about the nature of reality' (p.127); how one sees the world. Epistemology is described as being concerned with 'assumptions about knowledge' (p.127); what constitutes acceptable, valid and legitimate knowledge, and how it can be communicated to others. Johnson & Duberley (2000) echo this by describing epistemology as 'the study of the criteria by which we can know

what does and does not constitute warranted or scientific knowledge (p.3). Saunders et al. (2016) describe axiology as 'the role of values and ethics within the research process' (p.128) and is to be applied not just to the participants in research, but also to the researcher.

3.2.1 The Major Research Philosophies

Saunders et al. (2016) consider the five major research philosophies that are described in Fig 3.3 in terms of their ontology, epistemology and axiology, and suggest typical research methods employed by each.
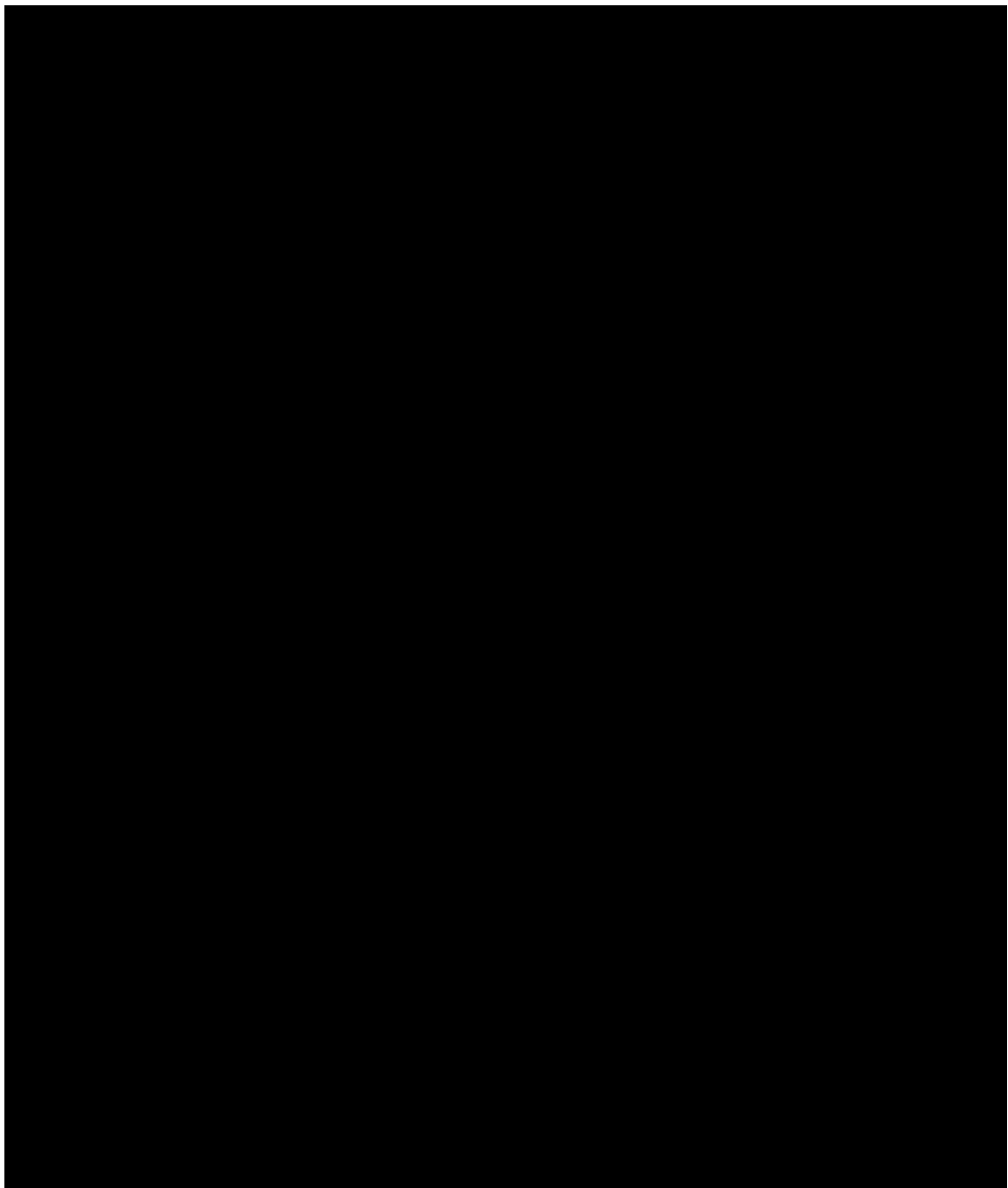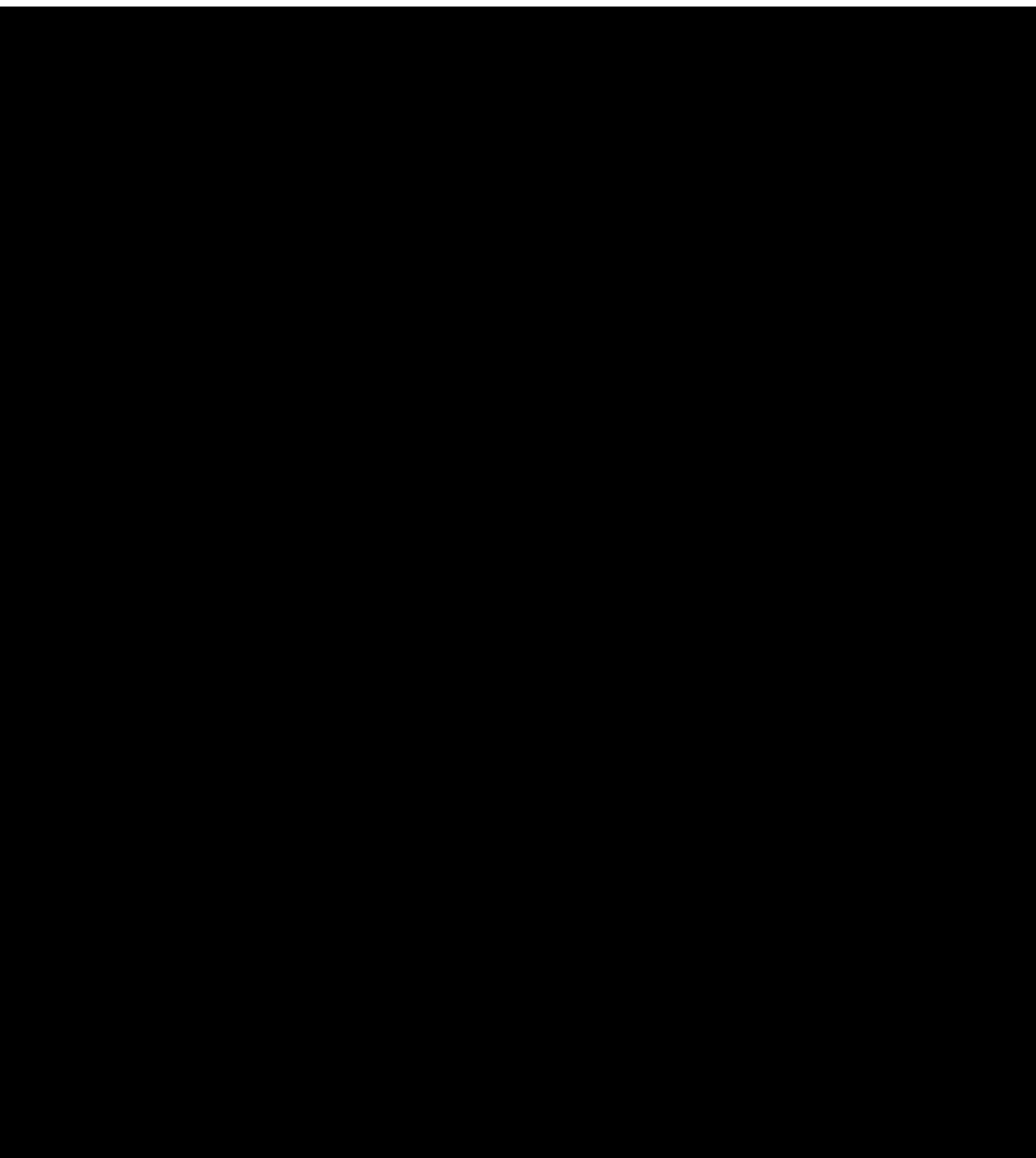
Table 3.1   The Ontology, Epistemology and Axiology of the Five Major Philosophies. (Saunders et al. 2016).

The domain of this research is the humanitarian supply network where the behaviours of individual stakeholders and the influence they have on the flow of information will be studied, together with the practicality and feasibility of coordination, cooperation and collaboration amongst stakeholders. It will explore human activity and interaction, behaviour, perception and value judgements in unstable, challenging and often hostile environments: the humanitarian supply chain is a societal paradigm. Within the paradigm, stakeholders will find themselves operating in atypical situations and their behaviours will be heavily influenced by local conditions where they may be exposed to, inter alia, extreme austerity, armed conflict, dubious ethics and

societal violence. Therefore, human emotion, instinctive reaction and risk-taking outside the individual's normal parameters may be commonplace. Therefore, there are likely to be multiple meanings to the data collected, and the focus of the research will be narratives, perceptions and interpretations. Responses to interview questions may well be heavily nuanced for a variety of reasons. It is appropriate that in this case, the researcher can have personal experience of the issues that tend to arise in the domain so as to be able to make sense of the nuanced data that are likely to be expressed. To be otherwise would place the researcher at a disadvantage. The contribution of this research will be a new understanding of the paradigm through the interpretation of the researcher. Therefore, the research philosophy adopted for this research is Interpretivism.

Final Research Philosophy
Interpretivism

3.2.2 The Research Positions

Ontology refers to a branch of metaphysics that examines the underlying structure of reality: whether reality exists independent of human influence or inter-action, or it exists as a social construct. In broad terms, the two main ontological approaches are realism and relativism, where realism considers that there is a 'real' social world that exists independent of human perception, and relativism that considers concepts such as reality, truth and good as being societal and cultural. By examining two opposing philosophies, positivism and constructivism, it is possible to uncover the diametric ontology of each.

Ontologically, positivism takes the realist standpoint that the world is out there, is real and exists independently of our knowledge of it. From a societal perspective, positivism posits that individuals acting within an environment will occupy space in a reality that already exists and will merely be 'on view'. Positivism primarily concerns itself with hypothesis testing using statistical techniques, where information to be analysed is derived from empirical data

and logical reporting of measured data, and where the dominant research method is quantitative: there is a stress on objectivity. However, constructivism is described by Bryman et al. (2021) as 'an ontological position that asserts that social phenomena and their meanings are continually being accomplished by social actors' (p.28). Given that for centuries, before the view of constructivism was formed, philosophers took a realist view of social science, but in doing so, the researcher had to adopt a subjective approach. Benton & Craib (2011) suggest that positivism does not sit naturally with the social sciences: 'social scientists will be guided by value orientations to seek explanations of particular social phenomena ... [and] by contrast, natural scientists are concerned with discovery of general laws by methods which exclude value judgements' (p.28). This contrasting dynamic suggests that positivism is not the best philosophical position to be adopted for this research because it is concerned with a paradigm where individual players are engaged in social interaction as the very essence of reality and where their decisions, actions and words carry influence within a socially constructed environment. This work seeks to develop an insight into those decisions, actions and words. In researching the social sciences, Gilbert (2008) states 'the positivist notion that there exists a single, objective reality or "truth" which can be discovered by scientific investigation is roundly rejected'; instead, he believes that 'individuals and groups construct their own version of reality' (p.33).

Three epistemological positions which are appropriate to varying degrees in the study of social sciences are considered here: positivism; realism and interpretivism. Bell et al. (2019) remind us that positivism contends that the purpose of theory is to generate hypotheses (deductivism), social science is objective and that scientific statements rather that normative statements are the true domain of the social scientist. Realism, in its two primary forms of empirical realism and critical realism, shares two features with positivism: the same approach to data collection and explanation should be taken for the natural and the social sciences, and that an external reality exists which is separate from the scientist's description of it. Bell et al. (2019) recognise a fundamental difference between these two epistemological positions and that

of interpretivism: the latter is based on the view that an academic strategy is required that respects the differences between people and the objects of the natural sciences which requires the researcher to understand the subjective meaning of social action in the manner described by Weber and his hermeneutic-phenomenological view of *Verstehen* (Tucker, 1965). It therefore appears to be more logical for this research to take an interpretivist stance which will allow individual stakeholder behaviours to be explored and understood, thereby allowing a research conclusion to be drawn by applying inductive reasoning to themes and behavioural patterns established through observation. The research methodology would therefore take a subjective rather than an objective approach which will lead to the use of methods which give access to the type of data needed to understand the meaning of the behaviour being examined. Contrary to positivism where quantitative, empirical, scientifically measurable data is collected for analysis to deduce a conclusion based on the proving or disproving of a hypothesis, this research necessitates the collection of qualitative data to induce meaning through interpretation and understanding.

In considering the epistemology of positivism, Van Steenberghen (1970) states that positivism is the doctrine which reduces all scientific knowledge to a knowledge of facts; it is a form of empiricism' (p.71). In this context, the term empiricism refers to a belief that the accumulation of facts is a legitimate goal in its own right, but this differs slightly from the more general definition of referring to knowledge gained through experience and the senses. By taking a positivist approach to research focused on a societal paradigm, the researcher's methodology could become limited and restricted to being objective and fact-based, which would not allow the knowledge gained to be rationalised and analysed in an inductive manner. When concerning oneself with the sociology of knowledge, Berger & Luckmann (1966) suggest that what is important is 'what people "know" as "reality" in their everyday lives, and that "knowledge" rather than "ideas" must be the central focus for the sociology of knowledge' (p.27). In a humanitarian environment, with players from different cultural and ethical backgrounds trying to work coherently together, there will be many versions of reality and of the truth: indeed,

philosophically, there will be many truths. Audi (2003) believes that in positivism, 'many judgements are true, but only in a qualified sense that reflects them being tied to the culture in which they occur' (p.268).

Focusing on interpretivism as a sub-set of constructivism, Bell et al. (2019) describe it as having a contrasting epistemology to positivism since interpretivism 'takes the view that the social world requires a logic of research that reflects the distinctiveness of humans against the natural order' (p.31). They suggest that positivism seeks to explain human behaviour whilst interpretivism seeks to understand it. Bryman et al. (2021) consider how individuals make sense of the world around them and how in particular 'the philosopher should bracket out preconceptions in his or her grasp of the world' (p.25) and identifies this intellectual view as being phenomenology.

In this research, axiology must be considered in the context of austere environments where many of those employed within the supply chain will be drawn from the local populous, and therefore are likely to have profoundly different values, standards and ethics compared to INGO staff. However, it is not just the humanitarian players being studied that must be considered, but also the axiology of the researcher. The research approach and the behaviour of the researcher must consider the moral, ethical and emotional imperatives that the situation demands. While players may take moral or ethical decisions that might look out of place in a normalised society, the researcher must establish his/her axiological position early and remain true to it. Failure to do this will only lead to the undermining of the research.

3.3   The Research Approach

Bell et al. (2019) suggest that research is conducted from one of two viewpoints: objective or subjective. Ontologically, an objective view is one that views 'the organisation as comprised of consistently real processes and structures'; whereas a subjective view sees 'an organisation as a socially constructed product, a label used by individuals to make sense of their experience' (p.34). It is also suggested that the function and purpose of research is either regulatory or radical. In this context, regulatory is described

as where 'the purpose of research is to describe what goes on in an organisation, possibly to suggest minor changes to improve them, but not to make any judgement; and radical as where the point of the research is to make judgements about the way that organisations ought to be and make suggestions about how this could be achieved' (p.35). Taking into consideration the research question, aim and objectives, the researcher must decide whether an objective or subjective approach should be taken.

3.3.1 Taking a Subjective or Objective Approach

The domain of this research is essentially social science: an examination of the human actions that affect the flow of commodities, people and information along a humanitarian supply chain. The approach must therefore be appropriate to the identification of the themes and issues encountered therein, explore the social relations of stakeholders, and describe the reality experienced by them. Given the nature of humanitarian operations and the environments humanitarians operate in, the approach needs to take into consideration differences in customs, behaviours and cultures, as stakeholders across the HSC spectrum come from profoundly different anthropological backgrounds. The approach must be capable of accommodating data collection and analysis of established protocols and accepted best practice, but also understanding ethically challenging behaviours and decisions, including attempts to exercise deontic power over areas of the supply chain. The focus of this research is to understand the information flow in the supply chain and understand how the behaviours and goals of individual stakeholders influence the flow of that information. Only by understanding these behaviours, and the rationale behind these behaviours, is it possible to determine how strategic coordination, cooperation or collaboration can deliver greater effectiveness and efficiency in the provision of disaster relief aid to where it is most needed. The nature of a humanitarian supply chain is therefore paramount in determining which academic approach to take. The research philosophy taken in this research is interpretivist for reasons explained in para 3.2 and both the ontology and epistemology of this philosophy are subjectivist. Given the societal nature of this research and taking the position that social reality is made up of

perceptions and consequent actions of social actors (as described by Saunders et al. 2016), it is appropriate for this research to take a subjective approach. This approach therefore justifies taking an interpretivist stance.

3.3.2 Theory Development

The way in which to approach the development of theory is also under consideration: whether to use deduction, induction or abduction as the basis of reasoning. As Robson & McCartan (2016) observe, deduction is 'the process of moving from theory to observation'; induction is 'moving from observation to theory'; and abduction 'cycles between the two' (p.37). Saunders et al. (2016) are more detailed, describing an abductive approach as 'collecting data to explore a phenomenon, identify themes and explain patterns to generate a new or modify an existing theory' (p.145). They offer a comparison of these three reasoning approaches which they also identify in their Research Onion diagram in Fig 3.3 in terms of logic, generalisability, use of data and theory:
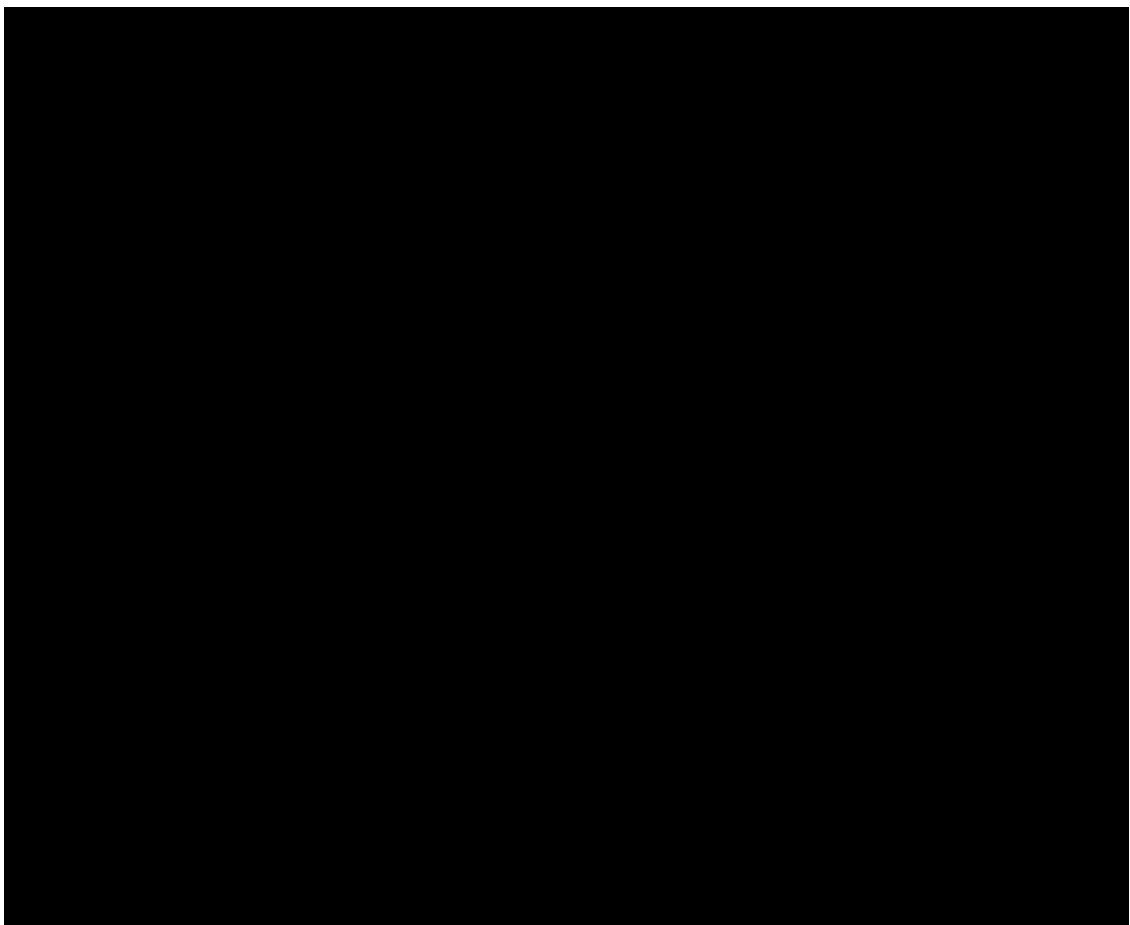
Table 3.2   Deduction, Induction and Abduction. (Saunders et al. 2016).

Since this research does not set out to prove or disprove a theory, and where the value of a known premise is not judged to be either true or untrue, it can be concluded that the deductive reasoning is not appropriate. Likewise, there is no intention to test conclusions drawn from known premises and the research does not intend to locate data in an existing conceptual model to be tested against further data collection, as in abductive reasoning. Instead, this research will form theory through the observation and critique of individuals in the humanitarian supply network environment where the empirical data informs the creation of a new conceptual framework: it employs inductive reasoning. Reiterating that research data should be interpreted to contribute to theory, Pratt (2009) posits that 'it is critical that scholars communicate what theoretical conversations they want to enter' (p.857).
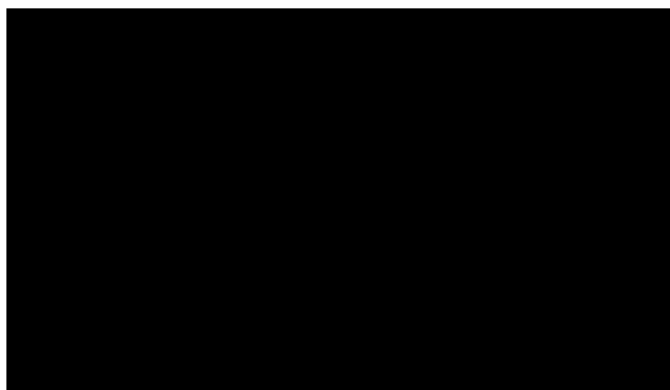
Figure 3.4   Theory construction by induction. (Adapted from Gilbert, 2008).

Gilbert (2008) suggests that it is appropriate to take an inductive approach where data in a research project is used to create a theoretical concept for a subject which is a construct and therefore not a tangible object (p.56).

This research is not based on preconceived ethics or morality, but rather, it places an emphasis on the ways in which stakeholders interpret their situation; it therefore examines how a humanitarian supply chain functions in real situations and then contextualises the behaviours and goals of the stakeholders before drawing interpretive conclusions. It sets out to discover the binding principle behind these behaviours and goals, and through analysis of the data collected, forms a theory in the form of a conceptual framework, the feasibility of which can be ascertained through academic validation. The research here does not seek to explain these behaviours.

3.4   Methodologies

In undertaking research, researchers employ a method by which the research will be conducted and implemented. However, before embarking, the science and philosophy of research must be understood as this in turn gives understanding to how knowledge is derived. This is research methodology. Adams et al. (2014) suggest that broadly speaking, there are two main domains of research frequently observed: quantitative and qualitative research (p.6). Buchanan & Bryman (2009) contend that the choice of research method is shaped not only by research aims, epistemological concerns and norms of practice, but is also influenced by organizational, historical, political, ethical and personally significant characteristics of the field of research (p.483). Therefore, to determine which approach should be used, the approach which best suits the research area should be considered. In tackling what could be described by Rittel & Webber (1973) as a 'wicked problem' (p.160), Reinecke et al. (2016) believe that qualitative methods are 'well poised to understand and explain complex and messy ethical phenomena' (p.xiii) like those facing humanitarians in the field.

Sweeney et al. (2022) discuss the paucity of mixed-method research when compared to single method projects in logistics and supply chain management studies (10% of all empirical articles published over the 10 years of the reviewed period) and they reiterate the value of mixed methods as a conscious research strategy. They identify that the two key drivers for conducting mixed methods research is 'the nature of the research question itself and the need to obtain a holistic and detailed view of the research phenomena under investigation'. They advocate the use of interviews rather than surveys because interviews are real: the researcher gets to know the participant, while survey respondents are more abstract, particularly large surveys. Sweeney et al. (2022) cite Sweetman et al. (2010) which remarks that amongst single-method qualitative data collection, interviews are the

most common and observation the least common, with surveys the most common amongst quantitative studies. In mixed-method studies, Sweetman et al. (2010) identify focus groups as being the most common amongst qualitative mixed-methods but unfortunately, circumstances precluded the adoption of focus groups or observation in this study. In the pursuit of that holistic and detailed view of the research phenomena, as encouraged by Sweeney et al. (2022), this study augmented the semi-structured interview method of collecting primary data with a form of meta-synthesis processing.

The research methodology adopted must allow the behaviours of individual stakeholders to be explored and must provide understanding to these behaviours. To achieve this, qualitative research will be undertaken where observation, case studies and interviews are considered feasible as research methods. It should be noted that one of the weaknesses of adopting an interpretivist philosophy is the risk of researcher bias, but this can be overcome through rigorous researcher reflectivity.

<div align="center">

Final Methodological Choice
Mixed-method Qualitative

</div>

The available research methods which allow data from a humanitarian supply chain environment to be collected and analysed include ethnographical interviews, periods of observation in the field and conducting an ethnographical case study. Writing in Denzin & Lincoln (2018), Brydon-Millar et al. look at Participatory Action Research (PAR) and go as far as to say that 'those who have been systematically excluded from knowledge generation need to be active participants in the research process, especially when it is about them' (p.564). There may be a justification for using methods more synonymous with quantitative research, such as a survey, and therefore the utility of mixed methods should be considered. As shown in Table 3.1, interpretivist research generally accepts that sample sizes will be smaller than they would be for other forms of research, but this allows the researcher to take a deep view of the data.

3.5   Research Strategies

Of the many research strategies or methods that exist, some are more appropriate in the conduct of quantitative research while others are oriented more towards qualitative. Using mixed methods is entirely acceptable in research terms and it has the advantage of not only verifying or falsifying a hypothesis but can also bring some meaning to the data collected. Strategies available to the researcher include:

- Action research
- Archival or documentary research
- Case study

- Ethnography
- Experiment
- Grounded theory

- Narrative inquiry or interview
- Rich pictures
- Survey or questionnaire

By examining these strategies in context, this research uses a route-map adapted from Beech (2005) to navigate to the point where appropriate and applicable research strategies become apparent.
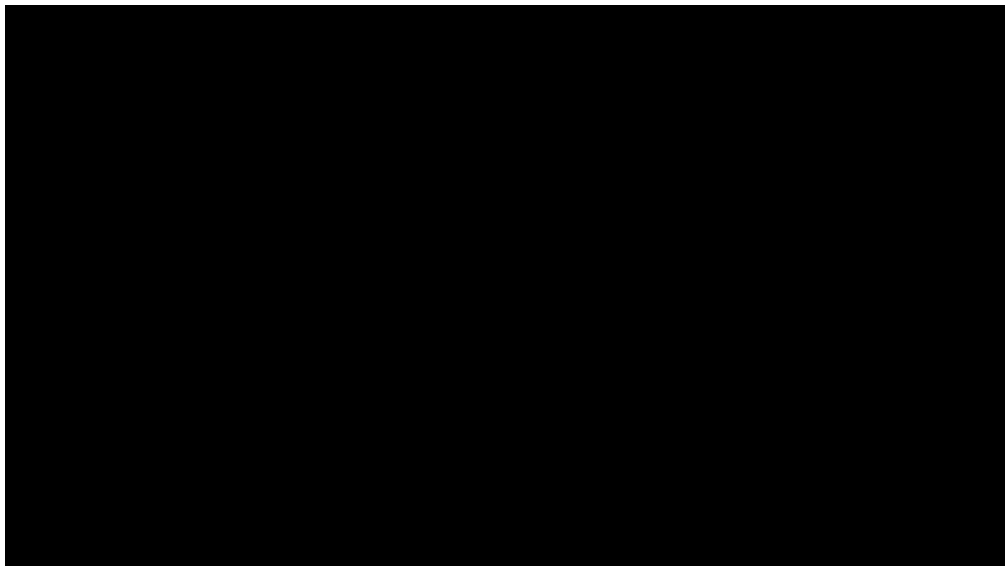
Figure 3.5   Research Strategy Map. (Adapted from Beech, 2005).

3.5.1 Strategic Considerations

Any research design must consider a spectrum of strategic factors as a precursor to the design process and the context of the research in terms of environment, target participant cohort and accessibility of data is of

paramount importance. The collection of humanitarian supply chain data occurs in three distinct research environments: on the ground during a humanitarian operation; in the regional or global headquarters of a stakeholder organisation and through depositories of documented resource material such as post-operational reports. To examine stakeholder organisations at their strategic decision-making and in-country operational levels, the target participant cohort will include deployed practitioners as well as strategic managers in organisation HQs. The consideration which underpins both environment and cohort is accessibility, and this will play a defining role in identifying the participant cohort. The participant cohort should include senior managers with whom the researcher is able to book time and the deployed individuals whose attention is primarily focused on something they will almost certainly consider as being more important than the research being carried out.

The researcher must be aware of political and bureaucratic sensitivities, particularly where data collection appears to convene data protection conventions and the operational practices of commercial stakeholders. Many individuals in the humanitarian logistics field will be employed for a couple of years by one aid agency before moving to another, often competitor organisation. As a result, humanitarian workers tend to feel a belonging to a tight-knit community of logisticians that is not bounded by the limits of their current organisation. One benefit of this is that they can quickly forge inter-organisational relationships in the operational environment similar to the way military units do. This can lead either to a fierce loyalty to the humanitarian practitioner community or manifest itself in an apathy for organisational loyalty. This must be considered by the researcher who may well be considered by the cohort as very much an outsider, and where the support and backing of strategic managers may not necessarily curry favour.

Research in a humanitarian environment will undoubtedly involve gathering data from individuals from many different nationalities and cultural backgrounds. It goes without saying that the researcher must behave in a respectful manner when dealing with people whose cultural beliefs and

behaviour are unfamiliar or difficult to understand. The nuance attached to data collected in particular operational contexts must be understood and care taken when drawing cross-cultural comparisons. The researcher's own political, professional and cultural outlook and subject pre-knowledge can cause bias, and tools and techniques to minimise this need to be understood and employed. Finally, before designing and piloting data collection methods, consideration must be taken of the appropriate time horizon. Longitudinal research may be appropriate, particularly where there is an aetiological aspect to research conclusions, but this project does not intend to infer causality in the primary data collected, but rather will take a snapshot within the information channels; therefore, it will be cross-sectional.

Since this research examines both horizontal flow between practitioners along the supply chain and vertical information flow within stakeholder organisations, using two different research design approaches would be appropriate. For horizontal flow, ethnographical observation, case studies and discourse analysis would be fitting, as too would be secondary resources. The ideal methods of collecting data from strategic managers and planners in the vertical plane would include semi-structured interviews and rich pictures, where participants draw detailed representations of complex or ill-defined problems.

As this research does not seek to prove a hypothesis or determine an outcome through simulation, e.g. model building to test a theory, neither mathematic modelling nor experimental research would be appropriate. Since surveys are more appropriate to qualitative research, statistical testing is also not appropriate in this case, although a carefully structured survey, together with case evidence and literature, can provide iterative triangulation.

3.5.2 Archival Research

UN agencies, INGOs and IGOs require to produce accounts of their activities during disaster relief operations and the documents produced are normally easily accessible. Individual organisations will hold them in their own archives but for humanitarian operations specifically, copies are also held by

international depositories such as ALNAP and educational institutes and foundations such as the Fritz Institute. Archival documents may offer cross-sectional information regarding the day-to-day activities of an organisation, or the information may be correlated in the form of a case study or post-operational report. In any case, they can be a valuable source of information, but care needs to be exercised when analysing qualitative data that has been written by an organisation for its own uses, as such documents can sometimes focus on aspects of activity which can help justify expenditure or organisational reputation for the consumption of donors and potential donors. Textual documents such as communications between individuals within a working group, diaries, agendas and minutes of meetings and operational plans tend to be more accurate in terms of real issues.

3.5.3 Ethnography

Ethnography is described by Liamputtong (2010) as 'the art and science of describing a group or culture' (p.148) where the group and culture are examined together. In the case of this research, the group would be humanitarian supply chain practitioners or stakeholder organisation managers, and the culture would be the synthesis of the processes, procedures and practices of the group in dealing with challenges and issues in the management of the supply chain. Bannister et al. (1994) suggest that ethnography can combine a variety of techniques, making it possible to check construct validity by examining data relating to the same construct from participant observation. This approach would therefore be apt, given the aim and objectives of this research.

Harrison (2018) draws a distinction between the anthropological ethnography of Malinowski and the qualitative sociology of the Chicago School (p.5). Ethnography in this sense is that of the Chicago School. Punch (2014) contends that the overarching characteristic of the ethnographic approach is its commitment to cultural interpretation. Specifically, it is noted that 'the point of ethnography is to study and understand the cultural and symbolic aspects of behaviour and the context of that behaviour, whatever specific focus of the research' (p.128). This would require the researcher to review and catechise

that which is observed through extensive field note taking and conducting interviews. Harrison (2018) observes that 'the goal of participant-observation is that the researcher becomes familiar enough within the research setting that "everyday life" proceeds as if they were not there' (p.22). However, to attain this, it is suggested that the three primary factors are the duration of time in research environment, the physical and social resemblance between the researcher and members of the community in which research is taking place, and the level of participation of the researcher. This research seeks to understand behaviour in both the vertically constructed strategic management environment and the horizontal in-country practitioner environment. Ethnographic study is possible in both, as long as the organisations' gatekeepers and environmental conditions, as well as the financial resources of the project permit. However, aside from obtaining the necessary ethical approval from one's own institution, one of the greatest challenges facing ethnographic researchers is gaining the consent from stakeholder organisations. This can be resisted or withheld for a variety of reasons, and it often falls on the researcher's openness and powers of persuasion to deliver the necessary consent. For this research, an overt ethnographic approach would deliver the capability of studying cultural behaviour at first hand while offering the ability to question the actions of stakeholders as they engage in activities and decision-making. It could also inform the interview process through identifying behaviour to be examined further before the analysis stage. Silverman (2010) suggests that in the analysis stage, ethnographic data can be coded in much the same way as grounded theory (Charmaz, 2014) or critical systems heuristics (Jackson, 1985).

3.5.4 Case Study

It is generally accepted that a case study is a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence (Yin, 2014; Robson & McCartan 2016; Saunders et al. 2016) and that the case may refer to an individual person, a group, an organisation or a change process (Yin, 2014); Bell et al. 2019; Saunders et al. 2016; Silverman, 2020).

Punch (2014) answers the question, 'What is a case study?' by suggesting that 'the basic idea is that one case (or perhaps a small number of cases) will be studied in detail, using whatever methods seem appropriate. While there may be a variety of specific purposes and research questions, the general objective is to develop as full an understanding of that case as possible' (p.120). Yin (2014) points out that the case study's unique strength is its ability to deal with a wide range of evidence and he identifies six sources of case study evidence (p.106), the strengths and weaknesses of which are shown below.
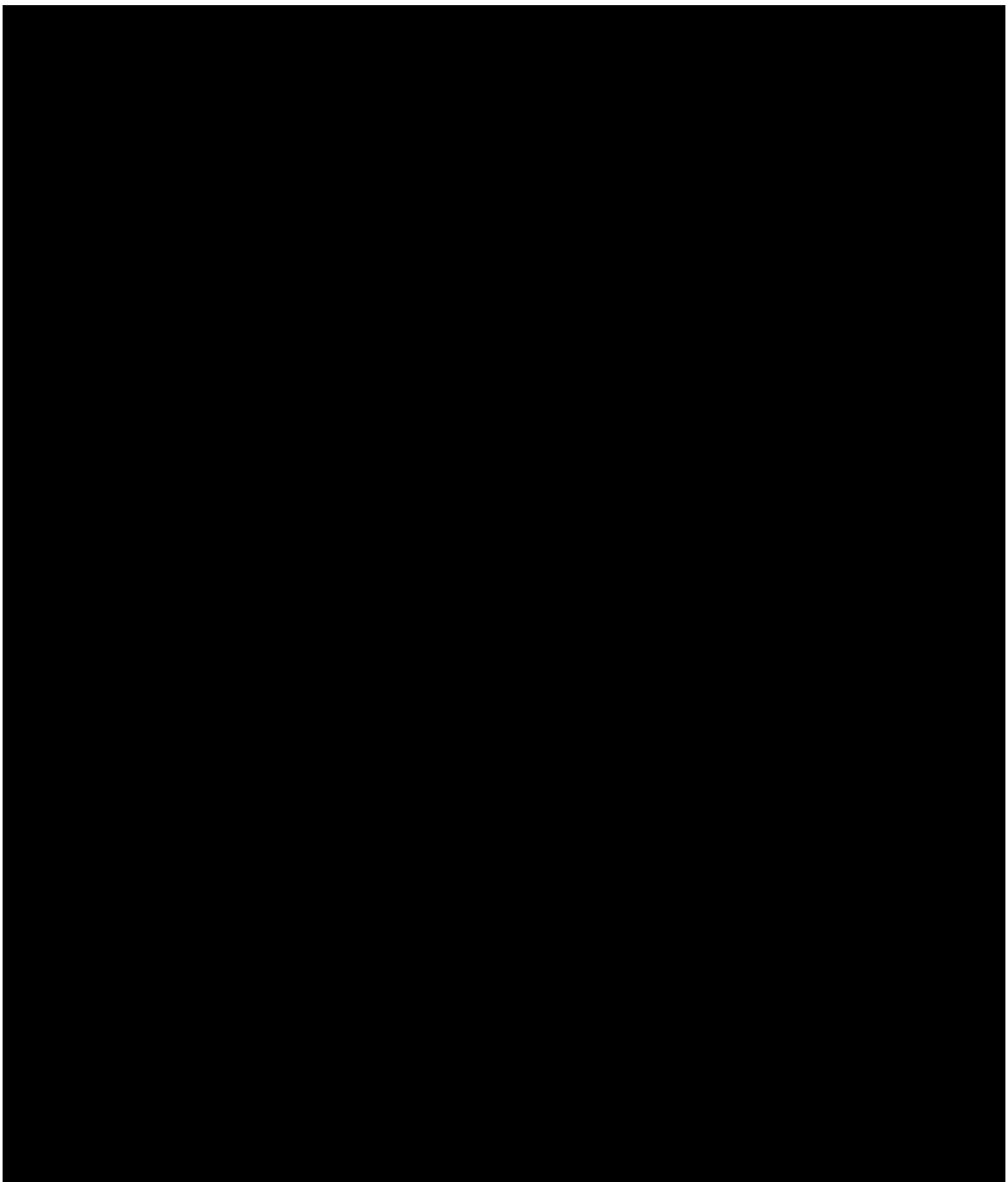
Table 3.3   Six Sources of Evidence: Strengths and Weaknesses. (Yin, 2014).

Punch (2014, p.122) identifies the four characteristics of a case study as:

- Being a bounded system;
- Being a case of something;
- The integrity of the case is maintained;
- Multiple sources of data and multiple data collection methods are likely to be used.

This research adheres to these characteristics as the humanitarian supply network is a bounded system and the case being studied is the flow of information. It maintains the integrity of the case by taking a holistic view of the supply network and as already established in para 3.4, it will involve multiple research methods. Therefore, employing a case study approach would involve two cases: the horizontal information flow along the supply chain and the vertical flow within stakeholder organisations. Given that information nodes in the horizontal chain include some of those in the vertical chain, and vice versa, using a multiple-case design to examine the flow of information throughout the humanitarian supply network would be appropriate. Since case study is a well-established research method with an accepted process for analysing the data collected (the chain of evidence), added value can be derived by using this approach and conducting what Dul & Hak (2008) describe as descriptive practice-oriented case study research.

3.5.5 Rich Pictures

Lewis (1992) points out that the concept of rich pictures has been connected to soft systems methodology since the mid-1970s and that Checkland introduced the idea as a tool by which a rich appreciation of the problem situation could be achieved by an analyst. Lewis (1992) however recognises that 'although such pictures may be used to convey an interpretation of a situation to a third party, the real benefit from such a picture is derived from the process of its construction' (p.353). The value to the creator is as a tool to

enable focused reflection, rather than a product to be interpreted by an analyst. To an extent, Cristancho (2015) concurs with this more modest use of rich pictures, describing them as 'a perspective of a "reality" with all its interacting components'. It is suggested that rich pictures 'allow individuals to tell their story, and while they may offer a space for dialoguing, their aesthetic value complements words; they may stimulate reflective conversations, provide a focus to enrich an interview, or provide data points themselves to be understood through aesthetic analysis. This complementarity may be useful when uncovering the tacit dimensions, emerging patterns and disruptive forces of a situation' (p.140).
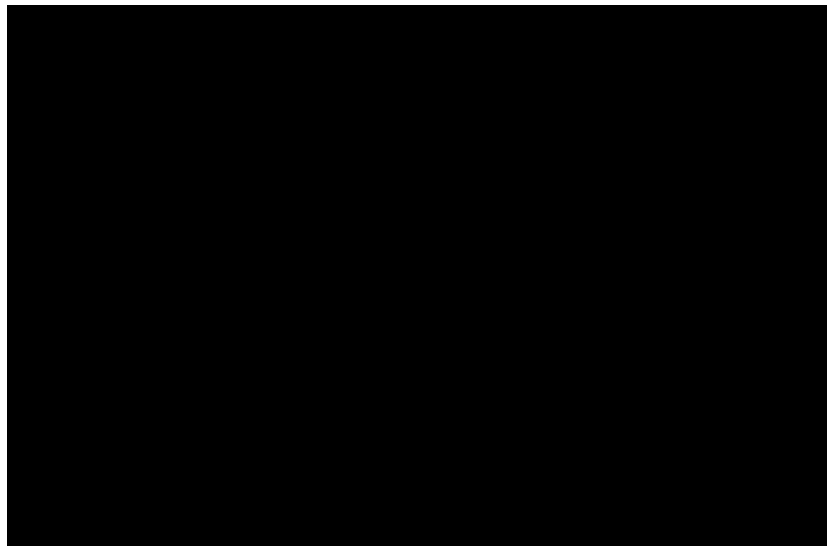
Figure 3.6   Example of a Rich Picture. (Cristancho, 2015).

Berg & Pooley (2012) consider the rich picture as 'an unstructured way of capturing information flows, communication and human activity' (p.363), and suggest words can be too powerful and open to misuse. It is argued that rich pictures can encapsulate meanings, associations and non-verbal communication such as unconscious emotion and feelings but assume that participants are confident enough to draw even simple, almost child-like pictorial representations. However, Berg & Pooley (2012) recognise the dangers of misinterpretation and that it is a tool for learning as much as for understanding or problem solving. Bell & Morse (2012) take a more positive view of the contribution rich pictures make to problem diagnosis and consider them to be situation summaries used to depict complicated situations. However, the rich picture is considered as a transient tool,

employed as a step in a process and one that encourages research participants to focus on the important elements of their contributions. A step-by-step art criticism framework is examined by which rich pictures could be analysed but it is concluded that it is probably not particularly appropriate to rich picture analysis. Rich pictures could be valuable to this research if used as a tool in a focus group or workshop scenario where participants are comfortable with the idea of using drawing as a means of expressing themselves, but if used, would probably be best employed in the early stages of empirical data collection rather than a stand-alone method of collecting researcher interpreted data.

3.5.6 Narrative Inquiry

In the Research Onion at Fig 3.3, Saunders et al. (2016) refer to narrative inquiry, defining it as a 'qualitative research strategy to collect the experiences of participants as whole accounts or narratives, or which attempts to reconstruct such experiences into narratives' (p.721). Research interviews, particularly those which are conducted in an unstructured or semi-structured manner clearly fall into the category of narrative inquiry, but this term also has a more specific meaning. A researcher may wish to gain additional depth to the information being gathered by inviting a research participant to provide a complete narrative of their experience. This specific form of narrative inquiry gives the researcher the opportunity of taking a more holistic approach to data collection and analysis, where the participant's experiences can be considered in the context of a complete story rather than fragments of information flowing from targeted questioning. Saunders et al. (2016) suggest that narrative inquiry should be used on a small sample size (1-3) participants where those selected are judged to be 'typical of a much larger culture-sharing population' (p.198). This form of inquiry would not be appropriate in the context of an organisation's headquarters where busy managers and higher level planners would be less inclined to spend valuable time engaged in an exercise of 'story-telling' with a researcher, and this would be where semi-structured interviews are valuable as they give participants the ability to break free from specific researcher direction, while getting quickly to the nub of the issues and challenges. Where a researcher

is embedded with an in-country practitioner carrying out ethnographic observation, the more intense form of narrative inquiry described above could add value. To gain both a deep and a holistic sense of an individual's experience, employing this strategy in combination with interviews would allow the researcher to create a data collection roadmap where the situation is studied at a distance and then individuals are asked to consider their experiences of specific business practices, thereby allowing specific challenges, issues and traits to be explored, with data being collected throughout.

3.5.7 Theoretical Case

A theoretical case is a construct which, although it does not physically exist, reflects what is known to be true or known to be the most likely to be true regarding a set of circumstances for which only secondary data exists. An early example of a theoretical case in the study of supply chain management is the Beer Distribution Game by Forrester (1958), as described in Fig 2.9. Forrester accepted known knowns to be robust primary data, e.g. the customer places the demand on a commercial supply chain; upstream elements of the supply chain react to that demand; to maximise profit, production must precisely meet demand; over-production does not maximise profit. Through establishing these known knowns through observed practice or secondary data sources, and by applying his intuition (what he knew to be true) regarding the effects of alterations in customer behaviour, Forrester produced a 'theoretical case' in the form of the Beer Distribution Game. The subjective nature of the Beer Game reflects the subjective nature of human behaviour and the subjective nature of the theoretical case. The theoretical case is, in effect, the most likely scenario to have resulted in the empirical evidence presented in secondary sources and ethnographic study.

3.5.8 Causal Reasoning

Chen & Chew (2020) define causal reasoning as 'an aspect of learning, reasoning, and decision-making that involves the cognitive ability to discover relationships between causal relata, learn and understand these causal relationships, and make use of this causal knowledge in prediction,

explanation, decision-making, and reasoning in terms of counterfactuals' (p.1). Similar to the reconstruction process used in narrative inquiry, causal reasoning involves identifying causality from a known effect through a process of reconstruction. However, this research seeks to utilise the concept of causal reasoning while avoiding the human tendency of counterfactual thinking.

3.5.9 Applied Abstract Reasoning

In an explanation of the 'Gioia Method' for qualitative studies of strategy and management, 'for revelation, richness and worthiness', Langley & Abdallah (2011) advocate following a meta-synthesis process where 'data structures' are built 'by progressive abstraction, starting with informant first-order codes and building second-order themes and aggregate dimensions' (p.109). Specifically, where there is an insufficient volume of empirical primary data and the researcher wishes to augment the available data with abstract primary data, such data can be derived by drawing on researcher intuition as exemplified by the theoretical case and the logic applied to a meta-synthesis process of causal reasoning. A known outcome can be traced back to the most probable cause by being examined in context by a researcher with sufficient knowledge to be able to bring researcher intuition to bear. Langley & Abdallah (2011) explain that this is achieved 'by abstracting common constructs from individual cases that can be used to describe and compare generic process components across all the cases' (p.111). The process follows the principles of grounded theory, but in reverse: from the known outcome, decision-making options are expanded and diverged to produce possible scenarios which are compared with the initial context and exposed to researcher intuition to establish which options are the most likely to have caused the known outcome. Further analysis could then be performed to ascertain the most likely reason for the known outcome, thereby deriving a set of abstract primary data. This process has been devised by the researcher as a bespoke tool for use in this research and is described in detail in Appendix F. This process, referred to in this research as Applied Abstract Reasoning, uses empirical evidence gathered from literature review, case evidence and practitioner intuition.

3.5.10 Iterative Triangulation

Lewis (1998) defines the concept of iterative triangulation as a four-phase 'theory development process which employs systematic iterations between literature review, case evidence, and intuition' (p.456). Data collection is followed by analysis and the development of conjectures. These steps permit refinement of the theory derived through the iterative process before conclusions are drawn through the evaluation of the theory. It is suggested that 'comparing and contrasting emerging constructs and theory across case settings refines conceptual definitions and strengthens internal validity, enhancing testability of resulting theory' (p.455). Cognisant that literature reviews, data, and intuition form the bases of most theory development methods, it is held that 'by aiding the development and refinement of constructs and a theoretical framework, iterative triangulation may serve as the first step in more intensive research projects, guiding the design of empirical, field-based research' (p.458); in this case, supporting the primary data collected through the interviews. Iterative triangulation also uses empirical evidence gathered from literature review, case evidence and practitioner intuition (see 3.5.9). It is noted that entering the iterative triangulation process with a well-defined focus 'improves the potential for developing quality theory' (Lewis, 1998, p.159).
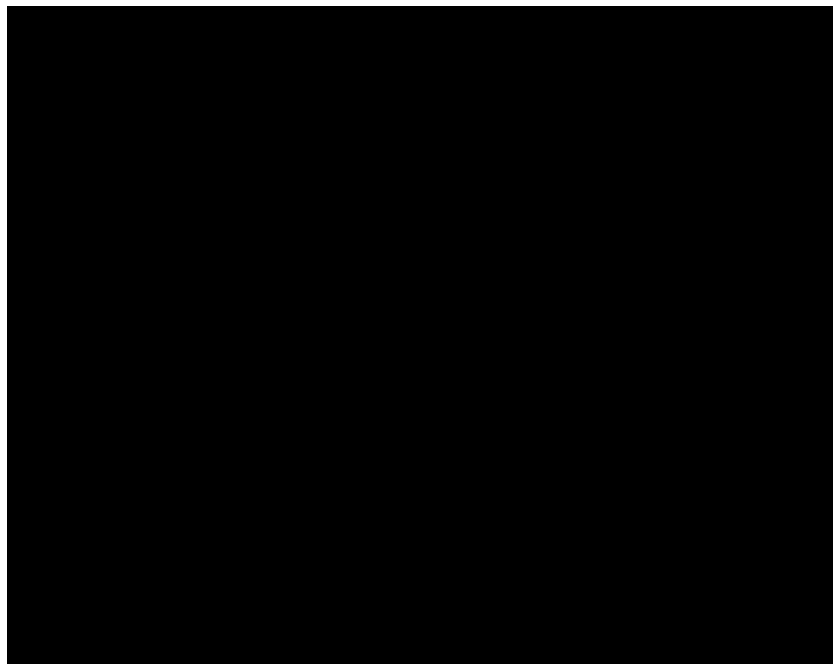
Figure 3.7   Iterative Triangulation – Methodological Process. Lewis (1998).

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As explained by Lewis (1998), intuition is a key element to this methodological process, where, by citing Mintzberg et al. (1979), Bourgeois (1979) and Weick (1989), it is argued that 'literature reviews, data and intuition form the basis of most theory development methods' (p.456). Bourgeois (1979) in turn quotes Pirsig (1974) to underline the role of intuition in human understanding and posits that Glaser & Strauss (1967) consider that 'intuition and data-based theorizing should go hand in hand' (p.445). Glaser & Strauss (1967) dedicate Chapter 11 to justifying the use of intuition in theory building, specifically in the process of Grounded Theory. Mintzberg (1979) refers to intuition as being a form of 'phenomena that cannot be measured' and that there is a role for intuition in decision-making (p.587). This view is echoed by Weick (1989) who describes intuition as consisting of 'conceptualizations that might not fit the categories delineated or forced by the imposed rigor of the general theory building. 20th Century thinking on the role of intuition in theory building has been developed by many contemporary authors (Sinclair, 2011; Nado, 2014). Resnik (2017) offers a definition of intuition as 'a mental process in which one forms a belief or judgment immediately, without any conscious awareness of an inference process at work. Intuition is usually distinguished from reasoning, which involves forming beliefs or judgments as a result of conscious inference or deliberation' (p.4).

3.5.11   Grounded Theory

Applicable to both qualitative and quantitative research, Grounded Theory was originally developed by Glaser & Strauss (1967) as a process for analysis, interpretation and explanation in social research in an interpretivist rather than positivist manner. It intrinsically involves deriving a substantive theory from a single research position to form a grounded formal theory applicable to the domain being studied. Grounded Theory was further developed by Strauss & Corbin (1998) and then again by Charmaz in 2006 and involves the theoretical sampling of subject groups with a focus on generating theory from the research, rather than beginning the research with a theoretical framework. Strauss & Corbin (1998) discuss sampling strategies useful in inductive qualitative research and Pratt (2009) warns that when employing sampling strategies, 'one's criteria for sampling may change as

the study progresses – and that is not only legitimate, but expected!' (p. 859). Corbin & Strauss (2015) suggest that it is entirely appropriate for a researcher to use existing substantive theory as a starting point to 'provide insight, direction and an initial set of concepts' (p.52) but stress the need for the researcher to maintain an open mind, particularly to the possibility of data emerging that doesn't fit the initial concept. This approach is particularly appropriate for this research where the subordinate question of whether DROs involve humanitarian supply chains, networks or systems has been thrown up by the literature. A further advantage of grounded theory is that many types of data can be used in this approach. Corbin & Strauss (2015) include memoires, historical accounts, semi-structured interviews and observation in a list of possibilities. Whilst the need for the researcher to have at least some degree of knowledge of the literature relating to the subject is reinforced, warning is made that too much knowledge can bias interpretations and 'block the discovery of new concepts'. Where appropriate, steps need to be taken to guard against this.

3.6   Time Horizon

The three accepted research time dimensions are cross-sectional, retrospective and longitudinal (Denzin & Lincoln, 2018). Robson & McCartan (2016) define cross-sectional as a design where 'the data are collected at a single point in time' and retrospective as being where 'the researcher collects data at a point in time about the situation at some earlier point in time as well as the current situation (e.g. by asking questions about earlier behaviour)' (p.143). In some quarters, the retrospective time dimension is considered to be a special type of cross-section which seeks to obtain data from more than one point in time. Ployhart & Vandenberg (2010) define longitudinal research as research emphasizing the study of change and containing a minimum of three repeated observations on at least one of the substantive constructs of interest. It is observed that 'reliability and statistical power generally increase with repeated observations, but practical constraints often prohibit including as many measurements as one would like' (p.103). Singer & Willett (2003) believe that 'time is the fundamental predictor in every study of change; it must be measured reliably and validly in a sensible metric' (p.10) and

intimate that the researcher needs to adopt whatever scale makes most sense for outcomes and the research question. However, while longitudinal research permits the study of change and thereby causality, this is not the aim of this research. Furthermore, given the nature of the organisations being studied, the practical constraints of time and funding do not permit a longitudinal study to be undertaken here.

Both a retrospective and a cross-sectional time horizon are appropriate as this research takes a snapshot of situations throughout the humanitarian supply chain and considers the flow of information at each point at a single point in time. This approach is applicable to systems since the processes, actions, behaviours and decision-making inherent to the system are unlikely to change coherently over short spans of time.

3.7   Research Design

Having determined in para 3.4 that this research will employ a multi-method qualitative methodology, the research design reflects the requirement to collect data rich enough to provide valuable meaning when analysed and to holistically capture the challenges of information flow in the humanitarian supply chain. The research design must be capable of data collection from both the vertical and horizontal information flows and therefore be applicable to both organisations' strategic managers and planners, and to their logistic practitioners in-country. This consideration of the many different perspectives of stakeholder organisations is key to obtaining a holistic view of the situation and will help to answer the subordinate question of 'supply chain, network or system?'

It is important to highlight a considerable challenge that faced this research and had a significant impact on research design. The ideal research method to collect the required data was to have been an ethnographic study with the researcher embedded in a small number of aid agencies deployed on DROs. Data collection, and the intended embedded ethnographic studies were due to commence in Spring 2020 but global travel restrictions and moratoriums on non-essential personnel being deployed by aid agencies as a result of the

COVID-19 pandemic caused a review of research design. Rather than stifling the research, this challenge allowed online access to aid agency staff that might not have been available for face-to-face semi-structured interviews, or who might not have been so comfortable with an online interview, had it not been for them becoming familiar with the practice in their everyday lives during lockdown periods. It also presented an opportunity to devise a method to augment the online interview data with abstract primary data derived from secondary source material (see para 3.5.9 and Appendix F).

3.7.1 Design Description

The research is conducted as a three-stage process designed around the Aim and Objectives with the four research processes stated in para 1.4 forming the basis of the preparation work that underpins the research. Stage 1 comprises this preparation work which ensures the design is coherent and focused on the gaps in knowledge as revealed in the literature review and the theoretical considerations involved in taking a holistic approach to the problems uncovered, as discussed in para 2.3.6.

Stage 2 involves the collection of qualitative primary data by conducting semi-structured interviews with relevant participants determined in a participation identification exercise. A question set is devised, focused on the research objectives but designed to act as a handrail for the researcher rather than a strict script, thereby allowing respondents to discuss topics which may not have come to light during the literature review. This guideline question set is sent to potential participants to allow them to orientate themselves to the essence of the research, thereby affording them an opportunity to take a level of stakeholder ownership in the research. This could increase the likelihood of the individual agreeing to participate as it would confirm to them that their contribution lay within their knowledge 'comfort zone'. Following technical trials of the Webex online interview, recording and transcribing medium, the question set, and interview form is subject to a pilot interview which, if successful, will be included in the final analysis of the interview data collected.
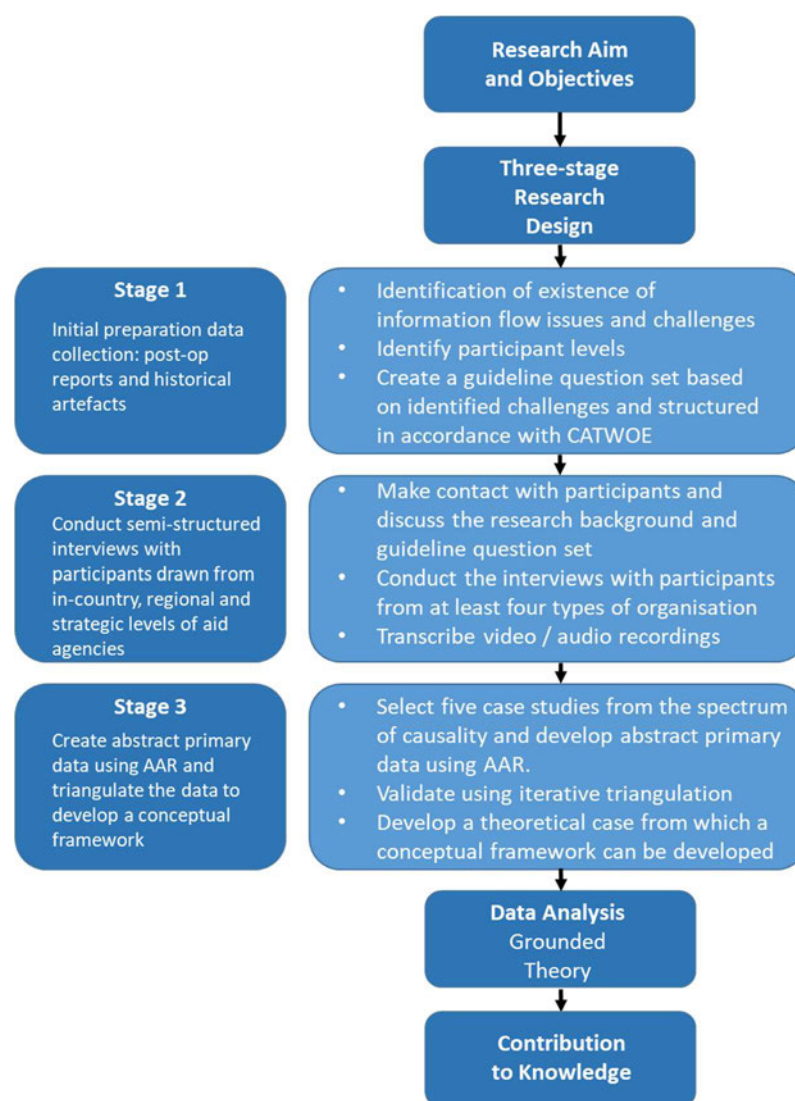
Figure 3.8   Three-stage Research Design.

Stage 3 is the derivation of abstract primary data drawn from case studies taken from across the humanitarian spectrum of causality through a meta-synthesis process introduced in para 3.5.9 and described in detail in Appendix F. This new data is then analysed with the results triangulated with the analysis from the Stage 1 data to provide academic rigour.

This three-stage research design leads to the analysis of the Stage 2 data using grounded theory and documentary narrative analysis of the Stage 3 data. The analysis results are triangulated using iterative triangulation (Lewis, 1998) and this triangulation is used to create a theoretical case from which the conceptual framework can be validated for its feasibility. Validating the conceptual framework for utility and usability (Platts et al. 1998) falls outside the scope of this research.

3.7.2 Research Stages

Each stage of the research design has actions to be taken by the researcher, actions expected by the participants, a purpose and outputs.

Stage 1			
Researcher Actions	**Participant Actions**	**Purpose**	**Outputs**
Review organisations' own post-operation reports	Not applicable	To determine what issues are recognised by the organisation	A list of issues which the organisation accepts exist
Review independent MEAL reports (ALNAP / ReliefWeb)	Not applicable	To determine what issues may not be recognised by the organisation	A list of issues which the organisation may not recognise and may not accept as existing
Select organisations to be approached	Not applicable	To examine issues in info flows and potential for C^3	A list of organisations from which potential participants can be identified
Contact selected potential participants and explain the research project	Consent to participation and schedule interview	To communicate background to the research and acquaint individuals with the guideline question set	Generate participants from each of the management levels from a UN agency, INGO and IGO organisation to participate in the research
Conduct technical rehearsals to ensure the smooth utilisation of Webex as an interview, recording and transcription medium	Technical advisor from university IT dept to coach the researcher in Webex and identify alternative media in the eventuality of Webex not being available	To ensure a high degree of professionalism is displayed by the researcher and to enable the concurrent recording and transcribing of the interviews	The production of a guide to be followed by the researcher for each interview conducted
Stage 2			
Pilot interview with a participant who understands the research process	Participant agrees to participate in a pilot interview which may be used in analysis	To ensure that the staging and the contextual focus of the interview is correct	Appropriate amendment of the question set and adjustment to the conduct of the interview, if required
Schedule interviews and ensure each participant is in possession of all	Participant agrees to participate in the interview	The collection of primary research data	Time and date for the interview to take place

the necessary documentation			
Conduct semi-structured interviews with selected cohort	Participation in semi-structured interview	Allow participants to describe their experiences and feeling in an informed manner but without manipulating the information received or creating bias	Voice recording and transcript of unbiased narrative from the participant providing rich information regarding issues and challenges, and their thoughts about them
Following initial processing of the data, conduct a validation by comparing collected data with other data from similar management levels and from the same organisation	Provides a cross-reference of issues and relationship perspectives and clarifies any concerns or issues arising from interviews involving specific management levels or organisations	Ensure the data is not misinterpreted or misrepresented by the researcher and that all necessary data has been captured	An accurately edited transcript of the interview ready for analysis
Stage 3			
Review Log Cluster minutes and independent MEAL reports (ALNAP / ReliefWeb)	Not applicable	To identify cases that demonstrate specific issues but not the decisions that led to them	Data from five specific issues across the spectrum of causality for analysis
Collate the secondary data to form case studies to be examined	Not applicable	To provide a set of distinct case studies where known issues can be traced back through the decision-making process to their most likely cause	A set of five case studies drawn from across the spectrum of causality offering different scenarios with problems rooted in common themes
Apply the AAR process to derive abstract primary data: most likely reason for each issue	Not applicable	To ascertain and analyse the most likely cause of known problems using a meta-synthesis process of reasoning	A summary of possible causes with the most likely cause identified, justified and analysed from which conclusions can be drawn
Integrate and distil the analysis of each case to create a summary of conclusions	Not applicable	To identify themes that will allow the data to be compared with themes from the interview data	A set of abstract primary data to be triangulated with the interview data

Table 3.4   Stages of the Research Design.

3.8   Data Collection and Analysis

Bell et al. (2019) remind the researcher that data collection is the key point of any research project. In qualitative studies it is suggested that participant observation and semi-structured interviews of around 45-70 minutes in length allow the researcher to keep an open mind about what (s)he needs to know about (p.11). Wilson (2014) extols the virtues of primary and secondary data and intimates that there are several different approaches one can take to qualitative analysis including documentary narrative analysis, discourse analysis and grounded theory. Saunders et al. (2016) take a rather more pragmatic view to categorising analysis: it is either deductive or inductive.

The most fundamental criterion in carrying out research is access to data. In the case of this research, access to secondary data is not an issue because the majority of DROs are subject to post operational reports and evaluations and this data is freely available through the organisations themselves as well as depositories such as the Fritz Institute and ANLAP. Over the past 10 years, where the Log Cluster has contributed much to the coordination of the logistic activities of DROs, a valuable library of meeting minutes has been built up with free access afforded through the Log Cluster website. However, where collecting data from primary sources, access may not be easily achieved and convincing individuals and organisations to actively participate in research can be challenging. INGOs and charitable aid organisations tend to be relatively transparent in their working practices, not least because to do otherwise would have a significantly detrimental effect on their ability to attract donations. As a result, they tend not to be overly protective of their business practices and less likely to feel under competition pressure to restrict access to their staff by researchers. Indeed, many encourage research as a means by which they can benefit from critique without having to engage an expense consultant. UN agencies are liable to behave in a slightly different manner. One must remember that the UN is intrinsically a political organisation and therefore its humanitarian agencies remain pseudo-political in nature. However, it should also be remembered that even middle management staff in UN agencies are highly education in comparison to other organisations: to hold the P3 grade of a supply branch desk officer or

coordinator, one must be a university graduate. To hold the P4 or P5 grade of a supply manager or senior manager, one must hold a Master's degree and anyone holding a director grade appointment of D2 or D1, a doctorate is a minimum academic qualification. As a result, UN permanent staff in even middle-management appointments understand the importance of academic research and often appreciate the contribution a research project can contribute to their area of work. Consequently, many UN agencies welcome the opportunity to participate in research, but this enthusiasm may not be shared by staff occupying lower grade appointments, including in-country practitioner posts.

International governmental organisations are different again, especially where the area of research includes information systems, access to information and dissemination of information. The old adage of 'information is everything' rings loud in many bureaucratic and hierarchic organisations, and not least amongst departments of national governments. These organisations are normally quite happy to benefit from free research output, but as a branch of government following often sensitive foreign policy, some tend not to be as accommodating to researchers in the field of humanitarian operations. Anecdotally, small nations like Ireland, through their IrishAid programme, appear to be more willing to work with researchers than the UK's FCDO or USAID.

In terms of access to potential participants, this research relies on contacts that the researcher has been able to establish in the early stages of this research, in anticipation of requiring a database of potential participants, and the willingness of organisations approached during the data collection phase to nominate staff to participate in the research. Contacts maintained on the LinkedIn platform and personal contacts from previous work that the researcher has conducted in the humanitarian environment form a pool of names to be filtered to ensure they are still active, remain appropriate participants and are not otherwise indisposed because of emergency operations currently being conducted globally.

3.8.1 The Mechanics of Interview Data Collection

The principal source of primary data is a series of semi-structured interviews conducted online. To examine the widest spectrum of challenges faced by the range of humanitarian organisations involved in DROs and susceptible to supply chain information flow issues, a representative from each of the following types of organisation would provide the level of richness of data required:

- UN Agencies – such as UNICEF, WHO and WFP;
- NGOs – such as MSF, HELP Logistics, OXFAM;
- IGOs – such as the UK's FCDO and USAID, and their contractors;
- The Global Logistic Cluster – a component of WFP, but quite distinct.

Within each of the four categories, three distinct operational levels were identified as existing within each organisation:

- Strategic Management Level – normally based at an organisation's headquarters in Geneva, Brussels or Rome, for example;
- Regional Management Level – normally located in areas of potential threat of disasters, most numerously in Africa, Asia and the Middle East but present on all continents of the world;
- In-country Level – mainly deployed to a particular country in response to a disaster occurring but sometimes located in an existing humanitarian development office where the organisation maintains an ongoing presence.

While IGOs will not maintain an ongoing or contingency presence at regional or in-country levels, they will maintain a 'desk' with an assigned 'desk officer' at regional and in-country levels. Aid delivery is generally outsourced by IGOs through private commercial companies who may operate under a banner of 'not-for-profit' but are still commercial businesses. In this research, they are referred to as IGO agencies.

The first step in preparing for the collection of the primary data is for the researcher to determine which individuals and organisations to approach to

achieve participation. The selection uses post-operational reports and other such historical artefacts to identify where issues and challenges in the humanitarian supply chain flow of information have already been documented. An examination of documentary secondary data on the ReliefWeb and ANLAP databases shows that humanitarian supply chain challenges are often common in nature and transpire fairly ubiquitously. This allows a researcher considerable choice of which organisations to approach because almost all organisations experience the same kind of issues at each of their respective levels of operational management. It should also be noted that a given individual may have recently worked for several organisations and will therefore not just have a depth of experience and knowledge to tap into but may also be in a position to appraise the variations in working practices of different organisations. However, this level of inter-organisational movement can mean that the pool of potential participants is relatively small because the individual working for the UN agency at the strategic level may also be the individual who could contribute to the role of the INGO in-country practitioner. The researcher needs to be aware of this and to ensure that data gathered on an individual's multiple roles is also captured and not precluded.

Supporting the principal primary data is abstract primary data; data which has been derived through the meta-synthesis process of Applied Abstract Reasoning. The accounts from secondary sources used to identify potential interview participants is also used to identify case studies from across the spectrum of causality (see Fig 5.4) which will be used in the process of deriving abstract primary data for analysis and triangulation. The aspirational levels of interview participation are tempered with reality: it is widely appreciated that getting large numbers of individuals to participate in interviews is not easy (Robson & McCartan, 2016; Denzin & Lincoln, 2018) but Robson & McCartan (2016) offer advice to the researcher which could help making participation appear less onerous or intimidating. How the researcher introduces themselves to a body of potential participants; what information they should be given in advance of the interview; and a description of how their contribution will form a valuable element of the

research are offered to optimise success at recruiting participants. While the research design minimum participation would be one respondent from each of the three management levels of each of the three UN, INGO and IGO organisation types (9 participants), plus two respondents from the Log Cluster. Cognisant that some participants were able to contribute to the research from more than one standpoint, the aspirational level of participation would be to conduct 20 interviews in total: sufficient to gain optimum richness of data without presenting a disproportionate volume of data for analysis, where quality and meaning could begin to be lost.

3.8.2 Data Collection Considerations

DeWalt & DeWalt (1998) highlight the importance of researchers developing trust with those agreeing to participate in their research. In principle, this should create a situation where the potential participant trusts the researcher's ethical approach to the degree that discourse activities will be truthful and representative of common occurrence. To instil trust from the outset, an online networking platform is used to carry the professional resumé and CV of the researcher. This ensures that any cold call contact is supported by a trustworthy source of background information on the researcher: confirmation of student status, expression of professional interests and history of professional activity. To further build trust, initial contact on the networking platform is followed up by an email emulating from the researcher's university email account, thereby reaffirming academic status. The initial email confirms the detail briefly discussed on the networking platform and contains details of the research project, including background, university ethics clearance and a copy of the guideline question set. At the outset of the interview, the interviewee is encouraged to give a brief description of their professional background, designed to allow the researcher to judge how best to approach the interview in terms of cultural considerations, ethical standpoint and content focus. The interviewee is encouraged to follow their own train of thought and reassured periodically that their contribution thus far is of value.

Just as trustworthiness is important in mechanising data collection, reliability is important to the data collected. Threats to reliability include error or bias on the part of either the interviewee or the researcher, or both. For the interviewee, an error is considered to have adversely altered the way in which they perform, and this could occur if the interview begins to overrun on the interviewee's allotted time, resulting in rushed or ill-conceived answers. Participant bias occurs when a false response is induced, perhaps by conducting an interview where the discourse could be overheard. By reassuring the interviewee that their contribution is valuable and that they are in control of all aspects of the interview, added confidence can deliver rich data which would otherwise not have been offered and lead to more accuracy in the recounting of events, thereby providing more reliable data. Researchers can fall foul of reliability error where their interpretation is altered through, for example, misunderstanding or a lack of preparation. Researcher bias occurs when their own subjective view influences the accurate recording and interpretation of participant responses. For that reason, recorded and automatically transcribed interviews offer researchers the opportunity to reflect on and, where necessary, question in slow time the reliability or applicability of data collected.

3.8.3 Analytical Processes and Tools

In inductive qualitative research, three common are quasi-statistical analysis, grounded theory and thematic analysis (Robson & McCartan, 2016) and all involve the transcribing of raw data, the generation of categories, themes and patterns and the interpretation of these findings. Due to the nuanced nature of the data likely to be collected, the quasi-statistical approach is deemed as inappropriate, leaving the similar processes of thematic coding and grounded theory as viable. However, Robson & McCartan (2016) suggest that thematic coding is best applied when deriving a purely descriptive or exploratory basis when working with a variety of theoretical frameworks. It is suggested that a grounded theory approach involves thematic codes that arise from interaction with the data based on the researcher's interpretation of the meanings and patterns in the transcripts, thereby more accurately capturing nuance. The

analytical process chosen for the analysis of the collected data is grounded theory.

Saunders et al. (2016) explain that in grounded theory, 'theory is allowed to emerge from the social reality and is therefore grounded in the data; it is compared with the researcher's existing theory throughout the analysis stage. The researcher requires to maintain an open mind throughout the stages of data collection and analysis, where themes and patterns emerge which are identified, coded and analysed within the context of social reality' (p.571). The researcher's interpretation of the emerging data is guided by the themes and common responses to actions and behaviours, thereby giving the data a richness of meaning uncontaminated by the researcher's pre-knowledge, bias or misinterpretation.

Several tools exist to assist in the management of data, the two most widely used are a data analysis software tool such as NVivo and a more manual approach using either an Access database application or a spreadsheet tool such as Excel. The benefits of using NVivo and other such applications is that once the input data is stored in the project folder, many query runs can be made quickly to compare and contrast the uploaded data. However, the major drawback with this kind of tool is that the data that can be derived is wholly based on the tool's capability of cross matching the true substance of queries. This research involves interview input data which can be highly nuanced and data which is presented in interview by a non-native English speaker who may well be trying to express themselves using words that do not easily translate from their mother-tongue language. Therefore, the knowledge and experience of the interviewer in fully appreciating what is meant in the interview data is key to accurate cross-referencing. In NVivo specifically, Jackson & Bazeley (2019) concede that cross-core analysis relies on the Matrix Coding Query or the Crosstab Query, both of which have difficulty in cross matching nuanced input data. In drawing attention to this system weakness, the researcher is reminded that 'there is a requirement for you to write up your observations from a Query report [because] the software does not do this for you. Interesting findings will not tumble out of your data

when you get to Queries end' (p.233). Since the researcher will play a more proactive role in interpreting the data and will need to consistently reflect on thematic aspects of coded data, the use of Excel is more appropriate in this case. Excel permits the manipulation of data by the researcher in an almost analogue manner, thereby requiring the researcher to carefully consider the feasibility, validity and applicability of statements in the raw data. As the interview transcripts testify, in many cases and for several reasons, the words used by a respondent may not necessarily reflect what the respondent actually meant. Where NVivo struggles, manual manipulation of the data prevails.

3.9   Limitations and Ethical Considerations

Notwithstanding the potential access problems indicated in 3.8 above that need to be surmounted when conducting research into a subject involving an organisation's flow of information, many practical and ethic challenges arise. On the practical side, physically getting to the geographic location of the participants can be challenging enough if international travel warnings have been issued and scheduled air travel is restricted due to the nature of the DRO. However, other challenges lie ahead in-country. On the ethical front, and aside from research and issues of interest to academic ethics committees, dealing with the behaviour of participants whose ethical viewpoint is not shared by the researcher can give rise to bias and judgements that can significantly impact on both the trustworthiness and validity of the data.

3.9.1 Limitations of the Research Approach

The variety of research approaches available for this study were significantly curtailed by the COVID-19 pandemic which saw severe travel restrictions imposed globally at the beginning of the data collection phase. As a result, all data collection had to be conducted online and several limitations were going to be inherent to the research approach taken. Securing a viable number of interview participants using a pool of contacts from a networking platform could be a challenge if those contacted simply chose to ignore requests to engage. No-shows would potentially be more prevalent for online

appointments than they would if the researcher called at the workplace of the participant for a face-to-face interview. The researcher would be relying on internet connectivity which, for deployed aid workers, may not be guaranteed. Relying wholly on interview data as the primary data source rather than augmenting interview data with ethnographic observations, for example, runs the risk of participants recounting experiences inaccurately. Ethnographic notetaking and insitu voice recordings would reduce such risk. Where secondary data is used, care needs to be taken to ensure the reliability of the document contents.

3.9.2   Practical Issues with Interview Participants

The challenges posed by the global COVID-19 pandemic also provided some opportunities. All data collection had to take place online which meant that the travel and subsistence costs inherent to gathering data internationally were non-existent. Due to the pandemic, potential participants had become used to conducting personal and professional meetings online and the researcher quickly became familiar with the technology required to stage a recorded and transcribed interview. However, the use of a networking platform contact database as the primary pool for establishing contacts could result in contact requests simply being ignored. Without colleagues working in the same offices, peer or management pressure to respond to such invitations to participate would be impossible to bring to bear where the norm is homeworking. Establishing a level of trust and ensuring that potential participants were comfortable with what was, in fact, a 'cold call' message from a networking platform contact they had never met would need be handled with tact, sensitivity and transparency. Following initial contact, all communications came from a university email account. Having agreed to be interviewed, getting the participant to the point where they honour the scheduled time and date was not taken for granted. The Russian invasion of Ukraine took several potential participants out of scope, including some who had agreed to engage but who subsequently found themselves unavailable. Technical issues in staging the interviews could arise, but these were mitigated by technical rehearsal, guide notes and back up audio recording. Where the default meeting platform turned out to be problematic for a

participant, an alternative such as Skype or a telephone interview was offered as a fallback option.

3.9.3 Ethics and Morality

Whether a research project is ethnical and employs ethical methods of data collection is a matter for the ethics committee of the respective educational institution, and this work is been subjected to committee scrutiny (see Appendix A). Since the research methodology did not entail direct contact with aid workers or beneficiaries in the field, no ethical issues arose. All data was collected in an open and transparent interview conducted on a video meeting platform, the copies of which have been retained securely.

3.10 Conclusion

The research domain is the humanitarian supply chain and specifically the human activity system that facilitates the flow of information, decision-making and flow of material supporting a disaster response operation. The humanitarian supply chain paradigm is a social construct where organisations and individuals representing organisations interact in a societal and politically social environment, and therefore ontologically, taking a Social Constructionist perspective is highly appropriate. Within the paradigm, players' behaviours and perceptions of coordination, cooperation and collaboration will be influenced both by local conditions and organisational business practices. Moreover, they will find themselves operating in an atypical situation, one which may expose them to extreme austerity, armed conflict, societal violence and fear. Therefore, human emotion, instinctive reaction and risk-taking outside the individual's normal parameters will be commonplace. The epistemology of this research is subjectivist to make sense of players' behaviours and decisions.

This research was guided by the work of Beech (2005) following a route from the subjective ontology of the study, through an interpretivist research epistemology, to an inductive methodology and resulting study techniques. The established logic of the Research Onion, as developed by Saunders et

al. (2016), was then used to bound the available techniques within a multi-method qualitative narrative.
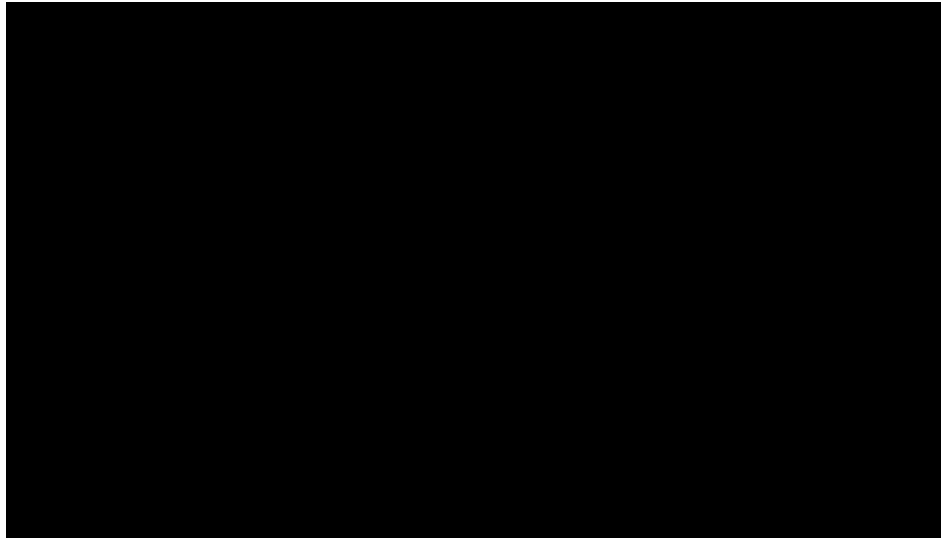
Figure 3.9   Research Strategic Routes. (Adapted from Beech, 2005).

Table 3.5 shows how the research approach, epistemology and theoretical perspective of this research have been derived and how they helped determine the optimal research methodology and timeframe.
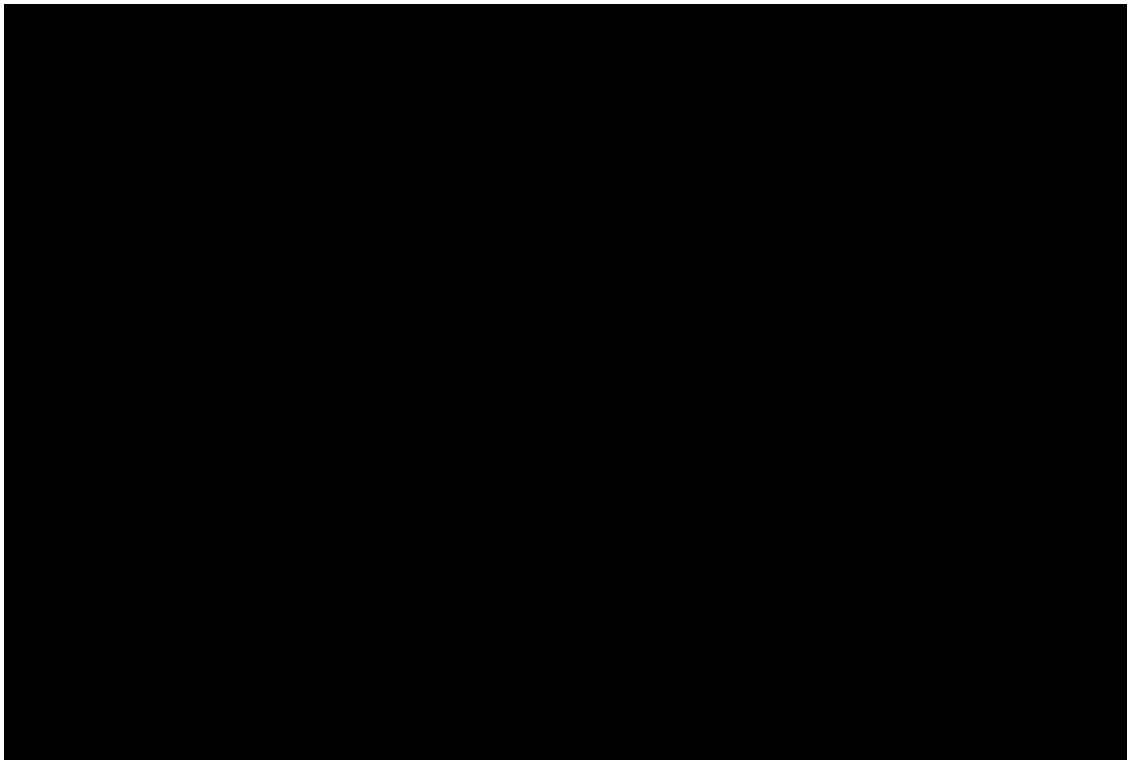
Table 3.5   The Derivation of the Academic Approach. (Adapted from Gray, 2007).

The chosen data collection techniques are:

- Narrative Inquiry – in the form of semi-structured interviews for both strategic and regional managers and in-country practitioners;
- Meta-synthesis data analysis – Applied Abstract Reasoning to create an abstract primary data set.

The data from the two methods is triangulated to determine the level of corroboration and provide academic rigour.

The technique used to analyse the primary interview data is the application of grounded theory as developed by Glaser & Strauss (1967) and refined by Charmaz (2014) and Corbin & Strauss (2015). Documentary narrative analysis forms part of the abstract data meta-synthesis process. The output of the data analysis underpins the construction of the theoretical case and therefore the conceptual framework.

CHAPTER 4

RESEARCH DESIGN: REQUIRED SPECIFICATION

*'Anyone can write a specification, but if nobody implements
it, what is it but a particularly dry form of science fiction.'*

Ian Hickson (1980-)

4.1   Research Design

In addressing the research aim through the research methodology, the
mechanics of how the data for this project is collected and analysed has
been articulated. Para 3.7 describes how the design of the research process
seeks to answer the subordinate question of whether the humanitarian
paradigm comprises a supply chain, supply network or supply system. In line
with the research aim, this process explores the nature of challenges and
issues faced by individual stakeholder organisations and how these impact
on other stakeholders sharing the same operational space. To appreciate the
many different stakeholder perspectives, a holistic view of any challenge or
issue would help to evaluate the impact one organisation can have on others.
For the purposes of this research, a challenge, issue or problem which arises
within a stakeholder organisation is given the generic term 'conflict', since
this occurrence arises in conflict with the routine working of the organisation.
A conflict can manifest itself in many forms: physical, psychological, political,
ethical or resource driven. To resolve a conflict, the organisation must
transform itself to terminate the conflict (avoid / eliminate), treat it (control /
reduce), transfer it (insure against it / contract it out) or tolerate it (accept /
retain). The decision as to which of these four options is chosen will be made
in accordance with the organisation's existing governance, ethical beliefs,
cultural background and general view of the world situation that surrounds
them, and this stance is termed as the organisation's *weltanschauung* (world
view). Developed from Checkland's CATWOE concept described in para
6.2.5, Rodriguez-Ulloa et al. (2011) define weltanschauung as 'the filter
under which the observer interprets the events happening in the real world at
a given time and space' (p.278). Taking into account an organisation's
weltanschauung (W), the transformation (T) that it chooses to enact will have

a reaction elsewhere in the operational space. Where this occurs, it is likely that the organisation will have little understanding of the impact on fellow stakeholders. For that reason, when an organisation decides to take action to address a conflict within its own organisational boundaries but is part of a greater humanitarian operation, only by appreciating their proposed transformation in view of their own weltanschauung from the perspective of other operational stakeholders will harmony and balance be maintained throughout the operational space. There is currently no formal mechanism to ensure this operational harmony and balance is maintained, but this research is designed to propose such a mechanism in the form of a conceptual framework. The framework will be conceptual in nature because while it will be derived from an empirically robust theoretical case, it is its feasibility and not its usability that falls within the scope of this research.

4.1.1 Design Specification

The purpose of the conceptual framework is to manage challenges and issues which arise in the humanitarian supply network in a holistic manner, to ensure that the knock-on effect of any action taken locally does not impact adversely on the whole network. The type of challenges and issues which can arise, and which this research collectively refers to as conflicts, include, but are not restricted to:

- Differences in individuals' perspectives or routine working practices;
- Internal friction arising from the management of the organisation;
- External pressures affecting organisational reputation;
- Differences in individuals' moral and ethical standpoints;
- Conflicting financial or economic objectives or propriety parameters;
- Constraints in resources, including manpower, training and education;
- Organisational aspirations in terms of service provision and delivery.

This research focuses on the information flows within the humanitarian supply network. It examines the vertical flow of information internally within an individual organisation from its strategic management level to the practitioner level on the ground, and the horizontal flow of information along

the various supply chains from donor to beneficiary. Information is present in many forms: organisational policy, Standard Operating Procedure (SOP), managerial processes and procedures with associated standard documents, progress and post-operational reports, standing meetings and forums, email communication and discourse between individuals. This research also examines how different types of information complement each other and how information media and the passage of information can affect the efficiency of an organisation and how it can cause relationships with other organisations to strengthen or deteriorate. Specifically, it considers the degree to which coordination, cooperation and collaboration occur in the humanitarian supply network and how improvements in this area may have a beneficial effect on those receiving emergency aid. To achieve a holistic view of these elements of the humanitarian supply network, this research takes a systems approach, and having considered Systems Dynamis (Besiou & Van Wassenhove, 2011; Harpring et al., 2021) and Complex Adaptive Systems (Hearnshaw & Wilson, 2013; Schiffling et al., 2020), VSM emerges from extant literature as being the most suitable base point from which to develop a design specification capable of understanding the whole humanitarian supply network paradigm (Vilalta-Perdomo, 2010; Preece et al., 2013; Ponte et al., 2016).

4.2   Value Creation

The passage of information along a supply chain accommodates the creation of value. Information detailing, inter alia, the size, make-up, supplier, destination and delivery mechanisms of a consignment creates and adds value to the consignment by instilling trust in the consignment order process. Information regarding disruptions in the supply chain permit timely action to reduce the effect of such disruption and information signalling the early arrival of a consignment allows those receiving it to make advanced arrangements for its receipt. All these reactions to information received gives the consignment more value; without such information the consignment would lose value.

Lusch & Vargo (2011) reflect on the idea that 'customers do not buy goods or services: they buy offerings which render services which create value'

(p.1302) and describe a service as comprising activities, deeds, processes and performances, but they also stress that these activities provide the benefits, or functions performed, for the beneficiary. This implies that 'products are "means" for reaching "end-states", or "valued states of being, such as happiness, security, and accomplishment"' and that an organisation delivering a service makes only value propositions whereby the value creation occurs 'only if the intended beneficiary determines that there is benefit and thus experiences value' (p.1303). Therefore, value is always uniquely and phenomenologically determined by the beneficiary. This is the basis of service-dominant logic. Weaver et al. (2019) explore the contribution of stakeholders engaging together in the provision of a service in a shared space such as a DRO and suggests that 'a shared space is a meaningful engagement between stakeholders who share similar values and coalesce around issues and co-creation (involving communities in the design and implementation) is at the heart of the approach' (S.5). Weaver et al. (2019) see co-creation not only has the power to create or enhance a bespoke service, but it also has the power to resolve conflicts by effectively extending the boundary of a stakeholder organisation to overlap with the boundaries of partner stakeholders within a single community. The framework model that is presented suggests that by entering into stakeholder relationships founded on an appreciation of partner boundaries and perspectives, a systemic domain can be achieved which is capable of conflict resolution.
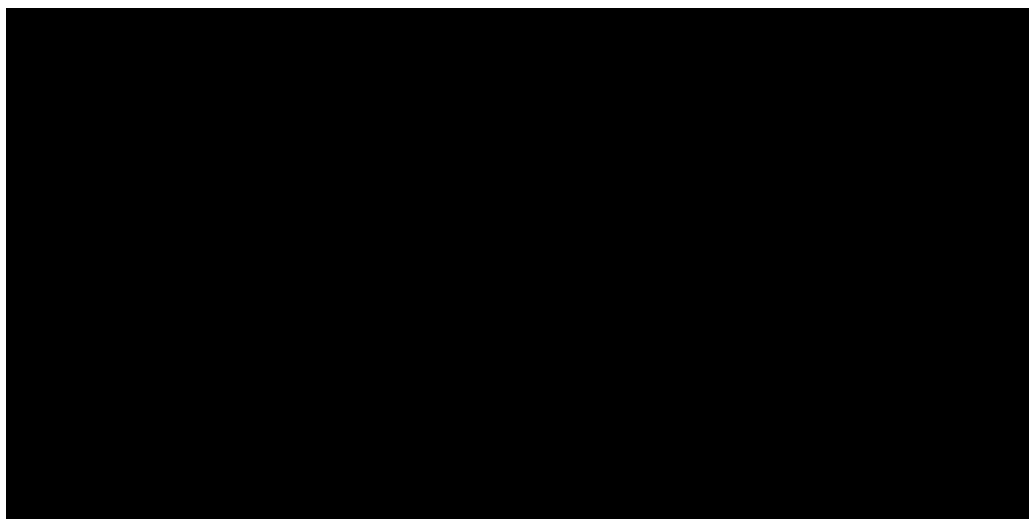
Figure 4.1   Value Creation through Transformation. (Adapted from Midgley, 2013).

Value can be created through a transformation from one state to another state to meet the demands of that new state. It therefore follows that if a single organisation meets a challenge or demand in accordance with its weltanschauung (W) through enacting a transformation (T) and other stakeholders within the secondary boundary act with the same accord, the combined effort of all stakeholders can be viewed as a single entity coming together to overcome a conflict or meet a specific demand in the provision of a service. In Fig 4.2, these transformations in world view are annotated T_W, and where a number of such transformations come together to arrive at the same transformational destination within the shared space, e.g. T_{W1}, T_{W2}, etc, the respective organisations can be considered as possessing shared values.
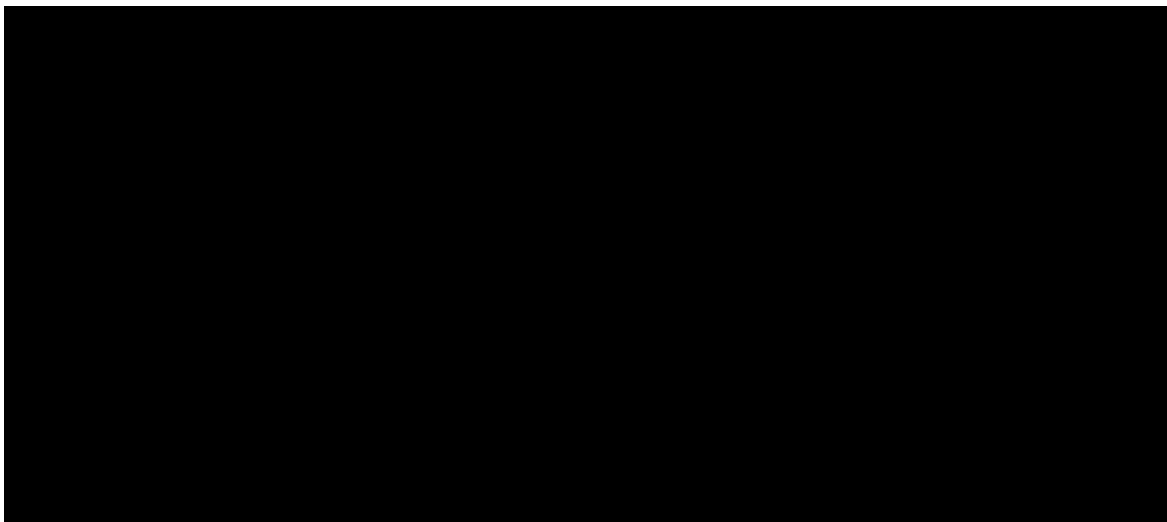
Figure 4.2   Conflict Resolution within a Single System. (Adapted from Weaver et al. 2019).

4.3   Stakeholder Relationships

Challenges and issues arising from the complexity inherent in DROs are largely resolved through a network of stakeholder engagements facilitated by either long-standing or hastily established relationships. Ergun et al. (2014) note that the first level of complexity occurs when more than one relief organisation becomes involved in a single relief operation 'because many organisations operate according to their own systems and objectives while at the same time working to contribute to the overall humanitarian cause' (p.1002). In their examination of dynamic complexity within supply chains,

Campos et al. (2019) consider 'an initiative [that] encompasses various innovation projects that alter the SC network and processes to reduce costs and improve performance' is termed 'transformation' (p.615) and where organisations engage in transformations in partnership with other stakeholders, they can resolve issues that arise and adjust the way of doing business to avoid issues arising. A transformation is an activity process based on a shared world view. Transformation is a process whereby stakeholders move together in one direction; this contrasts with co-creation where stakeholders move from different points to a common locus, thereby delivering a service. The three levels of stakeholder engagement which contribute to a transformation and create synergy in the pursuit of collective goals are coordination, cooperation and collaboration (C^3). The degree to which a stakeholder is prepared to commit to C^3 is likely to be subject to environmental factors such as geographical spread and availability of resources, ownership and control issues such as governance, moral standards, financial resources, legal constraints (including existing charters, protocols, etc) and organisational reputation. MSF's refusal to be seen to be working with a military force or IGO is an example of such limitations to stakeholder engagement, but while this may hinder collaborative working, it need not obstruct coordination of effort. Therefore, it is important to define what the terms coordination, cooperation and collaboration mean in a humanitarian context.

4.3.1 Conflict in Stakeholder Relationships

In practice, and certainly until recently, the majority of HROs that are engaged in supply activities as part of a disaster relief operation see themselves as working either alone or as a partner in an ad hoc, hasty partnership relationship (Bennett, 2016; Dubey & Gunasekaran, 2016; Shariq & Soratana, 2019a and 2019b; Sapat et al. 2019) where the stakeholders' relief efforts can still be seen in relative isolation when considered holistically in the whole operational context. Some HROs will refer to coordination to some degree but often in the context of the strands of their own activities. The term cooperation is relatively rare while collaboration as a concept is gaining in traction, particularly amongst INGOs such as UNICEF, WHO and

WFP (Sapat et al. 2019). In paragraph 2.5, coordination, cooperation and collaboration are discussed in detail, and in Fig, 4.3 it can be seen how a transformation / weltanschauung action (Tw) can create impact. In coordination, action Tw_1 occurs in isolation within its own organisational boundary but information regarding the action and the reaction to it is shared within the boundary of the second organisation. Tw_1 is coordinated with the reactions Tw_2 and Tw_x, but there is no value created. In cooperation, a minor overlap exists between the boundaries of the two stakeholders and as a result, the transformation resulting from Tw_1 is somewhat aligned with those of the second organisation through a shared understanding of W in the shared space. Collaborative working requires there to be a significantly greater overlap where the shared W results in the near alignment of Tw_1 as an initial action and Tw_2 and Tw_x as the reaction. The second organisation will know the intentions of the first, will have planned to mitigate any impact and will have assisted to reduce the impact as part of a pan-organisation risk management exercise. However, this does not address the complexity of the humanitarian supply network where many challenges and issues arise, where actions are met by the reactions of multiple stakeholders.
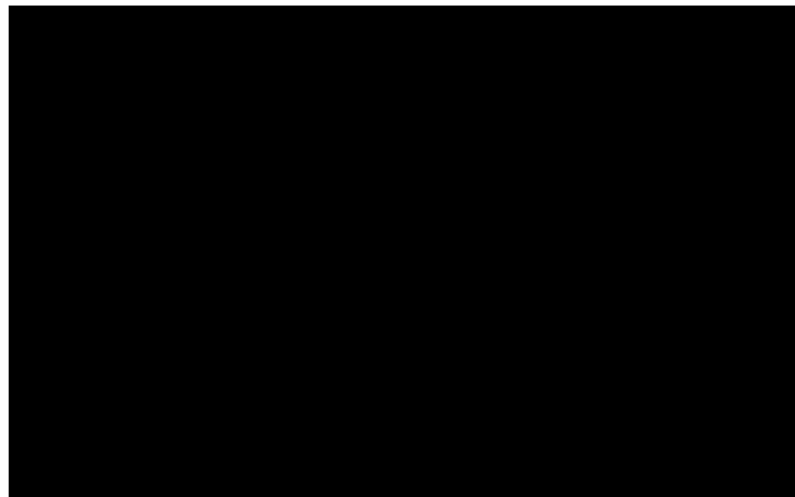
Figure 4.3   Conflict in Stakeholder Relationships. (Weaver et al., 2019).

Rodríguez-Espíndola et al. (2018c) observe that in the context of goal alignment, the goals of the top layers of a centralised management system are expected to guide the entire system but that in a collaborative

environment such as a DRO, the goals and organisational perspectives of different stakeholders can impact on logistic performance. Furthermore, the essential nature of information management is accepted and that 'a collaborative and interactive system needs to be developed to support the decision-making structure at the top' (p.1979). In the context of a humanitarian supply network, individual supply chains would be seen as part of a system that has a form of top layer that can facilitate decision-making while remaining mutual and transparent to all stakeholders.

Salem et al. (2019) consider the role of leadership in the DRO context, and in detail in the humanitarian supply chain context. The Hypothesised Moderated Mediation Model is presented as a way of building in a leadership component to provide cohesion between operational subgroups to permit cooperation between subgroups, thereby optimising operational performance.
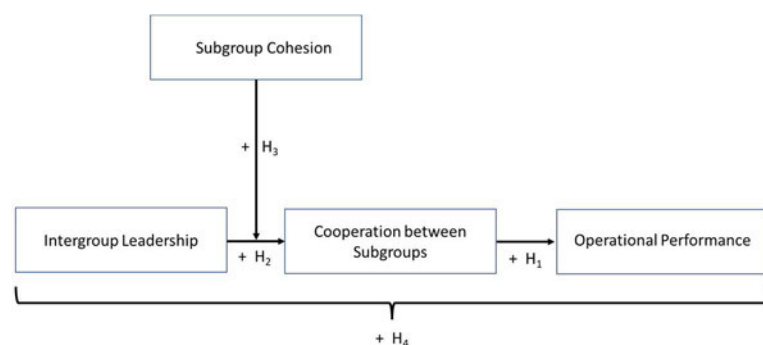
Hypothesis 1 (H$_1$)	Hypothesis 2 (H$_2$)	Hypothesis 3 (H$_3$)	Hypothesis 4 (H$_4$)
Cooperation between local and expatriate subgroups in humanitarian field offices is positively related to higher operational performance of humanitarian field offices.	*Intergroup leadership by humanitarian field offices leaders fosters cooperation between the local and expatriate worker subgroups in the field office, which ultimately informs operational performance of the humanitarian field office.*	*The more cohesive the local and expatriate humanitarian subgroups in a field office are, the stronger the positive effect of field office intergroup leadership on cooperation between the local and expatriate subgroups in the field office.*	*The more cohesive the local and expatriate humanitarian subgroups in a field office are, the stronger the positive effect of field office intergroup leadership on cooperation between the local and expatriate subgroups in the field office, which ultimately informs operational performance of the humanitarian field office.*

Figure 4.4   Hypothesised Moderated Mediation Model. (Salem et al. 2019).

Salem et al. (2019) extrapolate this model from a single organisation's field office scenario to a DRO supply chain by suggesting that if a leadership component can benefit an organisation, it should be capable of benefiting a collective of cooperation which shares common goals and outputs. However, it is recognised that more research on how this could be achieved needs to take place. If the logic of Salem et al. (2019) is to be followed, the implication is that either an overarching physical leadership component would be brought to bear, or a more theoretical-based leadership concept would be put into place. Given the interorganisational friction that exists in the humanitarian paradigm, it is unlikely that the former would be possible; but a leadership concept could be achieved through the establishment of an autopoietic leadership component.

In the context of this research, the definition of autopoiesis follows the original notion where Maturana & Varela (1980) define the 'autopoietic machine' and in later publications refer to an autopoietic system as being one that 'is organised as a network of processes of production of components that produce themselves in a recursive process of self-production'. Maturana & Varela (1987) further posit that 'a composite unity whose organisation can be described as a closed network of productions of components that through their interactions constitute the network of productions that produce them and specify its extension by constituting it boundaries in their domain of existence, is an autopoietic system' (p.349). Radosavljevic (2008) suggests that 'the organisation of the system is constituted by the relations that define the system as a unity (p.215) and that there is widespread acceptance of the importance of 'communicative spaces' and 'communicative domains'. This follows the argument by Luhmann (1986) that 'social systems, unlike living systems, use communication as their particular mode of autopoiesis' and establishes the importance of the flow of information in autopoietic systems. Mingers (2002) describes an autopoietic system as one that can transform itself into itself (p.280). This thesis contends that it is the humanitarian supply network paradigm that must be autopoietic to allow the supply network and its constituent supply chains to function as a viable system, in keeping with the three elements laid out by Mingers (2002, p.282):

- Autopoiesis in a social system is concerned with the process of producing those components which themselves constitute the system;
- The components of the system create a boundary that defines the paradigm;
- The paradigm specifies nothing beyond the process of self-production.

Florea et al. (2013) explore the organisational sustainability and the values that an organisation holds dear as part of its weltanschauung. Observations made include how environmental degradation, social and economic inequality, and changes in public opinions have created a dilemma for large organisations (p.393) and a role for the World Commission on Environment and Development (now the UN's Blundtland Commission) is suggested. Following the same logic in the humanitarian logistic paradigm, if an accepted world view of organisational governance and ethics were to be adopted, then the basis of a single system framework could eventually be established in practice. In the meantime, this research will examine how such a single humanitarian world view could be achieved in theory, one which would permit individual organisations to operate alone or in partnership in a harmonious, yet highly dynamic operational environment where no conflict has arisen, but one which could cope with conflicts as they arise. This entity would comprise of a single system.

4.3.2 Stakeholder Boundaries

Para 4.3.1 above considers what the humanitarian supply network paradigm is, but Ulrich & Reynolds (2010) encourage the researcher to ask what it ought to be. As a philosophical framework to support reflective practice, Critical Systems Heuristics (CSH) allows sense to be made of a situation by 'appreciating the bigger picture' (p.245) while considering the values and motivations built into our views of situations; the power structures influencing the issues that arise in the situation; the knowledge basis underpinning what is considered relevant information about the situation; and the moral basis upon which stakeholders bear the consequences of the knock-on effects of actions within the situation.

Perspective	Empirical selectivity ('Is' mode)	Empirical selectivity ('ought to be' mode)
'Facts'	Actual Mapping: What 'facts' are considered relevant and which ones are left out?	Ideal Mapping: What 'facts' ought to be considered relevant and which ones should be left out?
'Values'	Actual Mapping: What 'values' are considered relevant and which ones are left out?	Ideal Mapping: What 'values' ought to be considered relevant and which ones should be left out?

Figure 4.5   The Four Perspectives for Examining Selectivity. (Ulrich, 2005).

By reflecting on the four CSH tenets of motivation, power, knowledge and legitimacy during data analysis, and keeping in mind what interviewees describe as being the situation viz á viz what the situation ought to be, the coding and themes selected in the analysis will be formed from more than just one perspective, as shown in Fig 4.5.

Ulrich & Reynolds (2010) describe how 'CSH uses a set of twelve questions to make explicit the everyday judgements on which we rely (consciously or not) to understand situations and to design systems for improving them' (p.244). These boundary questions are described below, and their use is appropriate both to interpret the analysed data regarding the situation that exists in the humanitarian supply network and to validation the feasibility of the conceptual framework by interpreting what ought to be the situation.

SOURCES OF MOTIVATION

(1) Who is (ought to be) the client or beneficiary? That is, whose interests are (should be) served?
(2) What is (ought to be) the purpose? That is, what are (should be) the consequences?
(3) What is (ought to be) the measure of improvement or measure of success? That is, how can (should) we determine that the consequences, taken together, constitute an improvement?

SOURCES OF POWER

(4) Who is (ought to be) the decision-maker? That is, who is (should be) in a position to change the measure of improvement?
(5) What resources and other conditions of success are (ought to be) controlled by the decision-maker? That is, what conditions of success can (should) those involved control?

(6) What conditions of success are (ought to be) part of the decision environment? That is, what conditions can (should) the decision-maker not control (e.g. from the viewpoint of those not involved)?

SOURCES OF KNOWLEDGE

(7) Who is (ought to be) considered a professional or further expert? That is, who is (should be) involved as competent provider of experience and expertise?
(8) What kind expertise is (ought to be) consulted? That is, what counts (should count) as relevant knowledge?
(9) What or who is (ought to be) assumed to be the guarantor of success? That is, where do (should) those involved seek some guarantee that improvement will be achieved – for example, consensus among experts, the involvement of stakeholders, the experience and intuition of those involved, political support?

SOURCES OF LEGITIMATION

(10) Who is (ought to be) witness to the interests of those affected but not involved? That is, who is (should be) treated as a legitimate stakeholder, and who argues (should argue) the case of those stakeholders who cannot speak for themselves, including future generations and non-human nature?
(11) What secures (ought to secure) the emancipation of those affected from the premises and promises of those involved? That is, where does (should) legitimacy lie?
(12) What world view is (ought to be) determining? That is, what different visions of 'improvement' are (should be) considered, and how are they (should they be) reconciled?

Table 4.1   Checklist of Boundary Questions. (Ulrich, 2005).

Despite the subject of his research being commercial businesses, in considering a firm's autopoietic character, Radosavljevic (2008) recognises that the system 'is separated from the environment with an identifiable boundary and boundary components constitute it (the boundary) through preferential neighbourhood relations and interactions'. Importance is attached to stakeholder engagement, and in giving credence to Luhmann's view that society defines its own boundaries 'through communications that do/do not belong to them' (p.217), the defining nature of the flow of information is highlighted. The implication is that without the passage, sharing and management of information, a system cannot viably exist.

4.4   Single System

Dealing with the complexity of multiple humanitarian supply chains operating within an uncontrolled network in support of a multi-stakeholder disaster relief

operation presents not just a wicked problem, but a super-wicked problem. As revealed in the existing literature, while some of the rules and conventions of commercial SCM pertain in the humanitarian context such as supply and demand, commodity and information flows and lean / agility, others do not, e.g. profitability, consumer (rather than customer) demand satisfaction and ethical considerations (Jermittipartsert & Kampoomprasert, 2019). The current situation allows conflicts to arise within an organisation's primary boundary where they are addressed in isolation from other stakeholders, and this in turn creates distinct complexities.
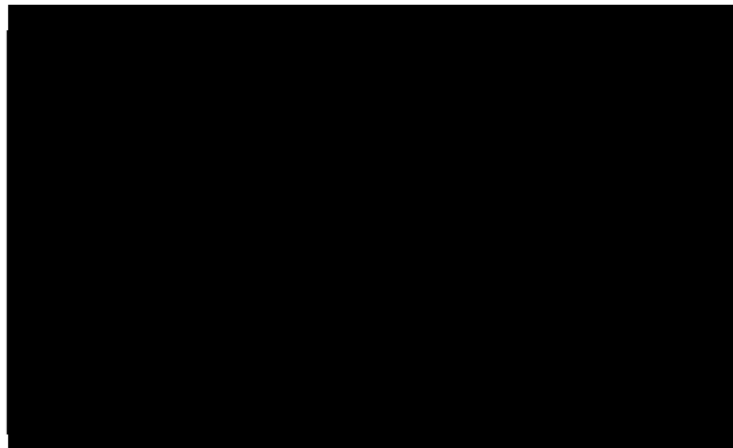
Figure 4.6   System Conflict. (Adapted from Midgley, 2013).

In a humanitarian supply chain context, these distinct complexities are visible to the Global Logistic Cluster and information regarding these conflicts is coordinated to allow other stakeholders to mitigate or manage their effects. If it were possible to establish an environment where all stakeholders operate collectively in a routinely harmonious 'steady state', this environment would be a single system. However, to function effectively and remain viable, it would need to be capable of reducing the risk of conflicts arising and resolving them when they inevitably arise.

4.5   Conclusion

This research is designed to establish how a holistic approach can be taken to resolve conflicts in the form of challenges and issues in humanitarian supply networks. The field of humanitarian SCM has developed considerably over the last two decades, with the 2004 Boxing Day Tsunami being the

accepted datum point of contemporary humanitarian SCM thinking. However, since then, this multi-stakeholder supply network has remained uncontrolled in the conventional sense of supply chain ownership and governance, and the ensuing complexity has remained unmarshalled. Stakeholders are unlikely to buy into the idea of one organisation exercising any form of authority over others and therefore any solution needs to achieve the level of supply chain control and governance without relying on a conventional leadership component in the form of a single entity. With information being the lifeblood of both a supply chain and a system, and an apparent lack of coherence in the passage of information, there is a case for conducting research to discover how, by treating the flow of information in humanitarian supply networks as a system, a holistic approach can be taken to resolve the challenges faced by humanitarian organisations. By doing so, value would be created in the humanitarian supply network, but this would require the boundaries of the paradigm to be established, an examination of the relationships between stakeholders and the perspectives of the paradigm that they hold, and the treatment of the paradigm as a system. This can be achieved by using CSH not only as a guide during data analysis but as a tool to validate the resulting conceptual framework that describes the network in its 'is' state and its 'ought to be' state.

CHAPTER 5

RESEARCH DESIGN: EMPIRICAL ANALYSIS

'If we knew what it was we were doing, it would not be called research, would it?'

Albert Einstein (1879-1955)

5.1   Structuring the Framework of Enquiry

The method of primary data collection for this research, as described in Fig 3.8, is a series of online interviews with humanitarian supply chain practitioners at the strategic, regional and in-country levels of their organisations, augmented by a meta-synthesis process of studying five cases where a problematic situation is recorded to have arisen but where the decision-making process that caused the situation is not known. By using this process, abstract primary data is established.

The primary data collection element of conducting semi-structured interviews follows conventional research protocol; the semi-structured interview as described by Robson & McCartan (2016) affords the interviewer flexibility and freedom in sequencing questions depending on the information they are able to draw out during the conduct of the interview. In this case, the semi-structured interview uses an interview schedule comprising a scripted introduction, a list of topic headings and associated questions which can be tailored by the interviewer during the interview process to suit the fluidity of the interviewee's answers and to guide the interviewee away from straying from the main focus. The interview schedule is created from the synergy of the aims, objectives and the processes used to support the research, as described in para 1.4. This schedule informs the creating of the question set, which itself is a handrail to guide both the interviewer and the participant in what Rubin & Rubin (2011) describe as a 'responsive interview as an extended conversation' (p.95) and argue that by doing so, the researcher can demonstrate a balanced interview technique by asking 'easy' questions that articulate empathy which can pave the way to asking 'tougher' questions later. Although this work was produced before the ubiquitous use of online

meetings, the advice on how to conduct an interview digitally remains pertinent:

- Encourage the interviewee to follow their own narrative by asking them to initially talk a little about themselves;
- Make written notes during recorded interviews to remember where nuance has been detected;
- Keep on topic when obtaining depth and clarity;
- Clarify meaning when coming across an interesting point;
- Tone down emotion.

The data from the online interviews and applied abstract reasoning process is synthesised to create a 'theoretical case' from which a conceptual model can be developed. This is not a typical research approach, but neither is it new. Prior to the existence of primary data relating specifically to the effects of over- and under-ordering in a retail and wholesale supply chain, Forrester (1958) created a theoretical case which he incorporated into the Beer Distribution Game (Fig 2.9). This was based on associated secondary data which he knew to be factual in the context of the impact of retail demand on supply chains. Following the same logic and principles, this research uses a hypothetical humanitarian operation scenario which focuses on the flow of information along and between humanitarian supply chains. It demonstrates that the humanitarian supply chain domain is complex, interconnected, and takes the form of a network of distinct organisational supply chains coordinated through the global cluster system. This theoretic case is described in para 5.6 below.

5.1.1 Addressing the Research Aim and Objectives

To ensure academic rigour, it is essential that the research aim forms the start point of the data collection and that the data collection process is guided and informed by the research objectives. Given that the aim of this research is to explore whether treating multiple, complex supply chains in a DRO as a network system would better facilitate stakeholder engagement and the

resolution of supply challenges and issues, it is necessary to recognise the following aspects of the research:

- Data regarding a single supply chain must be considered in the context of a complex environment where multiple supply chains operate and where stakeholder engagement is a necessary component of delivering humanitarian aid;
- The data needs to reveal the extent to which challenges and issues arise, as well as the difficulties experienced by stakeholder organisations in the bid to resolve them;
- Stakeholder engagement relies on the flow of information both vertically within a humanitarian supply chain organisation and horizontally between humanitarian relief stakeholders;
- The world view of each stakeholder will impact on the degree to which they are prepared to participate in coordination, cooperation and collaboration.

The research aim has been used to bound the scope of the research data collection questions, which in turn should permit analysis against the following research objectives:

- Identify the challenges and issues encountered in the delivery of supplies during emergency disaster relief operations;
- Ascertain how holistic thinking could help to capture the impact of such challenges and issues on other stakeholders within the complexity of the humanitarian supply network environment;
- Determine what concepts, methods and practices could be adopted to overcome these complexities;
- Produce a process framework which addresses the challenges specific to humanitarian supply networks.

The first three objectives will contribute to the achievement of the fourth by allowing the data to demonstrate to what degree an environment comprising world views, conflicts and a symbolic expression in ritual (see Fig 6.4) can be transformed into one of stakeholders, distinct complexities and a domain

coordination function, as described in para 4.4, to be used to give meaning to the humanitarian supply network paradigm by viewing it through a systems lens.

5.1.2 The Findings of the Literature Review

As summarised in para 2.9, the literature review reveals that amongst HROs, there is a vertical and a horizontal flow of humanitarian logistics information, and that the way in which these channels are used to manage supply chains varies between organisations. Humanitarian supply chain modelling tends to follow commercial thinking (Overstreet et al. 2011) and therefore little holistic perspective is available. This is compounded by the fact that in the education and training of humanitarian supply chain practitioners, there has been a tendency to use commercial supply chain models which inherently do not take a holistic view of a supply network. A consensus exists among humanitarian actors that where stakeholders cooperate or collaborate, issues and challenges are more easily resolved, but where organisations operate in isolation, the knock-on effect of isolated actions can cause issues elsewhere in the network (Schulz & Blecken, 2010). By examining humanitarian supply chains in terms of agility, adaptability and alignment, a more thorough understanding can be gained of how they work as systems (Dubey et al. 2020a; Sabri, 2021). Therefore, the literature review has been used to focus the research data collection questions.

5.1.3 Strategic Approach to Data Collection

To ensure that the strategic approach taken in this research is relevant to the strategic deliverables without introducing bias or steering participants to answer questions in a preordained manner, Checkland's CATWOE has been used as a handrail to structure the interview guideline question set. This ensures that the data collected can be mapped across transparently to the concept of the system, using a systems-based critique.

Table 5.1   CATWOE. (Adapted from Checkland, 1991).

5.2. Research Participation

Participants for the interview phase of the research were drawn from an array of organisations ranging from relatively small aid organisations such as Polska Akcja Humanitarna (Polish Humanitarian Aid), globally renowned and respected humanitarian actors such as OXFAM and CRS, and UN agencies and international government aid departments such as UKAid which is part of the UK government's FCDO. For the interviews, these participant's aid organisations were divided into four categories from which individuals were selected:

- UN Agencies – such as UNICEF and WFP;
- INGOs – such as CRS, HELP Logistics, OXFAM;
- IGOs – such as the UK's FCDO and their contractors;
- The Global Logistic Cluster – a non-political component of WFP.

Within the UN, INGO and IGO categories, individuals working at the strategic, regional and in-country levels of operation were identified. IGOs do not tend to maintain an ongoing in-country presence, but rather contract commercial 3PL / 4PL and not-for-profit companies to conduct in-country business on their behalf and in accordance with tightly controlled budget-focused contracts. An example of such an IGO agency is the UK-based company Crown Agents.

5.2.1 Question Set Design

Guided by the research aims and objectives and the focus of the interviews which form the interview schedule, a series of questions was devised which could be asked of any participant, irrespective of which organisation they

represented, which employment grade they held in that organisation or whether they worked at the organisation's HQ, regional office or in-country. By taking this holistic approach to the question set, three things could be achieved:

- A single set of questions asked of a single interviewee who happens to have experience at different levels of their organisation, or experience of working with different organisations allows these other experiences to be considered and analysed;
- By asking the same question to interviewees of different levels of a single organisation, it is more likely that internal as well as external issues, situations and challenges will be uncovered because each interviewee will answer the question from the perspective they hold within the organisation;
- The complexity involved in asking different sets of questions to interviewees who worked for different categories of organisation and at different levels was simplified, thereby significantly simplifying the initial data collection to be presented for coding and comparison at the first phase of analysis.

As summarised in para 5.1.3 above, the question set was designed to guide participants to areas of interest which were revealed by the literature review. Specifically, the questions focus attention on supply network complexity, stakeholder relationships, the knock-on effects of isolated action, vertical and horizontal information flows, supply chain control and ownership and improving supply network performance to the benefit of those in need. However, cognisant of the need to consider issues and problems which arise in humanitarian supply networks as requiring a holistic approach to resolve them and given the research parameters laid out in para 5.1.2, by taking systems thinking into account when framing the questions, it has been possible to make an early assessment as to whether the data collected was supportive of taking a systems approach during analysis. As can be seen at Appendix B, the questions were therefore aligned to the six crucial characteristics used in the determination of an SSM root definition: CATWOE. The structure of the question set also provides guidance for the

analysis phase of the research by facilitating boundary critique to be conducted.

5.2.2 Sampling and Participant Selection

'Purposeful sampling' (Corley & Gioia, 2004) was conducted where potential participants drawn from all four of the organisational categories and with experience working at one or more of the three operational levels were identified through social media networking sites, previous contact with aid organisations and suggestions from professional associates of the researcher. These potential participants were collated and sorted into target groups before being contacted individually. The background to this research was explained to each of them and their participation was invited. Despite the potential participants already being a contact of the researcher to some degree, only 50% responded at all to the initial contact. Of those who responded, four immediately stated their unavailability. Of those who agreed to be interviewed, five were subsequently unavailable due to work commitments and one failed to connect to a series of three scheduled interview appointments and then became uncontactable. The figures below reflect the challenge faced.

Number contacted	Number responded	Agreed to be Interviewed	Number Interviewed
51	**25**	**21**	**15**

Table 5.2   Interview Participant Numbers.

Given that the potential participants were already LinkedIn contacts, the initial response rate was lower than expected. However, it should be noted that the majority of participants have worked for multiple organisations and at various different levels (strategic / in-country), and in interviews, they were able to draw on multiple experienced in the last 2 – 3 years, thereby creating an 'input-multiplier' effect where significantly more than just 15 scenarios contributed to the primary data. Although sufficient data was harvested and thereby a data saturation point was achieved, the number of interviewees reiterated the benefit of corroborating the analysed data using data

triangulation. The decision to give participants the guideline question set beforehand was appreciated by those who were interviewed. It is possible that this advanced sight of the questions may have contributed to some initial responders to not proceed.

Before commencing the process of interviewing participants, each prospective interviewee was sent an information sheet laying out the background, aims and objectives of the research project, together with a statement that the research had received the necessary ethical clearance to conduct data collection, issued by the Business School Research Integrity Committee. The process of gaining ethical clearance also served as a valuable tool to ensure all the potential pitfalls of conducting research had been considered and as a useful exercise in incorporating academic rigour into the research methodology. The successful Ethical Application for this research is at Appendix A.

Once participation was confirmed, interviewees were assigned a specific anonymity code with a tag identifying the category of the individual's organisation and the level at which the individual works. The individual's name, and that of their parent organisation, can only be revealed by consulting the project's Anonymity Code Key which is held securely on a designated USB drive.

5.2.3 Conduct of Interviews

Once a potential participant had agreed to be interviewed, all communication switched from online networking platforms to email emanating from the researcher's university student email address. In accordance with the university's IT protocols, as many interviews as possible were conducted online using the university's WebEx video conference / meeting facility, accessed by the researcher using VMware Horizon Client or directly from a Craiglockhart Campus computer in the PhD student offices.

5.2.4 Recording and Storage of Data

The method of recording and storing conforms to the university's requirements. WebEx was used as the online interview platform, which enabled each interview to be recorded digitally in MP4 format on the university's IT system. In addition to the WebEx recording, a back-up audio recording was made of each interview, with the MP3 file being saved securely. All recordings will be deleted following examination of this thesis.

5.3   Data Analysis

The literature review makes clear that a significant issue affecting humanitarian supply networks is the inability of individual supply chains to act holistically when confronted with a challenge. The research aim and objectives which emulate from the literature review demonstrate this lack of holistic vision and the need to take a systems approach have already been justified in Chapter 4 and para 5.1.2 above. It follows that a systems approach should be used to analyse the primary data.

5.3.1 Primary Data Analysis

The processes used in analysing qualitative data tend to follow a generic path of data collection, description of the data and grouping the data into themes and issues which are then interpreted to describe what is happening.
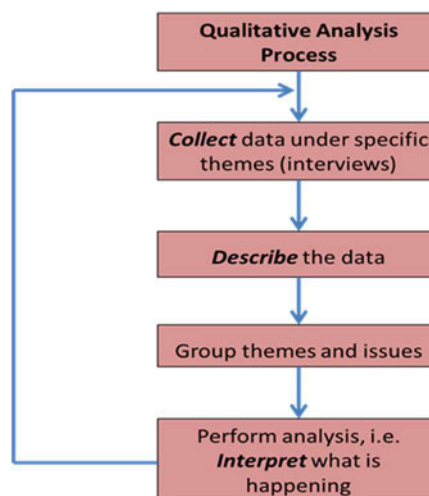
Figure 5.1   Example of a qualitative data analysis process. (Biggam, 2011).

As intimated in para 3.8.3 and described in Fig. 5.2, the inductive qualitative research process selected for analysing the primary data is grounded theory. Grounded theory is particularly applicable in this research because it can be used to collect and analyse data simultaneously in an iterative process. Beginning with informant first-order coding, it encourages the analysis of actions and processes rather than themes and structure. Grounded theory also develops inductive abstract analytic categories through secondary-order coding, thematic sampling and systematic data analysis (Corley & Gioia, 2004); and it emphasises theory construction rather than describing current theories (Charmaz, 2014). This latter characteristic is especially relevant to this research since there is no existing theory which expounds a holistic approach to humanitarian supply chain management. The grounded theory process guides the researcher through the semi-structured interview raw data collection process and the identification of meaningful initial 'open coding'. To achieve the highest quality of analysis, the researcher must maintain an open mind throughout the analysis process and take the time to reflect on the raw data when conducting further data collection from what was communicated and what was contextually meant by each respondent.

Sokolowski (2000) addresses the issue of the communication of meaning and presents his 'doctrine of intentionality' (p.159) where he stresses that it is incumbent upon researchers to ensure that responses to interview questions are understood in the context of the whole interview and to ensure that the collected data reflects what the respondent *actually* meant rather than what the researcher thought was meant. This is particularly applicable where instances of friction or conflict in terms of the social, political and cultural differences of the stakeholders is uncovered. Given the diverse make-up of this stakeholder group (UN agencies, INGOs and IGOs), it was likely that they would display characteristics from across the spectrum of unitarist to radical and fall into all three of Sokolowski's categories of 'technical, political and critical'.

In contrast to the generic process described by Biggam (2010), Charmaz (2014) describes grounded theory '[beginning] with inductive data, invokes

iterative strategies of going back and forth between data and analysis, uses comparative methods and keeps you interacting and involved with your data and emerging analysis' (p.1). The iterative nature is achieved through a process of reflecting on the raw data and the data derived from thematic examination, comparing data from and at the different process stages, and confirming relevant and meaningful further coding and analysis leading to the creation of substantive theory based on theoretical sampling themes.
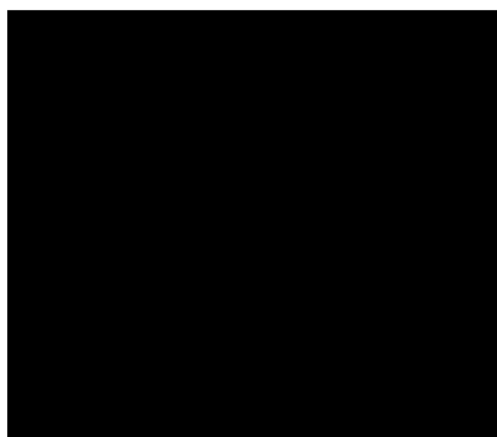
Figure 5.2   Funnel Structure of the Grounded Theory Approach. (Developed from Charmaz, 2014).

These strands of substantive theory can legitimately stand alone, pursuant to issues arising from specific aspects of humanitarian network operations but they can also be brought together to create grounded theory which gives meaning to the network as a whole. Charmaz (2014) refers to the form of grounded theory analysis that uses a process of coding, reflection and theoretical sampling as 'constructivist grounded theory', in that each stage of the process takes account of qualitative enquiry across all the interviews conducted. Charmaz (2014) concludes that 'constructivist grounded theorists aim for abstract understanding of studied life and view analyses as located in time, place and situation of the inquiry' (p,342).

5.3.2 Open Coding and Axial Themes

Coding words, phrases and themes from collected data produce a set of initial markers known as open codes which are established for each interview transcript (see Appendix C). The incidence of them is recorded to reflect how often respondents make reference to each open code. Care is taken to

ensure that a respondent's repetition of a point they wish to make does not distort the frequency count by constituting an inappropriate reference marker, but rather a reference is marked when a trigger word or phrase is raised in each different interview context. In this research, 65 open codes are identified from across the 15 interviews conducted, with each code being compared incident-to-incident across all 15 transcripts. These open codes are then grouped into axial themes and arranged using axial codes to facilitate logical and iterative analysis, thereby creating possible paths to take in the further data analysis. The seven axial themes that emerge are:

- Ownership or control of the supply chain;
- Stakeholder relations and competition;
- The flow of information and information management;
- Agents enabling effective working practices;
- Agents adversely affecting effective working practices;
- HR, staff and ethical considerations;
- The role played by the Global Logistics Cluster.

Of these seven, one stood out as providing a foundation for the other six: the Global Logistics Cluster.
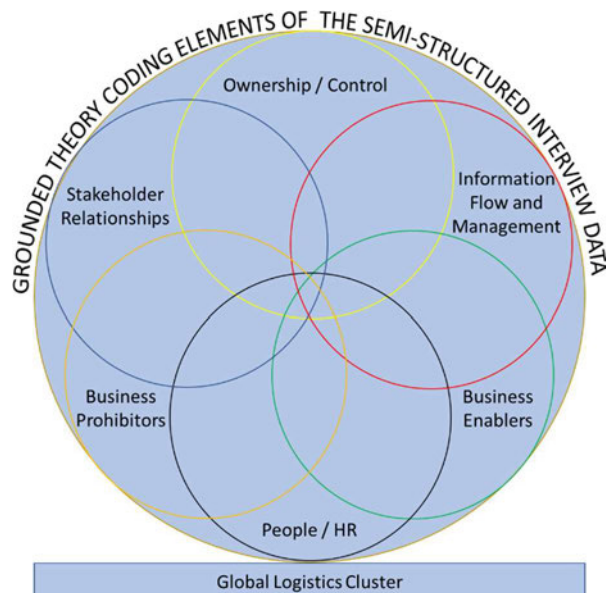
Figure 5.3   Theoretical Sampling: Grounded Theory Coding Elements.

However, two open codes which were identified in the raw data do not sit comfortably within these axial themes: the relationship between the

Emergency Response phase and the other phases of the Disaster Management Cycle; and the sense respondents have of belonging to or operating within a system. The former, which is gathering increasing research momentum (Rodríguez-Espíndola et al. (2018b and 2018c), was raised in the context of the benefits derived from conducting contingency planning and having pre-positioned stocks prior to a likely disaster occurrence, and the focusing of emergency response activities on the follow-on actions of the Development & Reconstruction phase. A 'systems' open code, axially themed 'supply chain development', is meaningful in that it was able to capture instances where belonging to a logistician community inferred being part of a system and allowed appropriate focused codes to be created.

5.3.3 The Iterative Process

With the open codes subsumed into themes, a review and comparison of the interview data as a whole and in the context of a holistic body of work, the axial themes are rationalised into axial codes which give context to the open coding streams and thereby enabled the selection of relevant data for focused coding. Focused coding comprises the initial in-depth analysis stage of grounded theory and looks at how meaning can be given to the individual incidents and emerging themes when examined using a holistic lens. Focused codes are used to sift, sort, synthesise and analyse the raw data as a whole body of work by providing context to the axial codes. In deriving focused coding, data can be viewed from two different perspectives: facts and values, giving rise to a decision of what is, and what ought to be considered relevant to the research (see Appendix D). This step is used to contextualise the references made by individual respondents to uncover what Sokolowski (2000) describes as actual truth, rather than perceived truth, 'official' truth, or bias regarding what should be examined in the research. The focused coding analysis allows further codes and themes to emerge, and these form the bases of the theoretical sampling from which conclusions can be distilled and cross-referenced in the context of the raw data. The themes that became apparent in the initial analysis stage remained through theoretical sampling but could be distilled in the reduction and integration stage, except for the Disaster Management Cycle issue and those pertaining

to education. The conspicuous characteristic of these two is that they are subject to external forces: the issues raised are driven by the effects of the surrounding environment rather than the effects of internal stakeholder decision-making.

At the point of analytical saturation, the reduction and integration stage facilitates 'a theoretical interpretation or explanation of the problem in a particular area [theme]', (Charmaz, 2014, p.344): the construction of substantive theory.

5.3.4 Substantive Theory

Once data analysis has reached a point of saturation, where no further meaningful understanding of the subject area can be achieved, the final analytical point is interpreted theoretically within the context of the holistic problem (see Appendix E). The seven subject areas of this research have emerged through the iterative process and the interpretation of their analysis is as follows:

FINAL CODING	SUBSTANTIVE THEORY
Relationship Basis and Common Bonds	In-country logisticians already work well together but they lack the ability to view the operational environment holistically. Their strategic management is stove-piped and can only provide high-level understanding of the organisation's activities and not those of the organisations around them. Therefore, achieving optimum effectiveness and efficiency is difficult. **No 'over-seer' entity exists, and organisational sensitivities preclude the Log Cluster from extending its mandate into SC control.**
Stakeholder Interaction and Passage of Information	There is effective lateral passage of information between in-country stakeholders, but many practitioners are frustrated with the communication and alignment of their parent organisations and the lack of lateral flows of information at the strategic level. All stakeholders appreciate that they work in a supply network, even if they are operating independent (commercial / 3PL) supply chains. Knock-on effects from decision-making are only avoided through ad hoc arrangements and information exchanges on the ground: to achieve optimal effectiveness, this needs to be formalised but without encroaching on organisational cultures. **There is a willingness to share information but not the mechanism to achieve a network of information that takes the holistic picture into consideration.**
Coordination, Cooperation, Collaboration, and the Global	The Log Cluster's strength lies in providing coordination, promoting cooperation and encouraging collaboration. There is little appetite for the expansion of its mandate into the realms of control or political engagement, but there could be latitude for the

Log Cluster's Mandate	development of the structure of a deployed Log Cluster to formally involve other stakeholders in 'office-bearing' functions. **Such an initiative would also promote closer organisational engagement at the HQ / strategic level.**
Working Practices	To harness best practice, improve effectiveness and achieve efficiencies, working practices must be based on achieving a holistic view of the operation. Without this, decision-making is disjointed resulting in ramifications for others. **There is a willingness to work together, just not the mechanism.**
Organisational Self and Ethos	For a variety of reasons, stakeholders are protective of their organisational cultures, but it is this that leads to the lack of collaboration that denies the achievement of optimal effectiveness. Cultures are unlikely to change; and nor should they. However, if a holistic mechanism were in place that allowed stakeholders to play to their strengths, cultures wouldn't have to change. Stakeholders could choose what resources to provide, which activities to participate in and what corporate information / data it wanted to share. However, they would also have access to comprehensive information upon which to base their decision-making. **Developing an autopoietic mechanism where decision-making influences and control measures were organic to the structure would allow stakeholders to maintain their unique identities and cultures.**
Holistic View	To provide the holistic view required, a form of control mechanism needs to be in place. A physical entity is likely to be highly contentious, therefore a theoretical concept needs to be developed which provides stakeholders with the opportunity to buy-in to the big idea and therefore take ownership of it. The 'it' is the supply chain operation, and the ownership comes from having a collaborative stake: being part of the community at the tactical and the strategic level. **This means that organisational governance and the operational environment will have as much a role to play as logistic functions.**
Disaster Management Cycle Synchronisation and Education	Preparing the ground for an intervention and then shaping the emerging practices during the response phase to better dovetail into the development phase needs to be coordinated at a higher level than individual stakeholders and the practice needs to be introduced into the ethos of each organisation as an accepted modus operandi. This would be developed by stakeholder organisations, institutes and academia, and delivered through education, training and adopted working practices. To support this, such forums as the HNPW and ECHO **could play a role, cognisant that both these are pseudo-political** in terms of their custodianship (UN and the EU).

Table 5.3   Substantive Theory.

5.3.5 Framing the Paradigm Problem

Charmaz (2014) and Corbin & Strauss (2015) advocate taking a further step beyond the construction of substantive theory to construct an over-arching theory to make sense of the holistic problem as presented through the tenets and themes used to construct the substantive theory. This grounded theory of the paradigm problem is grounded in the data analysis conducted to

saturation and the crystallisation of the holistic problem for which a solution is found. From the substantive theory constructed in this research, the over-arching issue facing the humanitarian supply network paradigm can be described as follows:

Within the humanitarian supply network, no owner / governance entity exists, and organisational sensitivities preclude the Global Logistic Cluster from extending its mandate into the control of supply chains. Whilst there is a willingness to share information, there is no mechanism to achieve a network of information that takes the holistic picture into consideration. The structure of a deployed Log Cluster could be developed to formally involve other stakeholders in 'office-bearing' functions, but much scepticism exists regarding this even though such an initiative would promote closer organisational engagement at the HQ / strategic level. There is a willingness to work together, but again, there is no mechanism. If such a mechanism were to be developed, it would have to be autopoietic in nature where decision-making influences and control measures would be organic to the structure so as to allow stakeholders to maintain their unique identities and cultures. To take the steps to work truly collaboratively, organisational governance and the operational environment would have as much a role to play as logistic functions. Where issues exist that could be resolved through a greater strategic understanding of humanitarian supply chain management, there are forums which could play a role, but many are pseudo-political and therefore unacceptable to some stakeholder organisations.

Table 5.4   Grounded Theory.

This final expression of grounded theory represents the interpretation of the problem as it pertains to Humanitarian Supply Network Management, as revealed by the empirical evidence presented in this research. The framing of the paradigm problem paves the way for the design of a feasible conceptual model that can make sense of the problem and provide a solution to the issues and challenges that arise across the spectrum of humanitarian supply chain operations. However, given the constrains encountered in the data collection phase and the need to ensure the academic argument is robust, this primary data must be independently corroborated.

5.4   Corroborating Primary Data

Due to the limitations, constraints and risk management of Covid-19 measures, ethnographical research was not possible. Therefore, to provide the necessary academic rigour to corroborate the findings of the interviews, other primary or academically robust secondary data is required. This is provided by the construction of a theoretical case, as described in para 3.5.7. In the absence of other primary data but in the presence of empirical evidence in the form of secondary data drawn from case studies, independent reports and evaluations of past operations, known knowns and researcher intuition can be used to interpolate the most likely reason for the end state described in the secondary data (see Appendix F). This 'abstract reasoning' allows a most likely case scenario to be constructed, thereby creating a set of 'abstract primary data': data which underpins the most likely case scenario. This new data is then further critiqued using iterative triangulation, as described in para 3.5.8.

5.4.1 Data for the Theoretical Case

Using this logic, a theoretical case can be constructed using the abstract primary data to support the primary data derived from the interviews. This involves the creation of a hypothetical humanitarian operation scenario designed using existing secondary source data found in independent reports from databases such as ALNAP and ReliefWeb, and Monitoring, Evaluation, Assessment and Lessons-learnt (MEAL) reports produced by independent experts and supported where necessary by organisations' post-operational reports. This unbiased secondary data provides a researcher with a specific end state: that which has occurred to result in empirical evidence. Using known-knowns and the researcher's intuition based on experience and expertise in the field, the end states can be deconstructed by asking how it could be possible to arrive at such an end state. Where it is conducted in tandem with reflectivity and a consciousness of potential bias, intuition as a legitimate research tool is underpinned by iterative triangulation (Lewis, 1998). Intuition plays an important role in abstracting this type of data because many actions or reactions may have occurred to result in an end state, but the most plausible action is traced by logical reasoning: knowing

what normally actually occurs in practice. This logical reasoning is underpinned by the literature review, other secondary data and interview data. Before this data set is accepted for analysis, it must first be applied to the empirical end states to ensure that the logic used in the abstraction process is academically robust: 'applied abstract primary data'.

To achieve a holistic foundation to the theoretical case, input data must be sought from the across the broad spectrum of instances which lead to humanitarian events.
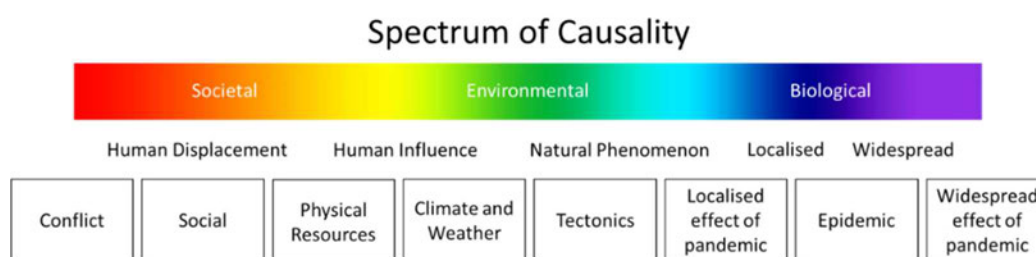
Figure 5.4   Humanitarian Spectrum of Causality.

By applying the research interview question set to individual areas of causality, a rich source of data can be created which can be analysed to identify common themes and link common likely causes to known results from across the spectrum.

5.4.2 Abstract Primary Data

Where there is a dearth of primary data and a wealth of secondary data augmented by a researchers' professional experience, it is possible to extrapolate a viable data set by examining the results of decision-making processes which have been applied to resolve a specific causal event. This process of applied abstract reasoning, intimated above, and described in detail in Appendix G, provides the researcher with a further source of primary data which can be used to compare and contrast the data collected through interviews.
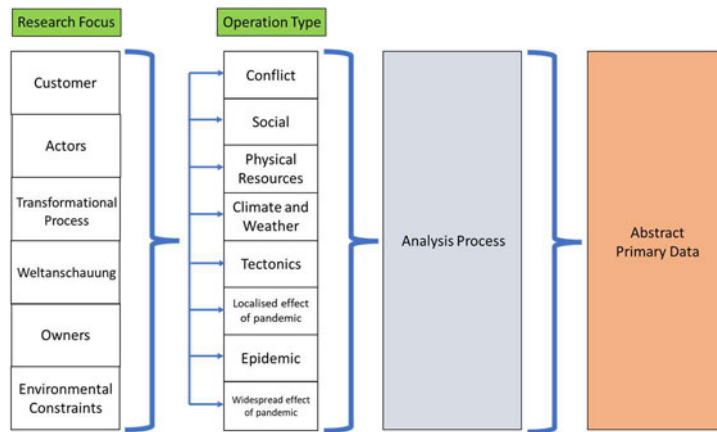
Figure 5.5   Applied Abstract Reasoning.

By its inherent nature, applied abstract reasoning will be bespoke to each set of circumstances, and in this case, applies the CATWOE-derived interview question set of systems-based research to the humanitarian spectrum of causality. Thereby, a bounded range of data can be analysed to determine common themes and, through the consideration of logical, doctrinally based and institutionally routine decision-making processes, the likely causes can be determined.

5.4.3 Applied Abstract Reasoning Data Analysis

Detailed analysis of the data gathered through the Applied Abstract Reasoning process is at Appendix G. The main analytical output of each case study is highlighted in Table 5.5 in bold, but the details pick up on many of the theoretical sampling themes in the primary data analysis shown in Fig 5.5. Issues regarding ownership and control of elements of the humanitarian supply network are of a concern to Host Nation (HN) authorities, the Log Cluster staff and NGOs who feel loathed to engage with stakeholders on political issues. The management and flow of information are considered to be of paramount importance across all five cases, with stakeholders being informed of the network contacts that can enable the effective delivery of aid and the areas to avoid because of the frictions impacting effective aid delivery. All five cases occurred prior to 2020 and therefore the loss of face-to-face relationships as a result of remote working was not the issue that it has subsequently become, as borne out by the primary data collection and

resulting grounded theory. However, the case studies bore out the importance of such individual engagement and stakeholder relationships in general. They also demonstrated how the Global Logistics Cluster has developed between 2015 and 2020 into a forum which underpins stakeholder relationships and the passage of information in DRO humanitarian supply networks.

Scenario	Analysis
Sierra Leone 1	When switching from a Push to a Pull logistic strategy, forward storage capacities should reduce while central storage facilities increase significantly. This was clearly not fully appreciated by the Main Logistic Hub Manager or Logistic Cluster Coordinator and only came to light when the subject was discussed with other stakeholders. The situation is likely to have arisen through a lack of experience on the part of the manager and coordinator but by discussing the situation with more experienced stakeholders within the Log Cluster, the ramifications of switching from a Push to Pull strategy were appreciated and a solution for the potential problems put into place. **The Log Cluster collective helps to reduce the knock-on effect of stakeholder decisions.**
Mozambique	While having a single point of contact from the national government or a lead agency is highly beneficial, it must be capable of effective stakeholder coordination and information management. Having such a node which does not function causes significant issues in the supply network. Where the POC sits at the operational level (like the NERC in Sierra Leone), its influence and effect will be broad; where it sits at the strategic level (HN government or lead agency), a level of strategic governance can also be afforded. **An all-informed stakeholder communication network is better than a malfunctioning single POC.**
Nepal	The value of contingency planning and the pre-positioning of aid stocks is widely accepted and in this case, periodically rehearsed by development aid agency staff and the local government. However, stakeholders must be agile enough to adapt to the prevailing conditions when translating such exercise and planning scenarios into real-life actions. There was an initial disconnect between in-country development staff and emergency response staff but this was quickly overcome. The real issue was the ability of elements of the HN government to adapt in a similar fashion. Having a stakeholder information forum was critical in Nepal and acts as an indicator of the importance of establishing stakeholder communication early in an emergency, built on a pre-planned modus operandi. **The importance of a Preparation – Response Continuum.**
Yemen	Where stakeholders come together in either a formal setting like the Log Cluster or in an ad hoc setting such as a community of logistic practitioners, the engagement that ensues provides information channels that can resolve pan-organisation issues, achieve economies of scale, can allow contact to be made and maintained with parties that may otherwise be considered 'off limits' and can achieve significant efficiencies in terms of resource management. This case underlines the benefit in a formal forum where stakeholder ToRs can be understood, and MOUs can be agreed to

	facilitate complex and financially sensitive activities. **Stakeholders coming together to take advantage of their shared strengths can be a capability multiplier, but this can often only happen where organisational cultural differences are understood by all.**
Sierra Leone 2	All too frequently, the Log Cluster Coordinator steps back from engaging directly with HN authorities, particularly C&I officers. In this case, it seemed appropriate to give this task to an embedded stakeholder in the NERC but this only added another link to a communications chain (albeit a face-to-face link), one that did not have the gravitas of a senior UN staff member. Given that there is a pseudo-political link between WFP and the HN government, and that C&I business is a governmental function, evidence suggests that the most appropriate actor to engage on C&I matters is the Log Cluster Coordinator. **The Log Cluster needs to accept that pseudo-political engagement involves a non-aligned party like an NGO, issues will persist as too will the effect on beneficiaries.**

Table 5.5   Applied Abstract Reasoning: Analysis Summary.

5.5   Iterative Triangulation

The term triangulation refers to the research strategy that involves the use of several data sources to strengthen the study's credibility and academic rigour (Robson & McCartan, 2016; Denzin & Lincoln, 2018). Jentoft & Olsen (2019) suggest that by using a triangulation method, research and evaluations will be strengthened and 'researchers will have the opportunity of gaining a better and broader understanding of the phenomenon under investigation' (p.181). Punch (2014) stresses the benefit of 'bringing together the different strengths of the methods' used in triangulation (p.309). However, caution must be taken when comparing interview data from different contexts as this could render direct comparisons problematic and lead to different versions of reality (Robson & McCartan, 2016; Jentoft & Olsen, 2019). This research deals with this potential issue by using the grounded theory constructed data in the triangulation process rather than the raw data derived from potentially different interview contexts. Thereby, triangulation is used to deepen and elaborate on the data rather than to confirm the data collected in the interviews. It also serves to add credibility to the theoretical insights presented by this research (Langley & Abdallah, 2011).

McCutcheon & Meredith (1993) observe that inductive case research such as this employs triangulation to improve representation accuracy of resulting

theory and Lewis (1998) explains that through using iterative triangulation, the traditional concept of triangulation is expanded 'utilizing existing case studies to enhance representational diversity' by comparing and contrasting constructs across case settings 'to refine construct definitions … which may help to develop encompassing theoretical frameworks'. (p.457). Cuthbertson & Piotrowicz (2008) and Weaver (2010) employ the iterative triangulation methodological process successfully in their research in commercial supply chain practices.

This research is inspired by Lewis (1998) by incorporating grounded theory and applied abstract reasoning into the iterative triangulation process to facilitate a more detailed 'Phase I – Groundwork' and 'Phase II – Induction' (Fig 3.7), thereby creating a more rigorous process: Multi-method Iterative Triangulation. The Phase I step is conducted during the coding and initial analysis stage of the grounded theory analysis of the interview data and the Case Study coding and narrative analysis of the abstract primary data from the meta-synthesis process.
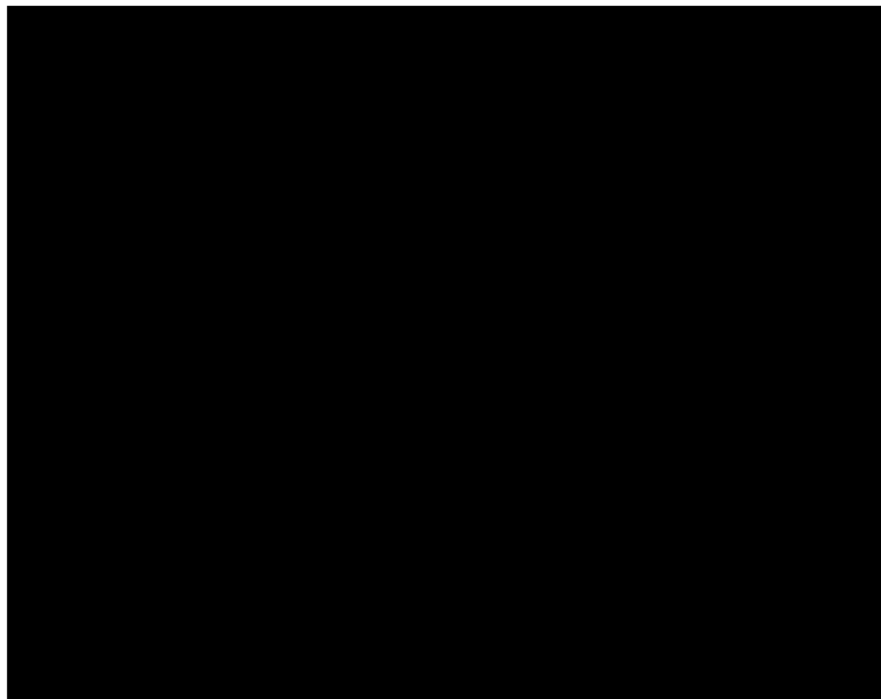
Figure 5.6   Multi-method Iterative Triangulation. (Adapted from Lewis, 1998).

For the interview primary data, the Phase II step is achieved through the theoretical sampling of the focused coding data analysis, where the further

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coding is reduced and integrated (Fig 5.3; Appendix E) producing substantive theory. For the case study data, the decision-making processes are compared, and conclusions are drawn, aided by researcher intuition (Fig 5.5; Appendix G).

5.5.1 Case Data and Conjectures

The substantive theory from the grounded theory analysis (Table 5.3) and the data from the applied abstract reasoning are synthesised in the Phase III step to allow theoretical conjectures to be made. These inferences are founded in the interview and case study data and can be traced back to their origins through the analytical processes.

Substantive Theory	Applied Abstract Reasoning	Expanded Conjectures
In-country stakeholder relationships are generally described as good but their strategic management is stove-piped, so they lack the ability to view the operational environment holistically. Achieving optimum effectiveness and efficiency is therefore difficult. No 'over-seer' entity exists, and organisational sensitivities preclude the Log Cluster from extending its mandate into SC control.	The in-country stakeholders enjoyed good relations, promoted by their participation in the Log Cluster. When the forum became aware of a potentially serious supply chain issue, switching from Push to Pull logistics, a combined effort presented a solution in time to avert the manifesting of the problem. All levels of C^3 were apparent. Such close cooperation was not apparent at organisations' strategic level.	In-country practitioners are happy to work together and consider themselves as part of a community of logisticians. At the ground level, their operations are conducted in parallel with considerable interaction facilitating joint initiatives. Organisational management is stove-piped but while this can impact efficiency, it does not prevent effectiveness.
There is effective lateral passage of information between in-country stakeholders, but not necessarily vertically within their parent. Knock-on effects from decision-making are only avoided through ad hoc arrangements and information exchanges on the ground. There is a willingness to share information but not the mechanism to achieve a network of information that takes the holistic picture into consideration.	In each scenario, the passage of information was key to effective aid delivery and when it failed, an obstruction arose. This was particularly evident in the sharing and management of information with HN government departments and led to Customs & Immigration issues in Nepal and Sierra Leone. The Sierra Leone issue was compounded by inserting an unnecessary link in the information chain which caused	While the Log Cluster acts as a valuable information exchange, it struggles to deal with issues arising from non-participants like HN government departments and IGO agents. As a result, it cannot forecast or resolve the knock-on effects that consequently transpire. Having a holistic view of the DRO would at least assist in containment of difficulties but could also encourage non-participants to appreciate

	confusion and slowed the resolution of the problem.	and attend the Log Cluster.
The Log Cluster's strength as a coordination node is acknowledged and there is little appetite for the expansion of its mandate. A possible development of the structure could involve other stakeholders. Such an initiative would also promote closer organisational engagement at the HQ / strategic level.	The achievement of concurrent effectiveness and efficiency in the face of resource constraints in Yemen was down to the cohesion created by the partner organisations. The idea of specific project coordination cells could be developed within the current Log Cluster mandate and the Yemen case demonstrates that closer engagement also at the strategic level can be a capability multiplier.	Formalised coordination and the promotion of cooperation and collaborative working practices at all levels is key to resolving the paradigm problems facing humanitarian logistic practitioners. The design of these working practices is common amongst most organisations but the idea of losing control of organisational practices is intolerable across partners. Consensus is key and is part of many partners' DNA.
To harness best practice, a holistic view of the DRO is required; without it, decision-making is disjointed resulting in ramifications for others. There is a willingness to work together, just not the mechanism.	The Mozambique and Nepal cases show that a lack of cohesion results in ineffectiveness and waste. HN control of sovereignty is not lost through stakeholder engagement and the passage of information. It is without doubt that the HN departments that created uncertainty and friction did not intend to create the effect they had on those in need of aid. The mechanism to deliver a holistic view of the operation did not exist.	This willingness to work together should be exploited theoretically to create a foundation where stakeholders can operate to their strengths without feeling that their organisational integrity is being threatened. This idea of 'organisational fear' is raised specifically in one of the interviews. The mechanism that would facilitate this closer engagement needs to involve consensus and be organic to the paradigm.
The stakeholder membership is diverse and its cultures are unlikely to change; however, a mechanism to allow stakeholders to access information holistically would to play to organisational strengths and create a foundation for collaborative working. The mechanism would have to be systemic to encapsulate all elements of the humanitarian supply network but also autopoietic to allow stakeholders to maintain their unique identities and cultures.	The level of coordination and appreciation of organisational cultural practices evident in the Yemen case set the conditions for a novel resolution of the resource issues. Drawing on the strengths and unique relationships some partners had with conflict adversaries, some combatants became part of the solution rather than the problem. Generating solutions from within the humanitarian paradigm seems better than trying to impose an external solution on an issue.	Stakeholder organisations have differing priorities, and none more so that the HN government. DROs are by their nature unique but by forging a set of principles acceptable to all partners could serve as a basis form common understanding and considerate decision-making. Such a base could provide the mechanism for stakeholders to take a holistic view of their operations and facilitate more open-minded thinking within incurring organisational risk.

To achieve an autopoietic system which had the holistic view required, a theoretical rather than a physical concept needs to be developed. It would require a method of aligning stakeholder strengths, opportunities and goals, gaining intelligence from the pertaining environment and an acceptable level of governance. Organisational governance and the operational environment will have as much a role to play as logistic functions.	In all case study instances, the failure to appreciate the bigger picture resulted in difficulties arising for multiple stakeholders. However, evidence in Sierra Leone and Yemen shows that by playing to partners' strengths, greater effectiveness can be attained and resources can be utilised in a more efficient manner, to the greater benefit of those in need. The common constraint was organisational risk, loss of reputation and loss of control.	In bringing organisations together in a more coherent construct, there needs to be a common set of principles and working practices and a shared ethos. However, this need not impact on an organisations' operational principles or cultural identity. Rather, a mechanism based on consensus and using tools and measures already in existence could be developed further to provide the holistic approach needed to avoid the impact of isolated decision-making.
Two aspects of the environment which are understood but under-resourced are DMC phase alignment and education. By aligning the phases of disaster management rather than treating the response phase in isolation would improve the environment at disaster onset and for future reconstruction. Higher level education for individuals and academic input to operational concepts are possible but not coordinated; they have no natural focus. HNs, established institutes and academia such as the Fritz Institute, Hanken, HNPW and ECHO could play a role, cognisant that the two latter are pseudo-political in terms of their custodianship (UN and the EU).	The storage and access problems seen in Mozambique occurred despite NGOs already being on the ground and working with elements of the HN government. The austere environment should have accelerated contingency planning and common working practices, but the emergency response teams seemed unable to take advantage of the existing arrangements. While education *per se* was not a contention in the case studies, it is clear that a wider, potentially more theoretical understanding of the paradigm would benefit stakeholder organisations and thereby help develop operational effectiveness and resource efficiencies through best practice.	There is clearly a role for an independent body to help develop an autopoietic solution but also to contribute to the future development of humanitarian supply network thinking. Such a body (which itself should comprise a diversity of stakeholders) could models and frameworks that could be used by practitioners to prepare better for the eventuality of a disaster and to help streamline the response to the future benefit of the location through bespoke aid delivery. This body could also contribute to the education of practitioners and act as a best practice forum for practitioners, organisations' strategic management and programmers, and academics.

Table 5.6   Case Data and Conjectures.

5.5.2 Theory Refinement

The expanded conjectures above represent a triangulated form of

substantive theory and when refined in terms of the themes identified in

theoretical sampling, can be compared to each substantive theory statement to confirm whether the primary data is consistent with, and is supported by, the secondary data.

Theme	Refined Theory
Sense of Logistic Community	Even where a Log Cluster has not deployed, in-country practitioners tend to consider themselves as part of a community; the Log Cluster promotes this cohesion. Not all strategic level managers and programmers understand this and therefore there is a need for greater understanding of the supply network at this level. The adaptability and shared values of practitioners is a firm indication that there is a willingness to work more collaboratively but an appropriate mechanism must be found.
Coordination, Cooperation and Collaboration amongst Stakeholders	While the Log Cluster promotes C^3, it cannot enforce it. Where it does not deploy, stakeholders make ad hoc arrangements based on their past experiences. An established and accepted set of principles as to how stakeholders can ascend the C^3 scale would provide practitioners with a level of swift trust and an indication of what to expect where engaging with other, diverse organisations.
Stakeholder Working Practices	The idea of 'organisational fear' and concern for reputation and operational risk tend to be retained at strategic level management. On the ground, agile working practices are evident which, if understood by organisations' HQs, could promote ascent of the C^3 scale. This could require a 'grand strategic' element where organisation HQs come together to establish best practice and shared working practices that they would be prepared to sign up to in corporate terms: reflecting at the strategic level that which effectively already occurs on the ground.
Organisational Culture and Ethos	Stakeholders will always wish to protect their organisational culture, resources, image and reputation, but where these characteristics are shared and understood by partner organisations, stakeholders can identify ways of playing to the strengths of the community rather to achieve greater effectiveness in aid delivery and efficiencies within stakeholder organisations – all to the benefit of those in need.
Passage of Information amongst Stakeholders	Communication amongst stakeholders is key to success. The sharing and effective management of information leads to improved cohesion and greater effect in aid delivery through coordination and collaborative working practices. Vertical communication and understanding within an organisation is as important as lateral communication between in-country practitioners, but lateral communication amongst stakeholder strategic level management, particularly programme and planning teams, would be a real game-changer.
Holistic View	It is clear from the data that the primary reason for friction, reduced efficiency and unoptimised effectiveness is a lack of holistic approach by stakeholders due to a lack of suitable platform or mechanism to achieve a holistic view of the paradigm. One interviewee referred to a 'Control Tower' concept, but a wealth of data suggests that a physical control tower, i.e. an appointed overseer organisation, would not be tolerated. The control tower therefore needs to be an autopoietic mechanism based on extant working practices, shared values and emerging practical concepts. Therefore, to achieve this holistic view, instead of a tall structure with one set of eyes, it needs to be a wide structure, inherent to

	the humanitarian supply network, with many sets of eyes that communicate with each other at every level.
Role of Players in the Wider Environment	Stakeholder organisations are in the business of getting aid to the right place, in the right quantities, at the right time and in the right condition; they have little time left over to consider the challenges facing others or solving problems that do not directly affect them. However, there are others who could undertake this important work. Sitting between aid organisations and the theoretical concepts of academia are a plethora of institutes, academic bodies and pseudo-political think-tanks which could bridge these two spheres. For example, research into bridging the Preparation / Emergency Response Continuum is already advanced but not so that of the Emergency Response / Development Continuum. University input such as that from Hanken, foundations such as the Fritz Institute and political entities such as ECHO can become engaged individually or participate with stakeholder organisations and their practitioners through forums such as the UN-sponsored HNPW.

Table 5.7   Iterative Triangulation Refined Theory.

5.5.3 Iterative Triangulation: The Justified Position

To achieve a more effective and efficient humanitarian supply network where the decision-making processes of stakeholder aid agencies do not adversely impact on others and therefore the aid effort, a more holistic approach to supply chain management needs to be taken. At its root is the passage and management of information and the understanding among stakeholders of organisational cultures. By understanding each other's strengths and weaknesses, partners can coordinate their individual activities, cooperate to achieve resource economies of scale, and collaborate to deliver the most effective, optimum aid delivery in austere, unstable environments with finite donor resources. Several of the building blocks required to create the foundation of a mechanism to achieve holistic, coherent and more collaborative working amongst stakeholder organisations already exist. Practitioners on the ground tend to work cooperatively, and often collaboratively. Coordination is second nature to in-country logisticians, as too is the sharing of information and a sense of belonging to a specialist community but this is not currently replicated the organisations' strategic management levels. While there is a support role for agencies outside the traditional humanitarian supply network stakeholder group, it is up to the established stakeholders to come together to create an autopoietic mechanism from within the paradigm to establish and develop an acceptable

form of governance and a tool to facilitate operational and contingency planning.

5.6   The Theoretical Case

The iterative triangulation confirms that the primary concern for humanitarian supply network practitioners and managers is the lack of cohesion among stakeholder organisations due to inefficient passage of information through an absence of a holistic approach to aid delivery. The data above indicates that while every disaster relief operation is unique, operations share common characteristics which allow the building of a theoretical case. Below, these characteristics are grouped in accordance with the themes derived from theoretical sampling.

Theme	Characteristic
Sense of Logistic Community	Practitioners on the ground generally feel that they have more in common with other stakeholder practitioners than they do with strategic level planners and programmers in their own organisations. Practitioners naturally gravitate towards each other in-country and cooperate as a matter of course. They have a natural tendency towards efficiency and try to avoid waste where possible. They consider logistics as a speciality not fully understood by others and the Log Cluster to be at the heart of this black art.
Coordination, Cooperation and Collaboration amongst Stakeholders	INGO and UN agency practitioners on the ground tend to work well together, not least because many know each other from previous operations. Even if they do not fully understand the modus operandi of each other's organisation, they appreciate the subtle differences and the strengths of their partners. This does not extend to IGO agencies and rarely to the strategic levels of their own organisations. In-country, stakeholders seek to ascend the C^3 scale but are often prevented from doing so by their own organisation. The role played by the Log Cluster in facilitating coordination in particular is valued and replicated on an ad hoc basis where the Log Cluster is not present.
Stakeholder Working Practices	Notwithstanding the pseudo-political nature of UN agencies, INGOs and UN agencies essentially share common working practices honed over many disaster relief operations. They emulate from SOPs and organisational policy that have evolved into broad common practice based on an informal assessment of best practice and formal lessons-learnt (MEAL) studies. The working practices of IGO agencies broadly follow commercial lines with many IGO logisticians coming from relatively low-level logistic management roles in military organisations. The stakeholder divergence between IGOs and UN / INGOs is stark and manifests itself in antagonistic views by IGO agencies of UN / INGO working practices. The Log Cluster is recognised as being a positive influence in the promotion of best practice among in-country stakeholders.

Organisational Culture and Ethos	Aside from the IGO (and where present, 3PL / 4PL) culture and ethos being more closely aligned to commercial practice, the culture and ethos of INGOs and UN agencies can be extremely diverse. Faith-based and ethically based INGOs operate in accordance with strict organisational principles but that does not prevent them from allowing other to operate in the gap they leave. Playing to the operational strengths and appreciating the operational weaknesses of partner stakeholders occurs among in-country practitioners but not so much at organisations' strategic level management. A fear can exist of a loss of reputation, control or influence and this perception may be the main reason why strategic stakeholder engagement is less prevalent than in-country engagement. The Log Cluster is seen as a forum where organisational culture and ethos can be explained and understood, even to the point of bridging 'constitutional' gaps, e.g., MSF engagement with individuals from humanitarian-supporting military forces.
Passage of Information amongst Stakeholders	Information flows readily between in-country stakeholders but aside from routine management communication and reporting, the vertical flow of information within stakeholder organisations is less evident. Where it occurs, it often causes frustration leaving in-country logisticians with the perception that their strategic level programmers and planners are insufficiently familiar with logistic practices and challenges. There is little evidence of a lateral flow of information between stakeholder strategic managers, even amongst UN agencies. The Log Cluster facilitates the in-country lateral flow of information but is not involved in internal organisation communication channels.
Holistic View	There is currently no way of obtaining a truly holistic view of a single DRO but from a logistic perspective, the closest comes in the form of the Log Cluster. This forum allows stakeholders to provide their piece of the logistic jigsaw to produce a picture that would otherwise not be available, but it still does not take into consideration stakeholder planning and programming decisions, from which many of the organisation's logisticians are absented. It is here that a mechanism able to provide a truly holistic approach to humanitarian supply chain management and network integration would be of greatest benefit.
Role of Players in the Wider Environment	For good reason, stakeholder organisations maintain their own individual identities through which they express their cultural and ethical ethos. Perceptions of control and ownership remain within the realm of the stakeholder paradigm but there is a role for external agents. Operationally focused stakeholders do not have the resources to undertake research and development of working practices in a structured manner, but entities such as specialist universities, institutes and political bodies do have this capacity, and increasingly, the will. Those with an interest in humanitarian operations now participate in such forms as the HNPW.

Table 5.8   Characteristics of the Theoretical Case.

Coordination is seen as an essential element of stakeholder engagement at all levels and is practiced vertically within stakeholder organisations. Both the interview data and the secondary source data show that cooperation is more likely to occur among in-country practitioners, either with or without the

approval of their strategic management. However, while in-country practitioners can work in a collaborative manner with other like-minded logisticians, working in collaboration with another organisation requires the active participation of both strategic level management teams. There is no evidence in this research of collaborations occurring such as those described in para 2.5.3, but the reasons for this are evident from the data. Reasons cited for not working collaboratively at the organisational level include:

- Trust issues;
- Cultural obstacles regarding organisational operating boundaries, reputation and protection of resources;
- Stifled vertical flows of information within stakeholder organisations;
- Insufficient shared information and working practices;
- Lack of common information and asset management platforms;
- Fear of losing control;
- Inability to develop strategic aspects of the paradigm.

5.7   Conclusion

The conclusion drawn from the data collected and analysed in this research is that there is an appetite for a mechanism that can deliver a holistic view of the humanitarian supply network where all stakeholders can adopt a holistic approach to their operational activities to optimise effectiveness and efficiency for the benefit of those in need. Furthermore, many of the foundation elements for such a mechanism already exist. A new conceptual framework model is required which encapsulates the humanitarian supply network paradigm and provides the holistic view demanded of stakeholders whilst protecting their identity, individuality and independence as individual aid agencies. This model needs to provide shared ownership based on consensus without apportioning ownership or control to one single entity and to ensure buy-in from all stakeholders. The mechanism should be a product of the paradigm which, while cognisant of and interacting with its environment, is capable of maintaining its operations and remedying internal conflicts by regulating itself: it must be autopoietic.

CHAPTER 6

JUSTIFYING THE THEORETICAL POSITION

'There's so much talk about the system. And so little understanding. That's all a motorcycle is, a system of concepts worked out in steel. There's no part in it, no shape in it that is not in someone's mind.'

Robert Pirsig (1974)

6.1   Systems Thinking

In previous chapters, it is clear that the application of commercial supply chain thinking is not particularly helpful when considering issues that arise in humanitarian supply networks (Swanson et al. 2015; Kovacs & Moshtari, 2019; Dubey, 2022) and that many contributors to supply chain literature concur that all supply chains, but particularly those in the humanitarian sphere are systemic (Habib, 2011; Schiffling et al. 2020b; Besiou & Van Wassenhove, 2021), where disaster relief processes would benefit from being systematically managed (Azmat & Kummer, 2019). This chapter considers why the application of systems thinking would make a valuable contribution and which tools and frameworks within systems thinking can best be applied in the humanitarian arena. It identifies a systems model which can:

- Deal with coordination, cooperation and collaboration in a complex environment as described in Chapter 2;
- Provide a basis for supply chain ownership, control and governance;
- Address all the Research Objectives listed in Section 1.4.

Borrowed from the exact sciences of physics and mathematics, the emergence of Systems Thinking in the early 1960s was pioneered, inter alia, by Stafford Beer through his application of the system concept to the social sciences (Beer, 1964). Schoderbek et al. (1990) consolidate the definition of 'the system' in the social science context as 'a *set* of *objects* together with *relationships* between the objects and between their *attributes* related to each other and to their *environment* so as to form a *whole*' (p.13). The set of

objects are the basic functions performed by the system's parts and in the context of a humanitarian supply chain, consist of those described by Van Wassenhove & Pedraza Martinez (2012) in their Relief Supply Chain model: response planning; mobilisation; donations and procurement; transport; stock asset management; and final delivery. In terms of relationships, this model recognises the importance of cooperation and information management but is does not consider attributes or the environment. The model offered by Blecken (2010) also considers these functions and the need for a flow of information but acknowledges that the stakeholders in a humanitarian supply network possess the attributes of difference levels of operation and the requirement for operational support from elsewhere in the environment. However, Blecken (2010) fails to consider emerging conflicts and issues affecting objects, relationships, attributes or the environment, primarily because supply chain management is broken down into fundamental elements: his model is reductionist in design. Indeed, no existing model takes a holistic stance. This thesis argues that only by taking a holistic approach can the humanitarian supply network be fully understood and the basic reason for taking a system approach to the humanitarian supply network is because, as Jackson (2000) states, 'all systems approaches are committed to holism' (p.18). The literature reveals that Maull et al. (2012) were first to have applied systems thinking to a supply chain, albeit in a simple form within a commercial context, despite Sweeney (2011) suggesting that taking a systems approach should be inherent to SCM. Preece et al. (2013) demonstrate how the Viable Systems Model (VSM) could be applied in humanitarian operations, but it is yet to be applied to a research project. In recognising the increasing requirement for supply chain integration, Puche et al. (2016) apply VSM to a single supply chain where the S1 entities comprise the integrated supply chain nodes. Taking a systems thinking approach to the humanitarian supply network is therefore logical and takes the work of Puche et al. (2016) forward by viewing the S1 entities as individual supply chains to be integrated into a structured network. Cabrera et al. (2008) guide the researcher by iterating systems thinking as a formal, abstract and structured cognitive endeavour which 'balances the focus between the whole and its parts and takes multiple perspectives into account' (p.301). When

considering humanitarian logistics, Schiffling et al. (2020b) contend that 'complex problems can only be approached holistically, with reductionist approaches yielding no or unsatisfactory results' and that it is appropriate to do so by viewing the problem though a Complex Adaptive Systems lens. Harpring et al. (2021) advocate taking a systems dynamics approach to achieve a holistic view of a complex emergency operations environment.

6.1.1 The Origins of Systems Thinking

Austrian Ludwig von Bertalanffy and American Norbert Wiener are considered to be the founders of what is now called systems thinking. Von Bertalanffy's background was in physics and philosophy but rejecting reductionism in experimental science developed his interest in 'the system' while exploring organismic biology in the 1920s. Post WW2, his work continued in Canada and the USA where he developed General Systems Theory. Weiner was a mathematician and social commentator who began his work in the 1920s, and so, like Von Bertalanffy, bridged the gap between the exact and the social sciences. His work on statistical analysis of controlled systems and the semi-random movement of particles (Brownian Motion) led him to develop what he referred to as 'cybernetics', described by him as 'the entire field of control and communication theory, whether in the machine or in the animal' (Weiner, 1948, p.11).
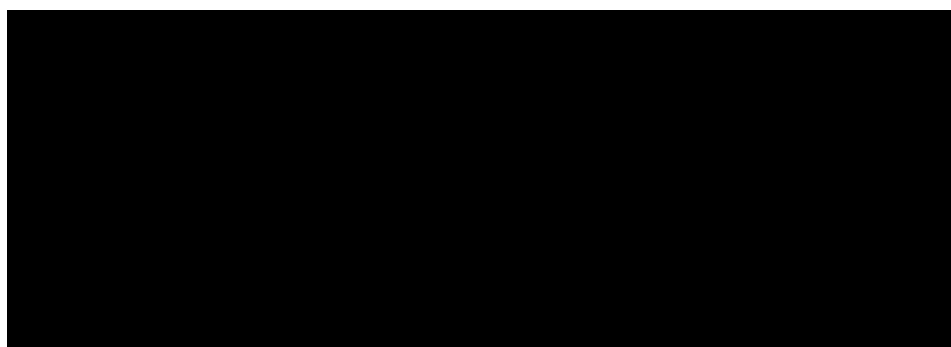
Figure 6.1   Ordering the Various Systems Approaches. (Schoderbek et al. 1990).

In the classification of Systems Thinking approaches, Von Bertalanffy's General Systems Theory is distinct from other approaches in that it takes a general view of the characteristics of a system and focuses on the conceptual relationship of emergence, boundaries and hierarchies of

systems with their environment. Cybernetics, and approaches which are derived from or closely related to it, take a particular approach to the system, e.g. applying a systems approach to engineering (systems engineering); or applying a system methodology to address complex problems in organisations or governments.

This research focuses on the complexities of management and information flows in the humanitarian supply network; the systems approaches specific to this field are those of cybernetics and operational research (OR). In Fig 6.1, Schoderbek et al. (1990) refer to OR as 'operations research'. One of the main tenets of cybernetics is the whole enterprise control system, the concept which necessitates and facilitates the flow of information. By the early 1970s, US cybernetics scientist Stafford Beer had developed a model to test the viability of a system, thereby developing the Viable Systems Model (VSM), a model very much in line with Von Bertalanffy's initial vision. It was therefore a logical progression to apply this model to an organisation experiencing problems, and from there, the application of systems thinking to management science in real-world settings. The pioneer of this OR approach was Charles West Churchman, with Michael C. Jackson and Peter Checkland contributing seminal works and developing Critical Systems Thinking (CST) and Soft Systems Methodology (SSM) respectively.

6.1.2 Taking a Systems Approach to Supply Chain Problem Solving

Echoing Schoderbek et al. (1990) and following on from para 2.7 where taking a systems perspective is described as being a more structured approach to resolving wicked problems, Jackson (2000) explains that 'complex problems involve richly interconnected sets of parts and the relationships between the parts can be more important than the nature of the parts themselves' (p.1). The application of systems thinking to solve wicked problems remains prevalent (Weaver et al. 2020). This emphasis on the resolution of complex, rather than simple situations is the bedrock upon which systems thinking is built. Taking the holistic view of a problem situation is an objective of this research and can be achieved by viewing the problem through the systems lens. Jackson's application of systems thinking to

organisational management shows that the approach was suitable for resolving the complexities of human behaviour within a social setting because it is interpretivist by nature, capable of viewing reality in subjective terms and seeks to maintain social order through consensus. Checkland (2000) reinforced this view through his work on Soft OR by claiming that 'systems ideas could help us to tackle the messy problems of management' (p.S11). Midgley (2013) describes a wicked problem as conforming to the following:

- Many interlinked issues, cutting across the usual silos (e.g., economy, health and environment), making for a high degree of complexity;
- Multiple agencies (across the public, private and voluntary sectors) trying to account for multiple scales (local, regional, national and global);
- Many different views on the problem and potential solutions;
- Conflict over desired outcomes or the means to achieve them, and power relations making change difficult;
- Uncertainty about the possible effects of action.

This research does not suggest that complexity and wicked problems do not exist in commercial supply chains because it is clear that they do. It does however contend that the reasons for the complexity are different and that the level of complexity is greater. It is not difficult to see how many problems arising in any supply chain could conform to all the characteristics above but given that they can arise at what Blecken (2010) describes as the strategic, tactical and operational levels, the risk that they may arise must be taken into account when designing the supply chains which feature in humanitarian supply networks. It appears from the literature that this rarely happens. Van Wassenhove & Pedraza Martinez (2012) recognise that OR methods and models are not routinely used to resolve issues in humanitarian supply chain management and suggest a clear disconnect between humanitarian academics and systems thinkers when they declare that 'if the OR community wants to generate relevant and high-impact research in this area, it needs to understand better the humanitarian context' (p.310).

6.2 Humanitarian Supply Networks through a Systems Lens

Despite Maull et al. (2012) taking the first steps to studying service supply chains through a systems thinking lens, until recently, few contributors have applied systems thinking to humanitarian supply networks. Preece et al. (2013) demonstrate the use of VSM in a disaster context but only through its application to case studies of emergency '999' call centres in UK and Japan responding to an emergency call regarding a relatively simple emergency event; they did not apply it to a humanitarian supply chain, let alone a network. Given the need to explore human behaviours of individual and organisational stakeholders, the application of General Systems Theory is not appropriate. Likewise, neither are systems engineering and systems dynamics as they consider technical modelling of hard systems and their underlying dynamics, albeit in organisational or societal contexts. Whie looking closely at the work of Luhmann, Jackson (2019) concludes that 'social systems are operationally closed systems maintained by an ongoing flow of communications' and that they are '"cognitive systems" which create their own reality' (para 4.7). Ramage and Shipp (2006) suggest that cybernetics would be appropriate as it explores the behaviours of cognitive systems and focuses on feedback and information; OR also contributes by providing methodologies for systemic interventions in addressing intractable problems.

6.2.1 DSRP and The Four Systems Thinking Patterns

Systems thinkers generally concur with the definition of the term 'boundary' which Checkland (1991) proposes as being 'that which formally defines the area within which the decision-making process has power to cause action to be taken' (p.174). This contrasts with the environment outside the system's boundary where the decision-making process can only hope to influence. The bounds of this decision-making domain also define the area over which the system's command function exerts control, and therefore to ensure that the extent and limits of stakeholder responsibility are fully understood, boundaries must be clearly defined. However, Midgley et al. (1998) take a Churchman view of the term boundary by also considering the boundaries to be applied in considering what values and judgements should be included or

excluded in the analysis of a system. It is concluded that that the application of boundary judgements is critical to understanding that boundaries are not just structured by reality but are also the limits of the knowledge that is considered in the system's analysis. There is an important link here with the scope of decision-making because Midgley et al. (1998) suggest that 'pushing out the boundaries of analysis may also involve pushing out the boundaries of who may legitimately be considered a decision maker' (p.468). Therefore, in taking a systems approach, the research should bear both interpretations of boundary in mind.

Cabrera et al. (2008) present the 'four simple rules of DSRP' to explain the skills required by systems thinkers: Distinctions (boundaries); System; Perspective; and Relationships. These contrast with what Midgley (2013) refers to as the Four Systems Thinking Patterns.

	Skills to be a Systems Thinker (Cabrera et al. (2008)	Emphases of Systems Approaches (Midgley, 2013)
Distinctions (Midgley prefers the term **Boundary**)	Distinction making in terms of what is and is not part of a system. By naming it, a boundary is created.	Approaches for exploring value and boundary judgements about what should be included in or excluded from analysis
System	Defining a system as being a whole made up of two or more related parts	Approaches for developing viable and highly responsive organisations at multiple levels (global to local)
Relationships	Relationship identification between concepts and interactions between them. Relationship-making forces our conceptual systems to expand and become more interconnected.	Approaches for understanding complex causality; feedback; vicious and virtuous circles; and the possible consequences of intervention
Perspectives	Perspective as a frame of reference akin to viewing a concept from the point of view of another, and therefore necessitates a subjective viewer (subject) and an objective view (object).	Approaches for addressing conflict; exploring multiple perspectives; developing mutual understanding; and agreeing solutions that people are willing to implement

Table 6.1   DSRP versus The Four Systems Thinking Patterns.

Notably, in response to Cabrera et al. (2008), Midgley (2008) takes issue with several aspects of the DSRP concept, arguing that it 'poses a significant challenge to the systems community by dismissing the practice of methodological pluralism' (p.317).

In addition to Boundary, Midgley (2013) offers three other factors worthy of consideration when applying systems thinking using the format presented by Cabrera et al (2008): Relationship, Perspective and the System. It is suggested that while the researcher should be cognisant of all four of these systems thinking patterns, it is entirely appropriate that one may emerge as a principal approach.
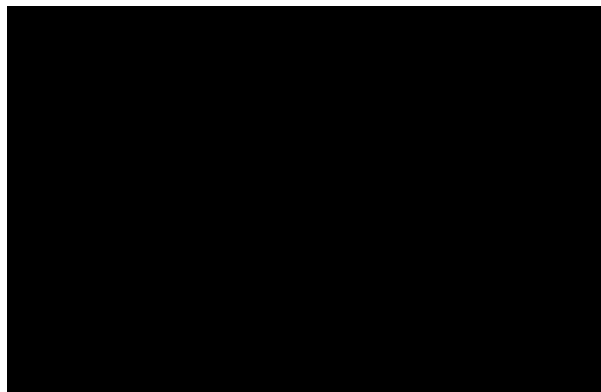
Figure 6.2   The Four Systems Thinking Patterns. (Midgley, 2013).

When considering Relationship, Midgley (2013) alludes to the understanding of complex causality but as intimated in Chapter 2, aside from the meta-synthesis processing of secondary data, this research does not set out to infer causality. Relationship in this context also includes facilitating feedback and considering the possible consequences of intervention, but while this research must take these into account, they are not central to the research aim. Therefore, despite this research focusing on the flow of information within and between stakeholder organisations and the role of coordination, cooperation and collaboration in their inter-relationships, Relationship in this context is not the primary approach. This Perspective approach specifically focuses on addressing conflict by exploring multiple perspectives through which mutual understanding is developed to reach agreed solutions that people are willing to implement. This too contributes to the research aim and will play a role in grounded theory analysis but is not central to the research

topic. However, when referring to Systems within this quadrumvirate, Midgley suggests that taking this approach enables the researcher to develop or design a viable and highly responsive organisation capable of operating at multiple levels, as INGOs seek to do at the global, regional and local levels. Looking at how a system can function within the humanitarian supply network paradigm is central to the aim of this research and it is therefore appropriate to take a systems approach, while appreciating the boundaries of the system, the relationships between stakeholders and the perspectives of each stakeholder at each of the strategic, tactical and operational levels: global, regional and local.

6.2.2 Paradigm Boundaries and Marginalisation

In applying primary and secondary boundaries to the humanitarian supply network as described by Midgley (2013), the primary boundary should fall at the limit of authority and decision-making, where control of the network is perceived to be relinquished. However, since a network in the sense of a humanitarian relief operation is rarely controlled by any one entity, it is extremely difficult to site this boundary using existing supply chain models. Applying a reductionist view, it is possible to discern the control and therefore the boundaries of individual supply chains within the network as these may be controlled and managed by either a single large NGO lead organisation or a small NGO or charity organisation working in isolation. However, this does not provide a holistic understanding of the network.
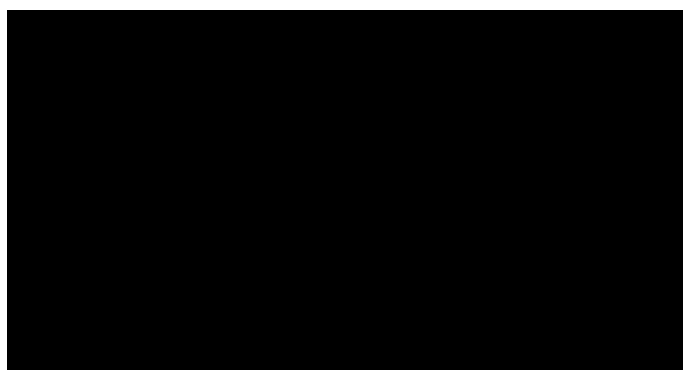
Figure 6.3   Boundaries and Marginalisation. (Midgley, 2013).

It is only through the mutual agreement of stakeholder organisations, augmented by coordination, cooperation or collaboration, that a primary

boundary can be set to define the systemic nature of the network, thereby defining which elements lie within the primary boundary as well as defining which elements are pertinent to the system but lie outside it. These are termed as 'marginalised'. Through the identification of these marginalised elements, it is possible to site the secondary boundary, outside of which there is no pertinent contribution to the system.

In Ramage & Shipp (2006), Churchman stresses that the most central problem to the design of the system is deciding what lies within and outside the primary boundary: how large the system is and how the basic elements are determined. This links back to Churchman's boundary judgements conundrum above.

6.2.3   Relationship and Perspective Conflict

Also quoted in Ramage & Shipp (2006), Ashby observes that a 'peculiar virtue of cybernetics is that it offers a method for the scientific treatment of the system in which complexity is outstanding and too important to be ignored' (p.52). It is inevitable, given the level of human inter-relationship and the breadth of individual and organisational perspectives of ethical, social, political and moral issues, that such complexity will perpetuate the manifestation of issues, challenges and difficulties in humanitarian supply chains. Midgley (2013) refers to these generically as conflicts and shows that they can arise within and from outside the primary boundary of the system. These conflicts are discussed in paragraph 2.6.1 above and Altay & Labonte (2014) list examples of conflicts specific to the humanitarian supply network. In Fig 6.4, Midgley shows how issues and challenges can arise from tensions within the primary or secondary boundary creating conflict, the effects of which are felt throughout the system. Midgley (2013) suggests that the main sources of such conflicts are due to breakdowns in stakeholder relationships, miscommunication between stakeholders and misunderstandings due to stakeholders taking different perspectives of a situation.

Fig 6.4 demonstrates how resolution can be facilitated through what he describes as a symbolic expression in ritual: an accepted form of system

ethos or routine which, in the humanitarian supply network context, is best represented by the role of system coordinator played by the Log Cluster.
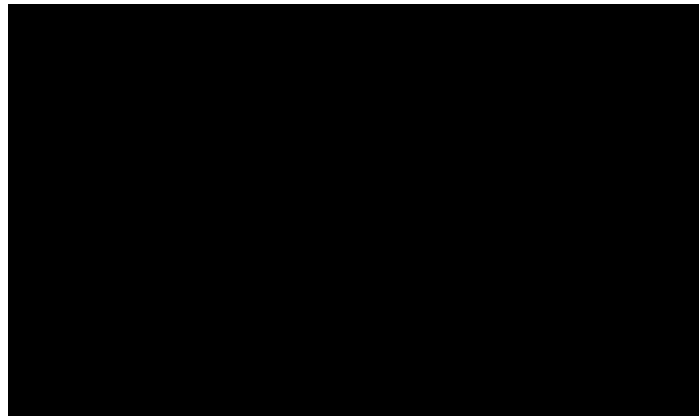
Figure 6.4   System Conflict. (Midgley, 2013).

Issues that occur either within the primary boundary (within a single organisation) or involve agents that lie outside the primary (but inside the secondary boundary) may give rise to conflicts that the system must deal with. Midgley (2013) argues that by still being cognisant of the system and its boundaries, the nature of these conflicts, which may or may not challenge a sacred or firmly held position, would be best analysed by taking either a Relationship or a Perspective approach. Taking a perspective approach requires an understanding of the individual, and often changing perspectives of each stakeholder while the Relationship approach is guided by the data gathered on stakeholder relationships: a more stable data set. For this reason, the Relationship approach is taken in this research.

If Fig 6.3 is considered to be the system at steady state, i.e. operationally dynamic and running smoothly without issues, then Fig. 6.4 can be considered as representing the system with emerging issues and resulting conflict. Each issue that arises will be unique in time and space, as well as being unique from the perspective of an observer and the actors in the situation. It is therefore logical to deduce that the system in steady state can be modelled but that the system distressed by conflict cannot, since each issue must be resolved from first principles. So, a humanitarian supply

network system can be conceptually modelled but must rely on a problem-solving methodology to return it to steady state once a conflict has arisen.

6.2.4 Sub-systems and Control Systems

Where a systems approach has been applied to a commercial supply chain, Maull et al. (2012) recognise the environment and 'wider whole' surrounding the system, and they encapsulate the system as a bounded entity comprising a control element with constituent sub-systems. The diagram at Fig 2.32 describes a commercial supply system with its control system function at its heart. Given the nature of stakeholder interactions in commercial supply chains, participants in such a system can be described as pluralist in that they will have differing values and goals. Flood & Jackson (1991) refer to some sub-systems as being recursive, where elements of each sub-system exist in other related sub-systems. Espejo & Gill (1997) confirm complexity as being fundamental to cybernetic thinking and refer to recursion as a key concept closely related to complexity. This relates to the architecture of a complex organisation and is 'based on the premise that all living things are composed of a series of sub-systems, each having self-organising and regulatory characteristics' (p.2). They describe an organisation functioning at global to local levels with the capacity to adapt to change in their environment and deal with complexity that is relevant to them, characteristics shared by IGOs, INGOs and UN agencies. Espejo & Gill (1997) posit that recursive structures are both efficient generators and absorbers of complexity and are highly adaptive to change; again, characteristics intrinsic to humanitarian aid organisations. Maull et al. (2012) acknowledge the role played by governance in the adding of value to complex supply chains and suggest that the 'response to such complexity is service supply chain management that attempts to control and avoid the emergence and unpredictability of high complexity hierarchies, by increasing ownership' (p.80). The system presented by Maull et al. (2012) in Fig 2.32 lacks the multi-dimensional form of humanitarian stakeholder organisations which operate at global, regional and local levels, but the desired multi-dimensional character can be achieved when a different Systems Thinking approach is applied.

Jackson (2019) describes systems approaches related to problem contexts in 'the system of systems methodologies' (p.158) and considers simple and complex systems in terms of the relationships enjoyed by the system's participants: unitary, pluralist and coercive.
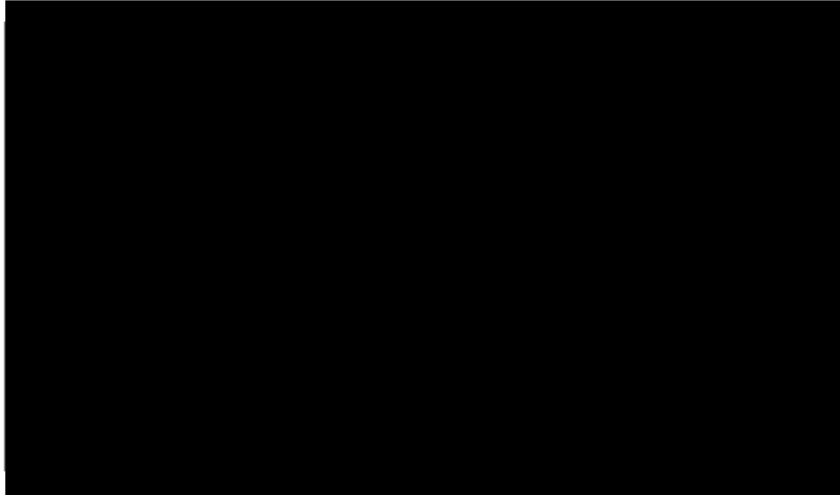
Figure 6.5   System of Systems Methodologies. (Jackson, 2019).

Jackson (2019) takes the view that where unitary participants, like the stakeholders in a humanitarian supply network, are acting as part of a complex system, organisational cybernetics is an appropriate methodology with which to consider the system and for a complex, rather than complicated system, the use of VSM is advocated (p.335). However, when the steady state of the humanitarian supply network system is interrupted by a conflict arising between stakeholders, a pluralist issue is considered to have occurred, and Jackson (2019) advocates the use of SSM as a way of resolving issues among pluralist participants of complex, complicated and simple systems (p.439). Therefore, viewing the humanitarian supply network in steady state through a VSM lens and resolving issues that arise in a pluralist problem context through the application of SSM is entirely consistent with Jackson (2019).

Vilalta-Perdomo (2010) describes VSM as a cybernetic model where 'an organisation's coordination, regulatory and control entities can be maintained over time' (p.78) and one which 'offers a language able to describe entities in terms of their internal constitution and external relations' where it can be

used 'to study how information can be used by a system as a means to control itself' (p.79). It is also worthy of note that Beer (1985) argues that 'any cohesive social institution is an autopoietic system' in investigations into potential pathological autopoiesis in an organisation's sub-system levels.
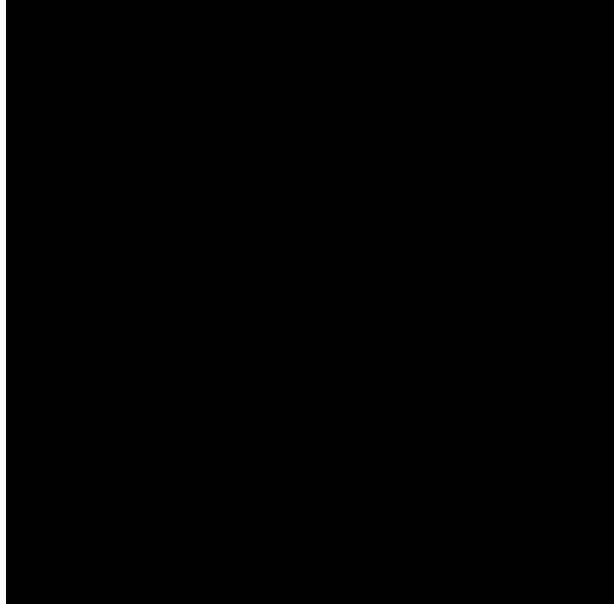
Figure 6.6   The Viable System Model. (Hildbrand & Bodhanya, 2015).

Over the years, VSM as developed by Beer (1985) has been refined and the version presented by Hildbrand & Bodhanya (2015) demonstrates how three operational entities within the system comprise of operational and management components as well as information and control channels, and how they interact with the system's management component and the outside environment. These operational entities are collectively referred to as System 1 (S1); with the coordination and monitoring elements known as the S2 functions. The system management component comprises S3 to S5, where S3 is concerned with the cohesion of operational units and the implementation of internal policy. It allocates system resources and conducts resource bargaining between operational units. S4 is primarily outward- and future-facing; it provides intelligence about the environment and external stakeholders and supports the system in adapting to external and future pressures. S5 is responsible for system policy and governance; it defines the system's mission, objectives, goals, values and culture; and it represents the system to the outside world. S5 also plays an arbitration role between the internal and external resource demands of S3 and S4.

6.2.5 Transformation and the Value of CATWOE

Emanating from General Systems Theory, the term 'transformation' refers to the process by which inputs are transformed into outputs, and this is demonstrated by Maull et al. (2012) in Fig 2.32. In SSM, Checkland (1991) defines transformation as 'the core process of a human activity system which can be expressed as the conversion of some input into some output' (p.319) and is a tool with which a problem situation occurring in a system can be defined, expressed and resolved through an understanding of the human activity system. This understanding is achieved by giving the system 'a concise, tightly constructed description that states what the system is; what it does is when elaborated in a conceptual model built on the basis of the definition, where every element in the definition must be reflected in the model derived from it' (p.317). A well-formulated root definition will comprise six crucial characteristics, captured by the mnemonic CATWOE (see Table 5.1). It is worth noting that while the weltanschauung element of CATWOE represents the perspective taken by stakeholder organisations, the flow of information occurs in the transformation process. Information is inherent in understanding and communicating the initial problem position but also in communicating the necessary transformation activity to achieve the required output to resolve the initial problem position.

This 'systems world' element of SSM can therefore be used to resolve a conflict within a humanitarian supply network system by using CATWOE to understand the crucial characteristics of the system when it has been thrown out of kilter. In a study of a district health system in KwaZulu-Natal, Luckett & Grossenbacher (2003) take the view that the term 'customer', or an early Checkland term for C of 'client' are both inappropriate for use in a Third Sector organisation and instead use the term 'beneficiary'. In doing so, they use BATWOE rather than CATWOE to better express who or what benefits from the transformation. Midgley (2013) applies a systems approach to challenges and issues that arise in community settings and uses the BATWOVE mnemonic, where, as system stakeholders, there are beneficiaries who are active agent and victims who are not. However, accepting that humanitarian supply chains and networks operate in a more

emancipated paradigm, the status of victimhood tends not to be used. Therefore, for reasons stated in 2.2.3, CATWOE is the appropriate term in this research.

As a problem-solving tool, SSM comprises seven distinct steps, shown in Fig 6.7; however, for the purposes of this research, it will only be necessary to follow the process to Step 4.
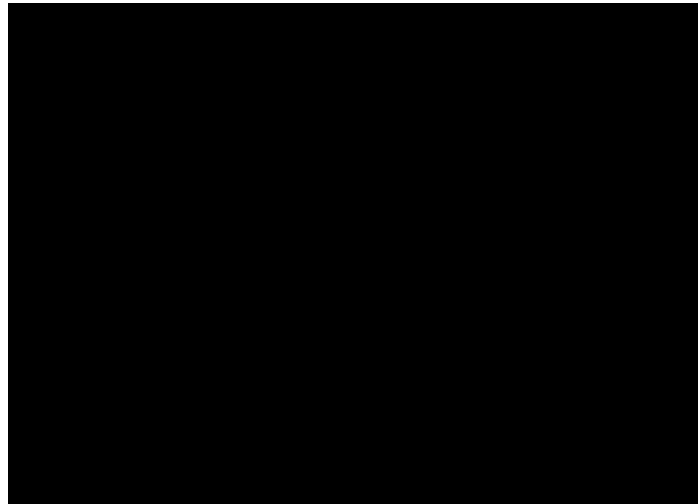
Figure 6.7   Soft Systems Methodology. (Checkland, 2000).

This research considers the Real-World problem and expresses the problem situation, with the model development occurring within the Systems Thinking domain, culminating with the creation of a conceptual model. It is the development of a method to derive root definition for problems in the humanitarian supply network and the creation of domain-specific knowledge guidelines that represent significant contributions to knowledge.

6.2.6 System Fit

VSM and SSM are just two systems thinking approaches described by Flood and Jackson (1991); others include Systems Dynamics (which places its emphasis on structures and processes, and how these shape behaviour) and Critical System Heuristics (which emphasises the importance and role of boundary judgements). Yolles (1999) takes the view that VSM is applicable for an organisation seeking to improve the control mechanisms proposed to be essential for that organisation to be viable, while Jackson (2000) views

SSM as being capable of tackling vague and unstructured problems. Preece et al. (2013) suggest that VSM is particularly applicable in functionalist research where SSM is more suited to research of an interpretivist nature; however, they echo the thoughts of Jackson (2000) by recognising that VSM is not so rigid as to not be valuable in undertaking more interpretivist work. Jackson (2019) examines Systems Practice in detail and considers ten types of systems approach broken down into sections reflecting their optimum applicability. He suggests that Socio-Technical Systems Thinking (STS) and VSM are appropriate to deal with organisational complexity. He notes that STS has been criticised for replying on the pre-existence of a set of common values which is at odds with the humanitarian paradigm, but also that it exhibits managerial bias and tends to be 'more positivist and objectivist in methodological terms' (p.284). VSM, on the other hand, is described as 'sophisticated in the manner it understands the tension between the requirements for stability and change, the vertical embedding of different levels within an enterprise, and the horizontal interdependence of elements integrated by coordination and control' (p.325). VSM is therefore particularly suited to achieving a holistic view of the humanitarian supply network paradigm.

Jackson (2019) identifies several systems approaches appropriate for dealing with 'People Complexity' (p.xxvii) but considers SSM particularly appropriate for undertaking 'interventions' (p.435). Given that a conflict arising in a viable humanitarian supply system would emulate from a decision made by a person and that an intervention would be required to resolve the conflict, the application of SSM would provide the structure needed to achieve resolution through critical reflection and discourse. Therefore, by taking advantage of the potential compatibility of these two approaches, the complexities of humanitarian supply networks can be addressed. VSM represents the system in a harmonious, steady state while SSM can address conflicts that throw the system out of its steady state.

6.3   Solutions in the Systems Domain

This research concerns itself with the ability to resolve conflicts in the humanitarian supply network by taking a holistic approach using systems thinking. As such, it does not concern itself with resolving a specific conflict, but rather provides the means to resolve any conflict through the application of SSM from first principles. Therefore, the area of SSM which is of most interest, and the area in which conceptual modelling will take place, is what Checkland (1991) referred to as the 'Systems World' (see Fig 6.7). The Systems World is a somewhat abstract place were the CATWOE characteristics can be applied to the system experiencing the problem situation; in this case the humanitarian supply network when a conflict has emerged, and it is no longer a system in its steady state.

6.3.1   The Pathway from the Problem Situation

Within SSM, it is important to determine the problem situation from as many perspectives as possible, and this can only be achieved through primary data analysis, using the richest possible data to build up a comprehensive picture of the situation. This allows viewpoints to emerge which facilitates the identification of systems or a hierarchy of systems relevant to problem-solving. It is this emergence that plots the pathway between the unstructured problem situation in Real World and the more abstract Systems World, the domain in which the conceptual model will be produced. In deriving the root definition of a system, Checkland (1991) states that the following question needs to be answered: 'What are the names of notional systems which from the analysis phase seem relevant to the problem?' (p.166). This gives the opportunity to take different perspectives of the problem situation and to give each perspective a root definition of the systems identified.
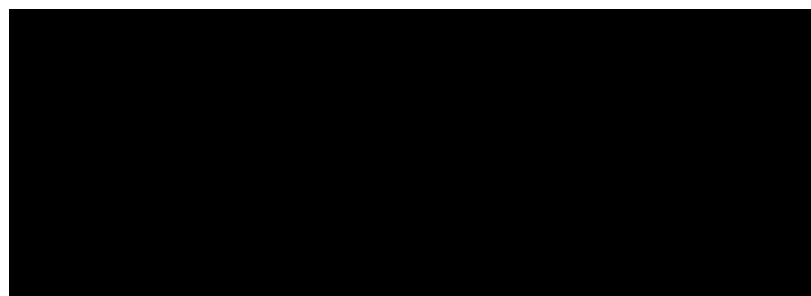
Figure 6.8   Systems World Domain. (Extracted from Checkland, 2000).

The conflicts that can be resolved in the Systems World domain, specifically through other design thinking, are those which arise through interaction with the environment, those involving boundary judgements and those involving value judgements. Conflicts that arise through the manifestation of risk can only be resolved through risk management in the real world because a system is not designed to contend with an infinite number of perceived risks, although it has to be able to identify when a risk manifests itself.

6.3.2 Root Definition Contribution

The role of transformation and the value of CATWOE are intimated in paragraph 6.2.5 above, and it is through these that the root definition is derived. Checkland (1991) gives an example of a root definition. In the context of humanitarian supply networks, this would look like:

> *A (… Owner …) owned system which, under the following environmental constraints which it takes as given: (… Environment …), transforms this input (…) into this output (…) by means of the following major activities among others: (…), the transformation being carried out by these actors: (… Actors …) and directly affecting the SMEs (… Customers …) in providing relief to beneficiaries and / or victims. The world view which makes the transformation meaningful contains at least the following elements among others: (…Weltanschauung …).*

The root definition is therefore a description of a set of purposeful human activities conceived as a transformation process and is used to create the model which will accomplish that which is defined in the root definition. Checkland (1991) describes 'the root definition is an account of what the system is; the conceptual model is an account of what the system must do in order to be the system named in the definition' (p.169).

6.3.3 Conceptual Model Influences

Checkland (2000) demonstrates how the conceptual model at Stage 4 of the methodology is then exposed to both a formal systems concept (Stage 4a)

and other systems thinking ideas and tools (Stage 4b). In this research, VSM is the conceptual basis and plays the role of the formal concepts system in the systems domain.

The conflict modelling cycle is an example of a systems thinking tool which can also contribute to the conceptual model at Stage 4b. Based on conflict theory, Yolles (1999) describes its goal as being 'that organisations should be able to adapt socio-culturally, involve socio-political reorientation, and should involve themselves in behavioural adjustment' (p.465). On the surface, this appears to align well with the aspirations of many humanitarian supply network stakeholder organisations.

6.4 Conclusion

All research is underpinned by a conceptual basis but the research currently being undertaken in the field of humanitarian supply network management suffers from a lack of applicable models and tools. The theories that underpin current work (Fig 2.10) are drawn from commercial supply chain thinking and adapted to specific challenges and issues arising during humanitarian operations. The lack of a holistic framework concept through which to view this complex paradigm leads to a reductionist view of the challenges and issues because they are viewed in isolation as either supply chain processes or functions.

Systems thinking offers a robust conceptual basis in the form of VSM because, in a similar way to Blecken (2010), it can be applied to a multi-layered supply chain organisation operating at strategic, operational and tactical levels but it can also accommodate the complexities of multiple supply chains coming together in a supply network. However, while VSM provides a sound conceptual base and has been applied in different settings, it does not have the flexibility of coping with issues that have hitherto not be captured by commercial supply chain models. Should such issues arise, SSM becomes a valuable tool because by deriving a root definition of the system from the problem situation, a domain-specific conceptual model can be developed using an array of other systems thinking tools, taking into

consideration such factors as the customer, end beneficiary and donor; all the stakeholders; the owners of the system (where such an entity exists); environmental constraints; the desired transformation process to resolve the problem; and the world view (Weltanschauung) that makes this transformation meaningful within the context of the whole system.

By taking a systems approach to the research and using VSM as the initial conceptual basis, it is expected that issues within the humanitarian supply network can be identified, examined and analysed in a holistic manner, as detailed in Chapter 3, with a full understanding of the impact that a localised action would have on the greater system. Where problems become difficult to resolve within VSM, SSM offers a fully flexible, holistic solution by providing a CATWOE-type framework from which to derive a bespoke conceptual model through the determination of a problem situation specific root definition. Therefore, by combining the merits of VSM and SSM, a conceptual framework has been produced, capable of resolving the complex problems that arise in humanitarian supply networks.

'Ludwig von Bertalanffy occupies an important position in the intellectual history of the twentieth century. His contributions went beyond biology, and extended to psychology, psychiatry, sociology, cybernetics, history and philosophy. Some of his admirers even believe that von Bertalanffy's general systems theory could provide a conceptual framework for all these disciplines.'

<div align="right">

Thaddus E. Weckowicz (1989)

</div>

7.1   Applicability of a Systems-based Conceptual Model

Notwithstanding the astute observation made by Weckowicz above, Chapter 6 justifies the theoretical position that taking a systems thinking approach to resolve the complexities uncovered in the data is appropriate. The most recent work, undertaken by Schiffling et al. (2020b) and Harpring et al. (2021), shows how the notion of considering humanitarian supply chain management in more holistic terms is gaining traction. Away from humanitarian or emergency operations, Jagustovic et al. (2019) take a generic view and suggest that 'since systems are (conceptually) bounded entities subject to boundary reflection, this requires a holistic understanding of the system' (p.67). As described in para 6.2.2 above, the humanitarian supply network paradigm is subject to its own boundaries and therefore it is appropriate to describe it as a system.

7.1.1 Beyond the C^3 Scale

In an examination of conflict in stakeholder relationships, Weaver et al. (2019) take the C^3 scale a step further. In Fig 4.3, they argue that by applying critical systems heuristics (CSH), stakeholders can undergo transformations in their world views to the extent whereby a single basis of motivation, power, knowledge and legitimacy can be attained; the creation of a single system. Problem definitions, solution proposals and the evaluation of outcomes can be determined using CSH and this is of particular relevance in trying to achieve a holistic view of the humanitarian supply network. Ulrich (2005) suggests that the process of determining these aspects of the problem is

'dependent upon prior judgements about the relevant "whole system" to be looked at' (p.1); what Ulrich (2005) and Midgley & Pinzón (2011) refer to as 'boundary judgements'. Boundary judgements determine which empirical observations and value considerations from data that count as relevant and how these judgements shape 'facts' and 'values' when assessing the meaning and merits of statements and implications in the data.
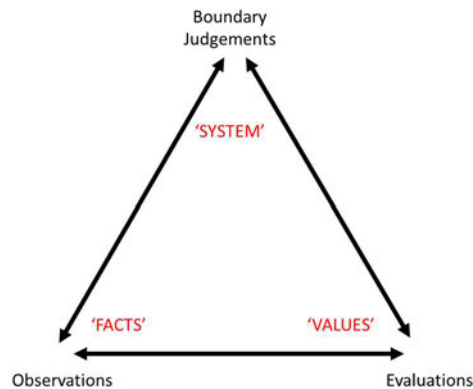
Figure 7.1   The 'Eternal Triangle' of Boundary Judgements, Facts and Values. (Ulrich, 2005).

In using the term 'situation' rather than 'system', Reynolds & Holwell (2020) explain that to make sense of a situation, one must first appreciate the bigger picture (p.256). By having a more holistic awareness the situation, one attains an awareness of 'the values and motivations built into our views of situations and efforts to "improve" them; the power structures influencing what is considered a "problem" and what may be done about it; the knowledge basis defining what counts as relevant "information", including experience and skills; and the moral basis on which we expect "third parties" to bear with the consequences of what we do, or fail to do, about the situation in question' (p.257). This links directly to Fig 4.3 and to the data confirmed through iterative triangulation. The 'situation' or 'system' is the humanitarian supply network paradigm, and the challenge is to find a mechanism that can embrace motivation, power, knowledge and legitimacy in a manner appropriate to all stakeholders. This has been achieved by treating the paradigm as a system and mapping the existing dynamic network in terms of a meaningful systems model in steady state and in a state of conflict. Chapter 6 looks at several models which contribute to systems thinking and

suggests models designed to inform or confirm a system's viability and to resolve conflict within a system.

7.1.2 The Conceptual Basis

The literature review describes the lack of specific theoretical foundation for supply chain management and operations. It also describes the complexity of supply chains in the commercial and humanitarian contexts and demonstrates the gulf that currently exists between theory and complexity. Chapter 4 examines the issues encountered by stakeholders in terms of stakeholder relationships and engagement in society generally and poses the question, '*Would taking a holistic view of supply chains in the humanitarian domain allow the flow of information to address conflicts within the paradigm?*'. Chapter 6 identifies the gradual move from humanitarian supply chains to humanitarian supply networks and poses the question, '*Is the nomenclature "humanitarian supply system" now more appropriate?*'. To answer these primary questions posed by this research, it is necessary to pave the way between the complexity experienced in the real world and the theory that can resolve these complexities. The literature review is clear that efforts to resolve real-world challenges have made little headway, so this research examines whether using a different conceptual approach will deliver the resolution so eagerly sought. Chapter 4 concludes that a holistic view can be achieved by using systems thinking as the conceptual basis of resolving challenges in humanitarian supply networks and Fig 6.8 demonstrates that a systems domain exists in Checkland's Systems World domain. By using VSM to give stability to humanitarian supply networks in steady state and by utilising the Systems World element of SSM to resolve conflicts, humanitarian supply network complexity could theoretically be supported as a viable system. Therefore, the conceptual basis of this research follows a pathway from what Midgley (2013) describes as distinct complexities to a stable and predictable system using VSM supported by SSM as a conflict resolution component.

7.1.3 Mapping the Paradigm in Steady State

VSM demonstrates the functions of coordination, cooperation and collaboration particularly well (Preece & Shaw, 2019; Hildbrand & Bodhanya, 2015; and Awuzie & McDermott, 2016). VSM as described in para 6.2.4 is now projected onto the humanitarian paradigm, where the S1 circle symbols represent the in-country supply chain operations with the S1 rectangles representing the individual organisation's in-country, regional and strategic supply chain management structure. To the side of the S1 function, the small upward pointing S2 triangle symbol represents the coordination function that occurs within each stakeholder organisation and the single large triangle, the in-country level coordination which is normally filled by the Log Cluster in UN-led operations (OCHA, 2020).
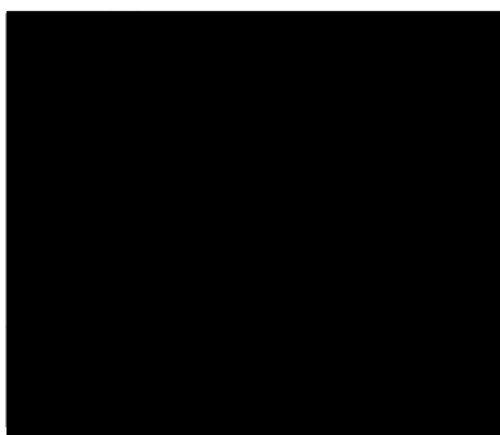
Figure 7.2   The Viable System Model: the S Functions. (Hildbrand & Bodhanya, 2015).

The downward pointing S2 triangle represents the monitoring function, often undertaken by the Log Cluster who have no authority to intervene where such monitoring reveals a systemic issue to be remedied. S3 controls the system and is concerned with forces inside the system, while S4 sits above S3 is often labelled 'Intelligence'; it is concerned with forces outside the system. S4 is intrinsically where cooperation would occur if the system chose to cooperate with another organisation either inside or outside its system. Meanwhile, decisions to enter into collaborative engagements are based on strategic aims, objectives and flexibility. Collaboration involves organisational dovetailing of governance and policy between stakeholders and therefore in a VSM humanitarian context, this would occur at the S5 level. From the data,

it is acknowledged that cultural problems could arise within the S3 to S5 components because this is area of the VSM model where power is concentrated.

System Component	Component Purpose in Humanitarian Context
S1	Individual operations line: already in existence at in-country, regional and strategic levels.
S2	Coordination and monitoring construct: nominally already conducted by the Log Cluster but monitoring only in an advisory capacity.
S3	Management and control of stakeholder organisations and the implementation of internal policy: could be conducted by each organisation where a mutually agreed set of Standing Operating Procedures (SOPs) exists. Many aid agencies already have similar SOPs as a result of best practice established over time.
S4	Primarily outward- and future-facing information receptor: provides information about the environment and external stakeholders and supports the system in adapting to external and future pressures. This function could be provided by a developed Log Cluster where non-UN actors have a formal 'seat' and establish close liaison with their own organisations' planning and programming staff.
S5	System policy and governance component: would require an agreed system mission, objectives, goals, values and culture, even if individual partners are 'exempt' aspects of these for accepted cultural reasons. S5 represents the system to the outside world and the data shows that humanitarian organisations already share these elements.

Table 7.1   VSM System Operational and Management Components.

Organisational power struggles in the humanitarian logistic paradigm are common: donor retention, reputation, strategic aims and cultural differences are all legitimate obstacles to a single S3 – S5 authority being established. As a result, any contention over the aspects of power, control and ownership arising in S3 - S5 needs to be exposed to the CSH stakeholder sources of influence of motivation, power, knowledge and legitimacy. Where each stakeholder recognises the values and culture of their partner organisations and buys-in to the concept of collaborative working, an accepted code of governance could be mutually agreed, and exemptions made for legitimate cultural reasons. Collaboration requires organisational transparency, where the strengths and weaknesses of each partner can be articulated and understood for the benefit of the whole rather than for the critical treatment of an individual organisation. This form of system management is autopoietic in that the motivation, power, knowledge and legitimacy come from within the

system stakeholder organisations and the system is capable of maintaining its viability by resolving conflicts that arise within it.

7.1.4 Resolution of Conflict

As early advocates of applying systems thinking to disaster response, Preece et al. (2013) conclude that 'VSM has never been used in a disasters context' (p.209) but they demonstrate through case studies how it could be used to model communication channels inherent to the relationships between elements in a humanitarian supply network by not looking at organisations purely in hierarchical management structure terms. They argue that in the humanitarian context, the operations at S1 mimic the multi-faceted form of competing and complementing supply chains and stakeholder organisations which already exist in the humanitarian supply network, with donors and outside support being represented in the Environment.

While VSM can take into consideration the relationships between stakeholders and the vertical structure of organisations within the humanitarian supply network, as well as the environment they interact with while it is in a steady state, it lacks the flexibility to address the conflicts that can arise. These could be based on organisational management or cultural considerations, or on a stakeholder's ethical view on discrimination or corruption. These are the problems of a human activity system as described by Checkland (1991). Such conflicts will inevitably arise in the operations undertaken in VSM's S1, and since each conflict will be unique, a bespoke system model would be required for each occurrence, based on a methodology capable of being easily derived from first principles. The purpose of this methodological tool would be to undertake a transformation to return the system to a steady state following the emergence of a conflict.

7.1.5 The Conceptual Framework

With individual stakeholders making up the S1 component, a restructured Log Cluster comprising S2 and the governance functions being exercised through agreed policy and procedures, the humanitarian supply network can achieve holism by functioning as a viable system based on VSM.
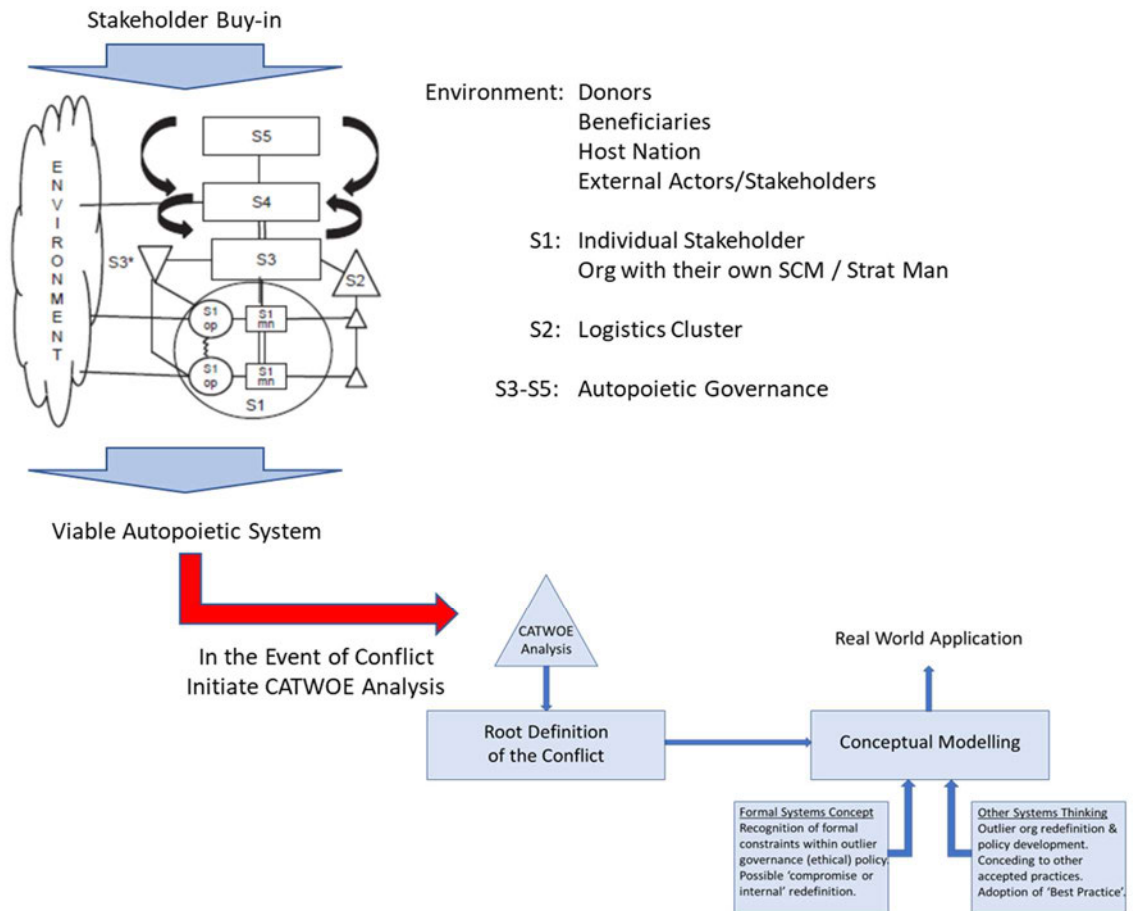
Figure 7.3   Conceptual Framework of a Humanitarian Supply Network.

When functioning without internal conflicts, the system would operate in steady state, but when an inevitable conflict occurs, resolution would be achieved through the utilisation of SSM Systems World structures: CATWOE analysis, root definition and a resolution conceptual modelling derived from formal systems concepts and applying other systems thinking. The resolution conceptual modelling will be bespoke to the conflict experienced because the root definition will be unique to the problem (the outlier subsystem), as too will be the applied systems thinking which supports it.

7.2. Validating the Conceptual Framework

In validating a conceptual framework in the real world, Platts et al. (1998) use the terms 'usability' to validate whether a framework or process can be used in the real world and 'utility' to validate whether using it makes any

meaningful contribution to the real-world situation (p.521). However, when they validate a framework or process design concept, they describe this as validating its 'feasibility'. While validating this conceptual framework for its usability and utility in a real-world situation falls outside the scope of this research, establishing whether the conceptual framework can be validated as being feasible is very much within scope. Punch (2014) states that feasibility only applies to the inference we make from what we observe and therefore the feasibility of the conceptual framework is established by considering the theoretical expectations of it against the inferences offered by the data derived from the primary and case study data sources, but also against those of the theoretical case as derived from the process of iterative triangulation.

7.2.1 Application of the Primary Data

One scenario captured in a primary data interview (SI-04) described the problems faced by an INGO organisation in trying to secure the provision of sustainment (food, water and basic hygiene) supplies to refugees in camps in NE Syria. The situation involved several non-Middle Eastern players operating in a highly volatile environment with little operational intelligence on the activities of combatant parties (including ISIS) and failing internet connectivity. ISIS violence in the area resulted in severe disruption to the INGO supply chain and a resulting scarcity of food and water in the refugee camps. Interviewee SI-04 points out that there was no Log Cluster presence in that part of Syria because, for political reasons, it had been deployed to Damascus where it was considered that its contribution would be greatest. Other aid agencies were known to have been operating in NE Syria but with the security situation worsening, there was no default plan to reinforce the aid effort in the area. The situation was only resolved by rationing at the camps, ad hoc low-level passage of information to communicate priority groups and the local supplies that could be diverted to them, the bravery of some non-combatant locally employed personnel and the eventual stabilisation of the security situation. Using the evidence provided by Interviewee SI-04 in the context of the Humanitarian Supply Network Conceptual Framework in Fig 7.3, it is suggested that:

VSM Component	Entity Proving the Function of the Component
S1	At least three aid agencies were operating in the area and in a viable system, their activities would have been coordinated by the S2 component.
S2	In the absence of the Log Cluster, a hastily formed 'NE Syria Forum' was formed by the respondent and others but only after the need was established by the worsening security situation. Ad hoc coordination and monitoring conducted.
S3	Had the S3 (routine management) component been in place, even in the form of coordinated SOPs, the worsening security situation would have been bench-marked against tolerances that would have alerted the S4 component to the potential threat to the supply chains.
S4	No S4 entity was in place to provide intelligence regarding the deteriorating situation or the restrictions that would impact potential solutions, e.g. supplies from NW Syria, Turkey or Iraq. A S4 entity would also have been in a position to contingency plan for disruption and provide an earlier supply-need triage system.
S5	Given that this was a conflict-induced disruption with no S3 entity in place, the presence of a S5 entity would have had limited effect in dealing with the tactical nature of the situation but could have provided a lessons-learned element to the aftermath to ensure no repetition.

Table 7.2   Primary Data Scenario: VSM Validation.

If it is assumed that the predicted viable system comprised three NE Syrian INGOs working together under the coordination of an already established and functioning 'NE Syria Forum' and working to the set of processes, procedures and SOPs agreed by the three INGO partners, then the conditions would have existed to facilitate a resolution of the problem situation. This would have been achieved under a joint initiative umbrella management agreement which would have facilitated the accurate passage of vital information. This management stratum would have elements from one of the umbrella organisations deployed to monitor the environment and provide liaison with the subject matter expert Refugee Camp administrators. The three partner organisations would have shared values, even if they were drawn from different ethnic backgrounds (Middle Eastern / non-Middle Eastern). Given the data provided by Interviewee SI-04, such a system could have existed and therefore, by exposing this system to the SSM Systems World domain, the validity of the second part of the conceptual framework can be established if the root definition of the initial problem can be considered as being meaningful.

> *A system owned by no one stakeholder organisation which, under the environmental constraint of supply chain disruption caused by ISIS combat operations, transforms the scarcity of essential supplies into the provision of essential supplies by activating contingency plans and reserve stocks, the transformation being carried out by the NE Syria Forum and directly affecting the refugee camps administrators in providing relief to refugees. The world view which makes the transformation meaningful includes the Dunantist ethos of each INGO, the shared determination to overcome the supply chain disruption and the impartial and politically neutral humanitarian values of each party.*

Table 7.3   Primary Data Scenario: SSM Validation.

The key point to note in the root definition of this problem is that the humanitarian supply network is referred to in systems thinking terminology as 'a system' that is owned by an owner (see Table 5.1: CATW**O**E). In terms of ownership, control and management, had an appropriate system existed comprising these predicted stakeholders, where their steady-state viable system was exposed to conceptual conflict in the form of supply chain disruption as a result of ISIS combat operations, the conceptual framework would require the application of SSM to return the conflicted system back to steady state. The precursor for this is a meaningful root definition and, in this case, the root definition can be assessed as sufficiently meaningful as to permit the application of the formal systems concept and other systems thinking initiatives to achieve a Real-World solution.

7.2.2 Application of the Case Study

Para 4.1 of Appendix G describes the problems faced by logisticians in the Yemen 2020 case study. The ongoing conflict was showing no sign of abating, COVID was spreading across the globe, exacerbating already severely disrupted supply chains into the country via different channels and starvation among the civilian population was causing grave international concern. Local, ad hoc, informal stakeholder relationships opened new avenues to achieve the most efficient and effective use of the little aid being delivered. The stakeholder organisations cannot be considered as belong to a humanitarian supply system because although the individual stakeholders clearly functioned as S1 entities and the Log Cluster was deployed and carrying out the S2 function, the S3 to S5 components were not in place.

However, the establishment of the dedicated project coordination cell was an unprecedented move by the stakeholders because if afforded a platform within the Log Cluster which, in very loose and informal terms, effectively replicated the S3 to S5 components.

VSM Component	Entity Proving the Function of the Component
S1	A diverse group of stakeholder organisations worked alongside but often separately from the WFP; but all were members of the Global Logistic Cluster forum.
S2	The Log Cluster benefited from input from knowledgeable and experienced INGO stakeholders and established a special project coordination cell where stakeholders worked collaboratively regardless of their size, INGO / UN agency status and cultural make up. Both coordination and monitoring supported the collaborative working. Some partner organisations could be considered to have been unlikely allies.
S3	The project coordination cell performed the S3 function in as far as it collectively and mutually set parameters for stakeholder operational management and involvement. Participating in specific tasks was elective and this provided the latitude to contact belligerent groups that were hitherto outside many partners' ethical scope.
S4	Having forum partners who were able to gain an extended oversight of the security, economic, political and international aid situations provided a expansive view of the environment, including the condition of those in need, commercial opportunities for economies of scale and dedicated safe movement routes.
S5	The governance for the system was an in-country consensus among logisticians on the ground. The degree to which their parent organisations had sanctioned their engagement is not recorded but at a low level and working within the governance guidelines of the own organisations, the S5 component can be said to have existed.

Table 7.4   Case Study Scenario: VSM Validation.

This case study represents the closest replication of the S1 to S5 components of a viable system and can be considered an almost unique example of how a humanitarian supply system could function in steady state in the real world. It is assumed that to achieve this level of collaboration, in-country stakeholders must have had the backing of their parent organisations. This being the case, the solution that was found can be considered a mutually beneficial autopoietic system and is a validation that such a system can function in steady state.

Due to how close this case is to the viable system, to validate the conflict resolution component of the conceptual framework, a root definition of the

actual problem is determined. Since there is no evidence of a conscious application of theoretical systems thinking to the in-country problem by the Log Cluster, it has to be assumed that there was no application of a specific systems model but that other initiatives with the characteristics of systems thinking were responsible for returning what can be theoretically considered a viable system back to steady state. Such characteristics would include a tendency to work collaboratively at the in-country level, a willingness to achieve a holistic view of the problem and an understanding that solutions to the many problems facing individual stakeholders could not be resolved in isolation, but rather required a concerted effort. A root definition of the problem that led to the establishment of the project coordination cell would resemble the following:

A system not owned by any individual stakeholder which, in an armed conflict environment where resources and essential supplies are scarce, transforms the lack of supply chain stakeholder cohesion into a diverse, collaborative network, the transformation being carried out by the Log Cluster by establishing a project coordination cell that can directly support partner organisations in delivering essential supplies to hitherto unreachable locations as part of a triage system. The world view which makes the transformation meaningful includes the Dunantist ethos of each stakeholder, the ability of commercially minded individuals to exploit market opportunities for the benefit of all partner organisations and a willingness to pool material, human and knowledge resources transparently, to mutual benefit.

Table 7.5   Case Study Scenario: SSM Validation.

In this case, the issue of ownership is noteworthy because it was not a key consideration of the stakeholder organisations. The most likely reason for this is borne out in much of the primary data: in-country logisticians, particularly those who have little engagement or understanding of their organisation's strategic business, are more likely to work collaboratively with like-minded individuals from their perceived logistician community. It is unclear whether this is a lack of organisational awareness on the part of these practitioners, but it is testament to the fact that such collaboration is possible at the tactical level. In this case, while no one entity owned the system: to an extent they all collectively owned it. It was organic to the stakeholder group, it was mutually demanding and beneficial, it directed available material resources where they were needed most at any given time, and it provided a platform for all

members of the group to contribute in a meaningful way. The available data suggests that stakeholders appreciated the strengths of others and played to those strengths themselves in the knowledge that this was an acceptable action to take. The stakeholders demonstrated that it is possible to act in an autopoietic manner, as part of a systemic network which resembles the theoretical underpinning of the conceptual framework.

7.2.3 Application of the Theoretical Case

The theoretical case, as articulated in para 5.6, possesses the characteristics identified from the primary and case study data. In practical terms, it sees a group of logisticians managing several independent humanitarian supply chains as part of a wider network coordinated by the Log Cluster. These practitioners are like-minded, feel that they belong to a community of in-country logisticians and naturally strive for efficiencies and improved effectiveness at the tactical level. They are unitary participants in the paradigm. They communicate laterally among themselves and as necessary with their parent organisations. They have limited contact with strategic level planning and programme management within their own organisations and the strategic communicate they do enjoy is with logisticians in their strategic supply branches. For the most part, organisational cultures and ethos are widely acknowledged and, in many cases, shared with other partner organisations. Practitioners on the ground are aware of their organisation's policy and procedure frameworks as well as those of fellow partner logisticians. In-country practitioners appear to understand the strengths and weaknesses of partner stakeholder better than strategic managers. As a result, practitioners feel constrained and frustrated at a lack of holism in gaining a view of operational activities, effectiveness and resource management. This occurs despite organisational working practices being broadly similar and stakeholders voicing an aspiration for a more cohesive and holistic approach to aid delivery. In-country, there is little appetite to engage with external entities and while strategic level management acknowledges the role universities, institutes and collective forums can play in improving their working practices, little engagement ever occurs.

The functional components in this theoretical case reflect those in the cases above because the theoretical case is borne out of the research data. Therefore, it is the application of the theoretical case data to the VSM and SSM elements of the conceptual framework that best describes the validity of the whole framework.

VSM Component	Entity Proving the Function of the Component
S1	The individual stakeholder supply chain operations are strategically driven by organisations in isolation but coordinated in the Log Cluster through the actions of in-country logisticians working on their own initiative but within their organisation's governance framework.
S2	The Log Cluster provides coordination and a brokerage for the exchange of ideas, information and resources at the tactical level.
S3	The only in-country management of the supply network is an intangible construct relying on combined working practices, the acceptance of best practice where appropriate, acknowledgement of shared strategic policies, processes and SOPs and a willingness to at least cooperate if not collaborate at the in-country level.
S4	The link to the environment occurs on an ad hoc basis with data and intelligence being shared in the Log Cluster by willing participants.
S5	Strategic governance guiding and directing stakeholder practitioners remains the responsibility of each stakeholder organisation and is not coordinated, let alone coherent. Each governance set reflects the culture, ethos and raison d'êtré of each stakeholder.

Table 7.6   Theoretical Case Scenario: VSM Validation.

As with the previous two data sets, the theoretical problem posed in this case is exposed to root definition to achieve a holistic understanding of the existing generic situation faced by humanitarian supply chain managers and practitioners. The logic applied to arrive that this VSM interpretation and SSM root definition follows the golden thread evident throughout the data analysis. This provides an empirically rich, generic definition which succinctly articulates the problem faced within the humanitarian supply network paradigm.

A system not owned by any individual stakeholder which, in an emergency disaster relief environment where resources and essential supplies are scarce, transforms the lack of supply chain stakeholder cohesion into a diverse, collaborative supply network capable of prioritising the needs of beneficiaries, the transformation being carried out by the Log Cluster officially augmented by appropriately qualified stakeholder participants that can directly support partner organisations in delivering essential supplies to where they are needed in accordance with humanitarian principles. The world view which makes the transformation meaningful includes the Dunantist ethos of each stakeholder, the ability of appropriately knowledgeable individuals to exploit

environmental opportunities for the benefit of all partner organisations and a willingness to pool material, human and knowledge resources transparently, to mutual benefit.

Table 7.7   Theoretical Case Scenario: SSM Validation.

7.2.4 Application of Critical Systems Heuristics

This research discusses the humanitarian supply network paradigm, and to an extent, the limits or boundaries of the paradigm are known: it comprises the supply chain domain of an emergency disaster response operation involving international actors delivering aid to those in need at the bequest of the host nation government. The primary output of this research is a conceptual framework based on the theoretical case that has been constructed from the data analysis. However, to validate the conceptual framework robustly, this domain boundary must be defined in theoretical terms. The data has established that, to ensure that it can be viewed holistically, the paradigm is to be considered as being a system. Using CSH, the boundaries of this system can be defined not just in its 'is' state (which correlates to the real-life reality described above), but also in its 'ought to be' state which reflects the theoretical reality of treating the paradigm as a system. Using CSH's Twelve Boundary Questions, that which ought to exist can be gauged.

SOURCES OF MOTIVATION

(1) The client is the subject matter expert who understands the actual needs of the beneficiaries and can communicate these along the appropriate supply chain. The beneficiaries, whose interests should be served, are those affected by the disaster and who require the aid.

(2) The purpose of the supply network is to deliver emergency aid to wherever it is required, when it is required, in the quantities is it required and in the required timeframe. This should lead to a significant improvement in the conditions being experienced by those affected by the disaster.

(3) In the humanitarian system, the measure of improvement or measure of success is difficult to determine; however, it ought to be the delivery of any amount of aid to anyone who requires it. This is a contentious topic and one that falls outside the scope of this research. However, there is some moral agreement that even one life saved is worth the effort.

SOURCES OF POWER

(4) The decision-maker ought to be someone who exercises control over their own supply chain but has a holistic view of the whole network (of supply chains) or someone who, having thorough understanding of the workings of the network, can appreciate the effect their decisions can have on the network. This individual should be in a position to change the measure of improvement within their own supply chain and communicate this to other stakeholders so that they too can critique their supply chains to strengthen the workings of the network. This decision-maker should be making decisions within the bounds of a strategically agreed governance framework to which all stakeholders in the system subscribe.

(5) The resources and other conditions of success that ought to be controlled by the decision-maker are those over which the decision-maker exercises authority and responsibility. Those involved at the individual supply chain level should control those elements of their own supply chain for which they have authority and responsibility. Only an agreed body of stakeholder representatives should exercise any form of control over network issues, and where they do so, they should be in adherence to, or in direct implementation of, the strategically agreed governance framework.

(6) Strategic success is difficult to define but the end-state defined by a donor could provide a metric for an individual supply chain. Decisions regarding the success of an individual supply chain should be retained within the operational responsibility of that supply chain's manager, but where the decisions made in support of a single supply chain impact on the system, an appropriate body representing the interests of the strategically agreed governance framework ought to be able to influence those adverse decisions. By reiterating the strategic aim and advising of the adverse effects, the strategically agreed governance framework would become a passive part of the decision environment. The decision-maker in an individual supply chain should not control conditions in other supply chains but should not be able to destabilise the equilibrium of the system by causing adverse conditions to arise in other parts of the network.

SOURCES OF KNOWLEDGE

(7) Within individual supply chains, stakeholder organisations will determine who is to be considered a professional or subject matter expert. Within the system, individuals will present their credentials as they always have. Individual stakeholder organisations should nominate their representatives to the Log Cluster, particularly to any specific stakeholder role within the Log Cluster.

(8) Stakeholder organisations should determine what counts as relevant knowledge for the purposes of their supply chains and this should suffice for the operation of the system because stakeholders share the responsibility to ensure only appropriately qualified individuals are deployed to positions in-country under operational conditions.

(9) Stakeholders involved in a DRO should seek guarantees that improvement is being achieved from the subject matter experts (SMEs) working directly with beneficiaries. Only they will be qualified to opine whether their statements of need for the beneficiaries has been satisfied.

SOURCES OF LEGITIMACY
(10) Organisations that engage with the Log Cluster or substitute body should be treated as a legitimate stakeholder. Using the intelligence shared by Log Cluster stakeholders, the Log Cluster should reach out to those stakeholders who cannot or will not engage for themselves. Intelligence regarding the environment that is gathered by individual stakeholder organisations should be shared with the system either through the Log Cluster or specialised environmental information gathering cell. For the benefit of all system stakeholders.
(11) The legitimacy of the supply network should lie with the stakeholder body, as captured through MEAL and post-operational reports, other forms of testament (including academic) and Log Cluster records. Legitimacy should be developed in future operations by developing the working relationships with the network system but improving structures and supporting stakeholder policy. Legitimacy is achieved through coherence with the strategically agreed governance framework.
(12) Through time during an operation and repeated operational deployments using the system model of working, stakeholder world views will become more synchronised, while they retain their own identities and values. Therefore, while different visions of 'improvement' should be considered, these visions are likely to harmonise over time. However, there is as yet no body to collate and impose 'improvement' and therefore care should be taken to involve independent bodies when reconciling steps to develop the working of the system model.

Table 7.8   Validation of the Conceptual Framework using CSH. (Ulrich, 2005).

Using CSH as a form of 'other systems thinking' (Fig 6.8), a new dimension of the problem context can be examined. Paradigm participants when the VSM is in steady state act in a unitary manner; when a stakeholder acts in such a way as to create a conflict, this is an expression of pluralist action. By applying CSH's Twelve Boundary Questions to the problem context, the level to which coercion exists can be determined in a manner not possible with CATWOE.

7.3   Conclusion

One of the key issues to emerge from the two data sets is the lack of holistic view of activities, decision-making and resources in the supply network of an emergency response disaster relief operation. Chapter 6 provides a theoretical solution to this; namely the application of systems thinking. This chapter considers how a humanitarian supply network can be viewed in terms of the limits within which its activities are bounded and the importance of stakeholder relationships to achieve a meaningful outcome. It also

considers the perspective each stakeholder takes when forming a perception of fellow stakeholders, judging responses to ethically challenging events and the perspective others take when considering an organisation's effectiveness. It proposes taking a holistic approach to solving the problems that arise in humanitarian supply networks by applying the Viable Systems Model to the routine operation of the network and using Soft Systems Methodology to resolve conflicts that inevitably arise to knock the system out of kilter. The data from the interviews and Applied Abstract Reasoning are considered in a conceptual framework comprising these two elements. Using VSM, it has been shown that sense can be made of the network paradigm in steady state and that conflicts that arise knocking the system out of kilter can be resolved using the Systems World components of SSM.

The boundaries of the theoretical domain are confirmed using CSH and the boundary is expressed in terms of motivation, power, knowledge and legitimacy by applying the Twelve Questions; this can also uncover instances of coercion. Although the real world is yet to replicate the steady-state model projected by VSM, CSH confirms that the system boundaries already exist, and the application of the existing data confirms the viability of the theoretical case. The themes that emerge from data coding include motivation, power, knowledge and legitimacy, confirming that the use of CSH is applicable in validating the conceptual framework.

CHAPTER 8

FINAL CONCLUSION AND CONTRIBUTION TO KNOWLEDGE

> *'If you can get it into the country, I will get it to the place*
> *where it is needed'*
>
> <div align="right">MSF logisticians' mantra</div>

8.1   Final Research Findings

The literature review exposed several significant issues that confront
humanitarian supply chain practitioners and managers, the most prevalent
and widespread being the inefficient passage of information within and
between stakeholder organisations, a lack of cohesion between aid agencies
in the operation of their individual supply chains and the lack of overall
visibility of supply chain operations within the humanitarian supply network.
These were borne out in the research findings but while the research
uncovers other issues that arise in these unstable and often austere
environments, it also reveals the potential for resolving them if a holistic
approach is taken to supply network operations through systems thinking.
The importance of holism in the paradigm has now been recognised by
researchers and contributors have increasingly called for a pathway to
achieve a holistic position; this research has unearthed an opportunity for the
paradigm to develop to give aid agencies the opportunity to deliver effect in a
more unified manner. The findings of this research allow the humanitarian
supply network paradigm to be viewed in a new way.

8.1.1   Delivering on the Aim

The stated aim of this research is *to explore whether treating multiple,*
complex supply chains in a disaster relief operation as a network system
would better facilitate stakeholder engagement and the resolution of supply
challenges and issues in order to achieve maximum effectiveness and
efficiency in the delivery of humanitarian aid. The literature and the data
collected in the research confirm that the supply chains in a disaster relief
operation are multiple and complex, and that together, they constitute a
humanitarian supply network. They also confirm that challenges and issues

exist that impact effectiveness and efficiency. The fundamental question to be addressed is whether to formally recognise that the paradigm as a humanitarian supply network comprising supply chains, and if so, whether stakeholder focus should be on the network as a whole, rather than their own, often disparate supply chains. In essence, the aim is to establish how organisations could better fit into the network, and the findings of the research demonstrate the need for a holistic solution. By treating the network as a system, the aspiration expressed in the data for a holistic view can be achieved and therefore, the research findings deliver on the aim.

8.1.2 Achieving the Objectives

The objectives stated in para 1.4 steer the research to clarify and confirm the challenges and issues faced by humanitarian supply chain managers and practitioners, and to capture the extent of the complexities experienced by all stakeholders when working with each other. The need for a holistic approach is evident from the literature and therefore forms a tenet of the objectives which is addressed by a substantial primary data subset. Historic and contemporary thinking is examined to establish the best way of navigating a path to overcoming these complexities. It is determined that while taking a reductionist view can overcome the issues faced by individual stakeholders in resolving specific problems, it contributes little to network problems that effect stakeholders across the paradigm. The data analysis strongly suggests the need to treat the paradigm as a system and to apply relevant systems ideas and approaches to construct a conceptual framework that can map the existing humanitarian supply network into a form that can cope with the plethora of issues and challenges inherent to humanitarian supply chains. This research achieves the stated objectives by examining the issues and complexities; confirming that a holistic approach would contribute significantly to the resolution of these issues and complexities; considers theories and models that could contribute to achieving this holistic view; and constructing a feasible conceptual framework to demonstrate how a systems-based approach would provide a significant contribution to resolving the issues and complexity that arise.
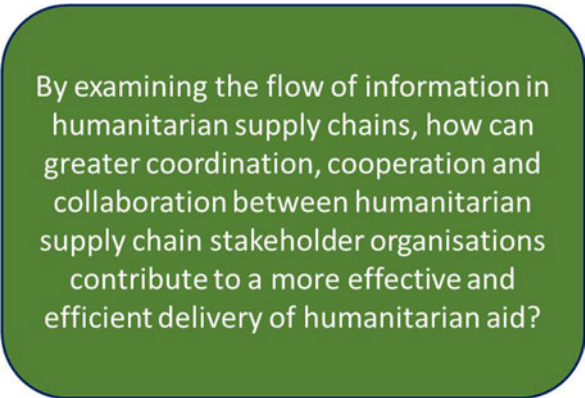
The Research Aim is achieved through the achievement of the Research Objectives, and Table 8.1 demonstrates how each objective has been achieved.

Objective	How it was Achieved
Identify the challenges and issues encountered in the delivery of supplies during emergency disaster relief operations	Primary data was analysed using the Grounded Theory process of analysis to create substantive theory which identified the challenges and issues encountered by those organisations involved in the primary data collection. This data was corroborated by secondary data analysis and iterative triangulation.
Ascertain how more holistic thinking could help to capture the impact of such challenges and issues on other stakeholders within the complexity of the humanitarian supply chain environment	Until now, the focus of researchers in the humanitarian context has been on individual supply chains and their various functions. This has been a reductionist approach. By taking a systems approach and viewing the domain as a humanitarian supply network paradigm, the way in which stakeholders interact can be viewed holistically. By mapping the paradigm as a system, the impact of isolated stakeholder decision-making can be captured, and any conflicts that arise between stakeholders can be resolved using other systems thinking tools such as SSM and CSH.
Determine what concepts, methods and practices could be adopted to overcome these complexities holistically	The application of VSM as a representation of the paradigm in its route (steady) state demonstrates how stakeholder engagement can be reflected in the five functional entities (S1-S5). Taking a holistic view through the VSM lens, stakeholders would have visibility of each other's actions and decisions, and could achieve cognisance of the impact of any isolated decision-making on their part.
Develop and validate a conceptual framework which addresses the challenges specific to humanitarian supply chains	By considering the humanitarian supply network paradigm as a viable system, where stakeholders collaborate in a unitary manner, VSM can be used to make sense of the different levels of stakeholder engagement. Stakeholder conflict can be resolved through the application of the systems world domain of SSM. Working in combination, these two systems concepts are brought together in a conceptual framework (Fig 7.3) to offer a way of understanding how the humanitarian supply network paradigm could function, and the framework is validated for its feasibility using the analysis derived from the iterative triangulation of the interview and meta-synthesis data in the form of a theoretical case. Validating the framework for utility and usability fall outside the scope of this research but form the basis of future work.

Table 8.1   Achievement of Objectives: Summary.

8.1.3 Addressing the Research Question

The literature review uncovered several recurring shortcomings that stakeholders perpetuate, seemingly unwittingly. Primary and secondary data underlines the importance stakeholders attach to the passage of information but there is a nuanced aspect to this. In the view of in-country practitioners, organisational strategic management attaches importance to vertical downward information flow in the form of policy, process and procedures as communicated in SOPs, and the upward flow of reports and other intelligence information regarding the performance of their staff. Practitioners see no evidence of inter-organisational strategic management communication which, they say, leads to stove-piped supply chain operations. Data confirms that amongst practitioners, there is not just the appetite for effective flows of information, but that it is seen as being essential for in-country operational effectiveness.

> By examining the flow of information in humanitarian supply chains, how can greater coordination, cooperation and collaboration between humanitarian supply chain stakeholder organisations contribute to a more effective and efficient delivery of humanitarian aid?

Both the literature and the data confirm that the core concern resulting from the inefficient flow of information is ineffective coordination, cooperation and collaboration among many stakeholders. The research proposes that greater coordination, cooperation and collaboration would be inherent to a humanitarian supply system were stakeholders had visibility across the operational domain and aligned their working practices to achieve the common goal through closer relationships and a form of mutual ownership and control of the network. This would provide much improved effectiveness and efficiency in the delivery of aid to those in need.

8.1.4 Research Design

Guided by the Research Onion and Beech's Research Strategy Map, the research follows a three-stage design (see Fig 3.8) and takes a subjectivist approach to examine the behaviours and perceptions of stakeholders in the humanitarian supply network paradigm. Interpretivist and specifically phenomenological in nature, the research is axiologically reflective, a key feature of the grounded theory analytical process used to process the primary interview data. The inductive theoretical approach seeks to establish consistencies and common meaning in the data derived from the multi-method research data collection comprising interviews and the meta-synthesis process of applied abstract reasoning. In line with the philosophical approach, the research is cross-sectional: it considers instances and events captured as a snapshot in time rather than over a longitudinal time frame where change would be observed.

8.1.5 Completing the Research Process

Throughout the research process, several tools were used to intensify academic rigour and promote high quality research. Potential interviewees were not randomly selected, but rather their selection was based on available online biographical information obtained from professional networking platforms, primarily LinkedIn. Background research into participants ensured that the criteria regarding type of organisation and level of employment fitted the profile of the participant body but also informed the researcher of possible overlaps in experience where one individual could speak authoritatively on behalf of more than one organisation or employment level. This was a data multiplier which mitigated against the sample size.

Given the restrictions preventing ethnographic studies, the research relied on a meta-synthesis method of processing secondary data. The method, developed from first principles using existing theory and borrowing elements from existing models and methods, applied abstract reasoning provided the abstract primary data needed to support the interview data. By following the established process of triangulating data sets, the documentary narrative analysis data from the meta-synthesis and the grounded theory analysis data

from the interviews were exposed to iterative triangulation, and this provided rigour to the methodology and support to the academically robust findings. Iterative triangulation also contributed to the further interpretation of the data, thereby avoiding falling into the trap of 'thick description' as defined by Pratt (2009).

Given the axiological path followed during the research process, it was entirely appropriate to use grounded theory to analyse the interview data, and this involved continual reflection between open, axial and focused coding, and between theoretical sampling, further coding and comparison and the reduction and integration process from where substantive theory could be constructed. At each of these grounded theory stages, and during documentary narrative analysis of the abstract reasoning data, value creation was considered in the form of Cabrera's DSRP rules (Cabrera et al., 2008), adapted by Midgley (2013): boundary, relationship, perspective and system. By applying value creation transformation, each of these four concepts are applied to the themes emerging from the data. Together with an appreciation of each stakeholder's world view, it has been possible to identify what causes conflict is the paradigm, how it can be avoided and how it could be resolved. While this constitutes a contribution to knowledge, it should be noted that this specific path involves a meta-synthesis process that is underpinned by researcher intuition. This path could not be followed without the researcher having the practical experience to make the necessary judgements regarding stakeholder relationships and behaviour.

A theoretical case is constructed to capture the real-world problem that has been determined from the analysed data, and notwithstanding real-world challenges identified in the research, a conceptual framework is developed capable of taking a holistic view of the humanitarian supply network and instilling coordination, cooperation and collaboration as normal working practices. The final step of the research sees the feasibility of the conceptual framework validated.

8.2 Limitations of Study

This research focuses on the stakeholders in the humanitarian supply networks that support the emergency response phase of disaster relief operations. As such, it deals with the perceptions of individuals working for organisations that vary in their cultural backgrounds, making the data collected subjective. This has necessitated sampling of views held by different types of organisation, from staff members holding positions at the strategic management, regional and in-country levels: twelve categories of data in total. While this scope of primary data collection is appropriate to the study, the number of interviewees available at the time of the study was limited by prevailing pandemic conditions to those available through a professional media platform. This limitation was exacerbated by potential participants not being available due to ongoing global DROs at the time the data was being collected.

Under normal circumstances, ethnographic studies would have been conducted that would have provided valuable richness to research data, but circumstances prevented this from taking place, thereby geographically and methodologically limiting the research.

8.2.1 Research Boundaries

The boundaries of the research, illustrated in Fig 1.3, have been clearly defined but acknowledge that many contributary topics exist alongside that of the flow of information between stakeholders. Firstly, the research is limited to the emergency response phase, even though there is clear linkage with the preparedness phase that precedes it and the reconstruction phase that follows it. This linkage is cited by interviewees and acknowledged in the themes and coding of the data analysis, but it is not expanded as a research theme because it is not intrinsically connected to information flow. Governance and performance management are acknowledged in Fig 1.3 and while governance has a role to play in the flow of information and stakeholder engagement, the examination of performance management and measurement is limited. Both these subjects are extensive and are worthy of

their own research project, and therefore they have been recognised by this research but fall outside the scope of this research.

With the target of this research sitting in the information domain, between the aid delivery process and strategic management and planning, it has been appropriate to concentrate a detailed examination on the make-up and role of the Global Logistic Cluster as a coordination mechanism as well as an information brokerage. Lessons learned from the 2004 Boxing Day Tsunami highlighted the lack of effective passage of information, and the UN cluster system was established to address this issue. The interview data has been valuable in this examination but by concentrating the applied abstract reasoning process on the Log Cluster in five different contexts, valuable data was gathered. Pratt (2009) observes that the point of data saturation is determined by the question the researcher seeks to answer, and that the substantiation of value in data comes from pattern formation where categories emerge through analysis, the patterns uncovered indicated that the data saturation point had been achieved. Conducting more case studies would have yielded more data but it is likely that it would only have served to further corroborate that which was already apparent.

8.2.2 Implications for Methodology

Methodologically, interpretivist research generally accepts that the data saturation point is achieved using smaller sample sizes than would be expected in positivist research, but this allows the researcher to take a deep view of the data. The richer data makes findings more difficult to reject and by their nature, interpretive findings are subjective and therefore promote further debate and enquiry. The decision to utilise Beech (2005) as a methodological handrail to navigate through the Research Onion led to a three-stage research design. The preparation stage where organisations and types of staff member were identified from secondary sources was followed by primary data collection and a meta-synthesis process to derive abstract primary data. The range of data collection methods was limited to those which could be carried out without involving travel of meeting face-to-face and therefore had to be conducted online. Even following a general

relaxation of global travel and contact restriction, online data collection was the only viable option because the length of the institutional ethics clearance process prevented adjustments to that which had been authorised in Appendix A and violation of the authority would have rendered the research inadmissible. However, these limitations produced the opportunity to create a bespoke, yet robust method of deriving the required data. Following corroboration of the two data sets, a theoretical case has been constructed to illustrate what the real-world problem is by projecting what the real-world situation is. This real-world projection represents the system in its 'as is' state rather than the state it ought to be. By applying the Twelve Questions of Critical Systems Heuristics, it has been possible to discern what the real-world state ought to be (Table 7.8).

8.2.3 Data Collection

Data collection methods should be tailored to both the satisfaction of the research aims and objectives and to the profile of the potential data sources. In this case, data was sourced from individuals working at different levels of three types of organisation. Due to travel restrictions, participants had to be available for online interview and in the event, were able to choose when the interview would take place. This level of flexibility would have been difficult to replicate had they been conducted in person, but face-to-face interview appointments may have led to fewer 'no-shows' and cancellations. The selected form of inquiry had to be appropriate in the context of an organisation's headquarters where busy managers and higher-level planners tend to be less inclined to spend valuable time engaged in an exercise of 'story-telling' with a researcher. Semi-structured interviews conducted online gave participants the added ability to dispense with specific researcher direction, while getting quickly to the heart of the issues and challenges. In sourcing the secondary data for applied abstract reasoning, the volume of available documentation in online depositories presented a challenge that was overcome by the researcher targeting disasters that are known to have attracted considerable study in the past. Given the information focal point and coordination of the Log Cluster, considerable use was made of the cluster's online library of reports and meeting minutes. The view expressed by Pratt

(2009) in para 3.5.11 regarding sampling strategy: that changes in sampling during a study is to be expected, was duly noted. Follow-up interviews with participants were attempted but none were available for a second interview following the reflection process. Such is the nature of the humanitarian supply network paradigm: HRO staff deploy globally at short notice all the time and research in this field must contend with that.

8.2.4 Analysis

One of the weaknesses of adopting an interpretivist philosophy is the risk of researcher bias, but this can be overcome through rigorous researcher reflectivity and the use of an appropriate triangulation method. For this reason, grounded theory was adopted for the analysis of the interview data, and this also added rigour by requiring the data to be analysed to the point of saturation. By linking similar concepts in different instances, contexts and events, it is difficult to question the findings. Through verifying the two sets of data from the grounded theory and documentary narrative analysis using iterative triangulation, further value and rigour was added because iterative triangulation exposes the analysed data to further iteration involving comparison, contrasting and reflectivity. With the iterative triangulation corroborating the data sets and clear patterns and categories emerging from the analysis indicating analytical saturation had been reached, the conceptual framework that has been produced captures the paradigm as a system in steady state with a tool for resolving conflict that arises. The scope of the research, as defined by the research aim and objectives, limit the transformation step from theory to real-world situation but it is possible to allude to how this transformation might occur.

8.2.5 Transformation of the Theoretical Case

The limitations of the conceptual framework in the real world are exemplified by the lack of single authority to own or control the humanitarian supply network; but this is also the case for any network comprising several individual supply chains. Langley & Abdallah (2011) describe such a core category to emerge from a theoretical model as 'an aggregate dimension' (p.119). Due to the juxtaposition of trust, often swift trust, experienced by in-

country practitioners and lack of strategic or corporate trust among stakeholder organisations, the answer to who or what fulfils the functions of S3, S4 and S5 of the VSM system lies in autopoietic mutual control and co-creation. Bennett (2016) recommends that the Inter-Agency Standing Committee (IASC) decentralises leadership, policy development and strategic-level decision-making, ideally to regional level, and that UN agencies and large NGOs 'reorient their strategic priorities away from direct implementation and service delivery and towards a more enabling function' (p.71).

The operational oversight, link to the environment and governance need to be constructs of the system: elements that are transparent and reliable. Stakeholders that engage in co-creation have the power to create or enhance a bespoke system, but also have the power to resolve conflicts by effectively extending the boundary of a stakeholder organisation to overlap with the boundaries of partner stakeholders within a single community. This transformation through co-creation would not be a natural or smooth for many stakeholders, and the start state, transformation process and end state would have to be explained to stakeholders by a respected independent body before it could be understood and accepted. Part of the process could be the augmentation or reorientation of the Log Cluster. Bhattacharaya et al. (2016) support this reorientation notion by advocating that strategic decisions and supply chain design takes place within aid programmes to facilitate the transfer of resources between stakeholders to make the supply chain more efficient.

8.2.6 Validation

This research sets out to capture the humanitarian supply network paradigm holistically by incorporating systems ideas and approaches into a conceptual framework which is subsequently tested for feasibility but not usability and utility. This is because of the limitations that exist in the real world. The framework is founded on the concept that a viable system represented by VSM can exist and that where conflicts arise, these can be treated through the application of SSM Systems World domain processes. However, the

VSM concept pre-supposes that the paradigm has functioning unitary autopoietic governance: it does not. The theoretical case is found to be feasible; real world conditions would have to develop further before the conceptual framework could be tested for usability and utility. This limitation means that the framework remains conceptual.

8.3   Contribution to Knowledge

It is generally accepted that the design and implementation of humanitarian supply chains in the aftermath of the 2004 Boxing Day Tsunami was subject to marked change, with many commentators considering this point as being the beginning of the distinct field of humanitarian logistics (Carroll & Neu, 2009; Tomasini & Van Wassenhove, 2009; Kovács & Spens, 2011; Overstreet et al. 2011; Kunz & Reiner, 2012). Since then, the field has developed considerably with new initiatives such as blockchain (L'Hermitte & Nair, 2021) and emergent digital technology such as the use of drones (Marić et al. 2021) featuring as strands of research. While these themes fall outside the scope of this research, they remain avenues for research in the future. The Covid-19 pandemic and rises in global costs have provided fertile ground for examining how a pandemic contributes to humanitarian supply chain disruption (Kovács & Falagara Sigala, 2021), linking preparedness to emergency response to reduce costs (Goldschmidt & Kumar, 2019), considering the use of options contracts in humanitarian supply chain procurement (John et al. 2020) and determining how the value of effectively reducing suffering in a disaster setting outweighs the costs (Malmir & Zobel, 2021). However, all these initiatives have one thing in common: they focus on single elements of a supply chain and therefore take a reductionist view of the humanitarian supply network.

Kunz et al. (2017) state that the increasing volume of papers published in the humanitarian logistics literature has not led to a proportional impact in practice, suggesting that a new direction needs to be taken to develop the field. Lewin et al. (2018) begin to look at the bigger picture by considering five critical issues affecting humanitarian operations and their supply chains and Dubey (2022) comes close to holistic thinking by focusing on coordination

and leadership. He also identifies some gaps in research, including a mechanism governing coordination, the need for scholars to consider the role of policy and an examination of the role of culture in supply chain design. Together, these areas identified as gaps are contemplated in this research by considering how taking a systems approach can contribute to a better understanding of the paradigm. Governing mechanisms, policy and organisational culture are components in a social system, so it can be said that by conducting research into them, this work is contributing to a gap in knowledge identified by Dubey (2022).

Nunes et al. (2022) consider 'what counts as a contribution' (p.76) and posit that:

- Contribution to KNOWLEDGE: what do we KNOW now that we did not know before?
- Contribution to PRACTICE: what CAN we do now, that we could not do before?
- Contribution to a field or community: Who are the people that will READ your work?

8.3.1 Primary Research Contribution

Although some scholars have begun to take a systems view of the humanitarian supply network (Maull et al. 2012; Tabaklar et al. 2015; Schiffling et al. 2020b; Anjomshoae et al. 2022), none of them consider the humanitarian supply network as a single entity, a single system. Building on the work of Vilalta-Perdomo (2010), Midgeley (2013), Hildbrand & Bodhanya (2015), Awuzie & McDermott (2016) and Altay et al. (2023), the humanitarian supply network is identified as a single viable system (Fig 7.3) which, when impacted by a conflict, can resolve the systemic issue and return to a steady state using elements of Checkland (2000). Through the application of the Systems World steps of SSM, this research develops a method to derive the root definition of problems in the humanitarian supply network and creates domain-specific knowledge guidelines to resolve systemic conflict and return the humanitarian supply network system to viability. However, in employing

SSM, it is acknowledged that there will often be a situation in a system where no owner exists, and this could have an effect on the consideration of CATW**O**E in a humanitarian supply chain management context. If the system can be developed to be truly autopoietic in terms of its governance and strategic decision-making processes, the system could then be described as being co-owned or mutually owned through strategic co-creation.

8.3.2 From Chain to System

Over the past 20 years, the notion of humanitarian supply chains has given way to supply networks (Tatham & Pettit, 2010; Zhoa & Xia, 2014; Jahre et al. 2016) but despite the area of study recognising the more complex nature of the paradigm, the view of the whole network remains incoherent with disparate views being taken of many aspects. Yet, the literature also reveals an aspiration to take a holistic approach to the issues and challenges of the paradigm, but only recently have studies taken into consideration the notion that the humanitarian supply network element of a disaster relief operation could or should function as a system (Besiou & Van Wassenhove, 2011; Janvier-James, 2012; Maull et al. 2012). The contribution of systems ideas and approaches to disaster relief operations was first posed by Preece et al. (2013) and work by Jagustovic et al. (2019), Schliffling et al. (2020b), Paciarotti et al. (2021) and Harpring et al. (2021) all intimate the existence of a humanitarian supply system, but none frame it in terms of the humanitarian supply network paradigm. This research frames the paradigm by defining humanitarian supply chain management, supply systems and the applicability of using systems thinking to interpret the problems that are experienced by humanitarian logistics practitioners and their supply chain management staff. In addition to the host nation government and support from military forces in a non-combatant role, the paradigm encapsulates donors, UN, INGO, IGO agencies and commercial businesses in the delivery of emergency response international relief aid to subject matter experts on the ground who are best placed to provide the direct support to people that have been affected by the onset of a disaster. The complexities inherent to the paradigm dictate that a holistic approach is taken to determine the best working practices to be undertaken and the most effective way of passing information between

stakeholders to ensure the aid is received by those in need in the right place, at the right time, in the right quantities and in the right condition.

8.3.3 Defining and Mapping

Humanitarian supply chain complexity attracts widespread acknowledgement (Chen & Paulraj, 2004; Blecken, 2010; Overstreet et al. 2011; Van Wassenhove & Pedraza Martinez, 2012) with a multitude of stakeholders engaged with several distinctive supply chains supporting a single DRO. Table 2.2 summaries some of the ways that the humanitarian supply chain concept has been modelled where attempts have been made to define boundaries, identify functions and services and capture the flow of information but none manage to map the paradigm holistically by defining stakeholder relationships, demonstrating lateral and vertical information flows, recognising strategic management isolation and acknowledging the existence of logistic coordination in-country. Through the presentation of Fig 2.20, this research attempts to encapsulate all these aspects into a single model, one which illustrates the multi-dimensional nature of the network and the co-existence of supply chains that are inherent to it. This model also captures an output of the grounded theory analysis of the interview data: it is widely accepted among in-country practitioners that they belong to a community of logisticians who are present in each of the model's horizontal nodes. Their relationships are formalised where the Global Log Cluster is deployed but is still present in an ad hoc form where it is not. The existence of this in-country logistic community concept is yet to emerge in literature.

8.3.4 Multi-method Iterative Triangulation

The benefits of data and analysis triangulation are well-documented (McCutcheon & Meredith, 1993; Cuthbertson & Piotrowicz, 2008; and Weaver, 2010) but Lewis (1998) creates a process where, through iteration, greater meaning is given to the data being triangulated. By processing and analysing data following the steps of Lewis' model (Fig 3.7), the data can be triangulated using a single method; but it is possible to improve the academic rigor of the input data by using multi-method research tools to inform the key Phase III – Iteration step. This research achieves this added rigor by using

the combined outputs of the grounded theory and applied abstract reasoning as the sources of the expanded conjectures. The Iterative Triangulation model by Lewis (1998) is refined and improved to produce the 'Multi-method Iterative Triangulation' model, shown at Fig 5.6.

8.3.5 Applied Abstract Reasoning

In the quest for robust data to corroborate the primary data gathered through the interviews, the meta-synthesis process of applied abstract reasoning was devised based on the logic of grounded theory and using reliable secondary sources. The process, which is detailed in Appendix F, delivers abstract data that corresponds to that collected from the interviews and withstands the scrutiny of iterative triangulation. The diagram at Fig 5.4 contributes to a greater understanding of the causes of disasters through the creation of eight categories across a spectrum ranging from societal, through environmental, to biological.

8.3.6 Clarification of the Lexicon

Early contributions to humanitarian supply chain literature, particularly those written before 2004, contain terminology which can get conflated and confused. Even the terms 'logistics' and 'supply chain' fall foul of this but Larson & Halldorsson (2004) offer a simple solution to this particular conundrum: call it whatever you want but tell everyone what you mean. This approach to the lexicon is no longer applicable and the data collected in interviews confirms the importance professional practitioners attach to the accurate passage of information. Therefore, this research takes time to clearly define terms such as customer; coordination, cooperation and collaboration; SME Expert; IGO Agency; and logistic community. It also draws a distinction between a supply chain and a supply network and identifies the ramifications of switching from a Push logistics strategic stance to Pull logistics. This research therefore offers these definitions in development of a concise humanitarian supply chain management lexicon.

CONCEPT	CONTRIBUTION
Presentation of the conceptual framework	The major output of this research is a framework that is theoretically capable of defining a humanitarian supply network as a system. A process of validation is used to confirm its theoretical application. However, exposing the model to real-world scrutiny falls outside the scope of this research, and therefore, the model is not validated for its usability and utility in the real world. The framework is found to be feasible when used in the context of a theoretical case derived from grounded theory and documentary narrative analysis, where the analysis has been corroborated using multi-method iterative triangulation.
Recognition of the paradigm as a system	Despite the dynamism and complexities of humanitarian supply networks, established working practices, procedures and processes exist. Many stakeholder relationships are also well-established, and perceptions of hierarchies, control and ownership occur. By defining and mapping the humanitarian supply network paradigm, an ad hoc systemic structure emerges which reflects the S1 operations element of VSM.
Application of Systems Thinking	Taking VSM as the baseline from which to view the paradigm and applying systems ideas and approaches, it is possible to model a humanitarian supply network when it represents viable system. However, due to their disjointed nature, conflicts arise which impact humanitarian supply network viability in VSM terms. This can be resolved through the application of the Systems World domain of SSM, thereby returning the system to a viable steady state.
The in-country logistic community concept	An output uncovered in the grounded theory analysis of the interview data was that many in-country logisticians consider themselves to be part of a community where information, knowledge and concerns are shared freely, independent from organisational ethos or direction. These communities gravitate towards the Global Log Cluster, where is deployed. Where it is not, ad hoc arrangements are made and community members instinctively assume liaison, information brokerage and other vital roles. The data suggests that this activity occurs despite, rather than with the agreement of organisation strategic management, and that if it did not occur, many more conflicts would arise. Neither this logistic community concept, not its contribution to the smooth running of operations, have emerged from existing literature.
Recognition of the need for autopoietic governance mechanisms	Data analysis shows that while there is a recognition amongst stakeholders that more coherent strategic management within humanitarian supply networks would have a positive impact on beneficiaries, individual stakeholders are very loathed to give up any power, control or kudos that they may have. There are particularly strongly held views by INGOs regarding UN agencies, and vice versa. Therefore, any form of governance of a humanitarian supply system would have to come from within the paradigm, would need to be transparent and unthreatening and would have to enjoy the consensus of all stakeholders. In social science terms, it would have to be autopoietic.

Methodological Contribution: Multi-method Iterative Triangulation model	By using grounded theory and applied abstract reasoning as the basis for the inputs to the Phase I and Phase II steps of Iterative Triangulation, additional rigor is achieved, and the model refined and improved.
Methodological Contribution: Applied Abstract Reasoning as a meta-synthesis process	Pandemic circumstances meant that a new approach was required to derive robust data from secondary sources. It was noted that while some post-operational reports are compiled by independent actors, most secondary source data in humanitarian logistics literature is written by the relevant organisation, thereby exposing it to potential bias. However, the researcher has experience in this field and was therefore able to use intuition to scrutinise potential instances of bias but also to judge what decision-making processes led to specific resultant outcomes. Based on the principles of grounded theory and guided by the primary data question set, the process of Applied Abstract Reasoning is described in detail in Appendix F.
Methodological Contribution: Clarification of the lexicon	Analysis of the research data shows the importance of accurate passage of information, and this applies to the terms used by practitioners as well as the substance of the information. The words and terms commonly used in humanitarian logistics operations often carry different meaning and include 'coordination', collaboration' 'supply chain' and 'customer'. Existing literature does little to hone the lexicon relied upon by practitioners and academics alike. During this research, many of the more fluid terms have been exposed to academic reflection and this thesis used by the researcher to reflect their most appropriate and accurate use in the context of a humanitarian supply network. A further contribution would be to formalise the lexicon from a practitioner and academic perspective.

Table 8.2   Contribution to Knowledge: Summary.

8.4   Opportunities for Further Research

The most significant limit to this research has been the circumstantial restrictions placed on the researcher in terms of the ability to conduct ethnographic observations. Therefore, the most obvious opportunity for further research would be to corroborate the findings of this research using ethnography and more open forms of discursive data collection conducted insitu during a DRO. A further round of semi-structured interviews with actors drawn from organisations that have not yet participated would give added breadth to the primary data analysis. The opportunity to interview non-logistician project and programme management staff in the four types of organisation identified in para 3.8.1 should not be ignored as this would bring a valuable perspective, given the important role played by such individuals, many of whom may not appreciate the value of their engagement. An

obvious benefit of this is that the researcher would be in more direct touch with the very object that is being investigated (Denzin & Lincoln, 2018; p.669).

8.4.1 Real World Applicability

This research demonstrates that a conceptual framework comprising a viable systems model underpinned by soft systems methodology is a valid theoretical interpretation of the humanitarian supply network paradigm, but the scope of this research stops short of applying the framework to real world problems. A logical step forward would be to test the usability and utility of the framework (Platts et al., 1998) through further research by exposing it to a focus group of practitioners to ascertain what shortfalls it may currently have in practical terms and what would need to be done to rectify the shortfalls. Specifically, the key control and monitoring, intelligence and governance components of the viable system would have to be aligned to potential new ways of working to deliver the degree of autopoietic control and ownership required as part of the transformation. Due to the nature of the stakeholders in terms of their independence, different governance structures and their political or apolitical character, there would have to be consensus on the development and enacting of what would constitute 'control' and 'ownership' processes and measures. Jahre & Fabbe-Costes (2015) advocate procedural and process standardisation and to an extent, this is being achieved through the tendency for individuals to move between HROs, taking best practice with them. Interview data reveals that the SOPs and policies of UN agencies are becoming more synchronised because they are capturing the obvious way of doing things. So, the step to strategically agreed governance frameworks, common processes and procedures, and synchronised SOPs tailored to the cultural distinctions of the organisation is possible. Since these functions are inherent in organisations' strategic level of management and thinking where stakeholder relationships, influence and organisational reputation are key, it would be appropriate for such a governance framework to be modelled on the CSH tenets of motivation, power, knowledge and legitimacy. A forum already exists where such ideas can be exposed to peer review: the OCHA-sponsored Humanitarian

Networks and Partnerships Weeks (HNPW) forum, a combined face-to-face / online conference-based medium which draws together academics, practitioners and programme staff from across the humanitarian sector. Such a forum should be part of any future research into the validation of the conceptual framework in real world application.

8.4.2 Global Logistic Cluster Mandate

The observation by Bhattacharaya et al. (2016) regarding strategic decisions and supply chain design facilitating the transfer of resources between stakeholders underpins the idea of further developing the mandate of the Global Logistic Cluster. Currently, the Log Cluster enjoys an uneasy relationship with some NGO partners in that while it is appreciated for its role as an information brokerage, some view it as a 'UN structure'. As the custodian of the Log Cluster, WFP exercise great influence over the UN's road-vehicle and aviation assets, directly engaging with strategic lift air and sea assets. It is therefore understandable that WFP should continue to play a significant role in the Log Cluster, but there may be ways that other stakeholders could be afforded a greater degree of ownership over the forum. Data from this research offers varying perspectives on this subject, ranging from a 'control tower' concept to 'leave well alone', but this wide degree of disagreement suggests that this is an area ripe for further research. Future research in this area may too make use for the HNPW forum.

8.5 A Final Thought

As one would expect from a group of stakeholders engaged in humanitarian relief operations, in any given disaster relief operation there is a shared goal. Increasingly, the ways in which individual organisations achieve that goal are convergent and, irrespective of cultural backgrounds, ethical perspectives and access to resources, humanitarian supply chain organisations are rather similar. This similarity is appreciated by those practitioners on the ground and their logistic management structures, but it appears that this is not the case amongst the strategic layers of planners, programmers and directors at the heads of these organisations. Given that around 80% of operational

expenditure in any given DRO is invested in logistics (Christopher & Tatham, 2018), DROs can be viewed as logistic operations; however, those heading the aid effort see it differently. This view frustrates in-country practitioners and their managers, but it does not stop them delivering the aid to those in need, even if it is delivered less effectively or less efficiently. The data bears out that there is consensus for taking a holistic view of the paradigm, and this research is a step towards achieving it. However, much more needs to be considered: changing the weltanschauung of those who have not participated in this research: the planners, programmers and directors. Logisticians need to be guided by research through some means whereby the space between the theoretical and the practical can be bridged. But logisticians need to be given the power to change the paradigm, and unless logisticians are appointed as the planners, programmers and directors of UN agencies and INGOs, any change that takes place is likely to be slow.

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Appendix A

Ethical Clearance Letter

Edinburgh Napier
UNIVERSITY

The Business School
Edinburgh Napier University
Craiglockhart Campus
219 Colinton Road
Edinburgh, EH14 1DJ
SCOTLAND

11 June 2021

Application reference: ENBS-2020-21-027

Title of proposed research: 'Humanitarian Supply Chains: Enabling Multi-dimensional Information Flows to Address the Knock-on Effects of Disruptions'.

Dear David,

The revised application you submitted to the Research Integrity Committee has now been approved.

Please use the above application reference if you need to demonstrate that you have received ethical approval from the Business School Research Integrity Committee.

Good luck with

your research.

Regards,

Matthew Dutton
Convener, Research Integrity Committee

INVESTOR IN PEOPLE

RESEARCH QUESTION SET STRUCTURE

The structure of the research question set does not just identify the questions used to guide the conduct of the semi-structured interviews, but it describes how answers to the questions might relate to issues experienced at the strategic, tactical and operational management levels and also indicates how the questions relate to Soft Systems Methodology, and specifically, the six characteristics of the root definition.

Guideline Interview Question	How Answer May Pertain to the Three Management Levels		Link to SSM Root Definition Characteristics
When issues arise within an aid organisation, the action taken by the organisation to fix the issue can have a knock-on effect on other stakeholders. **When your organisation acts to resolve an issue, how do you mitigate against any knock-on effects that your actions may have on others?**	Strategic	Possible that the strategic level may consider its lower order levels as the stakeholders being impacted, rather than external organisations.	**Customer:** in this case, the customer is relief effort itself, and the organisation is being asked to identify what processes it uses which lead to 'customer satisfaction'. Customer satisfaction in this context is an effective supply chain reaching the beneficiaries - the 4 'Rights'.
	Regional	At a level where collaboration is most likely to be effective, both internal and external stakeholders should figure in the answer.	
	In-country	This is where knock-on effects are possibly least likely to be appreciated but where contact with external stakeholders is easiest (Log Cluster).	
The resources available to logisticians on the ground and the ethical issues they are exposed to differ from one relief operation to the next, and even	Strategic	Really looking to see how the logistic response team gets operational level information to logisticians through a bespoke logistic channel.	**Actors:** the organisation is being asked what actors contribute to the flow of information which ensures the efficiency and effectiveness of their individual supply

other the duration of a single humanitarian operation. **How does your organisation ensure that information regarding these type of issues flows effectively and efficiently between the various stakeholders of your emergency humanitarian supply chain?**	Regional	This could bring out regional intelligence ventures and importance of IMS and HR management.	chain. It should allow the organisation to develop the idea that they have a perspective, but so too do others.
	In-country	Likely to identify areas where a lack of technology impacts on expectations and uncover the real issues or existence of information channels.	
From an academic perspective, a supply chain stakeholder is any person or organisation which participates in, or has an impact on, your activities. **How does your organisation communicate with other aid agencies and your own staff at the various levels, and how effective would you rate the flow of information between you and them?**	Strategic	Likely to see like-minded orgs communicating better, i.e. NGO to NGO; UN to UN, etc. Possible strategic partnerships to be unearthed.	**Transformational Process:** the function of multi-level communication is specifically examined. This communication includes vertical communication within the organisation and horizontal communication with other stakeholders at all levels. It is through this communication that commodities flow along the supply chain / through the supply network, thereby creating the transformational change.
	Regional	Since they are halfway along the line management and possibly co-located regionally with their stakeholders, some firmly held views are likely at this level.	
	In-country	The role and benefits of the Log Cluster would be expected to be voiced at this level.	
During international humanitarian emergency operations, there will often be several separate supply chains controlled by aid agencies and the host nation, and sometimes friction occurs, resulting in challenges amongst the different supply chain operators. **From your experience, how can these challenges be addressed, and such friction avoided in future?**	Strategic	It is possible that this may not even be appreciated at strategic levels of many organisation. Where they are, they may even be viewed as someone else's problem.	**Weltanschauung:** this asks the interviewee to draw on their own knowledge and expertise to opine how challenges can be overcome. This will intrinsically gain an insight to their own professional perspective, based on their world view. It may be that they don't consider their actions as being detrimental to others, or they may take the view that all stakeholders are inherently linked and should operate as such.
	Regional	This is the level of management most fertile for resolution and mutual understanding between stakeholders. It is possible here that the real ideas may start to emerge.	
	In-country	Likely to identify areas where close relationships do already occur (e.g. UNICEF and WHO supply chain managers).	
During disaster relief operations, when the UN Logistics Cluster is deployed, its main role is to coordinate the logistic effort of aid agencies and promote cooperative and collaborative	Strategic	There may be some basic understanding of the Log Cluster, but it may not be apparent at this level as to how strategic management can contribute and benefit from it.	**Owners:** in the complexity of humanitarian supply networks, the concept of ownership is somewhat lost. Perhaps the nearest thing we have is overview, which can only be established through coordination. The Log

working. **What has your personal experience been of the Logistics Cluster and if it were to develop its mandate or scope in the future, what other functions do you believe it should consider taking on?**	Regional	There should be awareness of the benefits of the Log Cluster at this level, but it is unclear to what level it is considered as a stakeholder.	Cluster is the default coordination and information brokerage and is perhaps best placed to exercise overview. Ownership infers power and authority. The Log Cluster doesn't have that power, but perhaps the authority could be a collective, autopoietic authority within a VSM S4/S5 construct?
	In-country	Any praise for the Log Cluster is likely to be sung here; and the best ideas for future development will come from those who have this level of experience.	
Disaster relief post-operational reports and academic research identify a wide range of issues and challenges that can adversely affect humanitarian supply chains, ranging from physical disruption to managerial challenges. **From your experience, what are the most difficult problems that face humanitarian supply chain managers and practitioners and how have these challenges been overcome?**	Strategic	At the strategic level, this may uncover SOPs for resolving common or particularly challenging 'acknowledged' issues.	**Environmental Constraints:** both in terms of the physical environment, which will be unpredictable and ever-changing, and the managerial / administrative environment. It should tease out issues regarding cooperation and collaboration, but also should feed into 'What if' scenarios.
	Regional	At regional level, this could identify patterns of problems, potentially where 'lessons identified' have failed to become 'lessons learnt'.	
	In-country	This could unveil some recurring issues which are resolved locally through best-practice or informal stakeholder engagement.	

Table B.1   Research Question Set Structure.

OPEN AND FOCUSED DATA CODING

OPEN CODING	AXIAL THEMES	AXIAL CODING	FREQ	CONTEXT	FOCUSED CODING
Ownership	Power / ownership / control	Control	5	Ownership of the HSC / HSN: from supplier to consumer. Not of great importance	The one participant who voiced an opinion on needing to take ownership of the supply chain was from a commercial company delivering relief consignments for an IGO. This individual seemed to lack an understanding of humanitarian supply chain management and coordination. Instead, he took a commercial perspective of the supply chain he was trying to influence; this frustrated him. The other participants who referred to ownership of the supply chain took the view that full ownership of an HSC is not possible and that this was generally accepted by the HSC community.
Control / power			5	Control of the HSC / HSN: authority, responsibility and governance	One respondent suggested a 'control tower' concept, but this is taken to mean holistic overview rather than exercising control over other organisations. The IGO agent spoke of trying to control the humanitarian supply chain as if it were a commercial supply chain. Others referred to maintaining control of their part of the supply network (good practice) without impacting on others. One referred to the HN trying to exert control over NGO activity by insisting on a 'one-door' policy for aid arriving into Nepal. Three spoke of donors trying to exert control over NGO activities by specifying the use of their donations (see below). One spoke of UN agencies seeking to exercise control when working alongside INGOs. None made a connection between control of the supply network and its governance; possibly because they don't see the paradigm as a network.
HN interference			5	HN authorities restricting or denying access on political or racial grounds	Interference is not unknown but appears to be more prevalent in conflict situations (Syria, Yemen, Sudan, Nigeria, Cameroon). The only example of non-conflict zone interference was cited in Nepal (see above).
Organisational Reputation		Organisational Reputation	7	Maintaining a strong and clean image	Two respondents referred to organisations following a specific course of action purely to protect their organisation's reputation. Five others referred to organisations taking into consideration their reputation before signing up to initiative or agreements.
Putting your organisation first			7	Protecting data for governance and planning reasons	The in-country IGO agent who would not share what was considered confidential for commercial reasons and one respondent referred to their organisation as not sharing data for governance reasons. Otherwise, the main reason for keeping data confidential was to protect supplier identity and the volumes of supplies organisations had in their pipelines. Given that there is no real commercial imperative here, reasons for this kind of practice are unclear.

Data confidentiality		Organisational Security	8	Failing to share and 'poaching' resources incl staff	One organisation cited as being big enough to have poached staff from a smaller organisation. The IGO agent not willing to share resources and collaborative activities because he believed that his organisation would disapprove. Other references entail the 'flag-planting' of many UN agencies and NGOs in emergency response, possibly to enhance reputation or attract more funding.
Finance with strings attached		Donor Funding Conditions	3	Donors or procurement orgs stipulate particular specifications, maybe unhelpful	Three instances of NGOs trying to divert resources to locally recognised higher priorities but prohibited from doing so by donors. One instance involved the 'loan and payback' of relief stores to assist another NGO which couldn't go ahead.
Coordination	Stakeholder Relationships	Routine Stakeholder Interaction	17	Low-level sharing of information to derive benefits and avoid issues	The need for and the benefit of coordination is mentioned multiple times but for several reasons. Organisations wishing to work in isolation recognise the need to coordinate for their own [selfish] operational reasons. Small NGOs see this as necessary to avoid duplication of effort that they can ill afford. The majority of UN agencies and NGOs see it as the very essence of being a logistician in a humanitarian supply network, without which the network could not function.
Cooperation			8	Individual / organisational interaction to a shared goal	Smaller NGOs sought to work cooperatively with other NGOs and this is also true of WFP and UNICEF for UN logisticians. A number of respondents drew attention to the difficulties encountered by NGOs when trying to work cooperatively with UN agencies. NGOs were keen to cooperate with HNs but this was not a trait observed among UN agencies. There seemed to be a variation in understanding (defining) the term: some saw cooperation as one-off or minimal coordination, rather than a closer relationship with another stakeholder.
Collaboration			9	Organisational commitment to a shared goal with shared resources	All occasions where the word 'collaborate' arose, it was used almost euphemistically rather than referring to stakeholders coming together to work truly collaboratively. This was probably down to a general inaccurate use of the word.
Face-to-face			10	Resolving in-country issues	Four respondents specifically stated that working face-to-face was their preferred modus operandi and that being forced to engage with other stakeholders purely online was alien to them. Almost all the other responders mentioned that they considered face-to-face meetings as being important in HSC stakeholder engagement. All respondents except one (the IGO agent) considered online working during COVID as being detrimental to humanitarian operations; the in-country IGO respondent made no reference to online v face-to-face working.
Community / contacts network			21	Logisticians on the ground talk to each other to resolve low-level issues	With the sole exception of the in-country IGO agent (who didn't seem to appreciate that humanitarian logisticians considered themselves as belonging to a community), all respondents considered their ability to function within a recognisable community as being essential to their success in an operation. The community spirit sometimes came from meeting individuals already familiar from past operations but also from swift trust vested in a common understanding of the 'black art' of logistics. The importance of making and maintaining contacts was recognised by all respondents.

			12	Individual orgs negotiating with HN authorities for access and real estate	All NGO respondents mentioned the importance of engaging with the HN as a source of advice, guidance or to facilitate bypassing bureaucracy. The in-country IGO agent got particularly close to the HN MoH in an attempt to extend their mandate to impinge of UN agencies. It was noted that overt engagement with HN by UN agencies was a subject raised by several NGOs and the IGO agent.
Stakeholder interaction with HN					
Stakeholder Relationships		Stakeholder Competition	13	Competition: NGOs v UN agencies	Most respondents acknowledged that there is a difference of opinion regarding the competencies and attitudes of UN agencies and NGOs. NGOs tend to consider UN agencies as aloof while UN agencies consider NGOs as being too quick to judge them. IGO entities had a low opinion of the UN. Despite all this, NGOs and UN agencies are happy to work together, particularly as members of the HumLog community; the in-country IGO agent interviewed would have been happier to cut the UN agency out of the supply chain and deal only with the HN.
Common set of rules / SOPs		Stakeholder Support Frameworks	9	Common platforms, standards and procedures to enable collective pooling of log functions	Respondents expressed a desire to work with other organisations using a common set of processes and procedures, with many wishing to see a common procurement platform. However, none suggested an existing governance package, and none expressed an opinion that their organisation's package would work well as the common package.
Shared Values			12	Trust is inherent here	Most UN and NGO respondents stated that trust was an important part of their modus operandi, and that trust could be achieved relatively quickly through interaction as HumLog community members. Notably, the in-country IGO agency seemed to not consider trust as an important factor, perhaps because they are a more commercially founded organisation.
Utilising local knowledge			7	Using local knowledge to get to the crux of the issue or to contact the right person	Those respondents who had clearly considerable experience working in-country articulated the value of local knowledge and using local NGOs, HN staff and other local populace as an effort-multiplier. One suggested that a good logistician was not one who knew all the answers but was the one who knew the pople with the answers. One respondent suggested that by using local contacts, NGO organisations can gain local buy-in, thereby removing local frictions and making their interventions more transparent.
Shared management systems			7	Common procurement system or possibility for integration for smaller orgs	Most prevalent amongst seasoned in-country NGO staff, the concept of a common procurement platform is seen as beneficial, particularly to smaller NGOs, but linking to Ser 15, many perceive UN agencies to be holding a monopoly on procurement and unlikely to share procurement resources outside their organisation. None suggested that they would be prepared to host a shared procurement platform.
Information flow and access	Information management and Flow	Passage of Information	16	Sharing information about resources and the state of the market	In more than one context, the sharing of information regarding the availability of resources was raised and this was tied to the state of the in-country micro-economy. The two forums discussed as being the most effective way of sharing information were the Log Cluster and where this was not deployed, the in-country HumLog community.

Sharing of sensitive data			2	Sensitive to the UN (political), an NGO or commercial organisation	Both of the instances regarding sensitive data sharing were connected with financial transactions and resource provision. Both instances of protecting data were directed by the organisations' HQ or Regional office, and not the in-country team.
Information Management		Information Management	14	Sharing of information for the common good: collective databases / LC	The majority of respondents frequently referred to the need to share data on an IT system capable of managing the information and presenting it for common consumption. The Log Cluster was suggested by several as being the best location, in their opinion, for this info management function.
Internal org management and comms			13	The ability for an org to communicate with their logisticians effectively	The subject of vertical information flow was common among respondents, some of whom despaired at their organisation's ability to understand logistic issues but some of which agreed that their organisation had a good understanding. The important feature here is that the organisations have a vertical information channel available to in-country logisticians.
Use of over-arching software resources			5	Sharing tools like ULS (thru ECHO) amongst log partner organisations	The use of an over-arching software system like ULS (facilitated by ECHO) was raised by 5 respondents but their comments reflected short term and specific occasions where such a system was made available through a UN agency. There is no such system established as a standard roll-out for relief operations in general.
Transparency	Business Enablers	Practical Enablers	4	Transparency of UN agencies in particular - they are political	A small number of respondents commented on transparency as being problem for some partner organisations, UN agencies in particular. However, they did appreciate the political nature of UN agencies and conceded that this was probably the reason for this perception.
Efficiency			11	Logisticians naturally drive from efficiency. Only deploying into a gap.	It is widely acknowledged that by their very nature, logisticians strive for efficiency, with several organisations suggesting that they only deploy to a relief operation where they consider themselves as filling a gap in capability. This however is at odds with the flag-planting perception of relief organisations.
Preparedness / contingency			12	Pre-positioning and monitoring world events to pre-empt need	The importance and benefit of pre-positioning and contingency planning was voiced by most respondents; the disadvantages realised by failing to do so was also expressed. Most organisations now consider contingency planning as being part of their overall deployment strategy with NGOs and UN agencies who maintain in-country development offices as being best prepared.
Visibility			5	Lack of visibility across an organisation and the bigger partnership picture	The lack of visibility of the 'big picture' was raised by a handful of respondents who had found themselves deployed into a situation where the Log Cluster was not operating. Instead, they relied on the HumLog community but even here, the strategic view was difficult to achieve.
Investment in log capacity			8	Organisations funding in their own logistic capacity	Only half the respondents considered their organisations as investing the logistic capability with a number suggesting moving away from bringing in commodities and towards a market driven local resourcing effort. Investing in logistic capability ranged from equipment to training and recruiting personnel.
Standardisation			4	Achieving efficiencies through standardisation	Standardisation was acknowledged by some as an efficiency driver but was only mentioned by four respondents.

NGO protection from political issues			1	Politically focused orgs taking the pressure away from neutral and impartial organisations	One NGO respondent suggested that the UN and Log Cluster could assist more neutral and impartial stakeholders (NGOs) by intervening where politically charged issues arise. One such issue is in-country freedom of movement (Cameroon).
Capacity building among partners			5	Role of larger orgs and e.g. Fritz Institute to promote capacity building initiatives	The idea of non-deployable humanitarian organisations like the Fritz Institute to play a role in capacity building initiatives was raised. Also, the role of academics and closer ties between relief organisations and academic researchers was mentioned as a way of building HumLog capacity in terms of education, training and general understanding the issues better.
Organisational culture		Personnel Practices	18	Understanding how an org works before trying to align it with another	An issue which was raised in a number of contexts is the importance of understanding the ethos and ways of working of partner organisations. Organisations make conscious decisions to work, or not work with a variety of organisations based on their perception of how well the organisations can align. This perception of organisational culture feeds into the UN v NGO debate.
Formalised programmes			9	With an org coordinator (desk officer), flow of information is easier	Most practitioners prefer to be working within a formal project or programme with a designated desk officer at their HQ rather than an ad hoc engagement, which tends to be more prevalent where an operation is nearing the response / development continuum or where an in-country team is stood up to work with another stakeholder.
MOUs / ToRs / policy		Structural Support	7	Legal and contractual frameworks	The more commercially minded logisticians held store to having contracts, MOUs or ToRs in place to guide their decision-making and level of engagement. However, there was a more pragmatic approach taken by others, where they knew that their project offices were providing close support.
Governance focal point			3	Logisticians being engaged with governance issues	Aside from activities such as contingency planning, coordination and information sharing, there seems little in the way of organisational governance to concern logisticians. One respondent who works for a very flat-structured organisation, raised governance issues but this was clearly because they worked at both the in-country and strategic level of their organisation.
Common technology platforms			7	Integrated operational capability: procurement, contracting, etc	Fewer than half respondents considered common technology platforms for integrated operations worth mentioning. Those who did refer to it tended to be from smaller NGOs with a desire to piggy-back on larger organisations.
Risk management / appetite			5	Limitations an org places on itself through management of operational risk	Risk management was raised by the more commercially astute respondents and those with exposure to strategic operations. Generally, logisticians on the ground were less concerned with financial / operational risk management and more concerned with physical security of their commodities and staff.
Management accountability		Accountability	5	For behaviour and success rather than financial tracking. Data protection.	Only those exposed to strategic level operations seemed concerned with management accountability (as opposed to financial accountability). Two respondents referred to their decision-making being linked to organisational management accountability with one specifying the protection of sensitive data (regarding market competition and pricing of services) as being of particular interest to their organisation's management activities.

Financial accountability			7	Including access to cash where there are no operating banks e.g. the Hawala system	Financial accountability was only raised by those who were working outside their comfort zones when handling cash. Where 'routine' budgeting was being practiced, there did not seem to be any concerns with financial accountability, perhaps because these established practices have their own checks and balances. However, when using money transfer systems such as Hawala or when engaged with stakeholders that are more contractually based (e.g. IGO entities), financial accountability becomes more important to logisticians in-country.
Competition for resources	Business Prohibitors	Resource Constraints	14	Between 'rival' organisations and between partners	With the exception of the in-country IGO agency, all respondents raised the subject of resource competition, but not all from a negative perspective. Competition resulting in organisations losing out did arise but cooperation in the face of resource competition also featured. Some NGOs, cognisant of the strengths of others, actively adapted their operations to avoid losing out while others engaged with 'rivals' to try to achieve a form of parity based on a holistic prioritisation. This was largely achieved through the HumLog community.
Limited financial resources			14	Not enough funding to take on additional, unplanned important tasks / initiatives	Virtually all raised the issue of limited financial resources with only the in-country IGO agency considering themselves fully funded to achieve their stated mandate. They did suggest that with more funding (channelled to them rather than UNICEF), they could have been more financially efficient and operationally effective: their opinion.
Duplication of effort		Personnel Constraints	5	Disconnects between stakeholders doing the same thing	Duplication of effort was raised but in the context of logisticians commencing operations only to adjust operations and adapt aims once it is appreciated that there was a duplication of effort. The five respondents used this situation to reiterate the value of shared information, operational coordination and a natural tendency for logisticians to avoid duplication / wasted effort.
Fear of coming together			1	Fear of losing control of assets or influence	Although there may have been other instances implied but not specifically stated, one respondent suggested that there could be a fear among some organisations to engage with other stakeholders; but stressed that this tended not to be the case among logisticians on the ground.
Program v logistics		Organisational Constraints	6	The tension between program and logistics within an organisation	Both NGOs and UN agencies experience a tension between in-country logisticians and HQ level programmers, with the perception that programmers understand little about logistics, even though 80% of their expenditure is on logistics. To iterate, this is not between logisticians and HQ level desk officers with a logistics background (Staff Branch staff Branch 3/7 individuals rather than Staff Branch 4).
IGO agencies / 3PL lack of integration			3	Not wishing to engage with NGOs and UN agencies - remaining outside the community	The in-country IGO agency respondent felt very strongly that the UN were an 'incompetent and unreliable' partner organisation and they refused to engage with them; they also refused to engage with the Log Cluster which they perceived as being 'cluster by name, cluster by nature' (a reference to an English language expletive). The Strategic level IGO respondent had little consideration for UN agencies as they felt their SCM was independent of the UN. One NGO recognised the difficulty IGO

					entities and others [3PLs] had with engaging with established humanitarian organisations.
Commercial / humanitarian disconnect			1	Clash of commercial imperatives v humanitarian intervention	The comments made by the in-country IGO agency seemed to indicate a disconnect between commercial imperatives that they were working to and humanitarian imperatives which one would think should have been more important to them. That said, they also raised what they considered as humanitarian issues which they thought could be better addressed by commercial rather than conventional [UN-led] initiatives.
Market competition		Market Conditions	7	Competing for limited resources, e.g. vehicles	The perception that market competition exists in many scenarios, particularly early in a response operation. Those that reply on availing themselves of services and enablers in-country are most exposed.
Market inflation: locals			5	For relief supplies as well as real life support accommodation and equipment.	Respondents recognising that the local market is being manipulated for profiteering and coming together to beat the profiteers.
Market inflation: NGOs			5	Orgs offering high prices to secure limited resources	Where the limitation is quality rather than quantity, using influence and economies of scale to secure the best quality.
Dealing with ethical issues	Ethical Considerations	Human Ethics	13	Flexibility and tolerance in ethical judgements and the role of org HQ	Commenting on ethical issues, all organisations expressed a pragmatic approach within the boundaries of their organisation's ethics code. Many use or replicate the UN ethical approach and training which is widely considered as the common sense approach.
Sustainability		Environmental Ethics	4	Eco-friendly rather than ensuring	Despite sustainability and environmental protection playing a significant role in commercial SCM, few humanitarians raised it as a topic but one that did state that by their nature, HSCs are not sustainable. Another referred to a sustainability initiative that they had been asked to participate in but they declined on funding grounds.
Turnover of staff impacting ops	Staff Issues / HR	Staff	2	Personality-centric operational initiatives - someone leaves and it stops	An issue identified in the literature that did not materialise in the interviews is high staff turnover and the impact of this on operations. Only two respondents referred to it, and both referred to momentum being lost in driving projects and initiatives forward when a key member of staff turns over. This tended to be based on personality-centric initiatives which have been established by a particularly strong character.
Education and professional training		Education and Development	8	Professional v well-meaning amateurs	The subject of professionalism arose in half the interviews, but respondents recognised that while having professionals working in your organisation is advantageous, it is better to have amateur staff who are turning their hand to functions within the operation rather than no one. One respondent described how none of their team were logisticians but had the right skillsets to form an effective HSC (to support Ukrainian refugees).
Transfer knowledge and skills			6	Opportunities to transfer knowledge and skills to local actors	The benefits of transferring knowledge and skills to local actors was appreciated by some but there seemed to be a barrier in doing so. Although not stated, this problem seemed to be the

					opportunity of doing so: time, personnel resources, the right people to invest in.
Supportive of Log Cluster	Logistic Cluster Engagement	Positive Engagement	16	LC plays a valuable role in coordination, and this is recognised and valued	Both NGOs and UN agencies appreciated the role of the Log Cluster when it has deployed. Where it hasn't deployed, it has been missed. The only condescending voice among the respondents was the IGO agency whose opinion was extreme. 'Professional' humanitarians have a good understanding of what the Log Cluster's mandate is and why it seems often limited or constrained. A few would like to see its mandate developed but all saw its main focuses as being a source of coordination, a networking forum and a forum for the exchange of information.
Facilitator / brokerage			5	Considering the LC as a facilitator = brokerage. Also facilitating momentum in post turnover	Notwithstanding the broad understanding of the LC's raison d'etre by stakeholders, only one specifically drew attention to this work as a facilitator with 4 others referring to it as a forum. There could be some overlap here between 'LC forum' and 'logistics community', even though it is accepted that the latter is an informal grouping of like-minded professionals.
Using LC for conflict resolution			1	Stakeholders resolving major issues through the LC instead of their HQs	An example was quoted of one instance where the LC was able to assist in the resolution of issues between stakeholders who preferred to find an in-country solution rather than ref the issues to their organisational HQ. An implied reason for this was a perception that the HQ entity did not have a thorough enough understanding of the issues on the ground, so their input was considered unhelpful and possibly counter-productive.
Unsupportive of Log Cluster		Negative Engagement	4	Belief that the LC doesn't achieve much / has a restrictive mandate	Aside from the IGO agency who refused to engage at all with the LC, 3 others considered it as having limited effect but acted more as a meeting place provider that took written minutes. They suggested that the real contribution was the forum in which they were proactive and not the LC.
View of UN by other NGOs			14	Perception that UN have different ways of working and agencies are too big	All of those with a positive or neutral experience of the LC had a common perception of it: it was a UN entity that, depending on the personality, could behave aloof. NGOs in particular considered the link between the LC and WFP as sometimes problematic, but they understood why the structure is as it is. One respondent suggested that in the ideal world, the LC would be independent but conceded that some kind of mechanism would have to be put into place to fund and resource it, which would probably result in a similar situation to that in existence now.
Reluctance to engage with LC			3	Not trusting or misunderstanding the LC concept	The three IGO entities expressed distrust, a lack of understanding or the irrelevance of the LC for them. None engaged nor were they really able to accurately describe the role of the LC in a constructive way and in any detail.
UN / LC reluctance to engage with HN		Organisational Constraints	1	UN appears to avoid potential politically charged issues, e.g. customs clearance	Several respondents mentioned problems which required addressing with the HN, including safety and security of personnel, and customs clearance for inbound commodities. However, one NGO respondent drew attention to an occasion where the LC refused to engage with the HN to help resolve an issue.
LC reluctance to engage			3	Reluctance to engage with political or financial	Three instances were highlighted where the LC refused to act on behalf of stakeholders because it felt the situation was outside its bailiwick because of its political or financial connotations.

				issues affecting stakeholders		
Restricted deployment of the LC			3	The LC doesn't always deploy to where they could be useful - e.g. NE Syria	Three respondents highlighted that the LC does not always deploy, and that even if it does, it may not have the ability to cover the entire operational environment. NE Syria (political / conflict zoning) and Burkina Faso (size / distances).	
Emergency / development continuum	Disaster Management Phases		6	Better dovetailing emergency response operations to the development phase	Both NGOs and UN agencies suggested that, together with the LC, emergency response logisticians should structure their operations to run through the Response / Development Continuum rather than seek to extract at the end of the emergency phase. Benefits included a more robust future supply chain and longer-term economic investment, particularly where the local market has been relied upon for resourcing the aid effort.	
Systems	Supply Chain Development		1	Referring to supply chains as systems	Only one respondent used the term 'system' to describe the supply paradigm, but the context was that HSCs didn't just comprise a system; it comprised people. The reference was to draw attention to the importance of people in SCM rather than acknowledge the systemic nature of the supply network.	

Table C.1   Open and Focused Coding.

ANALYSIS AND FURTHER CODING

FOCUSED CODING	ANALYSIS AND FURTHER CODING	THEORETICAL SAMPLING
The one participant who voiced an opinion on needing to take ownership of the supply chain was from a commercial company delivering relief consignments for an IGO. This individual seemed to lack an understanding of humanitarian supply chain management and coordination. Instead, he took a commercial perspective of the supply chain he was trying to influence; this frustrated him. The other participants who referred to ownership of the supply chain took the view that full ownership of an HSC is not possible and that this was generally accepted by the HSC community.	Supply chain ownership in the conventional sense does not exist in the humanitarian paradigm; rather the movement of supplies moves from donor ownership to operator, and sometimes diverted to other operators. Instead, the chain is a network of logistic functions where ownership and control changes as commodities move downstream. The only way of ensuring the effective and efficient delivery of these supplies is through coordination, the sharing of information and working in a cooperative or collaborative manner. Commercial supply chains in the humanitarian environment arguably remain commercial, they do not become humanitarian supply chains purely because they carry relief aid. **OWNERSHIP - NETWORKS - COORDINATION - SHARING**	OWNERSHIP - NETWORKS - COORDINATION - SHARING
One respondent suggested a 'control tower' concept, but this is taken to mean holistic overview rather than exercising control over other organisations. The IGO agent spoke of trying to control the humanitarian supply chain as if it were a commercial supply chain. Others referred to maintaining control of their part of the supply network (good practice) without impacting on others. One referred to the HN trying to exert control over NGO activity by insisting on a 'one-door' policy for aid arriving in Nepal. Three spoke of donors trying to exert control over NGO activities by specifying the use of their donations (see below). One spoke of UN agencies seeking to exercise control when working alongside INGOs. None made a connection between control of the supply network and its governance; possibly because they don't see the paradigm as a network.	Some form of overview is required to optimise the relief effort but since no one can agree on which entity should take control, the solution of achieving such an overview must be autopoietic. While the idea of a physical control tower managed by an individual would be successful in an owned supply chain concept, it would have to take a theoretical form in a humanitarian supply chain environment. Coordination, cooperation and collaboration would have to be inherent in the conceptual form to enable the sharing of information. Most of the operational elements already exist but there is considerable divergence in terms of governance, organisational culture and ethos. Therefore, such a theoretical form would have to be detached from emotion: clinical; mechanical; systemic. **OWNERSHIP - C3 - AUTOPOIETIC**	OWNERSHIP - C3 - AUTOPOIETIC
Interference is not unknown but appears to be more prevalent in conflict situations (Syria, Yemen, Sudan, Nigeria, Cameroon). The only example of non-conflict zone interference was cited in Nepal (see above).	Due to inherent environmental instability, humanitarian supply networks are exposed to considerable interference and disruption. To best protect it from external interference, it requires to operation within established and accepted boundaries, emulating from a common governance concept. **SHARED - ACCEPTED - BOUNDED - PROTECTED**	SHARED - ACCEPTED - BOUNDED - PROTECTED
Two respondents referred to organisations following a specific course of action purely to protect their organisation's reputation. Five others referred to organisations taking into consideration their reputation before signing up to initiative or agreements. The in-country IGO agent who would not share what was considered confidential for commercial reasons and one respondent referred to their organisation as not sharing data for governance reasons. Otherwise, the main reason for keeping data confidential was to protect supplier identity and the volumes of supplies organisations had in their pipelines. Given	Organisations that behave in an insular manner detract from stakeholder cohesion. Therefore, when an organisation feels it has to behave protectively, it needs to appreciate its responsibility to other stakeholders in making them understand why it is behaving in this way through dialogue and transparency. **COLLECTIVE RESPONSIBILITY - BELONGING - FLOW OF INFORMATION – TRANSPARENCY**	COLLECTIVE RESPONSIBILITY - BELONGING - FLOW OF INFORMATION – TRANSPARENCY

that there is no real commercial imperative here, reasons for this kind of practice are unclear.		
One organisation cited as being big enough to have poached staff from a smaller organisation. The IGO agent not willing to share resources and collaborative activities because he believed that his organisation would disapprove. Other references entail the 'flag-planting' of many UN agencies and NGOs in emergency response, possibly to enhance reputation or attract more funding.	Organisation that actively undermine fellow stakeholders cause resentment and friction within the humanitarian community; this breeds contempt and results in the breakdown of stakeholder relationships. Flag-planting causes unhealthy competition and results in capability gaps that no one wants to fill. Through stakeholder buy-in and organisational mutual respect, the humanitarian supply network can become more coherent, thereby benefiting those who receive the aid. **COMMON PURPOSE - BUY-IN - BELONGING**	COMMON PURPOSE - BUY-IN - BELONGING
Three instances of NGOs trying to divert resources to locally recognised higher priorities but prohibited from doing so by donors. One instance involved the 'loan and payback' of relief stores to assist another NGO which couldn't go ahead.	When operating in a holistic system, specific supplies can be utilised to address priorities and then backfilled to satisfy donor aspirations or stipulation without upsetting the donor. A more systemic approach to supply network management can provide opportunities that are otherwise not available. **HOLISTIC - SYSTEMIC MANAGEMENT - OPPORTUNITIES**	HOLISTIC - SYSTEMIC MANAGEMENT - OPPORTUNITIES
The need for and the benefit of coordination is mentioned multiple times but for several reasons. Organisations wishing to work in isolation recognise the need to coordinate for their own [selfish] operational reasons. Small NGOs see this as necessary to avoid duplication of effort that they can ill afford. The majority of UN agencies and NGOs see it as the very essence of being a logistician in a humanitarian supply network, without which the network could not function.	Low-level and ad hoc cooperation and information sharing is wide-spread and considered by practitioners as being important. By accepting this at the organisational level, these established practices could be formally adopted as part of a systemic management concept. **INFORMATION SHARING - SYSTEMIC MANAGEMENT - BEST PRACTICE**	INFORMATION SHARING - SYSTEMIC MANAGEMENT - BEST PRACTICE
Smaller NGOs sought to work cooperatively with other NGOs and this is also true of WFP and UNICEF for UN logisticians. A number of respondents drew attention to the difficulties encountered by NGOs when trying to work cooperatively with UN agencies. NGOs were keen to cooperate with HNs but this was not a trait observed among UN agencies. There seemed to be a variation in understanding (defining) the term: some saw cooperation as one-off or minimal coordination, rather than a closer relationship with another stakeholder.	Not all aid agencies share the same culture or ethos. The UN is a political as well as humanitarian organisation; NGOs are purely humanitarian. Each has strengths and weaknesses but if brought together into a single entity, capability gaps would be filled, cooperation and collaboration would be widespread, and the flow of information would be comprehensive. Each organisation would operate within its own mandate but would be interconnected on the basis of capability, strengths and resources. **INTERCONNECTED - HOLISTIC - BELONGING - COLLABORATIVE**	INTERCONNECTED - HOLISTIC - BELONGING - COLLABORATIVE
All occasions where the word 'collaborate' arose, it was used almost euphemistically rather than referring to stakeholders coming together to work truly collaboratively. This was probably down to a general inaccurate use of the word.	Despite using the word 'collaboration', stakeholders do not actually engage in collaborative working, even if they think that they do and consider the notion as advantageous. Great understanding of the word is required but given that many organisations thing that they already work in this way, actually getting them to adapt to more collaborative working should not create an organisational management shock. This misconception could be used to pave the way to more coherent working practices and organisational linkages. **COLLABORATIVE WORKING - BELONGING - PROMOTING RELATIONSHIPS**	COLLABORATIVE WORKING - BELONGING - PROMOTING RELATIONSHIPS

Four respondents specifically stated that working face-to-face was their preferred modus operandi and that being forced to engage with other stakeholders purely online was alien to them. Almost all the other responders mentioned that they considered face-to-face meetings as being important in HSC stakeholder engagement. All respondents except one (the IGO agent) considered online working during COVID as being detrimental to humanitarian operations; the in-country IGO respondent made no reference to online v face-to-face working.	In-country logisticians are very comfortable working with others from different organisations and in doing so, develop inter-personal relationships which facilitate the flow of information. 1-to-1 meetings with many individuals creates a sense of community without actually meeting together in a large forum. Reinforcing these relationships with a formal forum such as the LC serves only to strengthen the sense of community among practitioners. This provides a tactical level of cohesion which can be used as the foundation for greater organisational cohesion. It is accepted that humanitarian logisticians don't need to know everything; they just need to know many people who know different things. **COMMUNITY - FLOW OF INFORMATION - BELONGING - COHESION**	COMMUNITY - FLOW OF INFORMATION - BELONGING - COHESION
With the sole exception of the in-country IGO agent (who didn't seem to appreciate that humanitarian logisticians considered themselves as belonging to a community), all respondents considered their ability to function within a recognisable community as being essential to their success in an operation. The community spirit sometimes came from meeting individuals already familiar from past operations but also from swift trust vested in a common understanding of the 'black art' of logistics. The importance of making and maintaining contacts was recognised by all respondents.		
All NGO respondents mentioned the importance of engaging with the HN as a source of advice, guidance or to facilitate bypassing bureaucracy. The in-country IGO agent got particularly close to the HN MoH in an attempt to extend their mandate to impinge of UN agencies. It was noted that overt engagement with HN by UN agencies was a subject raised by several NGOs and the IGO agent.	Engagement with the HN is seen as being of valuable by most stakeholders and it is likely that the HN would wish stakeholders to engage through a single point of contact. It would therefore be appropriate for the HumLog community to also have a single POC or at least a single coordination point, possibly the LC. To achieve this, there would need to be an uncoupling of the political aspects of the LC in terms of WFP's engagement with the HN. This perhaps is connected to Ser 25 and 62. **FLOW OF INFORMATION - POLITICAL UNCOUPLING - STAKEHOLDER ENGAGEMENT - LC MANDATE**	FLOW OF INFORMATION - POLITICAL UNCOUPLING - STAKEHOLDER ENGAGEMENT - LC MANDATE
Most respondents acknowledged that there is a difference of opinion regarding the competencies and attitudes of UN agencies and NGOs. NGOs tend to consider UN agencies as aloof while UN agencies consider NGOs as being too quick to judge them. IGO entities had a low opinion of the UN. Despite all this, NGOs and UN agencies are happy to work together, particularly as members of the HumLog community; the in-country IGO agent interviewed would have been happier to cut the UN agency out of the supply chain and deal only with the HN.	UN and NGO stakeholders generally agree to disagree on practical issues where differences occur. They accept that there are fundamental differences but that this also gives rise to strengths that the other does not have. Through cohesive and coordinated working, best practice can emerge but to achieve this, a holistic view of the operation needs to be taken and understood. where individual personalities do attempt to take such a view, it is not automatic or inherent in a stakeholder organisation modus operandi. The way to achieve his would have to be formalised either in education, training by individual organisations or in shared / common SOPs. **EDUCATION - COMMON UNDERSTANDING - COORDINATION - SWOT**	EDUCATION - COMMON UNDERSTANDING - COORDINATION - SWOT

Respondents expressed a desire to work with other organisations using a common set of processes and procedures, with many wishing to see a common procurement platform. However, none suggested an existing governance package, and none expressed an opinion that their organisation's package would work well as the common package.	Those organisations that were already adept at working with others did so from a position of ad hoc partnerships rather than formalised over-arching governance. This suggests that they view their organisations as quite independent with no understanding of how a shared / common governance package could benefit them: they did not consider themselves as part of a system, rather an entity in a network. Although a number of organisations share common themes in their SOPs, none of them are coordinated in governance terms (even among UN agencies). If these themes could be communicated for buy-in by a multitude of stakeholders, a lose form of common governance could emerge through education, inter-stakeholder initiatives and an understanding of strengths. **EDUCATION - COMMON UNDERSTANDING - THEMATIC WORKING PRACTICES - SWOT - SHARED VALUES**	EDUCATION - COMMON UNDERSTANDING - THEMATIC WORKING PRACTICES - SWOT - SHARED VALUES
Most UN and NGO respondents stated that trust was an important part of their modus operandi and that trust could be achieved relatively quickly through interaction as HumLog community members. Notably, the in-country IGO agency seemed to not consider trust as an important factor, perhaps because they are a more commercially founded organisation.	Trust, based on either personal interaction or through contracts, already exists widely in the HSCM paradigm and therefore could be used as a foundation stone for other working practices to deliver greater effectiveness. Trust is the key to moving from coordinated to collaborative working; to progressing up the stakeholder ladder. The trust concept planted in the physical being of the HumLog community could be a potent tool for breaking down stakeholder barriers and promoting transparency. **PROMOTE EFFECTIVENESS - SHARED VALUES - COMMUNITY - STAKEHOLDER LADDER.**	PROMOTE EFFECTIVENESS - SHARED VALUES - COMMUNITY - STAKEHOLDER LADDER.
Those respondents who had clearly considerable experience working in-country articulated the value of local knowledge and using local NGOs, HN staff and other local populace as an effort-multiplier. One suggested that a good logistician was not one who knew all the answers but was the one who knew the pople with the answers. One respondent suggested that by using local contacts, NGO organisations can gain local buy-in, thereby removing local frictions and making their interventions more transparent.	Where trust can be established outside the HumLog community, in the local population, working with locals can be an effort-multiplier. Including local companies, organisations and representatives as stakeholders can increase effectiveness, efficiency and achieve local buy-in both politically and commercially. It takes a seasoned DRO organisation to establish where such as relationship can be forged and when when ethical questions might arise. **ORGANISATIONAL CULTURE - TRUST - ETHICAL CONSIDERATIONS - SHARED VALUES**	ORGANISATIONAL CULTURE - TRUST - ETHICAL CONSIDERATIONS - SHARED VALUES
Most prevalent amongst seasoned in-country NGO staff, the concept of a common procurement platform is seen as beneficial, particularly to smaller NGOs, but linking to Ser 15, many perceive UN agencies to be holding a monopoly on procurement and unlikely to share procurement resources outside their organisation. None suggested that they would be prepared to host a shared procurement platform.	Hosting a shared system may place unacceptable responsibility on an individual stakeholder but best practice and understanding the the strengths of individual organisation, together with a collaborative approach to the functions of logistics would provide accessibility to those who need assistance in executing the functions. **SHARED VALUES - FLOW OF INFORMATION - COMMUNITY - SWOT - HOLISTIC**	SHARED VALUES - FLOW OF INFORMATION - COMMUNITY - SWOT - HOLISTIC
In more than one context, the sharing of information regarding the availability of resources was raised and this was tied to the state of the in-country micro-economy. The two forums discussed as being the most effective way of sharing information were the Log Cluster and where this was not deployed, the in-country HumLog community.	Sharing information to achieve greater effectiveness, efficiencies and to fight micro-economy inflation is seen by all stakeholders as being valuable. Non-commercial stakeholders place considerable value in the LC and this needs to be reiterated across the community to ensure its optimum performance. Instead of ad hoc communities developing where the LC hasn't been deployed, perhaps a pan-stakeholder SOP to form a more formal HumLog community could be created through education	COMMUNITY - EDUCATION - FLOW OF INFORMATION

	initiatives. This would require education institution input and stakeholder buy-in. **COMMUNITY - EDUCATION - FLOW OF INFORMATION**	
Both of the instances regarding sensitive data sharing were connected with financial transactions and resource provision. Both instances of protecting data were directed by the organisations' HQ or Regional office, and not the in-country team.	Generally speaking, the protection of sensitive data is not an issue for in-country logisticians, probably because of the naturally coordinated way they tend to work. However, programme level HQ staff may need to become more aware of in-country realities and by having a logistics HQ desk officer, such fears could be resolved. **ORGANISATIONAL CULTURE - VERTICAL FLOW OF INFORMATION - EDUCATION**	ORGANISATIONAL CULTURE - VERTICAL FLOW OF INFORMATION - EDUCATION
The majority of respondents frequently referred to the need to share data on an IT system capable of managing the information and presenting it for common consumption. The Log Cluster was suggested by several as being the best location, in their opinion, for this info management function.	Hosting such a system may not be practical but having assess to shared systems hosted by individual stakeholders would be more easily achieved. This would require organisational buy-in, an inherent tendency to share data and a holistic approach to stakeholder relationships. if the LC was to accept such a function, it would have to be managed away from WFP systems. **HOLISTIC - TRUST - SHARED VALUES - SWOT - FLOW OF INFORMATION - COMMUNITY - LC MANDATE**	HOLISTIC - TRUST - SHARED VALUES - SWOT - FLOW OF INFORMATION - COMMUNITY - LC MANDATE
The subject of vertical information flow was common among respondents, some of whom despaired at their organisation's ability to understand logistic issues but some of which agreed that their organisation had a good understanding. The important feature here is that the organisations have a vertical information channel available to in-country logisticians.	Strategic level management need to understand that since 80% of expenditure is on logistics, this operational area should attract proportional operational importance. Failure in this area creates significant managerial ineffectiveness and inefficiency. Forums such as the Fritz Institute, Humanitarian Networks and Partnership Weeks (HNPW), OCHA, ECHO and European Humanitarian Forum (EHF) could play an effective role. **EDUCATION - ORGANISATIONAL CULTURE - VERTICAL FLOW OF INFORMATION**	EDUCATION - ORGANISATIONAL CULTURE - VERTICAL FLOW OF INFORMATION
The use of an over-arching software system like ULS (facilitated by ECHO) was raised by 5 respondents but their comments reflected short term and specific occasions where such a system was made available through a UN agency. There is no such system established as a standard roll-out for relief operations in general.	Such an over-arching capability would have to be vested in an independent organisation capable of managing it impartially but also transparently, with access to active participants / members. It would have to be hosted outside the UN umbrella, possibly initially accessible only by INGOs. **HOLISTIC - COMMUNITY - FLOW OF INFORMATION - ORGANISATIONAL CULTURE**	HOLISTIC - COMMUNITY - FLOW OF INFORMATION - ORGANISATIONAL CULTURE
A small number fo respondents commented on transparency as being problem for some partner organisations, UN agencies in particular. However, they did appreciate the political nature of UN agencies and conceded that this was probably the reason for this perception.	This is symptomatic of the juxta position of INGOs and UN agencies: they recognise that they are different but recognise why. Therefore, the underlying issue is one of mutual understanding and transparency, both based on trust. Maintaining a flow of information to explain clearly decisions that are taken but which have a knock-on effect is a basis of holistic understanding and collaborative working. **TRUST - FLOW OF INFORMATION - HOLISTIC - SHARED GOALS**	TRUST - FLOW OF INFORMATION - HOLISTIC - SHARED GOALS

It is widely acknowledged that by their very nature, logisticians strive for efficiency, with a number of organisations suggesting that they only deploy to a relief operation where they consider themselves as filling a gap in capability. This however is at odds with the flag-planting perception of relief organisations.	It is evident at the tactical level that efficiency is a natural characteristic of logisticians, but it can only be optimised by logisticians coming together in-country. The idea of only deploying to fill a gap is laudable but rarely the case in reality. The best way of achieving optimal efficiency and thereby deliver optimal effectiveness to beneficiaries, is to work collaboratively, with all that this involves. **COLLABORATION - COMMUNITY - FLOW OF INFORMATION - HOLISTIC**	COLLABORATION - COMMUNITY - FLOW OF INFORMATION - HOLISTIC
The importance and benefit of pre-positioning and contingency planning was voiced by most respondents; the disadvantages realised by failing to do so was also expressed. Most organisations now consider contingency planning as being part of their overall deployment strategy with NGOs and UN agencies who maintain in-country development offices as being best prepared.	Considering the DMC Emergency Response phase in isolation is no longer an option and aid agencies need to be more proactive in planning. Evidence shows that this is not happening, probably through a lack of resources. Perhaps an independent organisation capable of carrying this out holistically to the benefit of all aid agencies is the answer. Even a shared database, fed by contingency planners and development office planners could serve as an initial form of such a shared capability. **HOLISTIC - SHARED INFORMATION - PLANNING - DMC PHASES**	HOLISTIC - SHARED INFORMATION - PLANNING - DMC PHASES
The lack of visibility of the 'big picture' was raised by a handful of respondents who had found themselves deployed into a situation where the Log Cluster was not operating. Instead, they relied on the HumLog community but even here, the strategic view was difficult to achieve.	A holistic view of the operation is essential in the optimisation of effectiveness and efficiency. In the absence of an 'owner' or 'control' function [military logistics], information must be shared effectively. Cooperation and Collaboration are tools, as too is a shared information management system. The latter requires resources and acceptance of responsibility. **COLLABORATION - COOPERATION - HOLISTIC - FLOW OF INFORMATION - SHARED INFORMATION**	COLLABORATION - COOPERATION - HOLISTIC - FLOW OF INFORMATION - SHARED INFORMATION
Only half the respondents considered their organisations as investing the logistic capability with a number suggesting moving away from bringing in commodities and towards a market driven local resourcing effort. Investing in logistic capability ranged from equipment to training and recruiting personnel.	Organisational culture, available resources and the environmental situation in-country will drive the relief approach but, in any event, logistic capacity remains important. An organisation's agility - its ability to switch modus operandi - depends on its organisational culture, governance and resources. Staff can adjust operational posture through education and training, but this requires strategic buy-in and resources. Where this doesn't exist, organisations such as the Fritz Institute, Humanitarian Networks and Partnership Weeks (HNPW), OCHA, ECHO and European Humanitarian Forum (EHF) could be influential. **ORGANISATIONAL CULTURE - RESOURCES - EDUCATION - GOVERNANCE**	ORGANISATIONAL CULTURE - RESOURCES - EDUCATION - GOVERNANCE
Standardisation was acknowledged by some as an efficiency driver but was only mentioned by four respondents.	Standardisation is a valuable efficiency tool but falls outside the scope of this work. However, there is an element of best practice, shared information, and therefore holistic operation inherent in standardisation. **HOLISTIC - SHARED INFORMATION - SWOT**	HOLISTIC - SHARED INFORMATION - SWOT
One NGO respondent suggested that the UN and Log Cluster could assist more neutral and impartial stakeholders (NGOs) by intervening where politically charged issues arise. One such issue is in-country freedom of movement (Cameroon).	While the LC considers itself to be a non-political entity, its close links with WFP would allow it to act as a natural conduit for INGO stakeholders to request assistance for apolitical cover to afford them neutrality without engaging with political entities.	LC MANDATE - ORGANISATIONAL CULTURE - SWOT

	This could be a development of the LC mandate. **LC MANDATE - ORGANISATIONAL CULTURE - SWOT**	
The idea of non-deployable humanitarian organisations like the Fritz Institute to play a role in capacity building initiatives was raised. Also, the role of academics and closer ties between relief organisations and academic researchers was mentioned as a way of building HumLog capacity in terms of education, training and general understanding the issues better.	Closer ties between practitioners and academia, perhaps through a mechanism such as the HNPW forum would facilitate new thinking and feedback for academia providing solutions to real life issues - a theoretical / reality interface. Capacity building could be modelled and tested with results shared among all aid agencies, thereby promoting a holistic view to HSCM problems and the sharing of information. **HOLISTIC - FLOW OF INFORMATION - EDUCATION - SWOT**	HOLISTIC - FLOW OF INFORMATION - EDUCATION - SWOT
An issue which was raised in several contexts is the importance of understanding the ethos and ways of working of partner organisations. Organisations make conscious decisions to work, or not work with a variety of organisations based on their perception of how well the organisations can align. This perception of organisational culture feeds into the UN v NGO debate.	Success in organisational alignment is founded in understanding org culture and having a willingness to cooperate or collaborate, regardless of the fact that organisational differences may exist. Understanding comes from experience and will-power underpinned by trust. **TRUST - ORGANISATIONAL CULTURE - COLLABORATION - SWOT**	TRUST - ORGANISATIONAL CULTURE - COLLABORATION - SWOT
Most practitioners prefer to be working within a formal project or programme with a designated desk officer at ther HQ rather than an ad hoc engagement, which tends to be more prevalent where an operation is nearing the response / development continuum or where an in-country team is stood up to work with another stakeholder.	Vertical information flows and strategic understanding of the tactical situation are often only resolved in large organisations through the assignment of a suitably trained desk officer / coordinator. This links into organisational culture above. **ORGANISATIONAL CULTURE - RESOURCES - EDUCATION - GOVERNANCE - VERTICAL FLOW OF INFORMATION**	ORGANISATIONAL CULTURE - RESOURCES - EDUCATION - GOVERNANCE - VERTICAL FLOW OF INFORMATION
The more commercially minded logisticians held store to having contracts, MOUs or ToRs in place to guide their decision-making and level of engagement. However, there was a more pragmatic approach taken by others, where they knew that their project offices were providing close support.	Organisational alignment can be achieved formally or in an ad hoc manner. However, a common best practice based on closer links with academia could produce a guide which could be used by individual orgs to inform their operational structure and agility. This could include example MOUs, ToRs, SOPs, etc. Editorial control of such a guide could sit with an independent institute (Fritz or Hanken Int Business School). **HOLISTIC - FLOW OF INFORMATION - EDUCATION - SWOT**	HOLISTIC - FLOW OF INFORMATION - EDUCATION - SWOT
Aside from activities such as contingency planning, coordination and information sharing, there seems little in the way of organisational governance to concern logisticians. One respondent who works for a very flat-structured organisation, raised governance issues but this was clearly because they worked at both the in-country and strategic level of their organisation.	The larger the organisation (less flat-structured), the further logisticians seem to be from governance concerns. This creates two issues: uninformed in-country staff; and isolated programme / planning staff. Connecting with Ser 34, this relates to organisational alignment: an org out of alignment finds fast and robust decision-making difficult to achieve. **ORGANISATIONAL CULTURE - RESOURCES - EDUCATION - GOVERNANCE - VERTICAL FLOW OF INFORMATION**	ORGANISATIONAL CULTURE - RESOURCES - EDUCATION - GOVERNANCE - VERTICAL FLOW OF INFORMATION
Fewer than half respondents considered common technology platforms for integrated operations worth mentioning. Those who did refer to it tended to be from smaller NGOs with a desire to piggy-back on larger organisations.	Platform sharing could be considered a future step once data sharing and information sharing has become more widespread. More research needs to be conducted into which platforms would provide benefits and where should their custodianship lie. However, these respondents draw attention to a willingness and necessity to share information and allude to a role for the LC. **HOLISTIC - FLOW OF INFORMATION - LC MANDATE - SWOT**	HOLISTIC - FLOW OF INFORMATION - LC MANDATE - SWOT

Risk management was raised by the more commercially astute respondents and those with exposure to strategic operations. Generally, logisticians on the ground were less concerned with financial / operational risk management and more concerned with physical security of their commodities and staff.	This probably sits more with strategic planning than in-country practitioners, but vertical information flows and org alignment are key to ensuring that risk management in-country is both proportional and sufficient. A tool to ensuring this is the assignment of a desk officer / coordinator at HQ level. **ORGANISATIONAL CULTURE - RESOURCES - EDUCATION - GOVERNANCE - VERTICAL FLOW OF INFORMATION**	ORGANISATIONAL CULTURE - RESOURCES - EDUCATION - GOVERNANCE - VERTICAL FLOW OF INFORMATION
Only those exposed to strategic level operations seemed concerned with management accountability (as opposed to financial accountability). Two respondents referred to their decision-making being linked to organisational management accountability with one specifying the protection of sensitive data (regarding market competition and pricing of services) as being of particular interest to their organisation's management activities.	Vertical information flows and org alignment are key to effective managerial accountability, which in turn affects staff behaviour and therefore reputation. A tool to ensuring this is the assignment of a desk officer / coordinator at HQ level. **ORGANISATIONAL CULTURE - RESOURCES - EDUCATION - GOVERNANCE - VERTICAL FLOW OF INFORMATION**	ORGANISATIONAL CULTURE - RESOURCES - EDUCATION - GOVERNANCE - VERTICAL FLOW OF INFORMATION
Financial accountability was only raised by those who were working outside their comfort zones when handling cash. Where 'routine' budgeting was being practiced, there did not seem to be any concerns with financial accountability, perhaps because these established practices have their own checks and balances. However, when using money transfer systems such as Hawala or when engaged with stakeholders that are more contractually based (e.g. IGO entities), financial accountability becomes more important to logisticians in-country.	In contrast to management accountability measures, all organisations appear to have established financial accountability measures [which is to be expected]. Financial accountability only arises amongst logisticians who are required to handle funds (cash) in a 'non-routine' manner such as money transfers where banking facilities do not exist. Arrangements for these appear a priority for stakeholder organisations, suggesting that there already exists a robust, or at least a workable financial accountability process. This would require vertical information flows and a dedicated finance desk officer to facilitate this level of accountability required. **ORGANISATIONAL CULTURE - GOVERNANCE - VERTICAL FLOW OF INFORMATION**	ORGANISATIONAL CULTURE - GOVERNANCE - VERTICAL FLOW OF INFORMATION
With the exception of the in-country IGO agency, all respondents raised the subject of resource competition, but not all from a negative perspective. Competition resulting in organisations losing out did arise but cooperation in the face of resource competition also featured. Some NGOs, cognisant of the strengths of others, actively adapted their operations to avoid losing out while others engaged with 'rivals' to try to achieve a form of parity based on a holistic prioritisation. This was largely achieved through the HumLog community.	Even when resources are scarce, logisticians will adapt to the prevailing circumstances and either negotiate or prioritise their own operational goals. To permit this, trustworthy information must be shared, and this can only come from transparency and a robust communication system to underpin coordination. **COMMUNITY - TRANSPARENCY - TRUST - FLOW OF INFORMATION**	COMMUNITY - TRANSPARENCY - TRUST - FLOW OF INFORMATION
Virtually all raised the issue of limited financial resources with only the in-country IGO agency considering themselves fully funded to achieve their stated mandate. They did suggest that with more funding (channelled to them rather than UNICEF), they could have been more financially efficient and operationally effective: their opinion.	IGO agencies apply commercial principles to set budgets and therefore inherently work within their financial limitations. NGOs' budgets are organisational and will be prioritised against org planning constraints, as too are UN budgets. This has the effect of driving a 'biggest bang for your buck' mentality at programme level. For this approach to work at the tactical level, organisations need to be financially transparent and prepared to highlight their weaknesses as well as their strengths. Coordination moving to collaboration benefits everyone. **TRANSPARENCY - SHARING DATA - SWOT - FLOW OF INFOMATION**	TRANSPARENCY - SHARING DATA - SWOT - FLOW OF INFOMATION

Duplication of effort was raised but in the context of logisticians commencing operations only to adjust operations and adapt aims once it is appreciated that there was a duplication of effort. The five respondents used this situation to reiterate the value of shared information, operational coordination and a natural tendency for logisticians to avoid duplication / wasted effort.	Duplication of effort can be identified early through stakeholder communication and transparency. This set against a natural tendency to avoid wasting resources significantly benefits those in need and should be coordinated centrally to achieve optimum efficiency. **LC MANDATE - TRANSPARENCY - FLOW OF INFORMATION - COMMUNITY**	LC MANDATE - TRANSPARENCY - FLOW OF INFORMATION – COMMUNITY
Although there may have been other instances implied but not specifically stated, one respondent suggested that there could be a fear among some organisations to engage with other stakeholders; but stressed that this tended not to be the case among logisticians on the ground. Both NGOs and UN agencies experience a tension between in-country logisticians and HQ level programmers, with the perception that programmers understand little about logistics, even though 80% of their expenditure is on logistics. To iterate, this is not between logisticians and HQ level desk officers with a logistics background (Staff Branch 3/7 individuals rather than Staff Branch 4).	There was overwhelming evidence of UN and NGO logisticians engaging on the ground but there was a concern that programme and other HQ staff failed to engage effectively with other stakeholders either through fear of exposing their understanding of the logistic situation or not knowing with whom to engage. This could be rectified by employing more logisticians in programming jobs in HQs. **EDUCATION - VERTICAL FLOW OF INFORMATION - ORGANISATIONAL CULTURE**	EDUCATION - VERTICAL FLOW OF INFORMATION - ORGANISATIONAL CULTURE
The in-country IGO agency respondent felt very strongly that the UN were an 'incompetent and unreliable' partner organisation and they refused to engage with them; they also refused to engage with the Log Cluster which they perceived as being 'cluster by name, cluster by nature' (a reference to an English language expletive). The Strategic level IGO respondent had little consideration for UN agencies as they felt their SCM was independent of the UN. One NGO recognised the difficulty IGO entities and others [3PLs] had with engaging with established humanitarian organisations. The comments made by the in-country IGO agency seemed to indicate a disconnect between commercial imperatives that they were working to and humanitarian imperatives which one would think should have been more important to them. That said, they also raised what they considered as humanitarian issues which they thought could be better addressed by commercial rather than conventional [UN-led] initiatives.	Due to their nature, commercially oriented supply chains in a humanitarian environment will adopt a different posture from others, not least to ensure that they are able to exercise ownership and control over their individual supply chain. However, such SCs are still part of the supply network in-country, and every effort should be made to make IGO agents and 3PL providers of the benefits of engaging with the HumLog community, but also to appreciate that there are marked differences with they need to understand in order to tolerate them. IGOs are unlikely to deviate from contracts just because of a change of humanitarian priorities on the ground but a reasonably stakeholder relationship with them would allow NGOs and UN agencies to cover gaps, but also allow IGO resources to underpin gaps that they might have. **EDUCATION - ORGANISATIONAL CULTURE - TRANSPARENCY - TRUST - FLOW OF INFORMATION (at Strategic or Grand Strategic level)**	EDUCATION - ORGANISATIONAL CULTURE - TRANSPARENCY - TRUST - FLOW OF INFORMATION (at Strategic or Grand Strategic level)
The perception that market competition exists in many scenarios, particularly early in a response operation. Those that reply on availing themselves of services and enablers in-country are most exposed. Respondents recognising that the local market is being manipulated for profiteering and coming together to beat the profiteers. Where the limitation is quality rather than quantity, using influence and economies of scale to secure the best quality.	A robust resource strategy can be crafted through contingency planning, which in turn should smooth some of the effects of increased focus on the local economy. Market competition is going to occur but attempts at profiteering or the destabilising of the local economy can be offset through a coordinated approach to resource provision and the local procurement of goods and services. If stakeholder engagement occurred at HQ / strategic level in terms of resource planning, the economies of scale achieved could alleviate the issue of obtaining quality services ahead of partner organisations. This would require a level of Grand Strategic adjudication which could only come from an autopoietic solution. **HOLISTIC - TRANSPARENCY - FLOW OF NFORMATION -**	HOLISTIC - TRANSPARENCY - FLOW OF NFORMATION - CONTINGENCY PLANNING - ORGANISATIONAL CULTURE - COORDINATION

	CONTINGENCY PLANNING - ORGANISATIONAL CULTURE - COORDINATION	
Commenting on ethical issues, all organisations expressed a pragmatic approach within the boundaries of their organisation's ethics code. Many use or replicate the UN ethical approach and training which is widely considered as the common sense approach.	Organisational governance sets the boundaries and vertical communication ensures that robust ethical judgements are made. Sharing a situation where an ethical issue crosses an organisation's ethic boundary may permit resolution through best practice or passing to an organisation with more relaxed ethical constraints. **GOVERNANCE - COMMUNITY - TRANSPARENCY - LC MANDATE ORGANISATIONAL CULTURE**	GOVERNANCE - COMMUNITY - TRANSPARENCY - LC MANDATE ORGANISATIONAL CULTURE
Despite sustainability and environmental protection playing a significant role in commercial SCM, few humanitarians raised it as a topic but one that did state that by their nature, HSCs are not sustainable. Another referred to a sustainability initiative that they had been asked to participate in but they declined on funding grounds.	Sustainability in terms of longevity v eco-friendly are often confused but consensus shows that both meanings are considered unviable, at least at present. Focusing on the eco-side of sustainability, organisations rarely have the available extra funding to expend green initiatives on the ground; rather such extra funding is channelled to the beneficiaries. Green transport assets cannot be used where the situation lacks the infrastructure and green energy sources currently require extensive infrastructure investment and long lead times. Where a stakeholder wishes to pursue a green agenda, it should understand that while their actions will be laudable, others are unlikely to have the financial resources to follow. **ORGANISATIONAL CULTURE - FLOW OF INFORMATION - GOVERNANCE**	ORGANISATIONAL CULTURE - FLOW OF INFORMATION - GOVERNANCE
An issue identified in the literature that did not materialise in the interviews is high staff turnover and the impact of this on operations. Only two respondents referred to it, and both referred to momentum being lost in driving projects and initiatives forward when a key member of staff turns over. This tended to be based on personality-centric initiatives which have been established by a particularly strong character.	High staff turn-over may not necessarily be problematic but where it affects the momentum of an operational initiative or project, then the affects have to be mitigated to allow delivery of the project. Collaborative working where the reigns can be handed over to someone already embedded in the project can achieve this but collaborative working needs buy-in both on the ground and that the regional or HQ level too. **ORGANISATIONAL CULTURE - COLLABORATION - HOLISTIC - VERTICAL INFORMATION FLOW - (LATERAL) FLOW OF INFORMATION**	ORGANISATIONAL CULTURE - COLLABORATION - HOLISTIC - VERTICAL INFORMATION FLOW - (LATERAL) FLOW OF INFORMATION
The subject of professionalism arose in half the interviews but respondents recognised that while having professionals working in your organisation is advantageous, it is better to have amateur staff who are turning their hand to functions within the operation rather than no one. One respondent described how none of their team were logisticians but had the right skillsets to form an effective HSC (to support Ukrainian refugees). The benefits of transferring knowledge and skills to local actors was appreciated by some but there seemed to be a barrier in doing so. Although not stated, this problem seemed to be the opportunity of doing so: time, personnel resources, the right people to invest in.	Individual stakeholders will recruit according to their resources, modus operandi and available manpower; rarely will be perfect staff profile be achieved. Internal staff training twinned with a HumLog community appreciation for individuals' willingness to contribute could facilitate three-dimensional training opportunities through cooperation or collaboration (training by organisations and the community passing on [transferring] knowledge and skills). Where a humanitarian imperative exists, people will adapt but to facilitate efficient and effective adaption benefits all. **EDUCATION - COLLABORATION - COMMUNITY - ORGANISATIONAL CULTURE - SHARED INFORMATION / EXPERIENCES**	EDUCATION - COLLABORATION - COMMUNITY - ORGANISATIONAL CULTURE - SHARED INFORMATION / EXPERIENCES

Both NGOs and UN agencies appreciated the role of the Log Cluster, when it has deployed. Where it hasn't deployed, it has been missed. The only condescending voice among the respondents was the IGO agency whose opinion was extreme. 'Professional' humanitarians have a good understanding of what the Log Cluster's mandate is and why it seems often limited or constrained. A few would like to see its mandate developed but all saw its main focuses as being a source of coordination, a networking forum and a forum for the exchange of information.	The overwhelming consensus is that the LC is a valuable stakeholder whose mandate is generally understood. There could be mileage in formalising the LC's mandate for stakeholder consumption and to encourage others to engage by tempering their expectations. Where the LC is deployed, its outputs should be apparent to all but where it is not, the existing HumLog community should attempt to replicate the LC's function to achieve the aspired outputs by using a generic template designed specifically for such an eventuality. **LC MANDATE - COMMUNITY - HOLISTIC - SWOT - SHARED DATA - COORDINATION**	LC MANDATE - COMMUNITY - HOLISTIC - SWOT - SHARED DATA - COORDINATION
Notwithstanding the broad understanding of the LC's raison d'etre by stakeholders, only one specifically drew attention to this work as a facilitator with 4 others referring to it as a forum. There could be some overlap here between 'LC forum' and 'logistics community', even though it is accepted that the latter is an informal grouping of like-minded professionals.		
An example was quoted of one instance where the LC was able to assist in the resolution of issues between stakeholders who preferred to find an in-country solution rather than ref the issues to their organisational HQ. An implied reason for this was a perception that the HQ entity did not have a thorough enough understanding of the issues on the ground, so their input was considered unhelpful and possibly counter-productive.	Recognising that such a resolution is possible, particularly while in-country logisticians are not comfortable with the abilities of their programme staff, should be embraced by all stakeholders and perhaps formalised (tactfully) in an LC mandate. **LC MANDATE - COMMUNITY - HOLISTIC**	LC MANDATE - COMMUNITY - HOLISTIC
Aside from the IGO agency who refused to engage at all with the LC, 3 others considered it as having limited effect but acted more as a meeting place provider that took written minutes. They suggested that the real contribution was the forum in which they were proactive and not the LC.	The role of the LC is not universally understood and therefore a concerted effort by WFP / LC should be undertaken to actively promote the LC's role to stakeholder organisations as part of contingency planning as well as in-country. This would require a more formal mandate. **LC MANDATE - DMC PHASES - FLOW OF INFORMATION - HOLISTIC**	LC MANDATE - DMC PHASES - FLOW OF INFORMATION - HOLISTIC
All of those with a positive or neutral experience of the LC had a common perception of it: it was a UN entity that, depending on the personality, could behave aloof. NGOs in particular considered the link between the LC and WFP as sometimes problematic, but they understood why the structure is as it is. One respondent suggested that in the ideal world, the LC would be independent but conceded that some kind of mechanism would have to be put into place to fund and resource it, which would probably result in a similar situation to that in existence now.	Where a holistic view of the paradigm is taken, a more cybernetic control function could not sit with the LC due to stakeholder perceptions and experience. This would not preclude the LC forum of executing such a function, particularly if the LC were to be formally restructured to have 'members' drawn from nominated stakeholders from across the paradigm. Such a forum would appear from the outside to be more coherent, and its existence could encourage others (IGO agencies / 3PLs) to engage. **LC MANDATE - HOLISTIC - COMMUNITY - SHARED DATA - ORGANISATIONAL CULTURE - TRUST - GOVERNANCE**	LC MANDATE - HOLISTIC - COMMUNITY - SHARED DATA - ORGANISATIONAL CULTURE - TRUST - GOVERNANCE
The three IGO entities expressed distrust, a lack of understanding or the irrelevance of the LC for them. None engaged nor were they really able to accurately describe the role of the LC in a constructive way and in any detail.		
Several respondents mentioned problems which required addressing with the HN, including safety and security of personnel, and customs clearance for inbound commodities. However, one NGO respondent drew attention to an occasion where the LC refused to engage with the HN to help resolve an issue.	Due to the juxta position of WFP's custodianship of the LC and the LC's humanitarian credentials, the LC is loathed to engage stakeholders such as the HN on political matters. However, it has the channels to engage indirectly through UN agencies but in a very controlled manner which NGOs do not have. If the LC persist on avoiding political problems such as HN customs	LC MANDATE - HOLISTIC - ORGANISATIONAL CULTURE – GOVERNANCE

Three instances were highlighted where the LC refused to act on behalf of stakeholders because it felt the situation was outside its bailiwick because of its political or financial connotations.	clearance, then a holistic solution must be found because this is a persistent problem being addressed on an ad hoc basis by inexperienced and often ill-prepared NGO staff. Formalising the LC's mandate would be helpful here. **LC MANDATE - HOLISTIC - ORGANISATIONAL CULTURE - GOVERNANCE**	
Three respondents highlighted that the LC does not always deploy, and that even if it does, it may not have the ability to cover the entire operational environment. NE Syria (political / conflict zoning) and Burkina Faso (size / distances).	It is appreciated that the LC cannot cover all operations omnipotently, but should its outputs be formally captured in a formal mandate, where it doesn't deploy, the existing HumLog community could attempt to replicate the LC's function to achieve the aspired outputs by using a generic template designed specifically for such an eventuality. See Ser 56. **LC MANDATE - HOLISTIC - SWOT - SHARED DATA - ORGANISATIONAL CULTURE - COORDINATION - COMMUNITY**	LC MANDATE - HOLISTIC - SWOT - SHARED DATA - ORGANISATIONAL CULTURE - COORDINATION - COMMUNITY
Both NGOs and UN agencies suggested that, together with the LC, emergency response logisticians should structure their operations to run through the Response / Development Continuum rather than seek to extract at the end of the emergency phase. Benefits included a more robust future supply chain and longer-term economic investment, particularly where the local market has been relied upon for resourcing the aid effort.	As with the merging of contingency planning with emergency response delivers benefits, so too does crossing the Response / Development Continuum. However, this could have connotations for future emergencies with staff tied up in development, but the future structure need not tie down individuals if the dovetailing can inject development staff into the end of the emergency phase. For the UN, such handovers are coordinated by UNDP but there is no such NGO-focused entity. Perhaps a holistic solution could be found from within the LC. **LC MANDATE - HOLISTIC - DMC PHASES - ORGANISATIONAL CULTURE - SWOT**	LC MANDATE - HOLISTIC - DMC PHASES - ORGANISATIONAL CULTURE - SWOT
Only one respondent used the term 'system' to describe the supply paradigm, but the context was that HSCs didn't just comprise a system; it comprised people. The reference was to draw attention to the importance of people in SCM rather than acknowledge the systemic nature of the supply network.	The term 'system' was not considered in the cybernetic sense and no one interviewed considered themselves as part of a system in any way. They all took a reductionist view of their environment, but their views were significantly underpinned by a need to take a holistic view of the paradigm. One way of taking such a holistic view is to take a cybernetics approach. **HOLISTIC - ORGANISATIONAL CULTURE - FLOW OF INFORMATION - COORDINATION - NETWORKS - AUTOPOIETIC - CONTROL**	HOLISTIC - ORGANISATIONAL CULTURE - FLOW OF INFORMATION - COORDINATION - NETWORKS - AUTOPOIETIC - CONTROL

Table D.1   Analysis and Further Coding.

THEORETICAL SAMPLING AND SUBSTANTIVE THEORY

THEORETICAL SAMPLING	FURTHER CODING AND COMPARISON	REDUCTION AND INTEGRATION	SUBSTANTIVE THEORY
ACCEPTED BELONGING COMMUNITY	**RELATIONSHIP BASIS** The majority of in-country stakeholders considered themselves to belong to a humanitarian logistics community and work with ease with other organisations. This is not the case or their organisation's HQ. Many in-country logisticians feel detached from their programming staff at HQ and they see this reflected in other organisations.	This sense of belonging to a logistic community is expressed by the majority of in-country stakeholders but not recognised as avidly by organisations' senior management. This indicates that while the idea of a more systemic modus operandi in-country would be likely met with some enthusiasm, such an idea could be more difficult to sell to HQs and regional offices. The foundations of common understanding and cohesion already exist but the primary frustration among stakeholders is the ability to see the big picture and base decisions on this holistic perspective. The Log Cluster is seen as a positive factor in enabling cohesion but lacks the truly holistic view.	In-country logisticians already work well together but they lack the ability to view the operational environment holistically. Their strategic management is stove-piped and can only provide high-level understanding of the organisation's activities and not those of the organisations around them. Therefore, achieving optimum effectiveness and efficiency is difficult. No 'over-seer' entity exists, and organisational sensitivities preclude the Log Cluster from extending its mandate into SC control.
COHESION COLLECTIVE RESPONSIBILITY COMMON PURPOSE COMMON UNDERSTANDING	**COMMON BONDS** There is a consensus among in-country logisticians that they share a common purpose and understanding and achieve cohesion through formal forums like the Log Cluster and other informal groups. There is a general aspiration to exercise a form of collective responsibility but that this is not necessarily supported by their regional or HQ management staff.		
PROMOTING RELATIONSHIPS SHARED GOALS & EXPERIENCES SHARED INFORMATION & DATA SHARED VALUES STAKEHOLDER ENGAGEMENT STAKEHOLDER LADDER FLOW OF INFORMATION (vertical & lateral) INFORMATION SHARING LC MANDATE COORDINATION	**STAKEHOLDER INTERACTION** With the exception of IGO agencies and some 3PL providers, stakeholders recognise the importance of interacting with each other and do so readily. They feel part of a network, even if they run their own bespoke supply chains. Where there is the organisational latitude to do so, they are quick to share information at the tactical level. They recognise that stakeholder relationships reflect those of the Stakeholder Ladder. **PASSAGE OF INFORMATION** Most organisations appreciate the value of vertical and lateral flow of information. This is a particularly highly referenced facet of the paradigm and as such, features highly amongst practitioners at the tactical level. Operational frustrations tend to be born out of a lack of information rather than a lack of resources. Most	Stakeholders are quick to apply pragmatism when working with others and this results in good relations forged through face-to-face contact. Information is shared in and away from the Log Cluster and organisations understand the status of others in terms of the Stakeholder Ladder. All organisations value the passage of information, and some are frustrated to see that while lateral information flows readily in-country, the vertical flow from programmers in HQs can often be challenging. All concur that information flow could be improved but they struggle to find a solution. Information surrounding resources is protected most closely.	There is effective lateral passage of information between in-country stakeholders, but many practitioners are frustrated with the communication and alignment of their parent organisations and the lack of lateral flows of information at the strategic level. All stakeholders appreciate that they work in a supply network, even if they are operating independent (commercial / 3PL) supply chains. Knock-on effects from decision-making are only avoided through ad hoc arrangements and information exchanges on the ground: to achieve optimal effectiveness, this needs to be formalised but without encroaching on organisational cultures. There is a willingness to share information but not the mechanism to achieve a network of information that takes the holistic picture into consideration.

	stakeholders appreciate the role of the Log Cluster.		
COOPERATION	**LC MANDATE** Stakeholders understand what the Log Cluster can do for them but are not clear on its actual mandate. As a form for information, ideas, guidance and occasionally, resource management, it is appreciated but the juxta position of the LC and WFP is not so easily understood. The LC could benefit from a formal mandate, communicated to all and one which could be organic in its ability to adapt to in-country circumstances.	The key to effective stakeholder engagement is C3: coordinated activities, cooperation with partner organisations and collaborative working where possible. A degree of each exists in the humanitarian environment, not least because of the existence of the Log Cluster. Seen as a stakeholder forum and information brokerage, the LC can support stakeholders in a limited way with WFP transport assets, but it remains primarily an information exchange where stakeholders get to know each other. Each LC that deploys adapts to the environment it finds itself in but there is no hard and fast mandate, so stakeholders' expectations can be frustrated. Some of this frustration could be resolved from formalisation of the LC's mandate and structure: involving NGO players and the ability to take a more holistic operational view of an emergency intervention could hold potential.	The Log Cluster's strength lies in providing coordination, promoting cooperation and encouraging collaboration. There is little appetite for the expansion of its mandate into the realms of control or political engagement, but there could be latitude for the development of the structure of a deployed Log Cluster to formally involve other stakeholders in 'office-bearing' functions. Such an initiative would also promote closer organisational engagement at the HQ / strategic level.
COLLABORATION **BEST PRACTICE** **BUY-IN**	**C3** Without exception, all stakeholders appreciate the value of coordination with some actively wishing to engage cooperatively or collaboratively. At the cooperation level, some organisations will step back to allow a stronger partner to take the lead (WFP and UNICEF in Sierra Leone). True collaboration is still not practiced widely.		
PROMOTE EFFECTIVENESS **SYSTEMIC MANAGEMENT THEMATIC WORKING PRACTICES CONTINGENCY PLANNING OPERATIONAL PLANNING** **BOUNDED** **CONTROL**	**WORKING PRACTICES** In-country logisticians are active in utilising best practice and keen to get stakeholder buy-in for initiatives on the ground. They prefer to do business face-to-face, and they have a natural tendency towards efficient working practices. The see operational planning as essential to effective delivery of aid but increasingly, they are keen to promote contingency planning and can get frustrated if none has been carried out.	The close relationships that stakeholders enjoy on the ground are not replicated at strategic level and as such, a degree of organisational misalignment takes place to the frustration of practitioners. A forum such as the HNPW that brings together strategic players, practitioners and academia could influence the development working practices and the harnessing of best practice at the strategic level and facilitate more holistic thinking on the ground.	To harness best practice, improve effectiveness and achieve efficiencies, working practices must be based on achieving a holistic view of the operation. Without this, decision-making is disjointed resulting in ramifications for others. There is a willingness to work together, just not the mechanism.
GOVERNANCE **OWNERSHIP**	**ORGANISATIONAL SELF** Stakeholder organisations are keen to operationally bound	Each stakeholder organisation guards its reputation, ethos and	For a variety of reasons, stakeholders are protective of their organisational

RESOURCES **PROTECTED** **AUTOPOIETIC** **ETHICAL CONSIDERATIONS ORGANISATIONAL CULTURE**	programmes and projects, primarily for financial reasons but also for reputational reasons. Strategic governance is essential, but frustration does occur when in-country staff feel that programme staff do not understanding the situation on the ground. Generally, SC ownership and end to end control in the humanitarian environment only applies to IGO agencies and 3PLs who operate discrete supply chains in isolation of other stakeholders. The fear of others maintaining some sort of ownership, control or influence over another exists among stakeholders and therefore any solution to resolve issues arising from this fear needs to organic to the paradigm, where mutual ownership is achieved in a non-confrontational, manner: an autopoietic solution.	funding lines vigorously, but this does not mean that they should fear cooperative or collaborative partnerships. Where entities play to their own strengths while being aware of partners' weaknesses, the value of the whole is greater than the sum of the individual efforts. A partner can be bound by organisational limitations but still contribute effectively to a greater good. There is little appetite for supply chain 'ownership' or 'control' in the humanitarian paradigm, but at the same time organisations' identity and independence must be respected. For that reason, any marshalling of ideas, resources, activities and operations to address the common good need to be autopoietic in nature, where trust, mutual respect and cultural understanding underpin stakeholder relationships.	cultures, but it is this that leads to the lack of collaboration that denies the achievement of optimal effectiveness. Cultures are unlikely to change; and nor should they. However, if a holistic mechanism were in place that allowed stakeholders to play to their strengths, cultures wouldn't have to change. Stakeholders could choose what resources to provide, which activities to participate in and what corporate information / data it wanted to share. However, they would also have access to comprehensive information upon which to base their decision-making. Developing an autopoietic mechanism where decision-making influences and control measures were organic to the structure would allow stakeholders to maintain their unique identities and cultures.
POLITICAL UNCOUPLING STRENGTHS & WEAKNESSES TRANSPARENCY **TRUST** **HOLISTIC** **DMC PHASES - EXTERNAL / ENVIRONMENTAL CONSIDERATION**	**ORGANISATIONAL ETHOS** NGO and UN stakeholders appreciate the need for transparency but concede that it is not always possible for operational reasons, normally financial. Trust is considered essential and swift trust is achieved through early interaction and through the Log Cluster. Ethical standards are broadly the same across the board, but some organisations are able to resolve some ethical issues quicker and more effectively than others, normally because their own ethical make-up permits them to operate in a way another organisation may not be able to (e.g. religious interceding). Organisational culture will dictate how and whether stakeholder engagement occurs to what degree and whether the organisation operates outside the Humanitarian Space (i.e. political engagement). Organisational culture will also dictate how adversarial or cooperative an organisation will be in terms of stakeholder engagement: through cooperation, stakeholders can play to each other's strengths while avoiding inherent weaknesses of their own.		

EDUCATION - EXTERNAL / ENVIRONMENTAL CONSIDERATION	**HOLISTIC** The belief that a holistic view needed to be taken during disaster relief operations was widespread. In-country practitioners concurred that this was as true for their HQs as it was from them on the ground and that the more holistic a view was, the more information would be available to inform their decision-making processes. This would result in more effective aid delivery with efficiencies allowing organisations to increase the amount of aid delivered. Clearly, having a holistic view is highly valued and most stakeholders considered the Log Cluster as enabling holistic thinking.	The barrier to achieving a holistic view of a DRO is the lack of 'visual height' that can be achieved by an entity that can provide the holistic view. No one organisation has a wide enough view of the whole operation because of organisations' stove-pipe nature or working. To achieve the holistic view, a new medium needs to be developed that provides the information required without encroaching on the freedoms, independence, culture and ethos of stakeholder organisations. One possible solution would be to utilise existing structures to create a cybernetic form of the paradigm where organisations felt comfortable to operate but where their contributions would act as an effect-multiplier.	To provide the holistic view required, a form of control mechanism needs to be in place. A physical entity is likely to be highly contentious, therefore a theoretical concept needs to be developed which provides stakeholders with the opportunity to buy-in to the big idea and therefore take ownership of it. The 'it' is the supply chain operation, and the ownership comes from having a collaborative stake: being part of the community at the tactical and the strategic level. This means that organisational governance and the operational environment will have as much a role to play as logistic functions.
	DMC PHASE SYNCHRONISATION It is felt that through closer links with the contingency planning phase of the Disaster Management Cycle, more could be achieved in the hours and days immediately after the onset of a disaster, making response organisations more effective at an earlier stage. Similarly, it is considered beneficial for some of the measures, processes and activities of the response phase to continue into the development phase, particularly in terms of infrastructure and economy capability building. Frustration was voiced on what was regarded wasted time at the beginning of an operation and wasted resources towards the end of an emergency intervention.	Strong arguments can be made to align contingency planning more closely with emergency response and align or develop emergency response measures with future development measures. The former is exemplified in Nepal in earthquake response planning, but few emergency responses actively shape activities to best meet the Response / Development Continuum. By encapsulating these activities into a smoother running DMC, much of the work needed in the time-constrained response phase can be achieved in planning, where the response can be shaped early to ensure dividends to the affected country in the development / reconstruction phase. By doing so, lessons learned and best practice can be considered in 'slow time', away from the urgency and instability of a response operation.	Preparing the ground for an intervention and then shaping the emerging practices during the response phase to better dovetail into the development phase needs to be coordinated at a higher level than individual stakeholders and the practice needs to be inculcated into the ethos of each organisation as an accepted modus operandi. This would be developed by stakeholder organisations, institutes and academia, and delivered through education, training and adopted working practices. To support this, such forums as the HNPW and ECHO could play a role, cognisant that both these are pseudo-political in terms of their custodianship (UN and the EU).

		EDUCATION Education and train, irrespective of how formalised, is considered valuable by humanitarian logisticians. Whether it is formal education of permanent staff or on-the-job training for volunteers and locally employed civilians, resources spent here are considered as an effect multiplier. Some feel that closer links between their organisations and institutes / academia would create greater understanding where academics could be brought to bear on issues affecting the whole stakeholder group as an additional resource.	The coming together of NGO and UN stakeholder organisations, practitioners on the ground, humanitarian institutions and academia could provide a blueprint for the way emergency response operations should be conducted to optimise resources. It could contribute to an autopoietic-based cybernetic concept that can achieve the holistic operational view without encroaching on organisational culture. A 'resource centre' that covered such subjects as staff training, procurement, SCM processes and procedures, governance and programming mechanisms such as policy documents, SOPs, Standing Instructions could be established where organisations could avail themselves of consensus-approved source documents from where they can quickly create their own policy and procedures in the knowledge that what they will create is largely in keeping with what other organisations are doing. This would promote common working practices, if not standardisation with consensus.	

Table E.1   Theoretical Sampling and Substantive Theory.

<u>APPLIED ABSTRACT REASONING</u>

1.1   Data Collection Challenge

Further to para 6.5.1, the challenged faced in this research was the inability to collect ethnographic data through a physical presence in-country during a disaster relief operation. Such data would have been the natural complement to data derived from interviews, but the ongoing COVID-19 travel restrictions and the unease of aid agencies to permit external personnel to live and work at close quarters with their own staff meant that a different approach had to be found; one that would not be wholly based on, or dependent upon, secondary data. During the literature review process of this research, it was quickly established that some secondary data in the humanitarian supply chain field left itself open to bias and organisational self-satisfaction. Firstly, the number of people working as practitioners in the field is relatively small and therefore it is proportionately more difficult to find a truly independent author of a post-operational report or 'external' evaluation report. Secondly, anecdotal evidence suggests that in-house post-operational reports tend to be written in such a way as to allow an organisation to learn some lessons without scaring donors or harming organisational reputation. Therefore, any new approach to derive suitably academically robust data using humanitarian supply chain secondary sources would need to involve some form of theoretical grounding.

Following the logic of the research methodology laid out in Chapter 3, and specifically the 3-stage research design of this research as described in Fig 3.8, the boundaries of the research are set and found to still be feasible, appropriate and academically robust. Working within these research boundaries, the question set for the semi-structured interviews was produced, and again reviewed in light of the research methodology.

1.2   Available Data Sources

Several types of secondary data sources were determined for use in this new process:

- ALNAP Monitoring, Evaluation and Lessons-learnt (MEAL) reports
- Internal post-operational reports
- External performance critiques
- Previous academic research (including academic journal articles)

1.3   Abstract Primary Data

Using existing secondary data to derive a set of theoretical primary data is a meta-synthesis process were the secondary data start-point is aligned with the research methodology and the data is traced to a 'probable' set of circumstances by a researcher who possesses sufficient proficiency in both academic and practical spheres of the field of study. In this case, through extensive previous experience and the pursuit of this research project, the research does possess such proficiency. This process requires secondary data from across the humanitarian spectrum of causality to be analysed to ensure that decisions, actions and causes that occur under different circumstances, e.g. conflict, tectonics and pandemics, are considered uniformly (see Fig 5.4).

1.3.1   The Scope of Research

The research areas of interest are already established through the literature review and are inherent to the research question set which forms the foundation of the interviews. When considering the aspects to be analysed from the secondary data, the same research boundaries must apply. By aligning the available data with the research question set, it is possible to produce a set of secondary data consideration guidelines within which the secondary data research is to be conducted. However, since the secondary data refers to event that have already taken place, to focus the information on the research question, a boundary of scope must be established. This is a qualitative statement to be used as a handrail for the researcher to trace the path most probable, from the outcome being analysed to the academically most likely cause. In this case, the bounding hypothesis is the supposition that the Global Logistics Cluster has an important role to play in promoting effective and efficient humanitarian supply chain through coordination and

shared information, and that the majority of stakeholders do engage with it operationally.

1.3.2 Tracing Causal Effects

The six research focal points are derived from the six characteristics of an SSM root definition summarised by the mnemonic CATWOE (see Table 5.1). In turn, they are linked to the interview question as shown in Appendix B and are applied to a multitude of secondary sources pertaining to DROs which have occurred across the spectrum of causality, as shown in Fig 5.4.

An appropriate DRO is identified as an example of each operation type and outcomes of that operation are considered against the links to CATWOE in Appendix B. The outcomes, and the actions which led to them, are analysed in accordance with the boundary of scope by tracing the action to a probable set of circumstances through a process of logical reasoning. By considering what could have led to a particular outcome, and which of a number of identified possibilities was the most probable cause, a set of data most likely to resemble the actual cause can be determined in principle. This form of analysis could be likened to 'grounded theory in reverse' (adapted from Charmaz, 2014) where empirical results or outcomes are followed through an analytical process to determine what 'probably' occurred to cause the outcome rather, than to determine a theoretical reason for an outcome.

However, whilst wholly in keeping with the Interpretivist nature of this research, this form of derivation of primary data is subjective and dependent on the academic and practical skills of the researcher. As a result, the primary data which is derived in this manner can only be considered as being abstract. However, even if the true cause is not established, the fact that an abstract cause has been established yields sufficient data to be used in conjunction with empirical interview data when considered through the process of iterative triangulation (Lewis, 1998).

1.3.3 Confirmation of Abstract Primary Data

The abstracted data from this process is then tested against further secondary source material to corroborate the robustness of the reasoning process. Using the principles displayed by decision-making actors during the respective DRO, each abstracted cause, or 'abstract primary issue' is followed through the logic of the demonstrated decision-making process to check that it would result in the effect catalogued by the secondary data capture. If the abstract primary issue can be linked this way, then the abstract primary data can be considered viable in terms of being a probable issue that was resolved or exacerbated to the degree that it resulted in the testament presented in the secondary source data.

1.4 Abstract Theory

The applied abstract reasoning process produces six sets of primary data drawn from eight relevant DROs which mirror the characteristics of a Checkland root definition (Checkland & Winter, 2006). Therefore, the structure of the root definition, as presented in para 4.3.2, can be applied to the findings in each DRO example to produce an abstracted root definition of the most probable set of circumstances which resulted in the effects reported in the secondary source material. Together, these eight abstract root definitions can be synergised to create a single abstract theory, in a theoretical step similar to transition of analytical substantive theory to grounded theory (Corbin & Strauss, 2015).

APPLIED ABSTRACT REASONING CASES

Introduction

Five abstract reasoning cases have been selected from across the spectrum of causality encapsulating conflict, physical resources, climate and weather, tectonics and epidemic (see Fig 5.4). Each case considers an aspect of the logistics operation for which there is little or no explanation, and for which the decision-making process must be traced back from the end result using available secondary data and practitioner intuition. The specific issue is identified, and the decision options are considered and analysed before drawing a conclusion through applied abstract reasoning. The first four case studies refer to international emergency response operations directly linked to a type of disaster on the spectrum above, e.g. the conflict-based disaster in Yemen; the tectonics-based disaster in Nepal. However, there are few examples of physical resource-based disasters which have attracted international responses: most tend to be resolved by national governments, e.g. the 1986 Chernobyl disaster in the former USSR. For this reason, the physical resource-based issue considered in the fifth case study is a resource failure during an ongoing emergency response operation, namely gross inefficiency in the customs clearance of aid relief consignments in Sierra Leone during the Ebola crisis, one which exacerbated an already chaotic situation.

1.1   Sierra Leone – Logistic Cluster Shared Information

Several testaments presented in Logistics Cluster (2015a) show that during the Ebola Crisis in Sierra Leone, it was recognised that the WFP's main storage warehouse complex in Port Loko was maxing out in terms of capacity and that there was a requirement to extend it. The Port Loko main logistic hub (MLH) was an integral part of the overall storage plan which included forward logistics bases (FLBs) throughout the country's districts and in Freetown, the national capital. However, following several assessments of total storage capacity, it was acknowledged that figures detailing the availability of storage space in Port Loko were inaccurate and considerably

lower than first believed. The situation was raised at the Logistic Cluster Meeting on 2 Feb 15 where the WFP's concerns were shared with the other stakeholders.

1.2   Specific Issue

The Port Loko hub comprised some 10 000 m^3 of storage, mainly under cover of permanent and temporary warehousing facilities and some on external hardstanding. All of the storage was behind an appropriate security screen. The facility also included a refrigerated ISO container for cold chain use. By the end of Jan 15, only approx. 2 000 m^3 of space remained available with fewer and smaller consignments being dispatched to District Ebola Response Centres (DERCs) and FLBs. Capacities in FLBs remained fairly stable or were falling but while the Ebola Response operation had largely entered a stable phase, it epidemic was by no means under control and an array of commodities were still required by the DERCs. FLBs were sited throughout Sierra Leone and these were designed to provide the relatively small DERC clinical and non-clinical stores with the necessary supplies. Where necessary, and in the particular case of cold chain items, DERCs could be supplied directly from the MLH in Port Loko.

1.3   Decision-making Options

Discussions among stakeholders at the Logistic Cluster meeting of 2 Feb 15 revealed the extent to which the loss of storage capacity was threatening the logistic effort and this shared knowledge base and expertise concluded that an urgent expansion of the Port Loko MLH was required. The decision to expand the MLH was confirmed to the stakeholders at the Logistic Cluster meeting of 10 Feb 15. At this point it was unclear why the situation had arisen, and the available secondary data sources do not specifically state the causes of the situation. The application of applied abstract reasoning seeks to expose the decision-making process that led to the Port Loko MLH almost maxing out, to ascertain what led to the situation and to conclude what actions within the supply network led to the situation being resolved.

The analysis considered the five primary reasons why storage capacity would be unexpectedly consumed during an operation where the in-bound consignments and rates of consumption were widely known:

- **Unexpected in-bound surge in supply**: the MLH operator and Logistic Cluster Coordinator were not aware of the volume of in-bound consignments;
- **Unexpected drop in demand**: the MLH operator and Logistic Cluster Coordinator were not aware of a reduction in the volume of items being issued to DERCs / FLBs;
- **Disruption of consignment flow**: the MLH operator and Logistic Cluster Coordinator were not aware of disruption affecting the distribution of commodities;
- **Change in distribution strategy**: the MLH operator and Logistic Cluster Coordinator altered the distribution strategy from Push Logistics to Pull without preparing for the effects of reducing the outflow to that which is actually required while simultaneously accepting the return of commodities which had been pushed forward but were not required and were now being made available for redistribution;
- **Loss of inventory visibility**: the MLH operator and Logistic Cluster Coordinator had lost visibility of inventory and were unable to anticipate where consignments were located or required.

1.4   Analysis

The analysis takes each of these five plausible reasons which resulted in the capacity situation and considers how feasible each scenario would be from a practitioner perspective by applying the researcher's intuition. The conclusions drawn indicate that there was only one viable reason for the situation arising, and this reason is exposed to further analysis before concluding the most likely reason.

Logistics Cluster Sierra Leone					
Possible reason for decision made	**Receipts greater than expected:** Failure of the Log Cluster to anticipate inbound consignments.	**Issues fewer than expected:** Failure of DERC SMEs to demand items required.	**Disruption to distribution:** Internal or external disruption to transport / distribution operations.	**Switching from a Push to Pull strategy:** Failure to recognise consequences of changing distribution strategy.	**Loss of control of inventory:** Inventory management system failed to anticipate demand patterns.
Analysis	The Log Cluster maintained close monitoring of consignments coming by sea and air from Europe and were appraised of direct donor support via UNMEER.	DERC SMEs had had 4 months of experience with the receipt and distribution of consignments, knew which commodities they required and which were not required during the Push phase and therefore knew what they wanted during the Pull phase.	While minor disruption was experienced as a result of miscommunication, road network disruption and minor constraints concerning local and regional political decision-making, there was no internal or external disruption to the supply chain to cause the urgent need for extra storage capacity in Port Loko.	Changing from Push to Pull logistics resulted in a reduction in forward moving commodities, a reverse supply chain and a continuation of in-bound supplies. The impact of these three occurring concurrently was not anticipated.	Regardless of the technical or rudimentary nature of inventory management, no system failure occurred which would have had a significant impact on storage capacity in Port Loko.
Conclusion	The Log Cluster had good visibility of inbound consignments and planned for their receipt and storage.	A steady flow of items which were required continued to meet the demands of the DERCs.	No physical supply chain disruption occurred which would have resulted in the capacity challenges in Port Loko.	Switching from Push to Pull Logistics slowed forward movement and increased returns while donations continued to arrive in Port Loko.	Irrespective of how austere, the inventory management systems employed by logisticians did not fail.
Most likely reason	The decision to switch from Push Logistics to Pull Logistics without appreciating the effect on available storage capacity in the main storage hub resulted in the potential bulking-out of the Port Loko and other storage facilities.				
Analysis	When switching from Push to Pull, an assessment of the impact on commodity flow throughout the supply chain requires to be undertaken. Such a switch is indicative of a stabilisation in the overall operational environment and signals the requirement to centralise bulk consignments to allow for effective and efficient breaking of bulk and onward movement. Moving to a Pull strategy should theoretically see forward storage capacities reduce but central storage facilities increase significantly. This was clearly not fully appreciated by the MLH operator or Logistic Cluster Coordinator and only came to light with the assistance of other stakeholders. A probable reason for the lack of appreciation is that those involved had neither the experience of switching from a Push to Pull strategy and had not learned the ramifications through education or training channels.				

Table G.1   Sierra Leone Ebola Epidemic.

1.5   Conclusion

Using the Logistic Cluster meeting as a coordination forum, the NERC Rep took the opportunity to share information concerning the storage situation. This allowed other stakeholders to consider the issue and bring their knowledge and experience to bear. While the secondary source material does not expressly state what factors contributed to the issue, applied abstract reasoning suggests that the most likely cause was a lack of

appreciation for the ramifications of changing distribution strategy from one of Push to Pull. Collectively, the Logistic Cluster membership recognised the gravity of the situation, and this steered the Logistic Cluster Coordinator to establish adequate additional capacity. The secondary source suggests that some MLH consignments were ready to be moved to insecure facilities and therefore it is clear that without this intervention brought about by the collective engagement of the Logistic Cluster membership in a coordinated and cooperative manner, considerable losses and supply chain disruption would have been experienced.

2.1 Mozambique – Supply Chain Performance Management during Cyclone Eloise

Mozambique suffered widespread cyclone damage in 2019 and was subject to a major aid effort to resettle affected people (UK Govt, 2021). In cooperation with the INGD, Mozambique's National Disasters Management Institute, resettlement camps were established and run by the Camp Coordination & Camp Management (CCCM) Cluster, who have remained in-country since. Global Shelter Cluster (2022) describes how the further devastation caused by Cyclone Eloise in Jan/Feb 21 coincided with significant internal population displacement because of internal conflict and the effects of population displacement caused by a tropical storm in Dec 20. UNICEF (2021) identifies the most important commodities needed in the response to Cyclone Eloise: essential medicines, potable water, hygiene products and shelter items such as tents and tarpaulins. Initially, much of this was distributed by the CCCM Cluster from pre-positioned stocks in the aftermath of the tropical storm, but the requirement increased exponentially following the devastation of the cyclone (IOM, 2021). The overall health and WASH situation was further exacerbated by the ongoing COVID-19 pandemic.

2.2 Specific Issue

Urgent local government and international assistance was needed to provide shelter for those already displaced by the tropical storm as well as those subsequently displaced by the cyclone. Although aid agencies were already

working in the area, there was an acknowledged lack of available storage facilities and constrained access to Beira's port facilities resulted in local contractors taking on a more significant role; one which required the international community to integrate them as stakeholder organisations (Global Shelter Cluster, 2022). However, the lack of an effectively functioning health system and effective passage of information led to considerable difficulties in identifying and targeting vulnerable individuals. Despite there being an established network of aid agencies in Mozambique, all of whom were communicating with each other, and the fact that the INGD was in theory working with the aid agencies, the issues regarding storage facilities and access persisted. The emerging practice of stakeholder engagement with local actors was apparently not being followed: no decision was taken to follow OCHA's 'Grand Bargain' concept, even though OCHA staff were on the ground (OCHA, 2022). This meant that the storage and access issues remained unresolved, despite local actors being available to assist.

2.3   Decision-making Options

Many of the situation and post-operational reports that record decision-making in the aftermath of Cyclone Eloise refer to aid agency stakeholder engagement with local actors as engagement with 'the government' (Global Shelter Cluster, 2022; IOM, 2022; CCCM Cluster, 2022; OCHA, 2022). There are also references to engagement with the Mozambique Government to train engineers and conduct contingency planning; however, there are also references made to the lack of INGD and 'local authority' resources and participation. There are no references of direct aid agency engagement with private firms, local independent organisations or community groups. This gives the impression that aid agencies may have been operating under political constraints in Mozambique, a country which is listed as low as 150th out of 180 countries on TI's International Corruption Perception Index.

From a practitioner intuition point of view, there are four principal reasons for aid agencies not engaging directly with local suppliers and service providers:

- The national government has forbidden them from doing so, either for security reasons (Mozambique remains subject to internal conflict) or for reasons pertaining to political control;
- The national government is acting as a single point of contact in the form of the INGD, but has failed to engage and communicate with local authorities and local contractors;
- Aid agencies have, in the past, worked with local actors but have found them to be unreliable or untrustworthy;
- Aid agencies are unable to identify reliable or trustworthy local contractors and do not wish to place their staff at risk in trying to do so.

2.4   Analysis

The analysis examines each of these four plausible reasons which resulted in the storage and access situation and considers how feasible each scenario would be from a practitioner perspective by applying the researcher's intuition. The conclusions drawn indicate that there was only one viable reason for the situation arising, and this reason is exposed to further analysis before concluding the most likely reason.

Stakeholder Engagement Mozambique				
Possible reason for decision made	**National Government constraints:** It is not unheard of for a government in a relatively unstable country to engage in activities where ethics are questionable when viewed through a 'Western' lens. It is possible that the INGD may have had a more controlling role than expected.	**National Government failure to engage locally:** In exercising a level of control over external organisations, a government may well wish to act as a single point of contact (in the form of the INGD), even though it may not understand the knock-on effects such a decision may have.	**Aid Agency Experience:** If aid agencies found the local economic situation to be too dangerous to engage directly with local contractors, serious consideration would be given to find alternative ways of support. The same could be said if agencies considered the local economic market to be fragile.	**Aid Agency protection:** If aid agencies perceived that the safety of their staff was at risk by engaging with local actors, they would instead rely on remote contact or impartial third-party actors to facilitate engagement. Mozambique is not considered as such a dangerous environment.
Analysis	Despite there being no direct reference to governmental corruption or political duress, the Mozambique Government is understandably likely to want to exercise control over strategic decisions made during the relief operation. Strategic initiatives have been identified	Communication infrastructure in the country was badly affected by the damage caused by the cyclone and ongoing internal political challenges can make dealing with local authorities difficult. While coordination is considered good among aid agencies, there is little	Where aid agencies have found unreliable or untrustworthy local actors, given the gravity of the situation, and the clear indication that people are prepared to be trained in specific tasks to assist their fellow citizens, it should not be difficult to find alternative local supplies / service providers. The many	While conflict did occur in some of the areas where aid agencies operated, there is little evidence of aid agencies being specifically targeted; and such conflict is described by many contributors as 'sporadic'. So, it is unlikely that safety fears would inhibit local aid agency engagement, but if it

	which involve both the national government and the INGD.	evidence of widespread coordination with the INGD or other governmental agencies.	stakeholder communications channels would easily facilitate this.	did, there would be more evidence of communication with governmental agencies.
Conclusion	The level of governmental control experienced in Mozambique is commensurate with any other government in a similar situation. It will wish to exercise oversight of organisations and commodities entering and being used in their country.	Given that many of the in-country aid agencies have been there for up to 3 years already, they will have a mature communication and coordination network focused on aid delivery. During this time, other than with the INGD, their interaction with the government is likely only to have been in response to the various weather-related disasters and therefore the networks will not be as mature.	The existence of unreliable or untrustworthy local contractors would not significantly constrain experienced and knowledgeable aid agency practitioners and therefore it is unlikely that the challenges faced by logisticians was as a result of this.	Despite the internal unrest in Mozambique for many years, there is no evidence to suggest that aid agencies are prevented from engaging with local contractors over security fears. If such fears had existed, evidence of attempts to remedy the situation would be apparent, as too would have been the attention aid agencies would have drawn to the situation.
Most likely reason	Evidence from reports, etc, together with a lack of mention of full governmental engagement suggests that the Mozambique Govt received information from aid agency forums and possibly also from local contractors, but not relaying it in such a way as to relieve the storage and access issues. As an accepted stakeholder organisation, the INGD would have had a role to play but there is little evidence to suggest that it was engaged to resolve the logistic issues that arose. Where specific strategic decisions have been taken, e.g. the training of local engineers to support infrastructure and resettlement centre work, this has occurred with extensive coordination. However, where the INGD, local authorities and national government have been needed to engage on more mundane tasks, there has been a lack of activity suggesting a difficulty in politicians and authority staff to take responsibility for more routine business.		
Analysis	The decision by a national government to act as a single point of contact brings with it the responsibility to ensure that all information flowing does so effectively and efficiently. It means that the governmental entity (such as the NERC in Sierra Leone during the Ebola crisis) is fully engaged with all other stakeholders; this does not appear to have been the case with the INGD. Accountability is also required in terms of governmental / local authority departments, where aid agencies can be sure that they are engaging with the appropriate individuals and that these individuals will accept responsibility for carrying out specific actions to resolve issues in the supply chain.		

Table G.2   Mozambique Cyclone Eloise.

2.5   Conclusion

In the absence of the Logistic Cluster, the CCCM Cluster and Global Shelter Cluster coordinated the passage of information during the Cyclone Eloise aid operation but as is common across the cluster system, neither possessed executive powers. The Mozambique Government's INGD body did have executive powers and was a major stakeholder but, as noted by Global Shelter Cluster (2021), perhaps did not understand the cluster system and the role and responsibilities of stakeholders engaging with UN-based cluster forums. In this instance, cluster meetings, situation reports and post-operation reports highlighted storage and access issues which were not readily resolved. The likelihood is that those organisations with extensive

knowledge and experience, but no authority were able to identify the issues quickly, but the entities with the authority to engage to resolve them were insufficiently experienced with the passage of information in the humanitarian operational environment to be able to quickly resolve the issues. The situation was further compounded by a lack of resources in-country and the condition of some of the pre-positioned stocks, frustration over which was expressed by Global Shelter Cluster (2021). It can therefore be concluded that to ensure the effective and efficient delivery of emergency aid, all stakeholder organisations need to understand the cluster system concept and their role in it.

3.1   Nepal – Earthquake International Response

Nepal lies in an area of the world highly susceptible to earthquakes and has, over the past century, suffered several catastrophic earthquake disasters. As a result, the principles of the Disaster Management Cycle are well understood, and contingency planning occurs as a matter of course by the Nepali Government through its National Emergency Operations Centre (NEOC) in Kathmandu. In Apr 15, a severe earthquake hit Nepal causing serious building and infrastructure damage, and significant loss of life. The national government was quick to activate the NEOC and to call for international assistance with the expectation that prior planning would greatly assist the emergency response, both in-country and internationally.

3.2   Specific Issue

In the event, serious deviations occurred between the contingencies that had been planned and even exercised in the years prior to the disaster and the execution of the response. In logistic terms, the first and perhaps most significant issue was the fact that the Nepali Government decided that Nepal's only international airport in Kathmandu, which has only one runway and the capacity on the tarmac to handle just nine large aircraft, would be the single gateway into the country for international assistance. It judged that for sovereignty reasons, staging areas in India and China would not be activated (Cook et al. 2016; Logistic Cluster, 2016). Although the airport had limited ground storage capacity, it did have a Humanitarian Staging Area (HAS),

commissioned just four weeks before the earthquake occurred. Although the airport was under the control of Nepal's civil aviation authority, the facilities and infrastructure were shared with the Nepali military.

It is difficult to uncover evidence that this decision by the local government was taken in consultation with, or with consideration of, other humanitarian stakeholders. It is however clear that this decision, exacerbated by several other unexpected developments, created significant disruption to the humanitarian supply chain in the immediate response to the disaster. Those other developments included:

- INGOs already in the country stepped up their operational posture while the government's District Disaster Response Committee (DDRC) was stood up to coordinate the activities of the various humanitarian actors in following the contingency plans already in place. These plans included the activation of the external staging areas, particularly one at the Birgunj border crossing (Logistic Cluster, 2016).
- The DDRC and Global Logistics Cluster worked together as the coordination forum for humanitarian supply chain organisations; but Logistics Cluster (2015b) reports there were 125 such organisations, any of whom had never worked with the Logistic Cluster. Cook et al. (2016) suggest that there could have been just as many international organisations and teams in Nepal who did not know of the existence of the Logistic Cluster and had no contact with it.
- Concurrent with the DDRC standing up, the Nepali Army established a Multi-National Military Coordination Centre (MNMCC) to coordinate the activities of international SAR teams and foreign military forces deploying in assistance to the Nepali Army (Cook et al. 2016).
- While civilian stakeholder organisations were, in theory, under the control of the DDRC for such operational elements as border control, space and storage allocation and operational boundaries, the sheer volume of personnel and commodities that subsequently arrived through Kathmandu Airport and attempted to across land borders made such control impossible. An example of this saw the Nepali

Government's decline the assistance of British military CH-47 Chinook helicopters because the RAF's only available route the delivery of aid was directly from Northern India, thereby circumventing the integrity of the Nepali border and customs (KC & Rayamajhi, 2020). This issue of sovereignty and the integrity of their national borders was understandably high in terms of governmental strategic priorities, but such decisions made throughout the aid operation, including a somewhat convoluted customs clearance process, had a detrimental impact on the aid effort (Logistic Cluster, 2015b).

- Customs and Immigration (C&I) procedures and entry controls remained firmly in place on entering Nepal, with strict customs procedures being followed to mitigate against the paying of tariffs and taxes for the importation of disaster relief consignments (Logistic Cluster, 2015b; 2015c; 2016). At the onset of the emergency, the NEOC stated that it had lifted C&I restrictions for aid consignments and humanitarian actors with 'the UN model agreement has taken as a base' (Nepal Govt, 2015) but Global Log Cluster minutes and situation reports indicate that this never happened.

- Restrictions and periodic closures of border crossings occurred at the border with India due to civil unrest in the Nepali border city of Birgunj and at the Tatopani crossing from China; further road closures were due to monsoon rains and landslides.

- The immediate airlift priorities of the Nepali Government were not those rehearsed by the INGO community in contingency planning. The government's priority was the evacuation of tourists and Himalayan trekkers while Logistic Cluster (2015b) shows the clear priority list comprising the UNHAS airlifting of shelter materials, followed by food, health consignments, WASH items and then the emergency components of education and nutrition. The movement of personnel is not even considered by the international organisations, but the Nepali Government attempted to divert international aviation assets to their priorities (Logistics Cluster, 2016).

- In terms of entry for international responders, the Nepali Government prioritised international SAR teams over others and gave priority entry

to 53 such teams, despite having already initiated teams of Nepali citizens from unaffected districts to conduct search and rescue tasks. In the event, together, these 53 teams rescued only 19 people (Cook et al. 2016)

3.3   Decision-making Options

Cook et al. (2016) notes that the stakeholders who were engaged in contingency planning and exercises with the Nepali government acknowledged that there remained 'the need to have disaster plans and engage in exercise even though plans may not work as previously anticipated' (p.25) because this preparation would expose weaknesses in the plans and rehearse the level of interaction required in the event of a disaster. This included strategic level coordination between OCHA and the Nepali government. However, significant humanitarian supply chain issues did arise in the event of the earthquake, and they arose because the decision-making process clearly did not follow the scenarios that had been rehearsed and planned. However, Cook et al. (2016) conclude that the stakeholders involved in the pre-disaster planning and coordination did recognise the essence of the military adage that 'it is not the plan that is important, but rather the planning' (Von Clausewitz, 1832).

The analysis considered the four primary reasons why, despite contingency planning, the Nepali Government made strategic management decisions which led directly to disruption of the humanitarian supply chain in the wake of the 2015 earthquake:

- The hierarchy of the Nepali Government that made the strategic management decisions were not aware of the outcomes of the contingency plans and were therefore not influenced by them;
- The government felt that, despite there being an unfolding national emergency, their borders were under threat from foreign powers;
- There was some misunderstanding between governmental departments of what political and economic practices should continue and which should be relaxed during a national emergency;

- The government understood the gravity of the national emergency but chose to run functions such as C&I regardless, or in ignorance, of the consequences this would have on the relief effort.

3.4   Analysis

The analysis takes each of the four plausible reasons which resulted in the humanitarian supply chain disruption and considers how feasible each scenario would be from a practitioner perspective by applying the researcher's intuition.

Supply Chain Disruption in Nepal				
Possible reason for decision made	**Hierarchy unaware of disaster planning:** The Grand Strategic level of government (Cabinet level) may not have been aware of the disaster plans and therefore not understood the ramification of creating a single point of entry to the country at the airport.	**Threat from foreign powers:** At the time there were regional tensions both inside Nepal and in the areas of both China and India bordering Nepal. Conflicts in Africa, the Middle East and Afghanistan had seen related attacks on non-belligerent countries (e.g. ISIS attacks in Europe).	**Which governmental functions should be relaxed:** While a certain level of routine must be maintained during a national emergency, a stance must be taken regarding taxes, tariffs and control of entry of imports and the entry of foreign nationals.	**Decision to maintain tight governmental control:** Previous disaster planning may have been based on a much smaller scale disaster where normal life continues for the majority of the population where the government may consider it appropriate to maintain total control of the political and operational situation.
Analysis	At the Grand Strategic level, the government was already working in partnership with the UN and had concluded an agreement for close working between the NEOC and OCHA at the strategic level and the DDRC and the clusters at the operational level. Therefore, it is highly unlikely that the Nepali Govt would have been disjointed in its internal response to the earthquake. It had already mobilised teams of responders from other national districts, using locally acquired pack animals to carry pre-positioned stocks to where they were needed.	The most effect overland route to locate a road entry staging area was at the Birgunj border crossing; this had been recognised in contingency planning. Civil unrest in this part of Nepal was giving the government legitimate cause for concern but it did not stop the Nepali C&I Service from setting up pre-entry processing points at airheads in India, as proposed by the UK Govt. Direct aid could have been secured using heavy-lift aviation assets for areas along the India-Nepal border, leaving the airport and the mountainous Tatopani crossing to support other areas.	Despite declaring otherwise, the stance that the Nepali C&I took was that the importation of goods, irrespective of whether they were aid-related, should be subject to normal import controls. This extended to virtually every consignment discharged at the airport and crossing into Nepal overland. However, when clearly marked humanitarian aid consignments arrived in-country, by the govt's own admission, they should have been given a special status, even if it meant pre-clearance and the recognition of standardised authorised items.	The govt understood that the scale of the disaster exceeded that rehearsed during preparation planning and would have known that this was not a situation where 'business as usual' was an option. It is therefore very unlikely that the govt would have decided to proceed in strict accordance with a plan that clearly had not survived contact with reality. The vast array of partner organisations would have been quick in pointing this out, had it been the case.
Conclusion	The decision to use only one point of entry was not taken by the government	Any security threat to Nepal during the disaster is likely to have been internal	Despite their declaration, the Nepali Govt appeared to misjudge the level of	While the scale of the disaster took everyone by surprise, the govt made every attempt to

	in isolation of the real picture on the ground. This decision was taken despite there being evidence of the scale of the disaster and in the knowledge that the internal response would have to be considerable in its scale.	rather than external. There is no evidence from the government or INGOs that a security risk from a foreign power existed, indeed, it would have been highly unlikely for so many foreign responders to have engaged with the disaster had there been a risk to their security in this way.	scrutiny required for responders and consignments, a subject that would have been considered in contingency planning. By deciding to use a single point of entry at the airport, the govt clearly sought to maintain tight control using limited resources but this will have contributed to the supply chain disruption.	act in proportion to the scale of the disaster and did not seek to run a country so badly affected by the earthquake in a routine manner. However, it clearly took its governmental responsibilities seriously while acting in coordination with partner organisations.
Most likely reason	The scale of this disaster was unexpected and did not fit the template used for contingency plans and exercises, and as a result, certain strategic management decisions were made by the Nepali Government that had an impact of the effectiveness and efficiency of aid delivery. At all levels, the government was aware of the contingency planning that preceded the disaster and were active in bringing that planning to bear. It knew that aid supplies needed to be fast-tracked through their customs process but for some unexplained reason, it decided to exercise control over C&I aspects of the operation. The choice of a single point of entry at the constricted airport, together with an unwillingness to find solutions outside its borders led to severe bottlenecks for personnel and aid consignments which delayed the delivery of aid exacerbated the problem.			
Analysis	A decision to effectively waive customs restrictions on aid and humanitarian personnel was made by the NEOC at the onset of the disaster, however, for many months thereafter, aid agencies reported that commodities were being held up by the customs process. Indeed, there is evidence that partner organisations had to accept these controls because the Global Log Cluster promoted early completion of customs clearance forms and engagement with C&I authorities. It is not uncommon for one branch or government (in this case the NEOC) to decide on one course of action, only to have another, more established branch to overrule the decision or simply fail to carry out their direction.			

Table G.3   Nepal 2015 Earthquake.

3.5   Conclusion

In this case study, it is apparent that several factors came together to create the disruption experienced by the humanitarian supply chain in Nepal but that they emulated from the lack of execution of one strategic management decision. From practical experience, it is likely that, contrary to the direction issued by the NEOC, an official from the Nepal C&I service who did not have a holistic view of the situation decided how to interpret the NEOC's direction and this interpretation persisted and caused the disruption. Internal governmental reports which could shed light of the exact reason for the disruption are not available, so this most likely cause has been determined. Although the scale of the disaster was wholly unexpected, stakeholders had years of contingency planning to draw on and while the plan may not have been executed according to the exercises conducted, the process of having carried out the planning was key to many stakeholders being able to adapt to the prevailing conditions. The humanitarian logisticians were evidently agile enough to do this (Logistic Cluster, 2016) and the NEOC displayed similar agility; but perhaps certain individuals in branches of the Nepali Government

who were not integral to contingency planning and who did not have a holistic view of the humanitarian supply chain were not so agile.

4.1   Yemen – Achieving Effective Aid Delivery in a Conflict Zone

For many years, Yemen has experienced internal strife, but the level of conflict escalated in 2015 with the Yemeni Government, backed by Saudi Arabia and the US, taking a more aggressive approach to quell unrest by Houthi rebels. The conflict has had a significant effect on the civil population with transport throughout the country severely hampered. Despite a functioning import system, aid plays a significant role in Yemen's food supply chain, with 13.5 million people targeted for humanitarian food assistance in 2020. Having endured years of population displacement, other commodities in scarce supply are medicine, shelter and potable water. A plethora of international and national NGOs and UN agencies are involved in delivering aid to Yemen and while WFP mainly imports its own food into Yemen, most other international aid organisations buy food items from Yemeni commercial importers (ACAPS, 2020).

4.2   Specific Issue

The issue which continues to plague aid agencies is the effective delivery of aid consignments to those who need them. Aspects of the issue has changed over the last 7 years from dealing with the targeting of aid convoys to the destruction of port infrastructure and blockading of ports to prevent commodities being discharged from international shipping. However, although attacks between belligerents continue, all sides have adopted dynamic operational methods in a complex and politicised environment with importers managing relationships with political actors in a way that ensures consistent market share and access (ACAPS, 2020). The greatest challenge now is cost, and the clearest indication of this has been a steep drop in demand for food from retail outlets and a spike in demand from aid organisations, many of whom source their supplies from the same retail market supplied by Yemeni importers. This situation has resulted in escalating food costs at a time when Yemenis have no means of paying for food and at a time of reduced funding for aid agencies to procure, transport

and deliver food, shelter and medicines. All of this is underpinned by spiralling fuel costs. Where ports are unavailable for bulk transit through blockade or destruction of infrastructure, overland transport is exposed to added costs related to internal taxation schemes used to extract tariffs from the movement of goods and people around Yemen, particularly from governmental and Houthi controlled territories (ACAPS, 2020). Log Cluster (2020) describes the contribution of COVID-19 in the restriction of access to Aden port, Aden and Sana'a airports and the WFP-charted sea passage for freight and passengers between Djibouti and Aden.

4.3   Resolution Options

Achieving effective delivery of aid within budget in Yemen has become progressively more difficult, made worse by a global cost of living crisis; donor funding is reducing, costs spiralling, and in the meantime, the conflict continues. Due to the longevity of the crisis in Yemen, many aid organisations have become engaged with networks of local actors who are able to mitigate some of the effects of the conflict for the aid agencies (Paciarotti et al. 2021), thereby reducing the overall security risk to INGOs. Paciarotti et al. (2021) reiterates the importance of agility when operating in conflict zones, and specifically flexibility in volumes, delivery method, supply system, product portfolio and supply chain reactivity. Faced with budgetary pressures and constrained methods of delivery, those involved in aid delivery were faced with several options to ensure the effectiveness and efficiency of their operations.

In this case study, the analysis considers four initiatives which have been considered to achieve more effective aid delivery, but which have yet to be determined as having been implemented or been successful:

- Agile, intelligence-led physical deployment of mobile storage units supported by dedicated quick response supply chains to provide targeted assistance;
- Establish a logistics concept which sees stakeholders working collaboratively to each other's strengths but more importantly, working

efficiently, utilizing shared storage and transport assets and creating economies of scale;

- Forge partnerships with organisations that may not be impartial but that can culturally and ethically engage with belligerent forces to avoid extortion by securing supply routes, points of delivery and long-term storage facilities locally;

- Distribution within safe areas only, but with the engagement of local agents with the freedom to operate in 'no-go areas' to INGOs and UN agencies and can act as the last mile entity for their out-of-reach communities.

4.4   Analysis

The analysis examines each of these possible responses that stakeholders have considered to address the cost issue, but none of which appear to be part of a coordinated, holistic initiative. They are analysed in terms of their merits, but also in terms of whether they could function as a coordinated concept.

Effective Aid Delivery in Yemen				
Possible reason for deciding on this option	**Intelligence-led quick response supply chains:** Targets actual points of need and reacts quickly to address the issue before withdrawing to redeploy elsewhere. Doesn't rely on permanent storage infrastructure and is agile enough to draw from WFP and local importer sources of supplies.	**Economies of scale collaboration:** Working in a collaborative manner with shared assets and knowledge together with individual organisational contacts and access would allow supplies from various sources to be collated and the benefits of economies of scale realised.	**Supply chains run by non-impartial partners:** Permitting non-impartial actors to deliver aid donations presents a serious ethical question, not least with donors. However, if it was practicable, running long supply lines from central warehousing facilities directly into no-go areas could provide cost and time benefits.	**Running shorter supply lines to meet local distribution:** To a limited extent, this already happens. This concept however would see a more coordinated division of the country with stakeholders running supply lines from centralised facilities to hubs they have been able to establish for the onward distribution of supplies by local actors in no-go areas.
Analysis	In principle, this is an efficient method of aid delivery but if it were effective, it would probably have been executed by now. It is possible that only now have the political and conflict circumstances allowed it to work. It could result in cost savings which could be invested elsewhere to provide more aid and at the	The cost saving achieved in shared mass storage and in-country transport assets are only one aspect: where individual actors can facilitate access to ports, road routes and geographical areas while avoiding over-inflated costs and extortion, then the rest of the partnership can benefit. With each organisation	Using a supply chain operator that can access restricted areas makes considerable sense and many contacts have been made with local distribution providers by INGOs over the years. There is no guarantee that an operator with access to a certain area will have freedom to move from the centralised warehouse, so	Given the contact many aid organisations already have with local actors, developing this concept would probably only require a coordination cell pulling together the strengths of the various international actors and determining where geographically the best outcomes could be achieved. By an aid agency using its

	same time support local importers, thereby supporting and not damaging the local economy. However, the intelligence leading the initiative would need to be robust, independent, accurate and timely. Any hint of bias would seriously impact the integrity of the initiative.	operating in an optimal professional and geographical area, costs could be reduced, savings realised, and opportunities maximised. This would not just benefit those in need but would support the local economy without creating additional friction with belligerent actors.	considerable due diligence would have to be undertaken by aid agencies with finite admin resources. DD would also have to be undertaken with donors and other stakeholders, as some partner organisations may not be prepared to be associated with certain local actors.	existing local contacts in relative isolation, there is less likelihood of an ethical issue arising among partner organisations. By working close with WFP, other aid agencies will be able to achieve greater supply chain integrity because they would be able to augment supplies procured locally with those imported by WFP.
Conclusion	If the intelligence can be trusted by all stakeholders, this initiative could deliver aid where it is needed with inherent cost savings. However, as costs spiral and the level of need rises, the need for an agile, mobile and temporary solution in an area becomes a need for a widespread and persistent solution. Where this happens, no savings can be made and a return to the status quo is inevitable.	If organisational, operational and political sensitivities can be overcome, a collaborative approach has much to offer in tackling the issue of rising costs and the resulting hunger and lack of medicines. It may also encourage displaced people to remain where they are for longer, thereby helping to address the issues of shelter and water purification with the development of more long-term settlement centres.	It is difficult to see how the benefits would out-weigh the additional workload involved in setting up this initiative. It is likely that if certain local providers were able to move freely to and from no-go areas, they would already do so; and if they were not, there will be a good reason why this concept has not been further developed. The ethical issues raised are likely to prove insurmountable.	By utilising local contact while at the same time working closely with other partner organisations, the aid effort as a whole could achieve economies of scale, maintain close contact with beneficiaries, run more robust and less transient supply lines and have a wider spectrum of material sources without damaging the local economy or antagonising belligerent sides. This should in turn promote reputation and reduce safety risks for staff.
Most likely initiative to be successful	The integrity of the Humanitarian Space is never more important than in the case of a conflict zone: humanity, neutrality and impartiality are paramount, not least to protect deployed aid staff. Freedom of movement is best achieved by adhering to these principles, but it does not always guarantee access, an issue evident in Yemen. With little prospect of costs failing at any time soon, any solution must be sustainable. A humanitarian operation that receives finite funding, as is the case in Yemen, any shortfall can only be achieved through efficiencies or prioritisation. Since prioritisation means someone who needs aid doesn't get it, achieving efficiencies is normally the only option. Achieving major efficiencies means taking bold action and working collaboratively is one such action that can achieve the outcome required. Partners working to their strengths is an element of collaboration and therefore it appears that a combination of Options 2 and 4 above would prove the most successful way of ensuring that the impact of increasing costs can be minimised.			
Analysis	By creating a specific project coordination cell within the Log Cluster, partner organisations could participate in a joint procurement, storage, transport and distribution concept that is coordinated at a strategic level in-country, delivers cost savings to individual organisations and therefore the operation as a whole, while addressing the political and conflict sensitivities inherent to the situation on the ground. Where such a collaborative body were to achieve initial success, the benefits to those in need of aid may perpetuate greater goodwill towards the aid effort with the possibility of better avoiding extortion rackets and questionable taxes, tariffs and levies. While this solution would have no effect of the conflict itself, it would at least help provide more aid for where it is needed and in the longer term, provide a sustainable solution to aid delivery until a settlement in the conflict can be reached.			

Table G.4   Yemen Conflict.

4.5   Conclusion

Using the membership of the Logistic Cluster as a basis for a collaborative
working model, partners would come together to share procurement
channels, storage and transportation assets, and in areas of significant risk
or no access, utilise local contacts to facilitate last mile distribution. The aim

of this model would be to make economies of scale which could be specifically redirected into procurement; to maximise available funding holistically to address areas of greatest need; and to minimise financial loss through corrupt or unofficial channels by bringing influence to bear through established local contacts.

5.1   Sierra Leone – Customs Clearance

Irrespective of whether a country is subject to an international disaster relief operation, it has the legal responsibility to protect the integrity of its legal borders, and this is done using an appropriate C&I authority. Customs procedures are just as important during a disaster relief operation as they are at any other time, and for that reason, humanitarian organisations do not expert national governments to completely relax their procedures, but they do expert governments to work with them to make the importation of humanitarian aid as simple and quick as possible (WHO, 2021). One of the main areas where friction can occur is in the importation of medicines because before a medicine can be brought into a country, that country must have granted permission for its use on its population. So, C&I processes and procedures play an important role in international humanitarian logistic operations.

5.2   Specific Issue

It is accepted that the responsibility for C&I lies with the national government and, as the appropriate authority, it should function independently from humanitarian organisations that might be importing emergency supplies and personnel into the country (WHO, 2021). For humanitarian actors, this means that they require clear, concise and ideally simplified procedures to follow, so as to ensure the fast arrival of emergency supplies while maintaining the integrity of the country's borders. To facilitate this, aid agencies need to have an appropriately authorised single point of contact to answer queries and pursue issues on their behalf. During the Ebola crisis in Sierra Leone, the representative of the government at the Log Cluster meetings, and therefore the single point of contact for humanitarian supply chain managers, was the NERC Representative. However, this individual was not a member of the

Sierra Leonian C&I service; but rather, was the NERC Logistics Pillar leader who was, in fact, a supply chain expert and UK national embedded in the NERC by DfID, there to advise the NERC leadership (and by extension, the Sierra Leone Government) on logistics matters. This individual possessed no authority to direct C&I activities and relied on a Sierra Leone Government liaison officer to pass information to the C&I service. It is noteworthy that Ross (2017) describes tensions between the NERC's British embedded advisors and Sierra Leonian NERC staff, of which this liaison officer was one. Direct contact between the Log Cluster and the C&I service was difficult to arrange. Logistic Cluster (2015d) shows that at the beginning of Jan 15, aid agencies were experiencing problems getting customs clearance for commodities arriving at both the international airport and at overland border crossings, and that minutes of meetings at Logistic Cluster (2015a) show that, due to the system that was in place, these issues were only dealt with in mid-Feb 15. There is no mention of why these issues were not resolved quicker, but it is evident from the adoption of the subject of customs clearance as a meeting agenda point, that a certain level of frustration was experienced among supply chain managers.

5.3   Decision-making Options

It is unclear whether the system which operated between the C&I service and the Log Cluster was designed to be like it was or if it merely evolved that way, but it is clear that it did not function efficiently enough to deliver fast resolutions to problems that arose with partner organisations. Given that the NERC construct was certainly created to a specific design (Ross, 2017), it is assumed that at some stage a decision was made with ultimately led to the situation that became the established method of communicating information between the two logistic parties.

The analysis considered the four primary reasons why the decision was taken to direct the flow of information between the Log Cluster, the established logistic coordination forum, and the Sierra Leonian C&I service through a single point of contact which possessed no authority within the C&I

service and, as an advisor, did not have any executive powers within the NERC:

- The single POC individual would be given the status to be able to influence the C&I service;
- The relationship between the single POC and the C&I liaison officer was based on a shared values and cultural outlook;
- The liaison officer possessed authority within the C&I service and was therefore able to engage quickly with any issues raised with him;
- The liaison officer had an understanding of the C&I issues that materialized and knew to whom issues needed to be addressed in the C&I service;

5.4   Analysis

The analysis takes each of these four plausible reasons why the NERC Rep to the Log Cluster acted as the single point of contact for the C&I service and considers how feasible each scenario would be from a practitioner perspective by applying the researcher's intuition. The conclusions drawn indicate that for several reasons this situation was inappropriate, and these are pulled together for further analysis before concluding that there would have been perhaps a more effective point of contact.

Passage of C&I Information in Sierra Leone				
Possible reasons for the decision made	**The POC would have the status to influence:** Only after the NERC was established did tensions between British and SL NERC staff become apparent. Hitherto, it had been assumed that UK nationals risking their safety to be in SL to help would have been sufficient to secure the status required for this role.	**Shared values of the POC and LO:** Given that both individuals were technically working for the same organisation (the NERC), it was probably assumed that irrespective of personality, the two roles would function harmoniously.	**LO had authority in the C&I:** In appointing a liaison officer to handle C&I issues and articulating C&I policy to international aid organisations, it would be logical to appoint someone who had the authority to effect courses of action to resolve C&I issues or influence those who could.	**LO understood C&I issues:** In appointing a liaison officer to handle C&I issues and articulating C&I policy to international aid organisations, it would be logical to appoint someone who had a thorough understanding of C&I issues and could interpret C&I policies and procedures to the partner organisations.
Analysis	The UK and Sierra Leone enjoy very good international relations and the UK Armed Forces are held in high esteem in Sierra Leone. By appointing a UK	Although both posts saw individuals working within the NERC but one was an embedded advisor while the other was facilitating access to a	It is clear that the LO had some influence in the C&I service because issues raised through him by the single POC were eventually addressed and policy was	It is clear that the LO understood his role in resolving issues and promulgating information because the problem was not one of accurate passage of

	Army officer which proved interpersonal skills to the single POC role, it would have been safe to assume that this function would work well with the C&I LO. However, irrespective of individual personalities, tensions had developed between UK and SL NERC staff, undermining any personal connections individuals would wish to possess. Merely being a UK Army officer did not convey authority or status for the individual appointed.	relatively small branch of the national government (possibly amongst other such roles). It is unlikely that the two individuals would have shared the same professional outlook since one had a West African civil service background while the other had a UK military background: these contrast on several levels and would mean that each individual is likely to have had a significantly different way of viewing any issues that arose.	promulgated through him to the Log Cluster. The issue of how much influence remains undetermined because while issues were addressed, they were not addressed quickly and this in turn had an adverse effect on both infected and healthy members of the population, depending on the commodity being delayed by customs procedures.	information, but rather one of timely passage of information. However, it is not clear whether the LO understood the ramifications of slow resolutions or whether, from a cultural perspective, the speed at which issues were resolved was in keeping with the length of time he would have expected it to take.
Conclusion	The role of single POC for Log Cluster C&I issues should not have been vested in the Log Cluster NERC Rep because that individual had no influence within the C&I service over cases that had been referred to them. The fact that the Log Cluster was operating in SL means that a strategic level agreement was in place between the UN and SL Govt, and therefore a direct link between the Log Cluster and C&I service would have been possible.	From the available secondary data, it is clear that the single POC took considered himself to be the Log Cluster's representative to the C&I service but it is probable that the LO viewed the POC as a non-executive advisor within his organisation. This will have placed the POC in a slightly invidious position because the role of POC for the Log Cluster was not his designated role; this will have come about because he represented the NERC, the place the LO worked.	The ability of the LO to achieve a resolution to issues that arose is not in doubt, but the level of urgency which was afforded to these cases frustrated many aid organisations. Having a NERC advisor, albeit a knowledgeable one, acting as the link between the Log Cluster and the C&I service was probably not appropriate but the logic as to why this situation arose is understandable and it is not clear who else in the Log Cluster could have acted in this capacity if the Log Cluster Coordinator was unable or unwilling to do so.	The knowledge and level of understanding of the LO is not in doubt because resolutions were achieved and accurate information regarding processes and procedures was promulgated. The frustration experienced by the aid agencies.was not in respect of time lost through the wrong solution being implemented but rather the length of time it took to see action being taken at all. Again, perhaps having the NERC Rep as an additional link in the chain exacerbated the delays.
Most likely reason for the situation arising	From a Log Cluster perspective, the attendee representing the NERC represented all the NERC's functions, including C&I; therefore, this channel was assumed to be the most effective way of dealing with issues. In all likelihood, the incumbent would have been happy to accept this role because they would have seen the logic in this view. However, the C&I LO did not take this perspective and it is possible that this was not wholly appreciated by the NERC Rep, who would have assumed that the C&I LO was on 'his team' and would have wanted to expedite any issue raised to him. This would indicate a certain level of cultural naivety on the part of the NERC Rep who, from a military perspective, would have been used to all parties working hard towards a common goal.			
Analysis	There are three issues that arise in this situation: the status of the individual interacting with the LO; the cultural backgrounds of the POC (whoever that might be) and the LO; and the number of links in the information chain. The status of the individual liaising with the C&I LO needs to be one which reenforces the gravity attached to the issues raised by aid organisations: the NERC Rep lacked this status because of the tensions, unseen by the Log Cluster, which existed in the NERC. While military officers can be extremely polite, tactful and diplomatic, unless they are operating in a combat or peace-keeping role, they can also be culturally naïve. Seasoned UN permanent staff are not so naïve and have considerable experience in working in these situations. It is fairly obvious that unless there is a distinct advantage for doing otherwise, keeping the number of links in the information chain to a minimum is going to facilitate a more efficient and therefore a more effective passage of information.			

Table G.5   Sierra Leone Customs & Immigration.

5.5 Conclusion

It is highly likely that the situation that saw the NERC Rep to the Log Cluster perform the role of single POC for Log Cluster members in terms of C&I issues evolved from an understandable assumption made within the Log Cluster and agreed to, in good faith, by the incumbent NERC representative. Ross (2017), who examines the design of the NERC, makes no mention of this arrangement in terms of a link between the NERC Situation Room (where the NERC Logistic Pillar Advisor and NERC Rep to the Log Cluster was employed). However, it is likely that by taking on this task, the incumbent inadvertently contributed to delays in resolving C&I issues experienced by aid organisation which could have been avoided had another actor assumed this role. Taking the three characteristics discussed in the final analysis above, it is quite clear that the Log Cluster Coordinator, a senior permanent WFP staff member would have been able to act as the single point of contact: such an individual would possess the gravitas of a senior UN officer, would have considerable experience in dealing with cultural differences in the operational environment and would have, through the existence of the agreement in place between the UN and the country's government, the authority to engage directly with a department of state such as the C&I service. It is therefore concluded that the case of Sierra Leone highlights the difficulties aid organisations can face when the Log Cluster Coordinator is not the single point of contact for C&I, and concludes that it is this port that should provide this function as part of its logistic services as a matter of routine when the Log Cluster deploys in emergency response to a disaster.

5.6 Summary of Conclusions

In keeping with the scope of the research referred to in Appendix F, para 1.3.1, a common theme across all five case studies is engagement with the global cluster system. The funding challenges experienced by logisticians in Yemen was significantly eased by Log Cluster stakeholders coming together to work collaboratively, thereby making their financial resources go further without feeling that the cluster lead UN agency, WFP, had taken over control. This was also the case in the swift and successful resolution of the Sierra Leone warehousing issue where stakeholders readily shared their knowledge

and experience; however, the same forum faced challenges in resolving difficulties arising from a breakdown in communications with the relevant customs authorities by effectively speaking to the wrong person. However, the manner in which the membership of the Log Cluster in Sierra Leone engaged with each other is testament to the importance of this forum. Logisticians have a tendency to help where they can, and this case demonstrates that they did so as a membership of a practitioner community in which they were at ease in working collaboratively.

Including the appropriate representative from national government departments was a theme in the Nepal and Mozambique cases where the local government were either unwilling to engage with the relevant cluster or were unaware of the importance of doing so. This effectively led to the in-country logisticians forming a more ad hoc practitioner community which was still capable of functioning but could not fulfil the potential of a formal forum that enjoyed HN participation. The Yemen case demonstrated that where a collaborative working model can be agreed, the benefits can be far-reaching.

All five cases highlight the importance of engaging with the global cluster system where it has been deployed and exemplifies the benefits that can be achieved through doing so. However, the cases also draw attention to the perception many stakeholders have of the cluster system, and particularly of the role of the lead UN agency. This perception, which varies among the different types of aid agency, needs to be managed, especially where there is any aspiration to develop a cluster's mandate.