**UNIVERSITY OF KWAZULU-NATAL**

# SUPPLY CHAIN MANAGEMENT BEST PRACTICES DURING NATURAL DISASTER OPERATIONS IN SOUTHERN AFRICA: A CASE STUDY OF THE UNITED NATIONS WORLD FOOD PROGRAMME

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## ABSTRACT

The research study was aimed at giving an insight into the supply chain management best practices that are employed by the United Nations World Food Programme (UNWFP) during its humanitarian natural disaster operations in the southern African region. The motivation behind the study is the increasing number of natural disaster occurrences that have been experienced from time to time, which have resulted to the increased suffering and loss of lives for the affected communities. The UNWFP together with other relief organisations in an attempt of minimising the impacts of natural disaster occurrences have been implementing measures to improve their relief operations. Humanitarian supply chain involves a coordinated system of activities and stakeholders with an overall objective of satisfying beneficiary needs, the UNWFP in its bid of making a difference during its relief operations has implemented various supply chain management practices that are aimed at improving its efficiency.

In ensuring that the goals of this study are achieved the qualitative research approach has been used which has been implemented through the use of the exploratory and case study research designs. Various data collection tools and methods have been used including conducting in-depth interviews, documentary and report analysis which have provided important data used for the study. In analysing the data collected the thematic analysis technique was employed which categorised the data into different themes, categories and codes all of which provided a description of the supply chain practices that are relevant during disaster operations. The main findings highlighted the fact that for successful disaster operations essential supply chain activities such as procurement, transportation and logistics, collaboration and information management should be strategically planned and controlled as critical success factors. The study has also discussed agile, flexible and responsive supply chain practices that have been successfully implemented in commercial organisations, these when properly implemented can contribute to the success of humanitarian efforts in southern Africa.

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## LIST OF ACRONYMS

**ALITE:** Augmented Logistics and Intervention Team for Emergencies

**COMPAS:** Commodity Movement Processing and Analysis System

**CSCMP:** Council of Supply Chain Management Professionals

**CSFs:** Critical Success Factors

**EMOP:** Emergency Operation

**EPR:** Emergency Preparedness Response

**ERA:** Emergency readiness action

**FAO:** Food Agricultural Organisation of the United Nations

**FITTEST:** Fast Information Technology and Telecommunications Emergency Support Team

**HBSA:** Humanitarian bulletin of southern Africa

**HBSA:** Human Security Baseline Assessment

**IACP:** Inter-Agency Contingency Plan

**IFRC:** International Federation of the Red Cross and Red Crescent Societies

**ISDR:** International Strategy for Disaster Reduction

**MPAs:** Minimum Preparedness Action

**NGO:** Non-Governmental Organization

**OCHA:** Office of the Coordination of Humanitarian Affairs

**PR/PO:** Purchase

**SADC:** Southern African Development Community

**SCM:** Supply chain management

**UN:** United Nations

**UNHAS:** United Nations Humanitarian Air Services

**UNICEF:** United Nations International Children's Emergency Fund

**UNJLC:** United Nations Joint Logistics Centre

**UNWFP:** United Nations World Food Programme

**USAID:** United States Agency for International Development

**WHO:** World Health Organisation

# CHAPTER ONE

# INTRODUCTION AND RATIONALE OF THE STUDY

## 1.1 INTRODUCTION

The field of humanitarian supply chains has been gaining recognition among researchers. This growing interest has been focused on creating and implementing systems that are aimed at facilitating the proper management and regulation of supply chain management related activities. This research project, in a bid to make a contribution to the humanitarian field, will focus on the supply chain management best practices that have been implemented by the United Nations World Food Programme (UNWFP) in responding to natural disaster occurrences in southern Africa.

This chapter will give brief outline of the research study structure, providing a detailed background of the field of humanitarian supply chains in southern Africa and how they have been regulated, controlled and managed. The research problem will also be explained and will illustrate the main areas that have been influential in determining the direction of this study. Other important aspects of this chapter are the outline of the main research objectives and questions and also of the significance and importance of the study. The research methodology used in the study will be explained, based on the objectives and questions of the research, including an exploration of the research tools and techniques used and an account of the study site and population of the study.

The chapter will also give a summary of the conceptual framework followed in the research study, which is mainly based on agile, responsive and flexible supply chains. Lastly, the chapter will highlight the unique contribution of the study towards the humanitarian supply chain management field as a whole and, more importantly, how the United Nations World Food Programme (UNWFP) has implemented supply chain related practices during their relief operations.

## 1.2 BACKGROUND OF THE RESEARCH STUDY

This research study has been influenced by the increasing rate of natural disasters that have negatively affected different countries within the region of southern Africa. The region has been prone to a diverse range of large scale natural disaster occurrences such as frequent cases of flooding, cyclones, droughts, epidemics and also veld fires. Some of the disaster occurrences that have been experienced in the region include Cyclone Eline that occurred in February 2000, hitting the South Coast of Mozambique and spreading along parts of Malawi, Zambia and Zimbabwe, causing a trail of damage. In 2007 Cyclone Favio affected parts of Madagascar and Mozambique and as a result 40 people were reported dead with 120 000 others having been displaced from their homes. An estimated 90 000 people had to be evacuated and, in addition, disease outbreaks were reported in the affected areas (Lukamba, 2010:484).

In the face of increasing natural disaster occurrences in southern Africa, there has been a growing concern from the international community, humanitarian organisations and local governments regarding the manner in which natural disaster operations are planned, organised and delivered. The growing level of damage to infrastructure and the loss of lives caused by these natural disaster occurrences have encouraged humanitarian organisations to focus on improving their operations through the adoption of supply chain management best practices in order to save lives and reduce the suffering of affected communities (Balcik and Beamon, 2008:15). Humanitarian organisations continue to experience a diverse range of challenges in managing disaster management phases, such as issues of preparedness, responsiveness and mitigation. Mbohwa (2011:176) remarks that most of the failures are attributed to the supply chain management practices that are implemented during these operations.

The UNWFP has been active in responding to natural disaster operations in southern Africa. It has conducted successful relief operations involving sudden and slow onset natural disasters, and it is described as one of the largest humanitarian relief organisations active during natural disaster operations in southern Africa. Its competencies involve being readily prepared for disaster occurrences through gathering information, buying and obtaining food in advance (WFP Strategic Plan Report, 2008:5). Focusing on the supply chain management best practices implemented by the UNWFP during disaster operations can offer an opportunity for a supply

chain framework to be designed that can be used by other disaster organisations during their relief operations.

Tatham and Pettit (2010:609) observe that the success of any disaster operation depends on the adoption of effective supply chain management practices that usually impact on supply chain related activities such as procurement, warehousing, transportation and distribution efficiency. This research study therefore acknowledges that there are supply chain management related inefficiencies that are experienced during humanitarian disaster operations. These usually result in the failure of humanitarian organisations to effectively respond to the affected communities. Therefore exploring some of the best practices that have been implemented by the UNWFP in efficiently responding to disaster operations can be considered as the foundation of designing supply chain management practices that can be successfully adopted for humanitarian supply chains.

## 1.3 RESEARCH PROBLEM

In response to calls for help from government and private aid organisations after a disaster occurrence, many donors respond in the form of pledges and provide aid in the form of money, medical supplies, food, water, sanitation equipment, shelter and support personnel. The challenge that usually arises is that of acquiring the needed resources from the donors and getting these to the disaster sites, deploying the supplies to the affected areas within a short space of time, and helping the areas begin the process of recovery (Perry, 2007:410). Disaster operations usually involve a moving a high volume of supplies, including medical, food and sanitary supplies. For the efficient movement of these supplies humanitarian organisations increasing need to adopt effective supply chain management practices in order to ensure that the supplies are moved in the right quantities, to the right people and at the right prices (Herman, 2007:12).

Humanitarian organisations, in managing their natural disaster response, have placed little or no emphasis on adopting supply chain practices aimed at achieving improved efficiency during their operations. As much as there is a desired need for efficiency during disaster operations, little is being done by humanitarian organisations in designing their supply chain management systems so as to achieve greater efficiency. This has continually led to the increased loss of lives and

suffering of the affected and vulnerable communities (Beamon and Balcik, 2008:4). The expectation has been that humanitarian supply chain best practices should present a solution for reducing the impacts of natural disaster occurrences and also present better support measures in restoring the affected communities back to their normality (Taniguchi, Ferreira and Nicholson, 2012:318).

The aim of this research study therefore is to provide insight into the supply chain management best practices that are implemented by the UNWFP during natural disaster occurrences that have been experienced in southern Africa. This will help the field of humanitarian supply chains develop a sustainable system that will be responsive to the needs of the affected communities. The findings of this study could be used as the framework adopted by other humanitarian organisations in ensuring that they are successful in conducting disaster operations within the southern African region.

## 1.4 RESEARCH OBJECTIVES

The objectives of this study can be summarised as follows:

- To understand how efficient customer responsiveness can best influence humanitarian organisations to delivering successful natural disaster operations.
- To understand the positive influences associated with adopting agile supply chain management principles during natural disaster operations in southern Africa.
- To determine how virtual supply chains can best influence and facilitate efficiency during natural disaster operations in southern Africa.
- To understand the advantages associated with humanitarian organisations operating as a system of networks "network based" during natural disaster operations.

## 1.5 RESEARCH QUESTIONS: BROADER ISSUES

The following are the research questions that the study aims to address:

- To what extent can customer responsive supply chain management principles be practically adopted to positively influence humanitarian natural disaster operations in southern Africa?

- How can market-sensitive, flexible and adaptive supply chains influence excellence during humanitarian natural disaster operations?
- To what extent is the implementation of the concept of virtual supply chains of significance to the success of humanitarian natural disaster operations in southern Africa?
- What are the possible effects of managing a supply chain as a network to humanitarian natural disaster operations in southern Africa?

## 1.6 RESEARCH METHODOLOGY

A detailed description of the research process followed in ensuring that the objectives of this study are met is provided in Chapter 4. This process is provided below, including an outline of the research design used, as well as an indication of the research instruments and what will define and identify the research universe of the study. The section will also briefly identify the critical steps and methods which will be used in obtaining and analysing the data deemed as critical in answering the objectives of the study.

## 1.7 RESEARCH METHODS EMPLOYED IN THE STUDY

Research methods involve a combination of strategies employed in gathering and analysing the data used during the study, the sections covered therefore include a description of the research strategy, design, instruments, population and sample and measures used in ensuring reliability and validity. These are briefly discussed below;

### 1.7.1 Research Strategy

In achieving the desired objectives of this study it is necessary to adopt a research strategy which will ensure that the data and information collected is relevant and accurate and also that it can be properly analysed. This research study looks into the supply chain management best practices that can be properly implemented during natural disaster operations. Therefore a case study approach has been identified as being suitable to explore and understand the supply chain management practices followed by an individual organisation.

Sekaran, (2003:35) describes the case study approach as involving an in-depth analysis of situations experienced or adopted by a specific organisation or individual that can be contextualised as representing similar approaches to be used by other organisations or individuals. The UNWFP, because of its disaster relief practices which have resulted in a trail of successful natural disaster operations, will be used as a case for this research study. This study seeks to determine the best practices that are implemented at the UNWFP. To achieve this, the research is exploratory in order to better comprehend the nature of the practices. This involves getting to understand all the systems the programme uses in managing its supply chains.

### 1.7.2 Research design

This research study is considered to be qualitative. Strauss and Corbin (1998:11) identify this as the type of research design that produces findings not arrived at by the use of statistical processes or other means of quantification. On the other hand, Cooper and Schindler (2008:214) define this as involving the techniques of interpreting data with an intention of describing, translating and decoding information in order to derive different interpretations and meanings. The study mainly seeks to identify the supply chain management best practices during natural disaster operations and using the UNWFP as a case study; therefore in order to gather the relevant information for this study narrative forms of data collection, such as carrying out in-depth interviews with the relevant employees of the organisation and reading analysis of organisational reports and articles, are used.

### 1.7.3 Research instruments

Having identified the research strategy and design to be followed, it is important also to give an insight into the instruments that were used in order to ensure that the correct information was gathered. For the objectives of the research to be achieved both primary and secondary data collection methods were used. Primary data is considered as the raw data that an organisation or researcher collects for themselves for the purpose of achieving certain research objectives (Cooper and Schindler, 1998:55). The collecting of primary data in this study was achieved through conducting in-depth interviews with UNWFP employees involved in the supply chain processes. Researchers including Sekaran (2003) and Seale (1999) have pointed out that, when the exact information that is needed is defined and known from the beginning, structured

interviews should be conducted. In this case the desired information pertains to identifying the supply chain management best practices implemented by the UNWFP. In that regard an interview guide was used in order to ensure that all the data was extracted from the interview sessions. Secondary data sources were also explored and this involved the use of peer reviewed journals, humanitarian reports and conference papers.

### 1.7.4 Population and Sample

A target population refers to the specified group of people, organisations or objects about which questions can be asked or observations made in order to develop the required data structures and information as defined by the researcher (Sekaran 2003:265). This research study therefore mainly focuses on providing insight into the supply chain management practices used by the UNWFP. Complementary information used pertaining to disaster operations deals mainly with natural disaster operations that have been carried out in southern Africa. In determining both the participating organisation and its respondents a purposive sampling technique was used. This was done in order to get relevant and accurate information from the individuals who have expert knowledge pertaining to supply chain management practices that are especially focused on agility, responsiveness and flexibility.

### 1.7.5 Data Analysis

The thematic data analysis technique was employed during this study. Thematic analysis is a method for analysing, identifying and reporting patterns (themes) within data, explaining the various aspects of the research topic (Braun and Clarke, 2006:79). Common themes were identified during the process of transcribing the interviews and they were categorised into the different concepts, namely, agility, flexibility and responsive supply chains, which are the variables forming the framework of this study.

### 1.7.6 Reliability and Trustworthiness

In order to ensure that the data used for this research study is reliable and trustworthy, measures were implemented in order to emphasise the validity of the methods and techniques used during data analysis. The use of research methods that have been well established with qualitative projects of a similar nature were implemented to guide the procedures employed, such as the line

of questioning followed during the in-depth interview sessions. Consistency and uniformity were maintained across all the interviews and observations carried out in the study. During the in-depth interview sessions the researcher made use of a tape recorder in order to ensure that the interviews could be played repeatedly so as to derive an accurate and proper interpretation of the information provided by the participants.

## 1.8 SIGNIFICANCE AND IMPORTANCE OF THE STUDY

The findings of this study provide insight into how humanitarian supply chain systems can be successfully structured in dealing with the increasing levels of uncertainty and challenges encountered during disaster operations in southern Africa. The UNWFP is the largest humanitarian organisation active in southern Africa and the study involves an exploration of some of its supply chain management best practices and how the implementation of these practices has resulted in increased levels of success. These best practices can be directly applied and implemented in other humanitarian organisations that are involved in the similar role of relief operations.

Attaining supply chain efficiency during natural disaster operations has the benefit of minimising the extent of suffering caused by natural disaster occurrences (Zhao, Xie and Zhang, 2002:34). Since such occurrences have been on the increase in the region of southern Africa, there is a need for humanitarian organisations to adopt efficient supply chain practices that will drive excellence during disaster operations. The concepts of agility, responsiveness and flexibility have been successfully implemented in commercial supply chains and this has seen an improvement in their supply chain performance. The UNWFP as the leading humanitarian organisation in the region has to an extent considered the use of similar concepts and therefore this study seeks to explore and identify how their operations have been transformed, presenting an opportunity for similar disaster operations active in the region to follow suit.

## 1.9 CONCEPTUAL FRAMEWORK

Supply chain management as a field has evolved significantly and most of the practices that have been implemented in an effort to improve efficiency have been introduced in commercial businesses. The use of different concepts, theories and frameworks has resulted in higher levels

of efficiency being attained (Van Hoek, 1998:509). Having identified some of the concepts and frameworks that have been used in different commercial circumstances, this research study provides an insight into how humanitarian supply chains can be positively influenced by the adoption of the specific supply chain management concepts. The study mainly discusses the concepts of agility, flexibility and responsive supply chains and also looks into the benefits that are derived from implementing the concept of critical success factors (CSFs).

However, it is essential to point out that there is no one framework that can be used for all the disaster occurrences that have been experienced in southern Africa. Moreover, the concept of agile, flexible and responsive supply chains is usually implemented in combination with the framework of CSFs. The attainment of agile, flexible and responsive supply chains will take place when there is a clear appreciation of the concept of CSFs, which postulates that for supply chains to reach the status of a desirable and efficient system certain factors should be attained (Yang, Burns and Backhouse, 2004:1055). Therefore this study will consider CSFs as being largely essential for agile, responsive and flexible supply chains to be achieved.

### 1.9.1 Critical success factors

Daniel (1961:112) argued that there are certain critical factors that first need to be achieved for an organisation to successfully achieve its objectives. The concept of CSFs is identified as referring to the characteristics, conditions and variables that, when properly sustained, maintained and managed, can have a positive influence on the supply chain of an organisation (Shen and Liu, 2003:487). During natural disaster operations there are certain critical factors that need to be given attention within the supply chain in order for successful and efficient relief operations to be carried out. Pettit and Beresford (2007), Gunasekaran and Ngai (2004) and Wang, Thai and Wei (2006) identified the ten CSFs of commercial supply chains as involving strategic planning, supply chain strategy, inventory management, transportation planning, capacity planning, participative management, information management, technology utilisation, relationship development and continuous improvement. Some of these are essential variables that humanitarian organisations have omitted when planning their disaster relief operations; therefore the intention of this study is to identify the main CSFs that are relevant to humanitarian supply chains and explore how these have been successfully implemented by the UNWFP during its disaster operations.

### 1.9.2 Agile, responsive and flexible supply chains

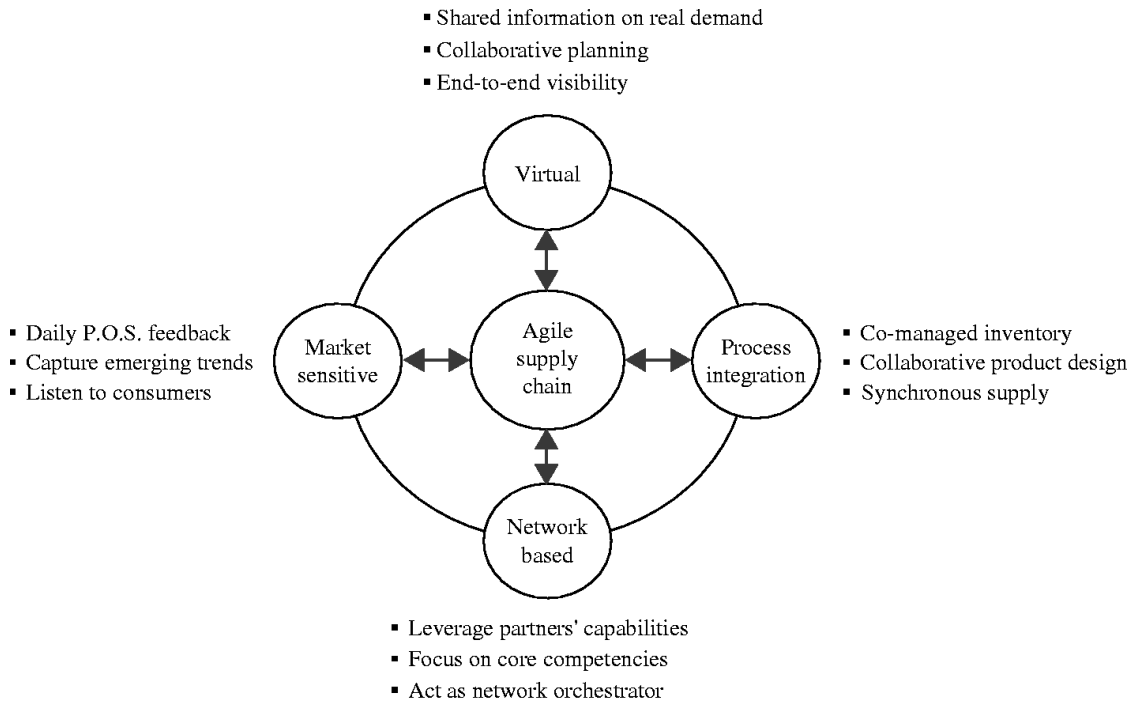
The other framework that is equally applicable and important for the purpose of this study is that of agile, flexible and responsive supply chains. The conditions in which humanitarian disaster operations are conducted are characterised by levels of uncertainty with regard to both the nature of their occurrence and the damage caused (Stevenson and Spring, 2007:690). The main objective behind the increased emphasis on the adoption of supply chain management best practices is to reduce this level of uncertainty, which has resulted in an increased loss of life. Humanitarian organisations actively involved in southern Africa, such as the UNWFP, have adopted supply chain management concepts that are identified as being agile, flexible and responsive to the given nature and characteristics of the disaster occurrence (Ben-Tal, Chung, Mandala and Yao, 2004:13).

In the opinion of Vonderembse et al (2006:225) an agile supply chain has the benefit of ensuring that the organisation effectively responds to the rapidly changing, continually fragmenting environments and conditions of disaster occurrences by being context specific and by aggressively changing to suit the current conditions. Agile supply chains are identified as being driven by providing customer specific goods and services, which is considered as being the main goal of humanitarian organisations during disaster operations. Lee (2004:4) describes the main objectives of supply chain management agility as involving the response to the short term changes in demand or supply quickly in order to handle and control external disruptions smoothly. The concept of agility, responsiveness and flexibility has been considered in this study in order to guide humanitarian organisations similar to the UNWFP into implementing supply chain management practices that are aimed at ensuring:

- Flexibility and adaptation to different natural disaster occurrences
- Building of integrated strategies that unify stakeholder relationships, forecasting, planning, replenishment, distribution and procurement
- Systematic information coordination, and
- Supply chain and operations management.

Figure 1.1 provides an illustration of the composition and the integration of agile supply chain networks. This illustration also offers an understanding of the key themes involved in agile

supply chains, encompassing process integration, virtual systems, market sensitivity and an emphasis on existing within a network (network based).




**Source:** Christopher *et al.* (2004)

**Figure 1.1**: **Agile supply chain network**

Harrison and Van Hoek (2008:130) identify the dimensions of an agile supply chain widely used in aiding the adoption of successful supply chain management practices during disaster operations. These include being *customer responsive*, defined as the capability of reading and responding to the end customer demand normally associated with efficient customer response (ECR). The other dimension involves viewing the supply chain as a *network of partners* who have the common goal of collaborating together so as to efficiently respond to the end customer needs. They also identified as an important dimension the viewing of the *network as a system of business processes* that tend to avoid incurring penalties of time, cost and quality for the network. Lastly, the success of the supply chain is attained through the creation of a *virtual supply chain* which is highly dependent on the movement of information.

## 1.10 UNIQUE CONTRIBUTION

The Fritz Institute (2010) emphasises that significant work needs to be done in order to transform humanitarian supply chains into being efficient in responding to rapidly increasing natural disaster occurrences. Humanitarian organisations are described as lagging approximately twenty years behind when it comes to the adoption of current and fundamental tools, principles and practices of logistics and supply chain management. During natural disaster occurrences there has been a significant loss of lives and the affected communities undergo periods of suffering as they are displaced from their homes and have little or no access to food (UN, 2009). Tatham and Pettit (2010:612) are of the view that the lagging behind of humanitarian supply chains has been a contributing factor to the loss of lives and the suffering of affected communities. This has been as a result of the delayed response and the inefficiencies encountered during the distribution of supplies, something that can only be resolved by the adoption of supply chain management best practices by the active humanitarian organisations.

This research study therefore argues that the success of humanitarian relief efforts lies in the improvement of humanitarian supply chain management practices. Focus on the UNWFP will ensure that other organisations involved in similar operations can learn from how the organisation has successfully adopted and managed supply chain practices in improving its efficiency. Failing to invest time and effort in conducting research studies aimed at improving humanitarian supply chains will lead to a further loss of lives as humanitarian organisations would not be in a position to deal with the increasing natural disaster occurrences in southern Africa.

## 1.11 CONCLUSION: OUTLINE OF THE CHAPTERS

**Chapter 1: Introduction and Background**

This chapter provides a brief background to the study and outlines the primary objectives, the key research questions and tools of the study. It also deals with the motivation for the researcher to conduct a study of this nature.

**Chapter 2: Literature Review: Humanitarian Logistics in Southern Africa**

The chapter critically reviews the available literature on the field of humanitarian supply chains in southern Africa. An in-depth exploration of the field of humanitarian logistics is conducted with the aid of previous case studies and reports from the organisations that have been active during natural disaster occurrences in southern Africa.

**Chapter 3: Literature Review: Implementing Supply Chain Management Best Practices in Humanitarian Disaster Operations**

This chapter provides a further exploration of the available literature with a specific focus on the supply chain management best practices that have been adopted by humanitarian organisations. Factors including procurement, inventory management, logistics and transportation and warehousing are explained.

**Chapter 4: Research Methodology**

The purpose of this chapter is to explain the research approaches taken during the study, which encompass the data collection, interpretation and analysis of the results. In addition, issues including the validity and accuracy of the data used during the study are explained.

**Chapter 5: Analysis, Presentation and Discussion of the Findings**

The purpose of the chapter is to analyse the primary and secondary data used during the study in order to draw relevant conclusions. The thematic data analysis technique was implemented and the chapter gives a detailed account of the different steps followed during the data analysis. This chapter carries out an in-depth discussion of the main findings derived from the data and how these relate to the main objectives and questions of the study.

**Chapter 7: Conclusions and Recommendations**

The chapter concludes the entire study and presents recommendations which clearly outline the actions that humanitarian organisations could take in attempting to improve their supply chains, thereby reducing the loss of lives and suffering of the affected communities. The limitations of the study are dealt with together with recommendations for future research in order to improve the field of humanitarian supply chains in southern Africa.

# CHAPTER 2

# EXPLORING THE FIELD OF HUMANITARIAN SUPPLY CHAIN MANAGEMENT

## 2.1 INTRODUCTION

There has been a growing interest in both academic and organisational research pertaining to the field of supply chain management. A significant level of effort and resources has been channelled towards identifying, designing and setting up proper and efficient supply chain systems. This has been directly influenced by the sustainable savings and improved efficiencies that are associated with an improved supply chain management focus. This study provides an insight into the advantages associated with the adoption of proper supply chain management principles and practices by humanitarian organisations in order to achieve excellence and success during natural disaster response operations.

As indicated in chapter 1, there has been a significant increase in natural disaster occurrences in different parts of southern Africa, which has resulted in loss of life and property. Consequently, there has been an increase in focus by disaster organisations on ensuring that their response operations are both timely and efficient (Chandraprakaikul, 2010:12). Achieving this has therefore meant a closer interaction with all the stakeholders involved and also an improved focus and strategy in supply chain management planning.

This section of the study addresses the broader field of humanitarian supply chain management, with the intention of indicating the nature of disasters common in the region and their main characteristics. It is important to have a clear understanding of the broader field of humanitarian supply chain management; to achieve this, an in-depth analysis of the characteristics and main challenges in the implementation of relevant supply chain management practices and principlesis made. In addition, the cycle that is usually followed during natural disaster operations is described in terms of the processes involved in order to adopt a proper supply chain framework.

Adopting best supply chain management practices can only be achieved when there is a clear appreciation and understanding of the field of humanitarian supply chains, which is the focus of the study. This chapter includes a review of some of the supply chain management designs that

have been implemented during different disaster response operations. The adoption of agile, responsive and flexible supply chains as a conceptual framework in implementing best practices is discussed. The objective is to identify and discuss some of the main advantages that are associated with the adoption of supply chain management best practices during relief operations and how organisations stand to benefit. The chapter also describes the natural disaster occurrences experienced in southern Africa, giving an outline of some of the variables that are generally considered in designing supply chain management practices during relief operations.

## 2.2 NATURAL DISASTER OCCURRENCES

Humanitarian organisations only initiate disaster response operations when a natural disaster occurs. This section of the study therefore identifies the natural disaster occurrences that have been experienced in southern Africa. It is important to state at the onset that the UNWFP has been mainly involved in responding to all the natural disaster occurrences discussed in this chapter.

For the purposes of this research study, the term natural disaster is considered as involving a sudden or progressive, widespread or localised natural occurrence which usually results in death, injury, damages to infrastructure and property and causes a disruption to the life of the affected communities (Ilhan, 2011:48). Natural disaster occurrences that have been experienced in southern Africa include veld fires, flooding as a result of high levels of rainfall, outbreaks of epidemics or diseases and droughts that have resulted in severe starvation (McClintock, 2009:297). Kovacs and Spens (2007:103) divide natural disaster occurrences into two distinct categories, namely, hydro-meteorological and biological disasters, which are each extensively dealt with below.

### 2.2.1 Hydro-meteorological disasters:

Hydro meteorological disasters are those types of natural disaster occurrences that are influenced by changes in weather patterns, including high levels of rainfall, high wind speed and changes in temperature, which are all commonly experienced in the region. The natural disasters associated with this category include the occurrence of floods, flash storms, cyclones, droughts

and veld fires (Holloway, 2003:30). For the purpose of this study it is important to have an understanding of the natural disaster occurrences that humanitarian organisations have been dealing with. These include:

- *Flooding, cyclones and flash storms*

Seasons with extremely high levels of rainfall have resulted in flooding, flash storms and cyclones, which are considered as one of the most dominant sets of natural disaster occurrences experienced in southern Africa. The Humanitarian Bulletin of Southern Africa (HBSA, 2013) has stated that an estimated 518 000 people across the region were affected by floods and storms during the 2012/2013 rainfall season.

Mozambique is one of the countries in the region that has previously suffered from massive torrential rains, which on numerous occasions have resulted in serious flooding. During 2000, it was threatened by severe and crippling floods that made inroads into other countries within the region, including Zambia, Malawi, Zimbabwe and South Africa, causing a significant trail of damage (Lukamba, 2010:483).

In January 2013 heavy rainfall contributed to the rising river levels in the Zambezi catchment, causing flooding in the Caprivi region in northern Namibia, which had inundated and destroyed houses, infrastructure and crop fields by mid-March. Up to 2300 families were identified as being vulnerable and hence relief aid had to be provided (OCHA, 2013:5).

- *Widespread poverty, starvation and droughts*

The other sources of vulnerability in the region have mainly been widespread poverty, starvation and droughts attributed to the declining levels of rainfall and erratic weather patterns (United Nations, 2009. Southern Africa previously suffered from two debilitating droughts that triggered serious water related imbalances, resulting in a 35% decline in cereal and crop production (ISDR Press Release, 2006:). The drought crisis was considered to be at its most acute in southern Africa during the 2007-2008 agricultural seasons when a population of 7.2 million people were considered to be in need of food aid. Malawi required aid for a population of 3.6 million, while Zambia and Lesotho jointly required aid for 3.5 million people during the same season (IFRC,

2007). Zimbabwe on the other hand also experienced serious drought conditions that resulted in close to 1, 2 million people needing consistent food aid supplies (Mbohwa, 2010:4). The number of individuals directly affected by poverty has continued to rise due to the poor harvests that are recorded in the different parts of the region. This effectively suggests that there has been an increase in the number of people requiring food aid from year to year.

### 2.2.2 Biological disasters

Biological disasters include occurrences like insect infestations and epidemics, such as cholera, typhoid and other ailments, which place the broader community at risk of being contaminated (Holloway, 2003:35). Humanitarian organisations have been involved in ensuring that most of these natural disasters are given attention as they pose the risk of affecting other communities if proper control measures are not used.

- *Epidemic outbreaks*

There has been a recent trend of epidemic outbreaks in the region, including cholera, typhoid and HIV. Cholera outbreaks have become more frequent in Zimbabwe with large outbreaks having occurred in 1999 and 2002. It is mainly transmitted through contaminated food and water and is closely linked to inadequate environmental management (WHO, 2008). In Mozambique the occurrence of cholera has mainly been as a result of the rapid occurrences of floods that affect the country on an annual basis. The United Nations Emergency response has had the mammoth task of ensuring that during flooding occurrences of cholera are prevented through the creation of holding camps with the right sanitation facilities (UN, 2010.

Malaria, largely attributed to the floods, is also one of the epidemics considered a major killer in Mozambique; this has resulted in an increased number of humanitarian organisations being involved in spraying vulnerable areas with insecticides and distributing mosquito nets and ointments to flood affected victims (UNICEF, 2008).

## 2.3 IMPACT OF NATURAL DISASTER OCCURRENCES

Natural disaster occurrences have diverse impacts on the affected communities, ranging from displacing communities from their geographical locations to causing a significant loss of life.

The humanitarian relief aid pledged by the international community to undo the damage caused by flooding, torrential rains and droughts and to assist the affected communities to recovery in southern Africa between 2010 and 2013 was estimated to amount to $25,3 million (HBSA, 2013:2).

Most governments in the region fail effectively to undo the damage caused by natural disasters because of the disruptions and the financial burdens that they face (International Strategy for Disaster Reduction, 2006:149). Disaster occurrences create serious disruptions and economic loss which impairs the ability of communities to recover. It is therefore important to improve the financial position of humanitarian organisations so that they can effectively organise successful disaster response operations. The sudden onset of disasters can destroy the physical infrastructure of the affected community through disabling the transport infrastructure, such as bridges and roads, and also cause disruptions to electricity networks and communication infrastructure (Kovacs and Specs, 2009:509).

The number of deaths and injuries resulting from natural disaster occurrences is also a detrimental impact. Thus, for instance, during the 1992 droughts close to 500 000 people suffered from malnutrition and a significant proportion of them died (USAID, 2005).

Understanding the main natural disaster occurrences commonly experienced in southern Africa and their effects is important for the humanitarian community as it allows them to be able to adopt supply chain management practices that are relevant to the different challenges presented by the various disaster occurrences (Mbohwa, 2010:12).

## 2.4 SUPPLY CHAIN MANAGEMENT

The Council of Supply Chain Management Professionals (CSCMP, 2006) defines the field of supply chain management as one that involves directing, managing and planning a diverse portfolio of activities involved in the sourcing, conversion, storage and logistics through a system of co-ordinating and collaborating with suppliers, intermediaries, third party providers and customers. The concept of supply chain management can also be referred to as a single entity which links customers and suppliers with an objective of creating value through properly

co-ordinating the individual objectives of the different parties forming the network (Badenhorst-Weiss and Nel, 2011:2). Supply chain management has been a dominant concept in commercial organisations and therefore the concept has been influenced by the underlying objective of reducing waste and operational cost and inversely increasing operational efficiency and profitability. In this regard almost every organisation can relate to the concept of supply chain management as it influences profitability, efficiency and customer value, which are all relevant to an organisation's success.

Thus it can be concluded that supply chain management as a broader field can be categorised as involving, firstly, commercial supply chains, which have the objective of competitively and profitably procuring, making and distributing their products to the end consumer. Another category includes humanitarian supply chains, which have the main objective of efficiently procuring, making and distributing supplies for the purposes of saving lives and reducing the suffering of affected communities (Herrmann, 2007:24). This study focuses mainly on humanitarian supply chains and will explain and identify their characteristics and the supply chain management practices they implement.

### 2.4.1 Context of humanitarian supply chains

Humanitarian supply chains involve a facilitated interaction between donor governments, international agencies, locally based agencies and the aid recipients, considered as being consumers. The supply chain is created through the flow of supplies, services, finances and information from donors, suppliers and other stakeholders of relief organisations for the purposes of providing physical aid to the different beneficiaries (Howden, 2009:5). The focus of humanitarian supply chains is not limited to the delivery of goods, materials and information but also focuses on managing the relationships of the stakeholders forming the network. Humanitarian supply chains have to create a cost effective flow of materials, information and financial value for proper and effective planning, control and implementation during natural disaster operations (Herrmann, 2007:20). Humanitarian organisations are not necessarily driven by profitability but consider the reduction of waste and an increase in operational efficiency as being important in achieving their overall objective of reducing the suffering of the affected

communities, through organising responsive disaster operations (Abidi, Leeuw and Klumpp, 2013:33).

Humanitarian logistics is one of the largest supply chain management activities carried out during disaster operations. In a natural disaster occurrence the movement of supplies from different geographical locations to the affected communities can only be achieved through an efficient logistics system. The United Nations World Food Programme (UNWFP) and Medicines Sans Frontiers define humanitarian logistics as the process of planning, implementing and controlling the efficient flow and storage of goods and materials as well as related information from point of origin to the point of consumption for the purposes of meeting the end beneficiary requirements (Beresford and Pettit, 2012:455). The focus of humanitarian logistics is on delivering aid to the affected communities. Tatham and Pettit (2006), Thomas and Kopczak (2005) and Tomasini and Wassenhove (2004), identify humanitarian logistics as a set of activities carried out in humanitarian supply chains with the aim of attaining logistics excellence.

Humanitarian supply chain management is a combination of activities involving the management of stakeholders, strategic planning and wider distribution and assessment efforts together with the overall goal of achieving an efficient and timely response during natural disaster operations (Al Talib and Abdul, 2014:27). Humanitarian supply chains are the systems that are involved during the movement, procurement and distribution of supplies by non-profit organisations in response to a critical need within the affected communities.

### 2.4.2 Factors influencing humanitarian supply chains

Humanitarian supply chain management is mainly concerned with organising, implementing and controlling the efficient procurement, storage, distribution and logistics during natural disaster operations (Ding-Kuo, Pettit and Beresford, 2006:178). This is a substantial task that often involves the movement of high volumes of supplies and materials considered essential in reducing and minimising the suffering of the communities affected by natural disasters. All the activities that take place in humanitarian supply chains before and after a natural disaster occurrence should be carried out swiftly and efficiently so as to meet the needs of the affected

communities and also to minimise the costs involved during relief operations (Minnich and Maier, 2005:34).

There is a diverse range of challenges experienced by humanitarian organisations during disaster relief operations. Some of the contributing factors are influenced by the characteristics of humanitarian supply chains, which include the unpredictability of demand and also problems associated with the last mile problem of transporting supplies to the disaster affected areas (Arlbojorn, Hallddderson, Jahre and Specs, 2008:55). Supply chain management best practices can be successfully adopted when there is a clear understanding of the characteristics of humanitarian disaster occurrences and the nature of the supply chains. A conceptual framework that can be suitably implemented for this study includes the adoption of agile, flexible and response supply chains, a concept that has been widely implemented and used by commercial supply chains. However, this framework will differ in humanitarian supply chains compared to commercial supply chains as a result of the differences that exist between them (Chandraprakaikul, 2010:3).

It is important to carry out an analysis that will identify the factors that need to be considered in designing humanitarian supply chains. Pateman, Hughes and Cahoon (2013:90) have identified some of the dominating factors that have had a direct effect in shaping the way in which supply chains are designed. These include unpredictability of natural disaster occurrences relating to their timing, geographic location and their nature and magnitude of occurrence. The period after a disaster occurrence is usually characterised by a sense of panic by both the government and the affected communities, which usually results in the lack of accurate information regarding the nature of operations required, such as the volume and type of supplies needed (Lukamba, 2010:213).

This section of the study will discuss the factors that are influential in shaping humanitarian supply chains; an understanding and appreciation of the existence of these factors has the effect of directing how supply chain best practices can be best implemented given the dynamic circumstances. The variables that will be discussed include demand uncertainty, irregular supply patterns, shorter lead times and insufficient information and resources.

- *Demand uncertainty*

Demand is one of the main variables driving efficiency within a supply chain system; that it is of central importance is suggested by the attention which commercial organisations have given to developing and improving their demand forecasting techniques. Putting together an accurate demand forecast is the primary objective of every organisation, including humanitarian organisations, as it allows for the proper planning, implementation and control of all the supply chain management variables (Chopra and Meindl, 2013:190). However, achieving a 100% demand forecast has never been possible (Monczka et al, 2010:335). This implies that irregularities in demand have been the cause of difficulties especially for humanitarian supply chains (Christopher and Towill, 2001:235). This is as a result of the suddenness of natural disasters, such as flooding, epidemic outbreaks, droughts and cyclones, which usually pose difficulty in determining the accurate numbers of the people who are affected and their geographical location as well as the actual number and nature of supplies needed during the relief operations. This is mostly the case with sudden onset natural disaster occurrences that unexpectedly occur leaving no room for adequate preparation and adequate demand assessments (Tatham and Specs, 2011:17).

With little or no demand information available after a natural disaster occurrence, organisations usually respond by pushing supplies to the affected areas with the hope that these supplies will be adequate in providing for the immediate needs of the affected population (Kovacs and Spens, 2007:104). Forecasts tend to be more accurate only during the later stages of the disaster operation as a result of an improvement in the flow of information, as proper demand forecasting measures would have been put in place. Faced with an increased degree of demand uncertainty, humanitarian organisations have therefore been forced into adopting supply chain management best practices that can improve their response operations and therefore better manage the level of uncertainty.

Uncertainty is a difficult supply chain variable to manage. In the case of humanitarian supply chains uncertainty cannot be entirely done away with and therefore, having realised this, humanitarian organisations have consistently been developing strategies to enable them to sufficiently match demand and supply (Christopher and Towill, 2001:235).

- *Irregular supply patterns*

The availability of supplies is a key issue during disaster operations; a diverse range of supplies is distributed during natural disaster operations in southern Africa. These include sanitary and medical supplies, food items, clothing, shelter and water and these movements have been conducted in large volumes (Patemen, Hughes and Cahoon, 2013:93). Chakravarty (2010:3) indicates that natural disaster occurrences are characterised by a drastic increase in supplies demanded by the affected population, resulting in humanitarian organisations gearing their efforts towards procuring and delivering the required supplies to the affected areas at the minimum possible time.

A number of natural disaster occurrences in southern Africa have seen a drastic increase in the number of supplies during the later stages of the disaster operation as there is an improved demand projection available then. This usually results in humanitarian organisations having to source the right pool of suppliers to cope with this increasing level of demand. The required set of supplies may vary greatly depending on situation and on a set of factors which include the nature, type and impact of the disaster occurrence, demographics and social and economic conditions of the affected areas (Mhohwa, 2010:13). Some of the challenges that are faced as a result of irregular supply trends involve the inflating of prices by suppliers as there is a direct increase in demand as seen by the UNWFP during the southern Africa drought of 2000 (WFP, 2011). Humanitarian organisations also have to switch between suppliers due to the diverse geographical location of disaster occurrences that might conflict with the supplier location and accessibility (Kovacs and Specs, 2007:12).

- *Shorter lead time*

Lead time refers to the time required in acquiring a product, which encompasses its purchase, production and assembly (Heizer and Render, 2006:557). It represents the gap between the time when an order is placed and when it is received. Lead time is a common supply chain management measure of efficiency used in commercial organisations. With humanitarian organisations there is a significant challenge in managing lead time; after a sudden natural disaster occurrence, relief organisations require supplies from either their donors or suppliers within the least possible time (Chopra and Meindl, 2013:328). Demand forecasting in

humanitarian supply chains is highly inaccurate and unreliable, which means that it is critical for the lead times to be kept as short as possible so as to make up for the changes in demand (Monczka et al, 2009:192).

Shorter lead times in humanitarian supply chains are desirable because of the nature of demand variability during disaster occurrences and also the effects in which a delay in availing supplies can affect the beneficiaries. Quick response to the rising needs of disaster supplies after the occurrence of a natural disaster is critical and therefore has resulted in relief organisations considering the sourcing of supplies from suppliers who are able to provide these within shorter lead times (Sheu, 2006:687). Disaster occurrences take place without any warning. Therefore the increased desire to reduce the effects is seen in the attempts to reduce lead times, which allows humanitarian organisations the opportunity to effectively respond to disaster occurrences.

- *Insufficient information*

The flow of accurate information within a supply chain is one of the critical factors determining the success of any supply chain operation. The management of information is critical during response operations and can have an effect on their effectiveness (Pettit and Beresford, 2009:458). Commercial supply chains, having realised the role that effective information management plays in enhancing their competitiveness and business growth have considered the use of information technology (IT) systems in facilitating enterprise resource planning systems. IT is also slowly being recognised by different humanitarian organisations as being important in supporting humanitarian efforts, with Long and Wood (1995:44) indicating that this can determine the success and failure of disaster operations.

In the event of a disaster occurrence there is usually insufficient information available to aid humanitarian organisations in planning their disaster operations. This is due to the fact that the immediate stage of a disaster occurrence is chaotic. Therefore the affected communities, national governments and the relief organisations are not afforded sufficient time to assess the damage caused by the natural disaster occurrence (Balcik et al, 2010:28). This has the effect of clogging the supply chain with unwanted and insufficient supplies, as donors and relief organisations respond by pushing through supplies into the supply chain, without having determined the actual

needs (Caddidy, 2003, and Murray, 2005). Information can also be identified as being insufficient in the sense that relief organisations are not aware of the actual occurrence of natural disasters. This also results in insufficient information pertaining to the number of the affected individuals and supplies needed during response (Kovacs and Specs, 2009:509). This differs from slow onset natural disaster occurrences, such as droughts and epidemic outbreaks, which allow sufficient time for relief organisations to properly plan their operations after having received some information (Kovacs and Tatham, 2009:218).

- *Insufficient resources*

Humanitarian operations are often carried out in environments with destabilised infrastructure from the lack of electricity and proper transportation channels, including airports, road networks and railway lines (Kovacs and Spens, 2007:100). This compromises the success of humanitarian disaster operations since relief organisations are not able to provide the supplies required by the affected communities. It also needs to be pointed out that most humanitarian disaster operations are under-funded, which results in most organisations having to eliminate some of the important supply chain concepts, affecting and compromising the success of their disaster operations (Lin Moe and Pathranarakul, 2006:400).

## 2.5 THE FRAMEWORK OF HUMANITARIAN SUPPLY CHAINS

There is no universally accepted framework used in designing humanitarian supply chains since various designs have been used which are specifically suited for different natural disaster occurrences. The nature, scope and magnitude of any natural disaster occurrence influence and determine the supply chain management approach adopted by any organisation (Stading and Kaufman, 2007:3). The main focus of disaster relief supply chain management is to design an efficient framework that allows for the effective movement and transportation of humanitarian supplies. This often includes the distribution of first aid material, food items, sanitary equipment and supplies and also rescue personnel from various supply points to a large number of geographically scattered destination nodes. In addition, the evacuation and the transfer of natural disaster victims to health care facilities and centres safely and rapidly may also be required (Barbarosoglu, Ozdamar and Cevik, 2002:120).

The dynamic nature of natural disaster occurrences has resulted in humanitarian organisations adopting different supply chain management frameworks for every disaster operation they carry out (Cozzolino, 2012:12). Southern Africa that has been affected by different natural disaster occurrences including flooding, veld fires, cyclones, epidemic outbreaks and droughts and all of these require unique and properly planned supply chain management designs as they present different challenges. Some of the supply chain management designs that have been used during disaster operations have been classified as resembling either the generic supply chain design or epidemic outbreak design.

### 2.5.1 Generic supply chain design

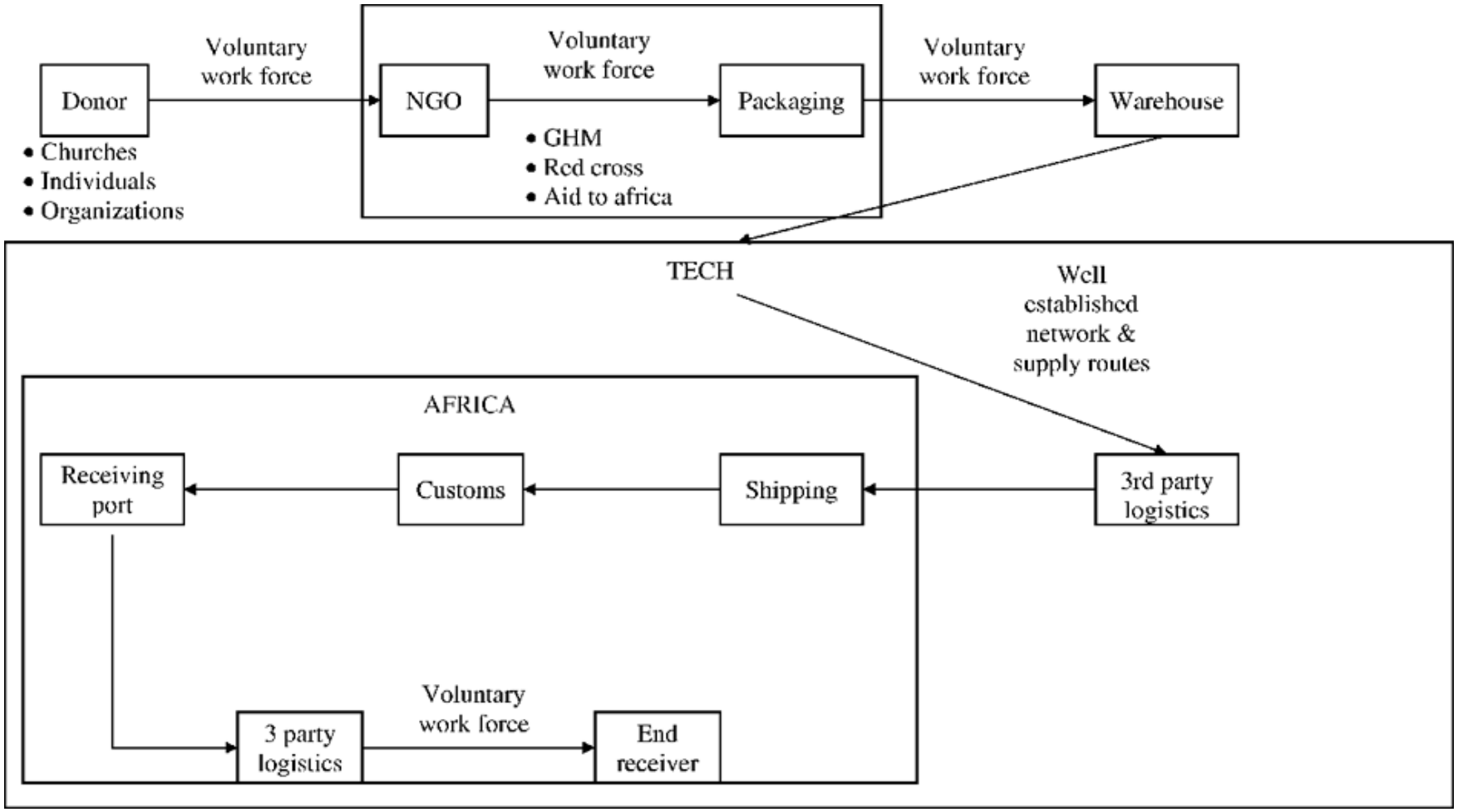
Kovacs and Spens (2007:12) created a framework that distinguishes between the various parties and activities that are involved in a humanitarian supply chain, such as the various actors, phases and logistics processes. In humanitarian supply chains the flow of goods from donors to the affected communities usually goes through a number of echelons, which may include many facilities. The flow and design of the humanitarian supply chain depends on the type and nature of the disaster occurrence, which effectively determines the volume, type and flow of inputs within the supply chain (Badenhorst-Weiss and Nel, 2011:4).

The design of the distribution network requires that decisions be taken that have an effect on a range of issues, including the location and flexibility of distribution centres, the capabilities needed to fulfil the demand of the affected people and the control systems to manage all these activities (Chandraprakaikul, 2010:5). During a natural disaster occurrence, logistics decisions are made which are specifically structured to address the needs of the affected community. The distribution of supplies will have to be made to different areas within specific time considerations. Any problems and inefficiencies experienced in the procurement of supplies will result in complications to the logistics operations and thereby increase the number of casualties. The occurrence of any natural disaster is unique and hence requires a tailor-made response operation (IIhan, 2011:48).

The distribution strategy followed is also influenced and determined by the natural disaster characteristics. The general distribution channel will involve an interaction of international actors, donors, government bodies, a pool of suppliers and non-governmental organisations. During disaster operations, such as droughts, famines and floods, humanitarian organisations usually follow the generic supply chain management design which they have identified as being efficient and easily manageable (Mbohwa, 2010:34).

Humanitarian organisations are often faced with the task of organising their supply chains to ensure that they efficiently respond to a disaster occurrence. This is considered a substantial task since these operations often involve the movement of high volumes of supplies. To save lives, the procurement of goods and services needs to be swift and must meet the needs of the affected communities; moreover, the costs involved should be kept to a minimum (Moeiny and Mokhesi, 2004:32). This can only be achieved when a proper framework is adopted that ensures that supplies are made available and efficiently distributed to the affected areas.

Figure 2.1 provides an illustration of the generic supply chain management framework that resembles natural disaster operations that have been conducted in southern Africa. It displays the main supply chain management activities involved during disaster operations, such as packaging of supplies, management of warehouses, shipping and the use of third party logistics providers (3PLs). In addition, the interaction between the donors, humanitarian organisation and the end recipient is displayed in the generic supply chain framework.

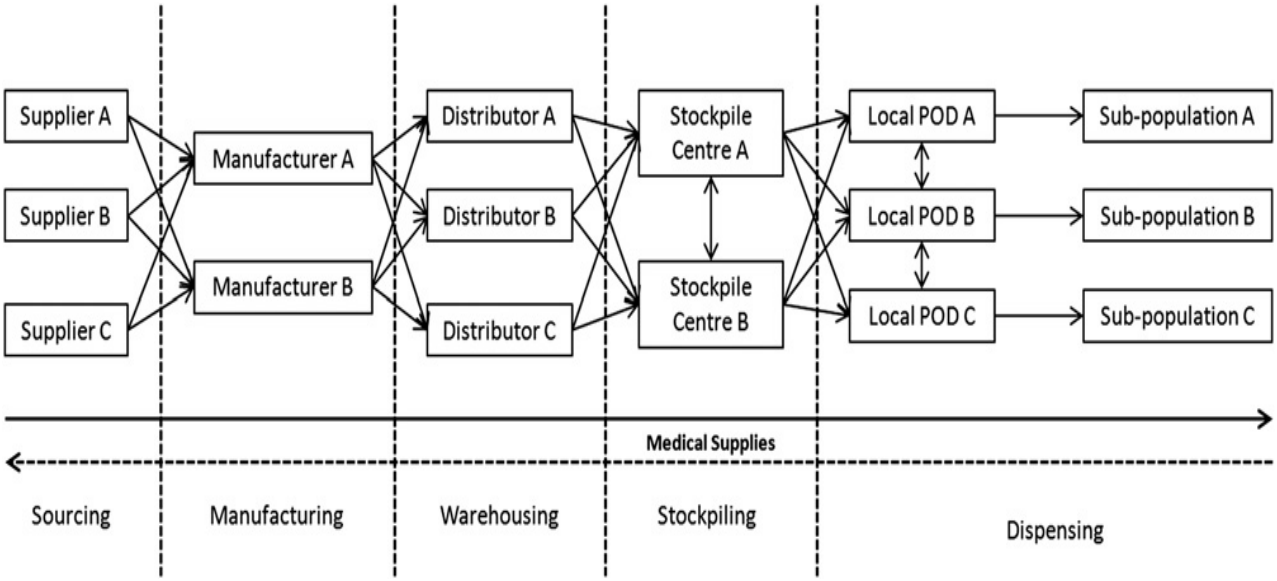



***Source**: (Haddow, Bullock and Coppolo, 2004:15).*

**Figure 2.1**: **Generic Humanitarian Supply Chain Management Framework**

### 2.5.2 Epidemic outbreak supply chain design

Balcik et al (2010), Kovacs and Spens, (2009) and Pettit and Beresford, (2005) in their research on humanitarian supply chains during epidemic outbreaks suggest an end-to-end supply chain approach, as displayed in Figure 2.2, which they considered as being relevant to humanitarian organisations which are active during epidemic outbreaks.




***Source:*** *(Moeiny and Mokhlesi, 2004:23)*

**Figure 2.2**: **Epidemic Outbreak Supply Chain Framework (End-to-End approach)**.

Figure 2.2 illustrates a common trend that is found in almost all humanitarian supply chains, which involve the flow of materials from the source represented by the pool of suppliers, donor organisations, corporations and national governments. Handling is also included, which is usually performed in the form of warehousing, and then lastly the target population, which includes the recipient communities directly affected by the disaster occurrence (Rodman, 2004:44). The supply chain for medical supplies involves an end-to-end approach including activities such as sourcing, manufacturing, warehousing, stockpiling and dispensing.

The WHO, Medicine San Frontiers and Doctors without Borders are the main organisations in the region that have been active in disaster operations involving epidemic outbreaks. The

challenge with these supply chains is that they tend to be specifically influenced by the type of natural disaster occurrence; for example, responding to a cholera outbreak will not require the same systems as a malaria outbreak (WHO, 2011). There are different types of medicines that are involved and each requires special care when being transported, stored and dispensed. Furthermore, the supply chain has the objective of ensuring that all the processes involved take place at the minimum time possible.

Understanding the nature and the scope of the natural disasters that have occurred in the region is important as it allows both communities and the responding humanitarian organisations to have a detailed framework of the nature of operations they should put in place.

## 2.6 SCOPE AND IMPORTANCE OF HUMANITARIAN DISASTER OPERATIONS

Humanitarian organisations play a significant role in minimising the effects of natural disaster occurrences as they have the responsibility of effectively responding to the needs of affected communities (Mbohwa, 2010:3). Carrying out this obligation has required the adoption of improved and efficient supply chain management practices. This has been influenced by the increasing number of natural disaster occurrences that have presented different challenges and thus resulted in the adoption of flexible supply chain practices that can efficiently respond to any natural disaster occurrence (Nikbakhsh and Farahani, 2011:292).

Humanitarian supply chains have a set of objectives which they seek to achieve. The next section of the study focuses on some of the key factors which humanitarian disaster operations through their supply chains are designed to achieve. Southern Africa as a region can attest to some of the roles that have been achieved by humanitarian organisations, including the prevention of disaster effects through organising, planning and implementing effective disaster response and recovery operations.

### 2.6.1 Minimising the effects of natural disaster occurrences

The HBSA, (2013) reported that by the end of May 2012 an estimated 1.2 million people had been affected during the floods in the region. Only 463 000 of the affected people had received

aid from humanitarian relief organisations in the form of shelter, clothing and food (Sammi and Van Wassenhove, 2003:12). Humanitarian supply chains play a crucial role in ensuring efficiency during humanitarian operations and the focus is on ensuring that a degree of success is achieved when sourcing, storing and distributing humanitarian supplies (Anisya and Kopczak, 2005:55). Humanitarian supply chains must be able to cope despite the diverse nature of requirements during the individual natural disaster occurrences.

Natural disasters have a number of effects; for instance, they have the potential to destroy transportation networks, making it difficult for the victims to be reached. Because of these destructive impacts, humanitarian relief organisations through their properly organised supply chains need to be able to respond to the individual requirements of the affected communities (Tatham and Spens, 2011:8). Humanitarian organisations organise disaster management that involves avoiding or dealing with the risks associated with disaster occurrences. This involves a set of processes designed to be implemented before, during and after disaster occurrences to prevent or mitigate their destructive effects (Christopher and Peck, 2004:3).

### 2.6.2 Co-ordinating disaster related operations

Relief organisations are the key stakeholders involved in helping communities and countries prepare for natural disaster occurrences, especially in countries like Mozambique and Madagascar that have been declared as flood risk areas, and also in responding to affected communities when the natural disaster strikes (Gustavsoon, 2002:37). Some of the relief organisations operate on a long term basis as they assist in the rebuilding of the destroyed infrastructure. For example, after Cyclone Eline, which seriously damaged infrastructure in Mozambique, relief organisations were involved in coordinated efforts of rebuilding the affected areas (Holguin-Veras et al, 2012:6).

The United Nations Joint Logistics Operations Centre (UNJLOC) (2007:12) has described the core function and role played by the humanitarian supply chains as ensuring that they effectively respond to the events that exceed the capacity of the affected areas. They need to respond in a quick and unique way so that they can save lives, preserve property and maintain the social, ecological and economic stability in the affected region. After heavy flooding in Beira and

Maputo, the UNJLOC managed to organise what has been referred to as the largest ever aircraft flight operation to be carried out as it involved 57 aircraft, a total of 9305 flight hours with almost 30 400 passengers and 11 623 tonnes of food and sanitary items being transported (UNJLOC, 2007).

### 2.6.3 Driving disaster supply chain excellence

Maspero and Ittman (2008:180) describe the tasks of humanitarian supply chains as involving a myriad of activities ranging from procurement, planning, transportation, warehousing, tracking, tracing and customs clearance. Humanitarian organisations specialise in ensuring that they drive supply chain excellence during natural disaster operations in order to reduce the suffering of the affected communities. Humanitarian supply chains involve a set of designed processes that are usually implemented before, during and after natural disaster occurrences. The operations are carried out in a planned sequence, which usually follows a cycle referred to as the "humanitarian relief chain cycle*"* (Martinez and Van Wassenhove, 2012:187. The aim of humanitarian supply chains is to ensure that proper planning, co-ordination and implementation is carried out in all supply chain processes so as to sufficiently provide for the end customer needs.

During the cholera outbreak of 2012 in Beit Bridge (Zimbabwe) and Musina (South Africa) relief organisations co-ordinated their supply chains and thus ensuring that medical supplies and personnel were quickly and efficiently distributed, in attempts to contain the epidemic from spreading (WHO, 2013). Holguin-Veras et al (2012:495) recognise the timely and efficient operations carried out by humanitarian relief organisations during the 2012 flooding in the Province of Gaza located in Mozambique as a display of supply chain excellence. Humanitarian organisations have participated in numerous response operations that have involved the distribution of supplies to diverse population groups despite the wide range of challenges that they have faced during this process.

Heaslip, Sharif and Althonayan (2012:379) are of the view that humanitarian relief supply chains allow for the co-ordinated efforts between organisations in terms of sharing of information and resources. Transportation providers such as DHL and TNT Logistics have established partnerships with the United Nations to improve the supply chain management activities

performed during the natural disaster operations. Such strategic partnerships have been created for the sole purpose of ensuring that excellence is achieved during these operations that is measured by the number of people who are saved from the effects of the natural disaster occurrence (Mbohwa, 2011:12). Tatham and Pettit (2010:611) identify the role played by humanitarian organisations during disaster operations as one that has resulted in improved response operations which have effectively led to a reduction in the loss of lives, compared to the disaster operations that were managed by the affected countries.

## 2.7 HUMANITARIAN RELIEF CYCLE

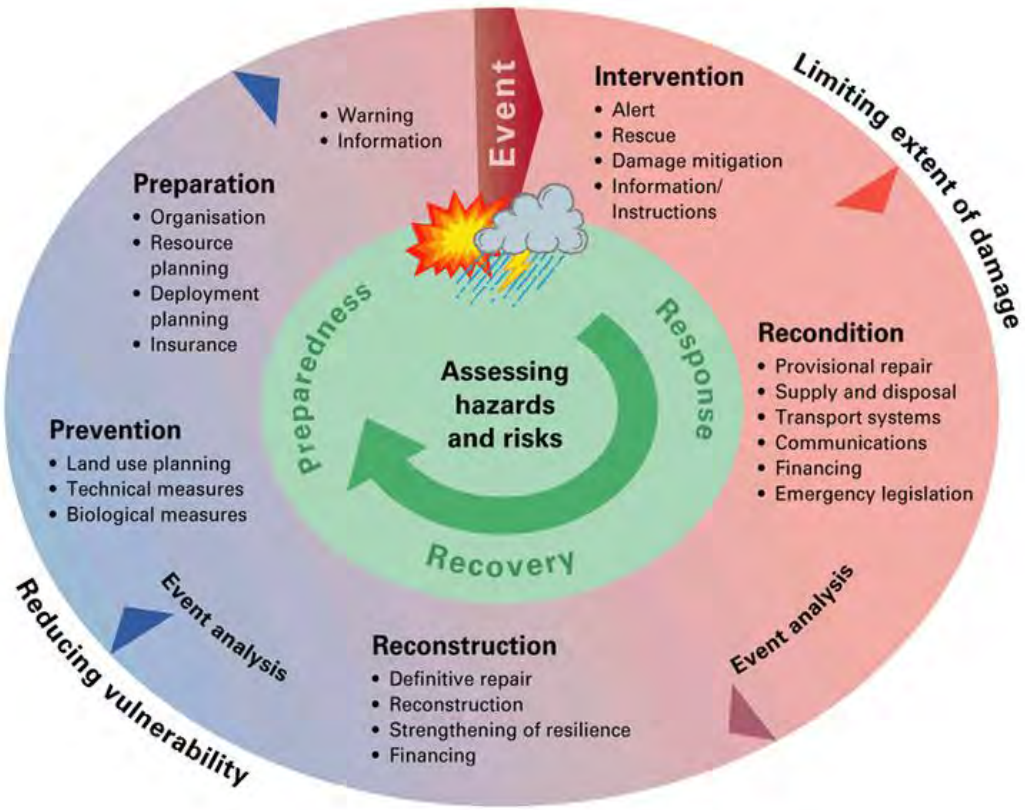
Understanding the processes involved during natural disaster operations is critical in facilitating proper supply chain management planning. A humanitarian cycle involves a series of activities performed during the management of natural disaster response operations (Inter-Agency Standing Committee, 2013:1). These activities are categorised into four stages, which are the response, recovery, mitigation and preparedness (Haddow, Bullock and Cappolo, 2004:23). These are inter-related activities and need to be managed in a seamless manner, using a coherent approach and a common set of tools. They can be further divided into specific phases, such as the preparation phase (time before a disaster) and the immediate response phase (after a disaster occurrence). It is during the immediate response stage that a combination of activities are carried out by the different relief organisations with the intention of ensuring that the needs of the affected communities are sufficiently addressed (Perry, 2007:410).

*Ramp up*, *sustain* and *ramp down* are some of the categories used in describing the activities in the humanitarian disaster cycle by Tatham and Spens (2011:14). The *ramp up* stage focuses on the initial stages of the natural disaster occurrence during which relief organisations seek to gain access to the affected areas through initiating response operations; speed is of high priority during this stage (Tomasini and Wassenhove, 2009:550). Managing, controlling and implementation of the response operation strategies are carried out during the *sustain stage* and relief organisations ensure that cost effective and efficient supply chain management practices are implemented. When disaster operations are being concluded, the phase is referred to as the *ramp down* and it is at this point that the organisation would have achieved part of its objectives

of assisting communities in recovering after the disaster occurrence (Lin Moe and Pathranarakul, 2006:402).

Increased collaboration and co-ordinated efforts between relief organisations during relief operations have been the major emphasis within the humanitarian cycle. The UNWFP has efficiently facilitated immediate disaster response operations in southern Africa through providing food supplies to poverty stricken areas and also to communities requiring food aid after natural disaster occurrences (UN, 2010). The Food and Agricultural Organisation (FAO) of the UN , on the other hand, has ensured that it facilitates preparedness operations in the case of slow onset disasters such as droughts through putting measures in place before the natural disaster occurrence, largely ensuring that disaster risk communities are prepared well in advance (Kovacs and Spens, 2007:110). Humanitarian relief organisations focus on providing different disaster management operations within the disaster management cycle. Therefore, the supply chain management practices and processes implemented are influenced by the phase in which the organisation is focusing and also the nature of the natural disaster occurrence (Pettit and Beresford, 2007:460).

Figure 2.3 provides insight into the sequence of phases involved during the natural disaster management cycle and also illustrates the activities performed by humanitarian organisations.




***Source**: Federal Office for Civil Protection (2010).*

**Figure 2.3: Disaster relief cycle**

### 2.7.1 Response Planning

Disaster response has been identified as one of the most critical phases within the natural disaster management cycle. The goal of the humanitarian organisation is to limit the extent of damage caused by the natural disaster occurrence. Cozzolino (2012:10) recognises that the major objective of this phase involves the preservation of life through minimising the suffering of the affected communities by adopting effective and timely response strategies. The sudden occurrence of natural disasters requires humanitarian organisations to act swiftly in mobilising supplies and moving into the affected areas; sufficient rescue operations also need to be provided and the impacts of the disaster minimised (Natarajarathinam, Capar and Narayanan, 2009:537). Therefore the supply chain management practices implemented during this phase need to be based on flexible, agile and responsive systems (Nikbakhsh and Farahani, 2011:300).

Humanitarian organisations carry out a diverse range of activities during the response stage and they usually strike a balance between time and quality during their response operations. The main focus is to ensure that response operations are carried out within a minimum time to avoid prolonged suffering of the affected people and also to ensure that a degree of quality and efficiency (Lin Moe and Pathranarakul, 2006:400). In the event of a disaster occurrence, humanitarian organisations send a team of experts to the affected areas to complete a quick assessment of the nature and impact of the natural disaster and to determine the response strategy to be adopted (Tatham and Pettit, 2010:614). This allows the organisation to be able to make initial decisions regarding the supplies that will be required during the disaster operation; possible donors, suppliers and logistics providers are approached and plans put in place for the implementation and conduct of relief operations (Anisya and Kopczak, 2005:123).

The response phase largely differs from one disaster to another based on the different needs and circumstances of each individual occurrence. At the same time, different strategies are implemented by humanitarian organisations in the response phase largely because of their different organisations objectives (McClintock, 2009:297). The diverse range of activities carried out by humanitarian organisations in the response phase is dealt with below.

- *Needs Assessment and information management*

After a natural disaster occurrence, materials need to be procured quickly, staff transported to the affected areas, transportation providers contracted and material supplies properly organised so that they reach the intended beneficiaries (Lukamba, 2010:490). For all this to be efficiently carried out, a needs assessment must be performed in order to determine the needs and requirements of the disaster operation. This assessment also guides the decisions that are made by relief organisations when performing their immediate response initiative. Kovacs and Spens (2007:105) note that the assessment of demand before the response operations tends to consider the cultural peculiarities of the affected communities, thereby avoiding a situation of providing communities with food stuffs that they consider to be ‘culturally unacceptable’.

Response operations are driven by the availability of information pertaining to the disaster occurrence. The speed at which the critical information regarding the disaster is collected, analysed and made available by the participating agencies influences the facilitation of an effective response strategy (Perry, 2007:412). The information tends to influence the manner in which humanitarian organisations organise their disaster response operations; most importantly it ensures that organisations know what they are dealing with before they implement their action plans. The information that they sometimes require pertains to the approximate number of the affected population and the impact that the disaster has had on the infrastructure such as roads and airports. It is important for humanitarian organisations to forecast and project the demand levels during the information gathering stage.

- *Mobilising supplies for response*

Humanitarian organisations need to be able to mobilise supplies from different parts of the world to support their disaster operations. Mbohwa (2010:1) points out that because of the severity of most natural disaster occurrences experienced in southern Africa, relief agencies have always been under pressure to respond immediately to disaster occurrences through the effective supply and delivery of aid. During the initial stages of a disaster, humanitarian organisations will initiate disaster operations without adequate resources and also without accurate information pertaining to the nature of the disaster and supplies required (Howden, 2009:9).

OXFAM, during the 2010 floods in Mozambique, was involved in the distribution of water and sanitary supplies to the affected areas while the UNWFP distributed food items to support the families that had been displaced (Mbohwa, 2010:487). In this way, different humanitarian organisations respond by supplying different items with the intention of saving the lives of the affected communities. Material supplies vary depending on the nature and scope of the natural disaster occurrence; some relief organisations distribute supplies such as food hampers, blankets, shelter facilities and clothing for cyclone victims, while during acholera outbreak relief organisations distribute clean water, medical supplies and sanitary equipment.

- *Reaching out to the disaster affected areas*

The immediate response phase usually involves a large amount of supplies being pushed to the affected regions. In flooded areas the challenge is usually how supplies can be transported to the intended destinations since road networks are often disrupted. Humanitarian organisations therefore usually consider the use of different transportation modes in order to access the affected areas easily (Vermaak and Van Niekerk, 2004:560). The lack of proper transportation infrastructure in the region influences humanitarian relief organisations to consider the use both of advanced and dynamic modes such as helicopters and cargo planes and also primitive modes such as animals (elephants and donkeys), depending on the circumstances. This indicates that during the initial response phase relief supply chains are concerned with getting supplies to the affected areas before any further damage and suffering occurs (Nikbaskhsh and Farahani, 2011:305).

There are supplies that are considered to be of high priority during the immediate response phase and therefore the distribution and transportation systems of these supplies need to be both agile and efficient (Arlbojorn et al, 2008:56). Perishable food items and medical supplies are considered as emergency supplies; therefore their supply chains are designed in such a way as to permit quick ordering and distribution to the intended beneficiaries before they expire, as they have a short shelf life. The WHO has made significant efforts to ensure that it distributes the correct volumes of medical supplies efficiently and effectively to affected communities (Perry, 2007:413).

- *Co-ordinated humanitarian relief efforts*

Logistics principles are essential in the response stage and collaboration of efforts usually strengthens the ability of relief organisations to carry out successful response operations (Howden, 2009:7). Disaster occurrences usually test the reactivity of systems and especially the capacity and ability of different stakeholders in working together. Response planning has been characterised by organisations working together to reduce the disaster impacts successfully and efficiently (Natarajarathinam et al, 2009:543). During Cyclone Eline in 2000, which affected parts of Mozambique and Zimbabwe, there were close to 100 relief organisations and 11 national militaries conducting disaster operations, resulting in successful relief operations being carried

out (Cosgrave, 2006:57). Although there is a high possibility of duplication of relief efforts during the response phase, since it has been observed that humanitarian organisations rush into the affected areas and perform similar tasks (Blecken, 2010:22), this issue is currently being addressed within the field through the use of improved information sharing between various humanitarian organisations involved within an operation (Tabbara, 2008:45).

Relief organisations that are active during natural disaster operations, for example, responding to epidemic outbreaks, need to ensure that they coordinate their relief efforts with the aim of delivering efficient and successful disaster operations (Beamon and Balcik, 2008:5). Relief organisations tend to emphasise greater logistical efficiencies through achieving a logistics network synergy, information sharing and connectivity between the individual organisations focusing on delivering health aid (WHO, 2012). Effective collaboration between the aid organisations is essential for the speed of response as it improves the ability of supply chain and logistics systems to effectively carry out operations.

Various relief organisations follow a specific process in conducting their response operations and these usually define the success of an organisation. Insert 2.1 gives a brief illustration of the response plan followed by the World Vision International in initiating their response operations.

***The Response plan of World Vision International***

*World Vision has been instrumental in Southern Africa through its phased response which typically occurs in three phases, response within seven days, 30 days and 90 days depending on the nature of the natural disaster occurrence (Kovacs & Specs, 2009: 518).*

*The supplies distributed and the activities carried out during this planned response, varies with the magnitude and nature of the disaster occurrence. In the first phase kits that can sustain victims for seven days are provided, the second phase involves kits that can sustain 5000 victims in 30 days and lastly the third phase is related to the reconstruction and involves long term rehabilitation (Kovacs & Specs, 2008: 105). The concern of World Vision after any disaster occurrence in the region is on how they can be able to reach out and distribute the kits that can sustain the affected communities for seven days. The answer has been on designing their supply chains so that they can be agile, flexible and responsive.*

***Extracted from**: World Vision International Report (2004:12)*

**Insert 2.1: Response plan followed by World Vision International**

The responsive stage is a critical part within the humanitarian logistics cycle and it is important that all the organisations involved carry out the necessary tasks in order to improve the efficiency of the response operations.

### 2.7.2 Preparedness

Disaster relief operations are complex and hence they require a significant amount of pre-planning (Herrmann, 2007:1). Perry and Lindell, (2003:338) describe the preparedness phase as involving the readiness of a country or organisation to effectively reduce the negative impacts caused by natural disaster occurrences through the timely provision of aid and services. Preparedness includes the activities and measures taken in advance to ensure effective response to the impact of hazards including the issuing of timely and effective warnings and the temporary evacuation of people from threatened locations (Lin Moe and Pathranarakul, 2006:402). Slow onset disasters such as droughts and pest attacks allow for relief organisations and communities to prepare before they occur, while disaster occurrences such as floods and earthquakes, allow for limited preparedness efforts to be made as they are sudden and unpredictable (Perry, 2007:411).

Meteorological natural disaster occurrences, such as cyclones, floods and droughts, are known for their devastating impact on human life, the economy and the environment. It is commonly agreed that there is a way of neutralising all negative impacts resulting from disasters and this has given rise to more relief organisations preparing and organising their supply chains and logistics systems before a disaster occurs (Lin Moe and Pathranarakul, 2006:397). The focus that a number of relief agencies operating in the region have in the preparedness phase is to ensure that they configure and put in place swift supply and logistics systems that are capable of responding to any disaster occurrence (McClintock, 2009:296).

Communities and the relief organisations have made efforts to prepare themselves by creating and enhancing necessary infrastructures and planning for the various relief operations well in advance so that they are able to cope with the effects of natural disasters (Nikbakhsh and Farahani, 2011:291). Other natural disaster occurrences, for instance, droughts that can be detected well in advance, allow relief organisations adequate time to prepare for the impact.

Activities such as the pre-planning of humanitarian logistics operations through locating necessary facilities, stock-piling necessary items and linking transportation networks form the basis of the preparedness phase of the humanitarian relief supply chain cycle (WFP, 2012).

The nature and type of the disaster occurrence usually determine the relief organisation's ability to successfully prepare for the disaster occurrence well in advance. For example it is impossible for the UNWFP to keep regular stocks of supplies for distribution during an earthquake, as it cannot be determined where it will occur and how it will destroy the infrastructure (WFP, 2011). However, in the case of an anticipated famine and drought occurrence, distribution centres can be set up in well in advance as part of the preparation efforts. The preparedness phase has been largely prioritised and is deemed feasible by the humanitarian relief community because it derives enormous benefits through the reduction of the effects of disaster occurrences (Tatham and Pettit, 2010:614).

Given the recurring nature of natural disasters in the region, disaster preparedness in vulnerable communities mainly focuses on developing the ability and capacity for quick response. This is considered to be the cornerstone of disaster relief activity (Lin Moe and Pathranarakul, 2006: 411). In areas like Mozambique that are considered as flood risk areas, the preparedness phase would include the building and creation of safe hubs for sheltering the affected communities and setting up proper sanitation facilities to avoid the outbreak of diseases. In addition, it is usually before the flood season that transportation for both supplies and victims are placed on standby so that in the event of a flood occurrence relief organisations can immediately respond (Tomasini and Van Wassenhove, 2009:554). Perry (2007:411) mentions the initiatives carried out by the United Nations Joint Logistics Committee (UNJLC) in the implementation of community based disaster preparedness strategies in flood risk areas including Madagascar and Mozambique, initiatives undertaken in order to facilitate effective response action and lessen the impact usually caused by the floods and cyclones in these areas.

Preparedness consists of developing a crisis response plan and training all the involved parties so that in the case of a crisis people know their roles and will be able to deal with it effectively (Natarajarathinam et al, 2009:537). Preparedness in disaster management deals with the

restructuring of the supply chain network, including pooling resources, prepositioning of relief items and postponement. It also involves the setting up of collaborative relationships between the different humanitarian relief aid organisations with regard to issues that include the sharing of resources and information. This ensures that, in the event of any disaster occurrence, relief organisations have a detailed plan on how they will carry out their operations efficiently (Tomasini and Van Wassenhove, 2009:551). On the other hand, humanitarian organisations also contract suppliers on a long term basis so that in case of a disaster occurrence the materials can be efficiently made available.

The success of any humanitarian disaster operation depends on the conditions of the affected area and community, the magnitude of the disaster and on how prepared the relief organisation is in responding. Factors such as transportation and communication infrastructure systems, environmental conditions, geographical locations and the time of occurrence have an influence on the overall success of a relief operation (Nikbakhsh and Farahani, 2011:297). This has, however, not prevented humanitarian relief organisations from initiating preparatory initiatives for a disaster occurrence through configuring their supply chains in order to improve their chances of successfully delivering relief operations. Humanitarian organisations consider acting in the absence of preparations as a costly step that also compromises the quality of service rendered to the affected communities (Tatham and Spens, 2011:8). The preparedness phase largely involves building capacity to respond to a disaster, such as working with communities to ensure they know evacuation options, prepositioning emergency response supplies and building organisational capacity to respond to disasters (Howden, 2009:5).

## 2.8 CONCLUSION

Humanitarian disaster operations involve a number of interrelated activities, and therefore the success of these operations depends on the adoption of supply chain practices that are aimed at positively influencing the different activities of the disaster management cycle. This chapter has given a detailed outline of the variables that are involved in humanitarian supply chains, the disaster occurrences that are common in southern Africa and their embedding characteristics. Awareness of these variables has allowed humanitarian organisations to be able to determine

which supply chain practices they need to focus on in dealing with different natural disaster occurrences.

The growing interest by researchers in this field has been motivated by the increasing number of natural disasters that have significantly affected different communities of southern Africa. The main objective has been to ensure that humanitarian organisations explore possible approaches and solutions for efficiently managing their supply chains so that they can swiftly respond and properly manage the different disaster phases, such as preparation, response, reconstruction and mitigation (Kovacs and Spens, 2009:521).

The increasing number of humanitarian organisations involved in responding to natural disaster operations in southern Africa has meant that there needs to be a proper exploration and understanding of the field and of how organisations can work together towards building a sustainable supply chain system that is prepared for any occurrences. Some of the organisations that are actively involved include the UNWFP, OXFAM, USAID, World Vision and Medicines Sans Frontiers. There are a myriad of supply chain concepts that can be implemented in order to improve the speed and effectiveness of disaster response operations; this study seeks to identify some of the practices and explore how they can successfully influence the natural disaster operations of organisations.

# CHAPTER THREE

# IMPLEMENTING THE CONCEPT OF CRITICAL SUCCESS FACTORS AND AGILE, RESPONSIVE AND FLEXIBLE SUPPLY CHAIN PRACTICES DURING RELIEF OPERATIONS

## 3.1 INTRODUCTION

There has been a growing need for humanitarian organisations to adopt supply chain management best practices that are relevant to different relief operations and that have an influence in speeding up and improving the efficiency of their overall operations. Some of these practices have been widely used by commercial organisations and have resulted in desirable results, including significant cost savings and increased operational efficiency. The perceived failures experienced during relief operations following major disaster occurrences has motivated the different organisations actively involved into looking at better ways of managing and organising their supply chains (Fritz Institute, 2010). This chapter therefore provides insight into some of the important supply chain concepts that have great potential in influencing the success of humanitarian disaster operations.

The success of a supply chain depends on the guiding frameworks and principles adopted by an organisation, which are either based on a certain theory or on a proven idea. There are many supply chain management guiding concepts and practices that have been developed by different organisations and researchers which are aimed at ensuring that supply chain excellence is attained. This chapter mainly dwells on the two frameworks that have been most widely used in the field of supply chain management. The concept of CSFs has been successfully implemented in commercial supply chains and has made a remarkable contribution in ensuring that they are efficient. This study therefore intends to provide insight into the advantages that can be gained in humanitarian supply chains through adopting CSFs as a guiding framework. The approach taken in this research study is to close the gap that exists in humanitarian supply chains, where it has been estimated that wastage rates of up to 30% are incurred during disaster operations (Beresford and Pettit, 2007:23). Since commercial supply chains are considered as being far more advanced than humanitarian supply chains, it is important for the latter to consider the implementation of

some of the frameworks and practices that commercial organisations have adopted. The possible application of these concepts is addressed in relation to how commercial organisations facing similar challenges to those experienced during natural disaster operations have implemented them.

This study will also look at the widely used supply chain management practices that involve the implementation of agile, flexible and responsive supply chain principles. The prevailing characteristics of humanitarian supply chains, which include the unpredictability of disaster occurrences, and also their diversity means that agile, flexible and responsive supply chain practices are most suitable as they offer a solution in dealing with the challenges.

## 3.2 THE CONCEPT OF CRITICAL SUCCESS FACTORS

Humanitarian operations often involve the carrying out of complex and interrelated activities that have to be performed before, during and after a natural disaster occurrence. For successful operations to be carried out the organisations and stakeholders that are actively involved need to have a clear understanding and appreciation of the problems and challenges that are involved during the disaster management process (Beamon, 2004:14). Attaining supply chain efficiency during the process can only be achieved through ensuring that the levels of uncertainty involved are either eliminated or properly managed (Pettit and Beresford, 2009:451). The constant need by humanitarian organisations to influence their supply chains so as to ensure that they sufficiently address and provide for the needs of the affected communities has resulted in organisations adopting and implementing more efficient policies and supply chain concepts that are focused on delivering supply chain excellence.

Supply chain excellence is a term that refers to the stage at which an organisation has implemented supply chain management reforms and concepts that allow it to satisfy the desired needs of the customer at the right time, place, quantity, price and specifications (Wiebe, 2004:10). In order for this to be achieved researchers have indicated that there is a need for the entire emergency management process to be segmented into meaningful elements so as to be managed step by step (Christopher, 2000:39). The process would involve identifying the most important variables that need to be given priority due to their influence on the performance of the

supply chain. Because the main objective of disaster operations involves alleviating the suffering of the affected communities, success during relief operations is of uttermost importance (Zhou, Huang and Zhang, 2011:243).

Implementing the concept of CSFs has been identified as one of the possible ways in which humanitarian supply chains can be improved. It involves ensuring that the critical areas that affect the overall performance of a supply chain are given special attention. CSFs are described as involving the key activities by means of which a specific organisation is able to reach its intended goals (Alazmi and Zairi, 2003:200). They are also referred to as involving a set of variables that need to be in place in order for an organisation deliver successful disaster operations (Huotari and Wilson, 2001:22). The concept of CSFs means that there are certain factors considered as being critical to the success of an organisation and that, when these are not attained, there is usually a high likelihood that the organisation will fail. Essentially these factors are the characteristics or variables that when properly sustained or maintained contribute to the success and performance of an organisational supply chain (Power and Sohal, 2001:12).

When CSFs have been identified it is usually easier for an organisation to dedicate sufficient resources and also to put in place a system that identifies the progress and performance of the organisation in relation to each specific variable. When the concept of CSFs is adopted in any organisation, it usually results in changes being identified in the performance of the supply chain; this is because the organisation focuses on meeting specific targets that positively influence the whole supply chain (Pettit and Beresford 2005:320). The goal of every organisation, whether involved in commercial or disaster operations, is to ensure that critical variables affecting the movement and delivery of supplies are properly managed in order to promote and support the initiatives and goals of the organisation as a whole; researchers have pointed out that this can be achieved through adopting the concept of CSFs (Zhou, Huang and Zhang, 2011:244). The success of a supply chain is determined by a few variables; when these variables are properly managed and controlled, they can drive an organisation into attaining supply chain excellence. There are a variety of factors that can be considered as the critical variables of a supply chain; however, most researchers admit that these differ from one

organisation to another depending on the challenges faced and the overall goals (Pettit, Beresford and Luo, 2006:23).

Pettit and Beresford (2005:320) are of the view that the implementation of the CSFs concept in humanitarian supply chains, using similar principles to those applied in commercial supply chains, will result in improved efficiency during natural disaster operations. Despite the acknowledgement that the circumstances and conditions in which humanitarian organisations operate in are very different to those of commercial supply chains (Thomas and Kopczak, 2005:10), this concept proposes that an organisation identifies the critical factors in which it considers as being influential to its supply chain. This therefore allows the organisation to focus on the specific critical variables which it deems as being essential for the success of its overall supply chain.

There are a few researchers who have been focusing on the implementation of the concept of CSFs in the field of humanitarian supply chains. This is because disaster operations are dynamic and require different approaches in addressing the challenges faced. Therefore organisations usually find it challenging to adopt a different set of CSFs for every natural disaster operation in which they conduct (Pettit and Beresford, 2009:453).

## 3.3 IMPLEMENTING THE CONCEPT OF CRITICAL SUCCESS FACTORS IN HUMANITARIAN SUPPLY CHAINS

Pettit and Beresford (2009:55) initiated the idea of adopting the concept of CSFs for organisations involved in humanitarian disaster operations. Their argument was that there are variables that are considered as being important during disaster operations and these have an influence on the success of the entire operation. The main variables which they identified included strategic planning, inventory management, transportation and capacity planning, information management and technology utilisation, continuous improvement and human resources (Huotari and Wilson, 2001:13). A study by Cook (1984) on the other hand identified ten elements considered as being critical during relief operations and suggested how these should be used as the main guidelines in conducting relief operations. Some researchers including Zhou,

Huang and Zhang (2011:250) have designed a framework of CSFs comprising four cause factors, namely, reasonable organisational structure with clear awareness of responsibilities, effective information emergency system, government unity of leadership and application of modern logistics technology. The effect factor identified involves the continuous improvement of the logistics operations system.

Humanitarian organisations respond to different disaster occurrences and therefore their supply chains usually adopt different approaches and frameworks due to the dynamic and unpredictable nature of these occurrences. There are numerous success factors that need to be properly managed during humanitarian relief operations and which organisations should pay particular attention to, although these cannot be standardised for every disaster operation (Beresford and Pettit, 2007:35). This section of the study deals with some of the factors that have been successfully identified as being influential in humanitarian supply chains and specifically those involving natural disasters.

The sudden occurrence of natural disasters means that organisations implement a level of readiness and efficiency within their supply chains in order to allow disaster operations to be swiftly conducted. Some of the success factors have been aimed at ensuring that preparedness and readiness is encouraged within the supply chain, especially in the case of sudden onset disasters. Disaster operations are required to be proactive and also should involve unity of direction on the part of active organisations and emphasis on timely government response (Oloruntuba, 2007:87).

For a supply chain to be successful, strategic planning is required that clearly outlines the long and short term decisions of the organisation, involving a combination of organisational strategies (Perry, 2007:420). Strategic planning involves crucial supply chain decisions affecting transportation and logistics, warehousing, location of distribution centres, outsourcing of activities and the deployment of resources to the affected areas. Strategic planning also involves a combination of decision factors that must be carefully managed and controlled as these have an influence on the outcome and performance of the organisation. Because of their influence these variables can be described as forming part of the CSFs (Pettit, Beresford and Luo, 2006:320).

The strategic planning level is a holistic process that includes the integration of the different decision factors considered as being crucial for the organisational success; it can involve the implementation of IT systems that are used during disaster operations, a step considered as being important as it provides an accurate analysis of the flow of supplies (Thomas and Kopczak, 2005:5).

The following section explains the other additional factors that have been identified as CSFs by different researchers and organisations. Some of these include strategic sourcing and transportation of supplies from their point of origin to their intended destination. The discussion also provides insight into how humanitarian supply chains can attain supply chain excellence through influencing the management of their inventory, capacity planning, information and human resource planning, continuous improvement, collaboration and technology utilisation. These are identified as the CSFs that should be carefully managed in order to improve the response operations and reduce the losses that are usually sustained in the event of a natural disaster (Soin, 2004:12). It is important for this study to focus on these main variables as they are jointly considered as being influential in shaping the success of disaster operations. The study also needs to identify the relevance of the concept of CSFs and how it can be successfully adopted in the field of humanitarian supply chains.

### 3.3.1 Inventory management

Inventory management is an important variable that affects the success and efficiency of a supply chain; it is one of the core logistics functions that influences the way in which supplies are pulled from suppliers or donors, and later pushed to the affected areas and victims (Bozarth and Handfield, 2008:459). The emphasis of humanitarian relief organisations is on ensuring that in the event of any natural disaster occurrence they have the ability to organise a structured response strategy, implying that organisations should be in a better position to respond at the right time, with the correct type of supplies and quantities to any natural disaster occurrence (Ozdamar, Ekinci and Kucukyazici, 2004:220). Humanitarian relief operations usually involve the movement of different supplies to affected locations; inventory management is therefore identified as a CSF on which all the functions and activities involved during disaster operations depend. Bozarth and Handfield (2008:446) consider inventory management as a core supply

chain management variable that is crucial to the success of any organisation, especially during disaster operations where it involves the co-ordination, planning and control of the movement of relief supplies.

The frequent occurrence of natural disasters has motivated relief organisations to adopting efficient inventory management principles. In implementing inventory policies organisations usually focus on ensuring that these influence the supplies that are within the organisation's supply chain and also those that are in different supplier and donor storage locations. Inventory policies regulate the movement of stocks between various supply points to the end customer, and this is usually done when the organisation clearly understands its suppliers and their lead times (James, Pettit and Beresford, 2006:180). There are various inventory management approaches that have been implemented by different organisations, all of which have the objective of ensuring that there is a consistent flow of supplies within the supply chain to satisfy the needs of the customer, at the same time keeping operational costs at their minimum. Some of the inventory management methodologies that are discussed have been directly taken from commercial supply chains as they have enhanced the success of their supply chains. The use of just in time (JIT), vendor managed inventory (VMI), prepositioning of supplies, postponement, standardisation, push and pull systems and pre-planned stock arrangements are some of the methodologies which researchers believe that, when properly implemented during humanitarian disaster operations, can enhance their success (Cooke-Davies, 2002:187).

In the case of humanitarian supply chains, inventory management focuses on ensuring that lead times for critical items are properly managed and also that the supply and flow of materials is in relation to the projected demand levels (Paton, 2003:212). Any delay experienced within the supply system has a direct impact on the time in which material supplies are delivered to the affected areas. The inventory management approach adopted is therefore influenced and determined by supplier lead times and by their location, which can be with either local or international markets (Pettit and Beresford, 2007:455). Inventory management for natural disaster operations will also have to take into account that the overall time taken for materials to be delivered to the affected communities after a disaster occurrence should be minimised so as to reduce the effects of the disaster occurrence from increasing (Tatham and Kovacs, 2010:37).

Inventory management involves strategic planning as it influences humanitarian relief organisations in making cost effective decisions. In achieving this, complex concepts and inventory management principles are adopted that have the goal of ensuring that the movement of materials within the supply chain is efficient.

The use of inventory management policies during disaster operations similar to those used in commercial supply chains has been very challenging due to the differing objectives and circumstances driving these supply chains. With humanitarian supply chains the focus is usually on ensuring that the inventory management policy emphasises minimising the lead time to delivery rather than the carrying costs involved (James, Pettit and Beresford, 2006, 178). This has been evidenced from the practice of humanitarian organisations of keeping enough stock on hand of relief supplies in order to avoid delays during response operations, especially with slow onset disaster occurrences. The challenge, however, that continues to be experienced by relief organisations regarding inventory management is on striking a balance through dividing a fixed budget between stockpiling and shipping costs in order to best meet the needs of the affected communities (McCoy and Brandeau, 2011:673).

Inventory management is one of the critical factors for disaster operations as it influences the movement of supplies into and out of the organisation. Although the implementation of some of the inventory management policies are described as being complex and costly, they make a significant impact on the performance of an organisation's supply chain (Spens and Kovacs, 2004:104). For example, in anticipation of a drought looming in southern Africa at the beginning of the year 2000, the UNWFP started stocking supplies that would be needed for distribution to affected parts of southern Africa. This resulted in the organisation responding to all the affected areas at the right time and minimising the effects resulting from this disaster (Mbohwa, 2010:22). Humanitarian relief organisations are also involved in the pre-positioning of critical relief supplies in strategic locations as this increases the speed of their response, thereby improving their supply chain efficiency (Balcik and Beamon, 2008:102).

Inventory of supplies has to be carefully managed in humanitarian supply chains due to the fact that it is critical in determining the success of an organisation and also that it enhances their speed of response to any natural disaster occurrence.

### 3.3.2 Transportation and capacity planning

The movement of supplies from a diversified pool of suppliers to the affected communities is one of the key objectives of natural disaster response operations. Transportation and capacity planning have therefore been identified as some of the CSFs that need to be properly addressed in order to attain supply chain excellence (Beresford, Jennings and Pettit, 2002:12).

In the event of a natural disaster occurrence, capacity planning is considered as one of the most crucial variables that influence the manner in which the organisation will respond to both the long and short term demand levels (Beamon and Kotleba, 2006a:200). Capacity planning involves decisions such as planning the number of warehouses required during an operation as well as distribution centres, transportation channels and the volumes to be transported at any given time, the volume of vehicles to be used and the size of the human resources team (Christopher, 2000:39). Capacity planning refers to the ability of an organisation to successfully organise operations involving various levels of demand; it can be also described as referring to the strength and ability of the supply chain in responding in a timely way to situations involving high volumes and a high variety of demand (Maxwell and Watkins, 2003:75). The four critical areas that need to be properly managed during capacity planning as indicted by Gunasekaran and Ngai (2004:270) include warehousing, transportation, materials handling devices and human resources. The main objective is for each individual humanitarian organisation to maximise its capacity so that it can respond to diverse disaster occurrences. Capacity planning also includes ensuring that the available transportation networks have the ability to handle the volume and movement of supplies within a given period. This might include the ability of ports and airports to handle relief commodities in varying conditions and scenarios (James, Pettit and Beresford, 2006:180).

Humanitarian organisations during relief operations tend to focus more on ensuring that there is an optimised flow of supplies within their distribution networks; therefore there is generally

more focus on connecting the physical distribution systems to the supply and demand points (Park, Hong and Roh, 2013:79). Balcik and Beamon (2006:102) are of the view that only a few quantitative methods have been developed to help improve location and distribution networks in humanitarian supply chains. Some relief organisations have made facility location and distribution decisions using ad-hoc methods which have been inefficient, resulting in high operation costs, duplication of efforts and a waste of resources. This has been attributed to the fact that disaster occurrences are highly uncertain. The main strategies that are usually employed in transportation and capacity planning have involved the consolidation of suppliers, local tendering and brokering, strategic alliances and the outsourcing of the facilities used for transporting supplies (James, Pettit and Beresford, 2006:180).

Other relief organisations already have premises that they own in the affected areas and therefore in the face of a disaster occurrence they make use of their premises and distribute their supplies through those locations. For example, the UNWFP has offices in almost every country in southern African, making it easier for a quick response in the event of a disaster occurrence (Rottkemper et al, 2011:729). The distribution channel of the UNWFP takes into consideration the development needs and personal safety of the affected communities. Cost efficiency tends to dictate the distribution of materials from centralised locations so that the affected communities collect supplies and rations from schools, community halls and churches that have been used as central zones (Long and Wood, 1995:221).

There is a growing need for humanitarian organisations to focus on ensuring that they implement concepts that will transform their transportation and capacity planning as this will optimise the flow and movement of supplies within their supply chains. In preparing and configuring their distribution networks, relief organisations focus on the creation of sustainable distribution channels that can facilitate the efficient flow and movement of materials supporting the success of relief operations (Balcik and Beamon, 2008:103). One can safely indicate that much stands to be gained by humanitarian supply chains when transportation and capacity planning are managed as critical success variables. This may influence organisations to implement transportation and capacity planning decisions that are aimed at enhancing supply chain excellence.

### 3.3.3 Information management

It has been noted by different researchers that the flow and management of information can determine the success and failure of an organisation. Thus Long and Wood (2005:215) acknowledge that in humanitarian supply chains the management of information is the single greatest determinant of success. Specific decision support, communication and information systems are important in managing relief operations. These can be successfully used during crisis management, disaster and emergency planning and during response operations (Umble, Haft and Umble, 2003:249). In ensuring that information management is properly carried out, humanitarian organisations have been implementing IT systems similar to those used in commercial supply chains.

IT plays the role of integrating the different activities through the provision of information, thus allowing the supply chain to operate more efficiently. Some of the implemented systems allow for the flow of accurate information and also play a significant role in facilitating assessment, performance measurement and control systems (James, Pettit and Beresford, 2006:180). Some of the information systems that are used during disaster operations involve tracking the movement of supplies within the supply chain, thus allowing organisations to regulate and trace their movement (Turner and Muller, 2004:330). IT provides positioning systems that play an important role in making available tracking information, such as the quality, quantity and the geographical location of the supplies, and thereby improving supply chain visibility (Aldolfi, 2005:45). These systems are also used for inventory tracking purposes, for instance, in identifying the position of inventory that is in transit from either the suppliers to the warehouses or from the storage areas to the end customers, that is, the affected communities (Fritz Institute, 2010:9). Information systems are also used to provide inventory reports to guide procurement patterns, share lists of supplies available in local and international markets including their prices and costs, and share information pertaining to the distribution of supplies within the network, thereby improving the monitoring of activities within the supply chain (Howden, 2009:4).

IT is an important enabler of effective supply chain management which spans the entire enterprise and beyond. It connects both the suppliers and communities that are being served by the relief organisation (Howden, 2009:1). A consideration of information systems includes the

control of systems that affect the internal and external operations of an individual relief organisation, thereby facilitating information transfer with other stakeholders. The success of any supply chain of an organisation lies in its ability to receive, encode and process information considered as crucial in facilitating successful disaster operations (Paton, 2003:213).

The expectation is that, in the event of a natural disaster occurrence, the relief organisation should be able to communicate with any of its stakeholders in order to initiate successful disaster operations. The increasing number of natural disasters in southern Africa has forced relief organisations to work towards improving the management of information through the implementation of information systems in order to influence the activities that are carried out in the natural disaster stages (Charles and Cloete, 2009:329). Information can be used in aiding procurement, warehousing and transportation during disaster operations (Jahre and Jensen, 2009:23). Failure to make proper use of the information derived from other parties in the supply chain results in organisations failing to carry out successful disaster operations. A handful of humanitarian relief organisations are introducing information systems in their operations, as they have seen the benefits, which include increased speed of response and accuracy in tracking disaster supplies and their locations (Chomilier, Samii and Van Wassenhove, 2003:18).

Humanitarian organisations have been implementing significant changes in their management of information through the use of systems currently implemented in commercial supply chains. The use of the SAP information software in tracking the flow of inventory and linking the relief organisation with its suppliers has been widely adopted (WFP, 2008). While the movement of relief items to and from disaster sites continues to be an important role performed by humanitarian logistics, the strategic focus must be on providing speed and accuracy of delivery of materials. This has also been achieved through an accurate analysis of information flow in order to get insight into the available needs and how they can be fulfilled timeously (Masspero and Ittman, 2008:183).

Information systems in humanitarian supply chains play the role of providing accurate and timely information on the number and quantity of supplies required to support a particular natural disaster occurrence. They also identify the supplies already delivered to beneficiaries and

in what quantities and at what locations (Howden, 2009:5). The emphasis on information systems in humanitarian supply chains ensures that activities such as warehousing, procurement, fleet management, transportation for suppliers and recipients, asset management and building management are properly managed (Thomas and Kopczak, 2005:220). When information management is considered as one of the CSFs in humanitarian supply chains, it can help influence humanitarian organisations in considering the adoption of efficient information management tools in order to influence their performance during relief operations.

### 3.3.4 Continuous improvement

Commercial supply chain management practices are designed to sufficiently meet and address the needs of the end customers, and therefore organisations have adopted a holistic approach of continuous improvement in an attempt to do this (Power, Sohal and Rahman, 2001:249). Continuous improvement entails the active involvement of an organisation in seeking better ways of responding to different challenges experienced in the supply chain. The diverse challenges that are experienced after natural disaster occurrences have also motivated organisations into seeking better and improved ways of dealing with them. In commercial supply chains the adoption of continuous improvement has been identified as a critical step towards coming up with solutions to some of the supply chain management challenges encountered (Bozarth and Handfield, 2008:123). Continuous improvement allows the organisation to adopt better concepts in order to influence the variables with regard to which it has been performing poorly.

Continuous improvement is a critical variable for humanitarian supply chains as they are often involved in responding to diverse disaster occurrences. This often presents different challenges and therefore it is important for them to continuously identify new ways of managing their supply chains (Gunasekaran, Patel and McGaughey, 2004:35). Continuous improvement is often achieved through the implementation of supply chain management concepts and practices that have been successfully implemented in other organisations faced with similar challenges. With commercial supply chains, this is achieved through actively tracking key variables of supply chain excellence and benchmarking them against the organisational key performance indicators

(KPIs). If these are not sufficiently achieved, then the organisation looks for ways in which to improve (James, Pettit and Beresford, 2006:182).

### 3.3.5 Collaboration

Collaboration is defined by Moeiny and Mokhlesi (2011:8) as the creation of an atmosphere in which there is the active transfer and sharing of information and essential data among all the stakeholders within a supply chain, in order to ensure that there is continued efficiency. This concept has been widely used in commercial supply chains as there has been a realisation that the actions of one stakeholder can directly affect the entire supply chain (Balcik and Beamon, 2008:110). During humanitarian disaster operations there are many stakeholders who have an influence on the speed at which the response operations are carried out. This therefore implies that for disaster operations to be a success there is a need for more collaborative measures to be adopted by all the actively involved stakeholders. In this regard collaboration forms one of the critical variables that should be strongly emphasised and adopted during relief operations.

Humanitarian supply chain collaborative measures ensure that all the organisations that are involved during disaster management make decisions in constant liaison with their suppliers, donor community and other partners. The information that is freely exchanged within the supply chain involves demand levels of supplies and the number of the affected communities. Sharing this type of information has the desired effect of improving the speed of response within the supply chain system since organisations will initiate response operations based on accurate and relevant information (Oloruntuba, 2007:3).

Collaboration in supply chains can also be taken as a key cost saving factor. Usually the problem experienced during disaster operations pertains to donors pushing supplies that have not been requested. Therefore, by maintaining closely monitored collaborative relationships with donors, humanitarian organisations will ensure that they allow for the flow of accurate information regarding supplies before they are delivered in order to avoid the accumulation of material supplies that are not needed in the supply chain system (Ben-Tal et al, 2004:23). Some of the techniques used by relief organisations to ensure that they take advantage of collaborative relationships include the implementation of VMI whereby the supplier manages inventory on

behalf of the relief organisation. The supplier is usually given access to the demand information, especially after a natural disaster occurrence, and thereby works towards fulfilling the demand so as to improve the speed of response (Chandes and Pache, 2010:335).

Collaboration also entails improved relationships that are maintained between the relief organisations and its service providers. Some of the efforts of collaboration that have taken place in humanitarian supply chains include the partnering of humanitarian organisations with commercial logistics organisations in an attempt to improve their distribution efficiency (Cottrill, 2004:22). Maintaining collaborative relationships ensures that decisions are quickly reached and implemented which enhances improved performance during disaster response operations (Kovacs and Tatham, 2009:222). Frequently the humanitarian relief organisations share resources and operational systems, a move that has improved the cost effectiveness of relief operations (Mbohwa, 2010:4).

World Vision disaster units in southern Africa have been designed to respond to natural disaster occurrences through delivering supplies to the affected communities within 72 hours. Key to the attainment of this goal has been the emphasis on collaboration, integration, standardisation, synergy and joint product development with its key suppliers and service providers (Mbohwa, 2010:5). The UNWFP has gone the extra mile by creating collaborative relationships with all its different suppliers, so that they can agree on standards that are cost effective and which better address the needs of the affected communities (WFP, 2012). Collaboration in the supply chain involves the sharing of know-how regarding specific disaster management techniques with the intention of improving the performance of humanitarian relief operations. Collaboration is an important factor that needs to be carefully applied in humanitarian supply chains due to the advantages and benefits that can be incurred by the supply chain.

There are many advantages associated with organising supply chains based on the concept and practice of CSFs. This is because the organisation adopts practices and policies that are aimed at ensuring that performance is enhanced in each success factor, thereby improving the performance of the supply chain. Humanitarian organisations have slowly been adopting the

implementation of similar processes and with time this will improve their management and delivery of relief operations (De Villiers, Nieman and Nieman, 2008:58).

## 3.4 ADOPTING AGILE, RESPONSIVE AND FLEXIBLE SUPPLY CHAIN PRACTICES IN DISASTER OPERATIONS

The concepts of agile, flexible and responsive supply chains are identified as influential in an organisation's adoption of a customer focused and responsive approach. There are many supply chain management challenges faced by organisations, ranging from a sudden change in customer preferences to variability in demand and supply trends. The environment in which commercial and humanitarian organisations operate is characterised by an increasing level of sophistication in customers, who demand a variety of customised products within short lead times (Stevenson and Spring, 2007:685). In order to ensure that these dynamic changes in the market are properly managed, supply chains adopt a combination of practices that encompass agile, responsive and flexible supply chain principles (Aprile, Garavelli and Giannoccaro, 2005:25). Researchers acknowledge the importance of flexibility in supply chain management as it ensures that the organisation is highly responsive in meeting the needs of the customers. It has long been identified that agility, flexibility and responsiveness are interrelated and they also influence each other (Oloruntuba and Gray, 2006:117).

- *Supply chain agility*

Agility is defined as the ability of an organisation to be able to cope and remain successful in an unpredictable and continuously changing market environment (Agility Forum, 2000). This means that the supply chain is able to deal with any uncertainties that might occur, such as, for example, an increase in demand beyond the capacity of the organisation. Vonderembse et al (2006:99) are of the view that agile supply chains enable organisations to rapidly respond to a changing, dynamic and highly uncertain environment by being context specific and through aggressive change. Organisations that have implemented agile supply chain systems are driven by providing the right products for the right customer or clientele at the right time and quantities. Agility can also be referred to as the ability of a supply chain and its members to rapidly align the network and its operations to the dynamic and turbulent requirements for the demand

network. In that way they are able to quickly assemble their supply chains in response to any changes (Ismail and Sharifi, 2006:43).

- *Supply chain flexibility*

Supply chain flexibility, on the other hand, is described as affecting specific organisational components such as the product mix and volume. It is defined in terms of mobility, uniformity and range, referring to the different states which a system can adopt and be able to switch efficiently from making one product to another different product. This implies that the organisation is able to perform well when making any product within a specified range (Stevenson and Spring, 2007:687). Although the concept of flexibility has been derived from manufacturing organisations, efforts have been made to adopt this principle in both service and humanitarian organisations (Krajewski, Wei and Tang, 2005:460).

- *Supply chain responsiveness*

Having defined agility and flexibility, it needs to be pointed out that these concepts are all aimed at improving the responsiveness of the organisation in fulfilling the needs of customers, although they might focus on different variables. The framework of agile, responsive and flexible supply chains is highly suitable for adoption in an environment that is characterised by the rapid introduction and demand of new products and supplies. It is also suitable for an environment requiring constant upgrades to the existing products and processes, the distribution and re-distribution of new resources, constant change of suppliers, frequent changes in demand patterns of products and supplies, changes in lead times and changes in commitment between the members influential in the supply chain (Chandra and Grabis, 2009:12).

Humanitarian supply chains operate in unique and dynamic environments. This has resulted in a growing interest by disaster organisations in implementing agile and flexible supply chain systems that influence them towards adopting a responsive customer based approach (Gosain, Malhotra and El Sawy, 2005:23). Some of the challenges that humanitarian organisations experience during disaster operations involve a combination of factors, linked to the unpredictability of disaster occurrences in terms of time, nature and scope (Bean et al, 2011:40). Humanitarian supply chains have lately focused on ways to improve customer responsiveness, as

this is one of the major challenges. The motivation behind this change in focus is not based on gaining a competitive edge but on improving operational efficiency (Anisya and Kopczak, 2005:12). For commercial supply chains, on the other hand, the adoption of such policies has been influenced by the benefits that the organisations incur, mainly involving an increased competitive advantage that reduces their operational costs and thereby increases revenue (Garavelli, 2003:145).

The main objective of humanitarian organisations is to be able to respond rapidly to natural disaster occurrences. Therefore their supply chains should be in a position to meet all the demand levels and requirements of the affected communities, although, for this to be achieved, a combination of information systems and logistics processes are involved (Christopher and Cowill, 2001:550). For disaster operations to be successful, humanitarian organisations need to ensure that they have flexible supply chain systems in place. For instance, most natural disaster occurrences trigger serious shortages of food supplies and therefore the supply chain needs to have readily available inventory to satisfy the changes in demand (Chandraprakaikul, 2010:8).

The literature has also dealt with the importance of why organisational supply chains should be aligned to the needs of their target markets. Thus Stevenson and Spring (2007:690) point out that organisations need to be rapidly responsive to the changing needs of their customers, the market trends and the environmental turbulence, which are the focus areas for agility. Gunasekaran et al, 2008, Heaslip et al, 2012 have identified that supply chain agility involves measures adopted to efficiently and effectively respond to the short term changes in demand and supply quickly and also to handle external disruptions smoothly. The framework of agility, responsiveness and flexibility ensures that the supply chain has a high degree of flexibility and adaptation to rapid changes to the environment, builds and creates integrated supply chain processes, facilitates systematic information coordination and supply chain operations management (Garavelli, 2003:145).

Humanitarian organisations need to implement agile, flexible and response concepts within their supply chains in order to improve the effectiveness of their disaster operations. Some of the

systems described in literature that can improve disaster operations involve the adoption of agility through postponement, virtualisation and coordination.

### 3.4.1 Postponement and agility

Postponement is a supply chain management concept according to which some activities are only performed when specific customer orders are received. It is one of the concepts of agility usually implemented when organisations are operating in conditions of uncertainty and it is an important building block in the construction of an agile supply chain (Charles, Lauras and Wassenhove, 2010:725). Some researchers identify postponement as an initiative that supports the concept of agility through the creation of common platforms or modules so that the final assembly of the product can take place when the final customer has been identified, which has the effect of reducing uncertainty and enhancing efficiency (Christopher and Towhill, 2001: 237).

Postponement is an agility tool that is mostly implemented in managing inventory. The term describes the practice by relief organisations of holding stocks for particular generic products which are later customised in order to satisfy the different needs of the affected communities (Simchi-Levi, Kaminsky and Simchi-Levi, 2008:218). Postponement involves the use of standard designs and features for products which are customised just before delivery is made to the target customers. For example, the UNWFP has been holding stocks of grain in silos which are later packaged into10kg, 20kg and 50kg bags, depending on the demand influenced by different disaster occurrences (Van Wassenhove, Martinez and Stapleton, 2005:312). Postponement is a variable that allows organisations to be able to respond timeously to the changing customer needs through the provision of the right supplies at the right time.

### 3.4.2 Virtualisation and agility

The main objective of virtualisation is to allow different organisations to develop a common working environment with the purpose of ensuring that there is an improvement in both flexibility and adaptability to changes in the environment, through the sharing of resources and competencies (Angeles and Nath, 2001:112). Virtual integration is responsible for ensuring that the organisation has the ability to implement improved process control measures and is also able

to manage demand volatility. It is a common strategy used in supply chains to reduce all the influences of environmental uncertainty through the improvement of inter-organisational coordination, information processing and control (Wang, Tai and Wei, 2006:46). For supply chains to be considered agile and responsive there is a need for the implementation of IT systems that are responsible for facilitating common operations such as purchasing and logistics and distribution. Virtual enterprises structures are highly dynamic and focus on the speed and flexibility enabled by building a united information space with extensive use of communication services (Camarinha-Matos and Afsarmanesh, 2004:12).

### 3.4.3 Coordination and agility

Agility focuses on ensuring that the changing needs of the customer are sufficiently met; for this to be achieved there is need for coordination of partners. Moeiny and Mokhlesi (2011:8) define coordination as involving an atmosphere in which all humanitarian relief organisations and their stakeholders willingly share information and necessary data that will help them achieve satisfactory results during the disaster management cycle. Coordination measures ensure that all the organisations and parties that are involved during disaster management make decisions after interaction with their suppliers, the donor community and their partners. When many partners are involved in analysing the needs of the beneficiaries, there is usually an accurate reflection of their exact needs, and some of the information that is freely exchanged pertains to their preferences and demand levels, influencing the speed of response (Oloruntuba, 2007:3).

Different coordination concepts that have been implemented and developed by organisations over the past decade include ECR, collaborative planning, forecasting and replenishment (CPFR) as well as JIT. These concepts are enabled by different parties coming together with the objective of improving the supply chain. Coordination flexibility in the context of humanitarian organisations pertains to the reconfiguring of supply chains and the deploying of the required goods to the recipients as quickly as possible (Scholten, Scott and Fynes, 2010:5).

## 3.5 CHAPTER SUMMARY

This chapter has explored the strategies that humanitarian disaster organisations can implement in order to improve their supply chains. Firstly, the concept of CSFs was discussed and explained as one of the influential pillars of supply chain excellence. The concept has been successfully implemented in commercial supply chains and has been associated with improving the performance of supply chains. CSFs refer to a set of variables that are considered as being critical to the success of the organisation, and therefore these have to be properly and sufficiently managed (Ab Talib and Abdul Hamid, 2014:26). In the case of humanitarian supply chains, researchers have indicated that strategic management has to be carried out with regard to activities such as inventory management, transportation and capacity planning, information management, continuous improvement and collaboration, as these are the main variables that can influence the success of a disaster operation.

The chapter has also outlined the advantages of adopting agile, flexible and responsive supply chains practices into humanitarian supply chains. These supply chain systems have the benefit of aiding organisations towards being customer responsive, and it is only through the adoption of these practices that they may be sensitive to the changing needs of end user customers (beneficiaries). An agile supply chain system has been discussed as one that is able to read and respond to the customer needs and that entails sufficiently matching demand and supply at any given time; this is facilitated by the feed forward mechanism (Chandra and Kumar, 2001:22).

This chapter has provided an overview of some of the benefits that are experienced by disaster organisations as a result of adopting flexible and agile supply chains. Most of the frameworks that have been discussed have been successfully adopted by commercial organisations. Although there are significant differences between the commercial and humanitarian environment, there are many lessons that humanitarian supply chains can derive from commercial organisations. The adoption of some of the agile principles implemented in commercial supply chains can provide increased efficiency and enable the continued effective use of resources. The main objective of disaster organisations is to ensure that they conduct successful natural disaster operations and that they minimise the suffering of the affected communities.

# CHAPTER 4

# RESEARCH METHODOLOGY

## 4.1 INTRODUCTION

The previous chapters have provided an overview of the supply chain management practices and principles that are suitable for implementation during humanitarian disaster operations. Some of these practices have yielded a degree of success for various humanitarian and commercial organisations. Chapter 2 gave a description of the prevailing conditions during natural disaster operations that need to be clearly discussed and understood before any supply chain management practices are considered. Chapter 3 described the concept of CSFs and also how agile, responsive and flexible supply chains management practices can be best implemented towards helping humanitarian disaster organisations towards successfully managing their supply chains. The concepts that have been discussed in the previous chapters are entirely based on the information gathered from secondary sources such as annual humanitarian organisation reports, journal articles and government publications.

Chapters 2 and 3 have partly attained one of the objectives of the study which involves identifying to what extent customer responsive supply chain management practices can be adopted and how these can positively influence natural disaster operations. At the end of the study all the objectives need to be achieved and therefore this chapter gives an illustration of the steps that were followed in the data collection process in order to gather relevant and accurate data suitable for this study. This involves a combination of variables including identifying the appropriate research methods and techniques for the study and also the steps followed in doing the analysis of both secondary and primary data sources (Malterud, 2001:484). This chapter also presents an outline of the research tools and techniques employed during this study; the discussion identifies some of the techniques that were used to ensure that the objectives of the study and the research questions are answered.

## 4.2 THE RESEARCH PROCESS

Research involves an organised, critical, objective and systematic inquiry or investigation into a specific problem; this is carried out in order to find answers or solutions that are relevant in responding to this research problem (Sekaran, 2003:5). It normally provides the essential information that is required for solving a series of interrelated problems and identifying the essential variables that need to be addressed in order to deal successfully with the subject under investigation (Cooper and Schindler, 2008:48). In ensuring that the research responds to all the objectives and questions a research process should be followed, which is a description of the steps that will be taken during the research study.

The objectives of this study are aimed at providing insight into the supply chain management best practices that can be successfully implemented during natural disaster operations in southern Africa. These are outlined as follows:

### 4.2.1 Research objectives:

- To understand how efficient customer responsiveness can best influence humanitarian organisations into delivering successful natural disaster operations.
- To understand the positive influences associated with adopting agile supply chain management principles during natural disaster operations in southern Africa.
- To determine how 'virtual supply chains' can best influence and facilitate efficiency during the natural disaster operations in southern Africa.
- To understand the advantages associated with humanitarian organisations operating as a system of networks (network based) during natural disaster operations.

### 4.2.2 Research questions

The following are the research questions that the study aims to address:

- To what extent can customer responsive supply chain management principles be practically adopted to positively influence humanitarian natural disaster operations in southern Africa?

- How can market sensitive, flexible and adaptive supply chains influence excellence during humanitarian natural disaster operations?
- To what extent is the implementation of the concept of virtual supply chains of significance to the success of humanitarian natural disaster operations in southern Africa?
- What are the possible effects of managing a supply chain as a network to humanitarian natural disaster operations in southern Africa?

In order to attain all these objectives and respond to the given research questions a research map has been designed to help ensure that the relevant data sets are made available at the correct time. This map gives a detailed outline of how research techniques are manipulated and organised in gathering and analysing the data. The research process provides a planned and detailed approach to a research problem and ensures that all the tools and designs to be used are consistently aligned to meeting the objectives of the study (Sekaran, 2003:118). Figure 4.1 is an illustration of a typical research approach that can be followed in any research study and the steps considered are only relevant towards achieving the stated objectives of each individual study.

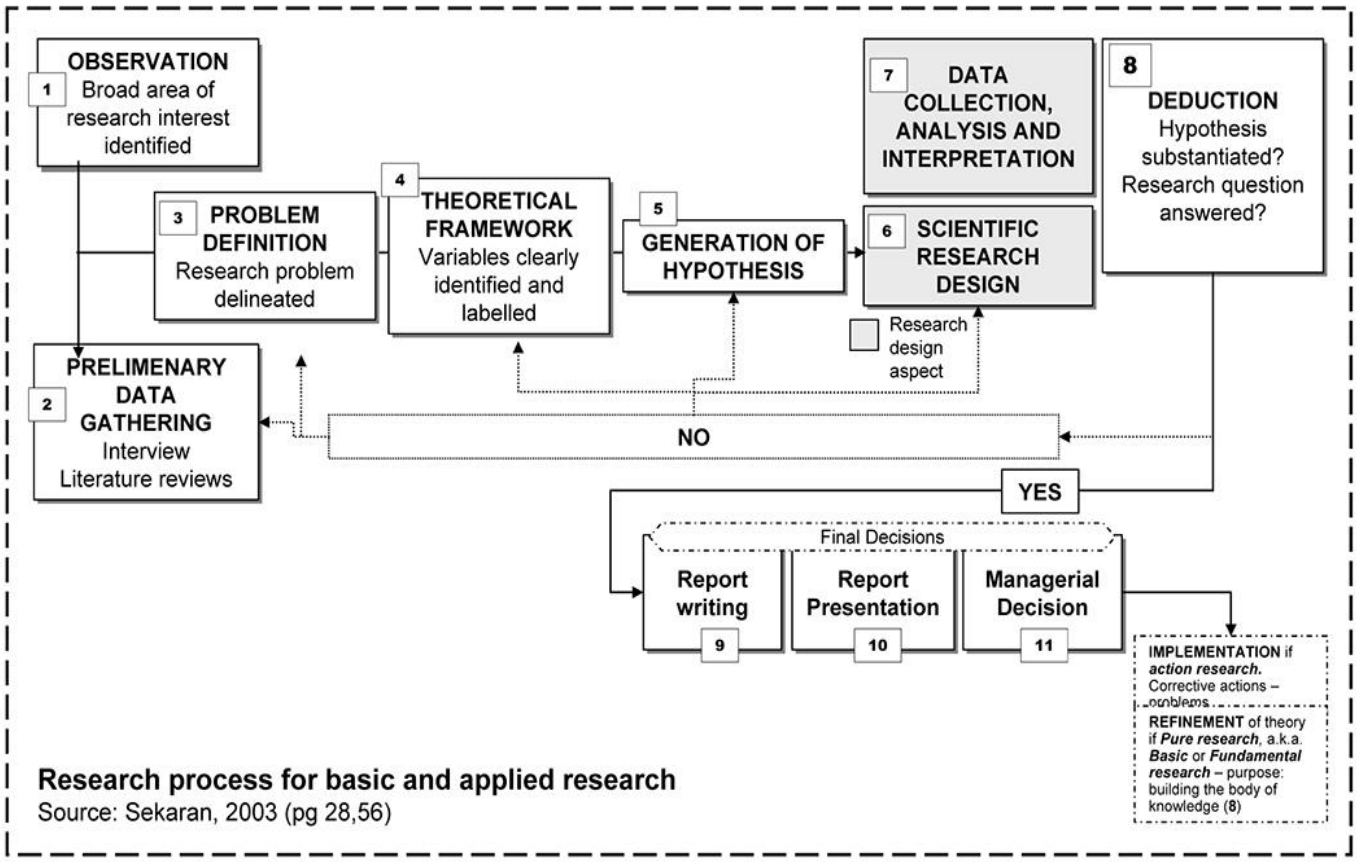



**Figure 4.1: The typical research process**

## 4.3 RESEARCH PHILOSOPHY

The research philosophy of a study as defined by Cooper and Schindler (2008:89) is a blueprint for fulfilling the research questions and objectives. It involves a series of decisions and choices relating to the purpose of the study, its location, type of techniques to which it should conform, the extent of interference and manner in which the data will be collected and analysed (Sekaran, 2003:118). In most cases the research philosophy implemented by researchers is determined by the type of the research study and the data sources that will be used in achieving the objectives of the study and also on how valuable the outcome is. Generally, the research philosophy plays the role of identifying the planning process involved in the research study and also gives an outline of how different variables will be used in ensuring that they are useful in contributing to the success of the overall research study. An outline of the tools and techniques that form the philosophy of this research study are given in this section.

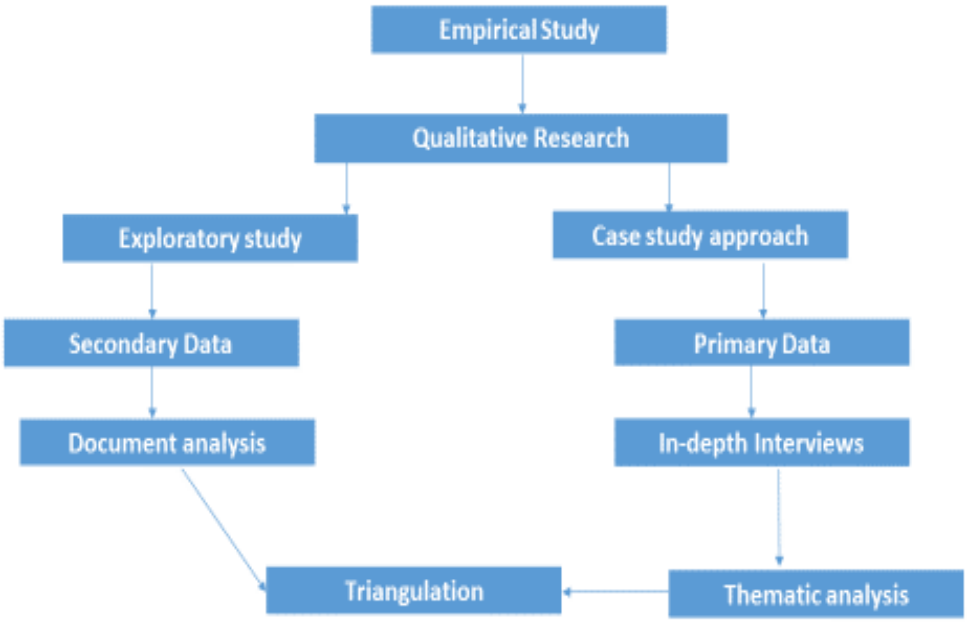



**Figure 4.2: Hierarchy of the research philosophy**

### 4.3.1 Empirical research

The purpose of this research study is to provide insight into the supply chain management best practices during natural disaster operations in southern Africa. Therefore the approach taken will involve collecting and analysing data from the UNWFP, a humanitarian organisation that has been instrumental in responding to natural disaster occurrences in the region. This research can therefore be classified as an empirical study. Babbie and Mouton (2001:75) describe an empirical study as involving the collection of new data using different methods or the analysis of already existing data in order to come up with new and unique findings.

Empirical research includes a set of research methods where empirical data or observations are made to answer certain research questions (Moodly, 2002:1). The research data sources used in this empirical study in order to provide insight into supply chain management best practices include both secondary and primary sources. Primary data is often collected with the intention or goal of answering certain research questions and is collected from the site in which the research is designed. Secondary data, on the other hand, is existing information that can be used in supporting the arguments of the researcher based on the data collected by other researchers (Sekaran, 2003:59).

### 4.3.2 Qualitative research approach

Research studies can either take a qualitative or a quantitative research approach. Qualitative research approaches have the aim of ensuring that a certain social phenomenon is clearly understood and therefore the methods employed generate an output of words rather than of numbers (Patton and Cochran, 2002:2). Leech and Onwuegbuzie (2007:558) observe that qualitative data involves an emphasis on the qualities of certain data entities and their significance which cannot be measured in terms of quantity, volume, frequency and amount. The aims of a qualitative research approach include gaining an understanding of a research problem from the perspective of the population or of the subjects involved. Since this research study is aimed at providing insight into the supply chain management best practices that can be used during natural disaster operations, it can be easily associated with the qualitative research approach. Therefore the qualitative research approach has been identified as being suitable since the questions will be aimed at gaining an understanding of the system; the data will be mainly provided by the United Nations World Food Programme (UNWFP).

The data collection techniques that are used in qualitative studies are aimed at asking probing questions such as identifying what, how and why of a phenomenon rather than on how many and how much. Malterud (2001:483) therefore describes qualitative studies as involving the collection, interpretation and the organisation of textual material from observations, interviews and surveys. There are numerous advantages that are associated with the use of qualitative data, especially the fact that it allows the researcher to be closer to the respondents or the source,

which improves the likelihood of collecting reliable and accurate data. Qualitative research methods are founded on the premise that research is a systematic and reflective process for the development of knowledge that can be shared and also can be transferred to other similar studies beyond the intended setting (Malterud, 2001:483).

A quantitative research study on the other hand emphasises rather quantitative measurements and the analysis of the relationships that exist between different variables. Cooper and Schindler (2008:710) describe quantitative studies as involving the counting of variables relating to some behaviour, knowledge and opinion. It is important to clearly explain the differences between qualitative and quantitative studies in order to justify why this research study is considered as being qualitative. Table 4.1 illustrates some of the underlying differences:

**Table 4.1: Differences between quantitative and qualitative research**

| **Topic** | **Quantitative research** | **Qualitative research** |
|---|---|---|
| **Research enquiry** | Exploratory, descriptive and explanatory (Objective) | Exploratory, descriptive and explanatory (Subjective) |
| **Nature of questions and responses** | Who, what, when, where, why and how many<br><br>Specific question obtain predetermined responses to standardised questions<br><br>Measurement, testing and validation<br><br>Measurable | Interpretative<br><br>Open ended questions and probing<br><br>Involve what, where, when and how<br><br>Exploration understanding and idea generation |
| **Sampling approach** | Probability and non-probability methods | Non-probability methods (purposive) |
| **Sampling size** | Relatively large | Relatively small |

| | | |
|---|---|---|
| **Data collection** | Not very flexible<br><br>Interviews and observations<br><br>Standardised<br><br>Structured<br><br>More closed questions | Flexible<br><br>Interviews and observation<br><br>Less standardised<br><br>Less structured<br><br>More open ended and more directive questions |
| **Data** | Numbers, percentages, means<br><br>Less detail or depth<br><br>Nomothetic description<br><br>Context poor<br><br>High reliability, Low validity<br><br>Statistical interference possible | Words, pictures, diagrams<br><br>Detailed and in-depth<br><br>Ideographic description<br><br>Context rich<br><br>High validity, low reliability<br><br>Statistical interference not possible |
| **Cost** | Relatively low cost per respondent<br><br>Relatively high cost project<br><br>Relies on more extensive interviewing | Relatively high cost per respondent<br><br>Relatively low cost project<br><br>Suitable when time and resources are limited |

***Source: Adapted from*** *McGivern (2006:57).*

### 4.3.3 Research design

In conducting a research study there are different designs that the study can adopt such as exploratory, descriptive, causal, explanatory and evaluative research. The research design that is adopted in any study is usually influenced by the research questions and objectives, which are the main determinants of the approach the study, will follow (Willig, 2003a:48). This section of

the chapter will provide a brief discussion of the main research designs involved in this study and also provide a rationale for the design chosen.

### 4.3.4 Exploratory study

Exploratory research is usually carried out when not much information is known about the subject being studied. This implies that there would be a limited number of similar problems or situations that would have been solved in the past by other researchers (Sekaran, 2003:119). Such studies are often carried out in instances when the researcher needs to understand a specific problem or situation. These studies are also considered by researchers when some facts are known regarding a subject but there is a need for more information to be discovered in order to aid with the development of a relevant conceptual framework (Silverman, 2007:89). Exploratory studies are also important in cases where there is a need for the researcher to get a good understanding of the subject of interest so that they can build more knowledge frameworks through establishing theories and relevant conceptual frameworks (Cooper and Schindler, 2008:139).

The exploratory research design is often used during the preliminary stages of the research where there is a need for an understanding of the variables that are involved in the research problem. The data collection methods that are involved in most exploratory studies include interviews and observations which allow the researcher to have an understanding of the phenomenon.

### 4.3.5 Descriptive study

Descriptive studies are mostly conducted in order to learn more about a specific problem and also to give an account of the characteristics that are involved. They are typically structured and will usually have a set of stated hypothesis or investigative questions (Cooper and Schindler, 1998:147). They are also aimed at ensuring that a valid and accurate representation of the variables involved is provided (Hardy and Bryman, 2009:939). Terre Blanche, Durrheim and Painter (2006:44) state that descriptive studies have the aim of accurately describing the phenomenon through the use of various data collection tools.

### 4.3.6 Explanatory study

Explanatory studies have the aim of providing causal explanations for a specific phenomenon. In the case where researchers are interested in examining the relationship that exists between variables, the explanatory research design is considered as being ideal (Sekaran, 2004:45). The major emphasis of this design is on determining a cause and effect relationship. This usually involves a planned and structured design (Malhotra, 2004:85). These studies are conducted on the premise that a change in one variable results in a change in another variable.

### 4.3.7 Case study

Case studies are becoming a popular research design. They are descriptive in nature and provide extensive information pertaining to certain individuals and organisations. Terre Blanche et al (2006:460) describe case studies as involving ideographic research methods that study individuals or organisations as being separate from the sub-sets of a wider population. They involve an in-depth analysis of similar situations that would have occurred in other organisations given that the nature and definition of the problem is the same as that experienced by other organisations. They place emphasis on a contextual analysis of fewer events or conditions and provide detailed insight regarding the researched objectives in the context of a particular population or organisation. Baxter and Jack (2008:548) categorise case studies into explanatory, exploratory, descriptive, multiple, intrinsic, instrumental and collective case studies.

### 4.3.8 Most applicable approach for this research study

Having identified the approaches that a single study can adopt, it is important to indicate which approach is ideal for this particular research study. The field of humanitarian supply chains has been a dominating subject among researchers, and there has been a growing need for efforts to be made for improving disaster operations in the region. The focus of this research study is on providing insight into the supply chain management best practices that can be used during disaster operations. The objectives of the study are aimed at gaining an understanding of the different supply chain management best practices and how these can influence natural disaster operations. The exploratory research enquiry is the approach that will ensure that the objectives of the study are met, as it is the method that is used when some facts are known about a specific

subject but more information is needed in order to develop a relevant framework (Sekaran, 2002:120).

With exploratory studies the main focus is on gaining insight pertaining to a subject, and usually this is conducted for research problems where few studies have been done (Malhotra, 2004:77). In gaining an understanding of the variables involved during humanitarian operations, a literature search was conducted including academic journals and reports compiled by the different humanitarian organisations. The case study approach is also used to complement the exploratory research design. The case study approach involves the examination of ideas that have been successfully implemented by a particular organisation or population set (Yin, 2009:4). This in effect means that the research problems or objectives are discussed in the context of the organisation and population set involved. In this research study the UNWFP is the focus of the data collection process in order to discuss and identify the effects of supply chain best practices during humanitarian relief operations. The advantages that are associated with the use of case studies include the fact that the findings can be generalised to other organisations involved in the similar line of business.

## 4.4 DATA COLLECTION

In carrying out a research study it is important to be able to put in place a reliable data collection process that will enable the researchers to be in possession of the data sets that can useful in answering the main research objectives and questions of the study. In this study both primary and secondary data sources have been used. Primary data is considered as the raw data that an organisation or researcher collects for themselves for the purposes of achieving certain research objectives (Cooper and Schindler, 1998:55), while secondary data is the information gathered by another researcher or organisation for the purposes of addressing a different research study other than the one being conducted (Kirby, 2001:43).

Various data collection techniques have been considered for this research study. The primary data will be collected through conducting face to face in-depth interviews. These will ensure that

the researcher is able to gain an insight into the supply chain management best practices that can be implemented during natural disaster occurrences. Secondary sources also play an important role in this study and therefore the use and analysis of peer reviewed journal articles, conference papers and humanitarian reports has been carried out. Every step, method and technique used in collecting and analysing data has to ensure that it has the desired effect of achieving the goals and objectives of the research study. Table 4.2 is an illustration of how the data collection techniques are useful in achieving the specific research objectives.

**Table 4.2: Matching objectives and data collection techniques used**

| RESEARCH OBJECTIVE | TECHNIQUE ADDRESSING THE OBJECTIVE |
|---|---|
| 1. To understand how efficient customer responsiveness can best influence humanitarian organisations into delivering successful natural disaster operations. | • **Secondary data: Peer reviewed journal articles and organisational reports.** |
| 2. To understand the positive influences associated with adopting agile supply chain management principles during natural disaster operations in southern Africa | • **Primary data: In-depth interviews**<br>• **Secondary data: Analysis of reports and other publications** |
| 3. To determine how virtual supply chains can best influence and facilitate efficiency during natural disaster operations in southern Africa | • **Primary data: In-depth interviews** |
| 4. To understand the advantages associated with humanitarian organisations operating as a system of networks "network based" during natural disaster operations | • **Secondary data: Literature review**<br>• **Primary data: In-depth interviews** |

### 4.4.1 Documentary data (literature review)

The research has made reference to secondary data sources in substantiating some of the arguments. The documentary data that has been used includes peer reviewed journal articles, organisational reports, conference proceedings and publications, minutes and newspaper articles.

These were used in order to get a clear understanding of some of the issues that are involved during natural disaster operations and most importantly to gain a detailed outline of the activities that the UNWFP been responsible for during natural disaster operations.

### 4.4.2 Qualitative interviews

Conducting qualitative interviews was the main tool used in collecting data for this research study. Cassell and Symon (1994:14) define qualitative interviews as interviews with an intended purpose of gathering descriptions or experiences of the interviewee regarding the subject under investigation. The goal of these interviews is to ensure that the research topic is viewed from the perspective of the interviewee and to derive an understanding as to why they subscribe to a certain perspective (Berg, 2009:132). Qualitative research interviews generally have a diverse range of characteristics, such as a low degree of structure imposed by the interviewer, open questions and a focus on specific situations or concepts rather than abstractions and general opinions. The use of qualitative interviews in this study was carefully designed and organised so that it ensured that the correct data was collected; the qualitative interviews were therefore be achieved through conducting in-depth and semi structured interviews that involved the use of an interview guide.

#### 4.4.2.1 In-depth semi structured interviews

Conducting an interview is a natural way of interacting with the targeted population and it fits in well with an interpretive research approach. In-depth interviews are described as empirical in the sense that they involve gathering information on a particular topic, and can be classified as theoretical since they are also used in developing and testing theories (Cavana, Delahaye and Sekaran, 2001:138). They are useful in cases where large amounts of data are needed in answering the research objectives and questions. In-depth interviews are conducted on a one-on-one basis and allow an opportunity for the researcher to explore the perceptions and ideas of individuals regarding specific subjects (Silverman, 1998:137). This type of interview technique allows for the interviewees to be able to respond in their own words, and the line of questioning used by the interviewer has no desired intentions of prompting responses.

Interviews can be classified as either structured or unstructured depending on the objectives which the study seeks to achieve, and the questions can either be open ended or closed. Open ended questions during unstructured interviews afford the interviewee a level of flexibility in responding to the questions and therefore have the advantage of ensuring that more issues are mentioned and discussed (Hanning, Van Rensburg and Smit, 2004:54). In structured interviews the interviewer allows the interviewee to respond to the given set of questions using the provided structure. Both approaches were used in this research study as the semi-structured approach allowed the interviewer to design questions that would allow the interviewee to discuss specific subjects in the way they desired and also draft questions that require a structured response (Cassell and Symon, 1994:33). In this regard four in-depth interviews have been carried out, with and all of the participants being from the UNWFP

#### 4.4.2.2 Interview guide

An interview guide is a document that helps the interviewer in directing the conversation towards the specific issues and topics which they are investigating. Interview guides vary in structure, ranging from being highly scripted to being relatively loose. They have the intended purpose of directing the interviewer on what to ask about and the sequence in which questions should be arranged (Denzin and Lincoln, 2005:721). Before in-depth interviews are carried out, the researcher compiles an interview guide to use during the various sessions. The questions in the interview guide are designed so as to ensure that the objectives of the study are attained and the emphasis is on identifying the different sections being investigated. The key supply chain management best practices, flexibility, agility and responsiveness, form the basis of this research study and therefore the interview guide is designed around these questions. The interview guide includes both close and open ended questions and was flexible enough to allow the interviewer to be able to adjust the sequence in which questions were asked and to further probe the participants based on their responses. Table 4:3 summarises the sections of the interview guide for this research study.

**Table 4.3**: **Summary of the interview guide**

| SECTION | TITLES DISCUSSED | DESCRIPTION |
|---|---|---|
| **1** | **Introduction** | This is brief overview of what the interview will cover and presents an opportunity for the interviewer to familiarise himself with the interviewee. |
| **2** | **General**<br>▪ Individual profile<br>▪ Organisational profile | The section is designed to ensure that the interviewee describes their roles within the organisation and also gives a reflection of some of the disaster operations that the organisation has conducted. |
| **3** | **Disaster phases**<br>▪ Preparedness stage<br>▪ Response stage<br>▪ Mitigation stage | The section seeks to gain an understanding of the different activities performed by the organisation during the various phases of the humanitarian cycle. Gaining an understanding of the supply chain management activities that they carry out is essential for this study. The section will investigate the activities carried out in the different phases. |
| **4** | **Supply chain management practices**<br>▪ Responsiveness<br>▪ Flexibility<br>▪ Agility | It is equally important to determine if the humanitarian organisation is influenced by the different supply chain management best practices in conducting its response activities. The section is intended to determine how the flexible, responsive and agile supply chain management pillars are implemented during the natural disaster management cycle. |

Interviews played an important role in this research study and have ensured that the right data is provided for this study. There are advantages and disadvantages that are associated with the use of interviews in collecting data and these have been summarised in Table 4.4 in order to present some of the limitations encountered in using this research approach.

**Table 4.4: Advantages and disadvantages of interviews as a data collection method**

| ADVANTAGES | DISADVANTAGES |
|---|---|
| **Thick data can be collected–**the detailed data collected from interviews far exceed the quality of data collected by quantitative methods | **Cost–**interviews are sometimes considered to be the most costly in terms of cost and money |
| **Participants can be probed**–with interviews the researcher asks additional questions increasing the depth of the data collected | **Reluctance of participants in participating**–people may be reluctant to make time in their schedule to talk to strangers |
| **Increased control of the researcher**–participants can be pre-screened to ensure that they meet the inclusion and exclusion criteria | **Bias–**with interviews, the researcher could potentially affect the outcome of the data collected |
| **Flexibility**–the interviewer can change aspects of the interview, for example, the language used, to suit the participant and gain a better response rate | **Generalisation–**this could lead to a decrease in reliability of the data collected |
| **Individual responses identifiable–**interviews allow the researcher to link responses to a certain individual | |
| **Close relationship–**the researcher can develop a close relationship with the participant which could lead to trust and result in a freer flow of information | |

***Source**: (Cavana et al, 2001:44)*

## 4.5 POPULATION AND SAMPLE OF THE STUDY

A target population refers to the specified group of people, organisations or objects to which questions and observations can be directed to in order to develop the required data structures and information (Sekaran, 2003:265). The research study is based on giving an insight into the supply chain management best practices that are implemented during humanitarian natural disaster operations in southern Africa and therefore the target population will comprise humanitarian organisations.

In the initial stages of the study there were a number of humanitarian organisations that were considered, such as the Gift of the Givers, World Vision and UNWFP. Among these only the UNWFP was considered suitable because of its availability in providing the data required in a reasonable time; thus convenience sampling was applied. This is a sampling technique that involves the collection of data needed for the study from the population elements that are willing and conveniently available to provide it (Cavana et al, 2001:261). It is often the technique used in exploratory studies since it offers the best way of collecting basic information. The UNWFP has conveniently been identified as the ideal organisation to use for this study as a result of the work that it has done in the region in recent years.

- *United Nations World Food Programme (UNWFP)*

The UNWFP is considered to be one of the largest humanitarian organisations actively involved in organising natural disaster operations in southern Africa. It has carried out initiatives supporting national, local and regional response operations through partnering with the civil, private sector and other agencies, with the goal of ensuring that the disaster operations are a success (WFP, 2008).

The organisation mainly focusses on ensuring that there is a high level of preparedness in anticipation to natural disaster occurrences and also carries out diverse supply chain activities, such as responsiveness, procurement, logistics and distribution of supplies and many other disaster reduction initiatives. The UNWFP has a regional office based in Johannesburg, South Africa, responsible for handling and organising natural disaster occurrences in southern Africa. The series of operations that the organisation has conducted in the region include response operations to the floods in Mozambique that affected close to 177, 645 people. In addition, it played an important role during the drought occurrences which affected Zambia, Malawi and Zimbabwe in 2008. The area of focus of the UNWFP in southern Africa covers more than eight countries, including Malawi, Zambia, Zimbabwe, Mozambique, South Africa and many others which have all been affected by different natural disasters. Figure 4.3 provides an illustration of the geographical focus of the UNWFP in its southern Africa operations.


***Source**: (WFP, 2008)*

**Figure 4.3: Geographical area covered by the UNWFP**

### 4.5.1 Participants

Selecting the participants to be involved during the data collection process has to be correctly conducted since it affects the accuracy and reliability of the data. The research study implemented the purposive sampling technique in identifying the participants to be interviewed within the UNWFP. Purposive sampling is a technique that is mainly confined to a certain target group that can provide the needed information based on the criteria designed by the researcher; only the participants that conform to the criteria are considered (Cooper and Schindler, 2008:192). In order to meet the research objectives and the main questions of this study participants were identified and selected based on the described criteria:

- The participant should be part of the supply chain function of the UNWFP and should be in any of the divisions or functions encompassing logistics, warehousing, planning, strategy and procurement.
- The participant should have been with the organisation when it carried out at least one natural disaster recovery operation in southern Africa.
- The participant should be conversant with supply chain management best practices that have been implemented by the organisation in conducting its natural disaster operations.

For this research study participants were selected based on these criteria and the main focus was on selecting individuals who were in a position to give a detailed description of the supply chain management best practices implemented by the UNWFP in a drive towards supply chain excellence. In addition, their knowledge of the supply chain variables involved during disaster operations had an influence on designing a framework that humanitarian organisations could use during disaster operations. The main participants that were involved in this study included the Regional Logistics Officers, the Regional Supply Chain Director, Regional Procurement Officers and the Supply Chain Liaison Officer. The research study conducted in-depth interviews with five participants who are qualified based on the criteria discussed above.

## 4.6 DATA ANALYSIS

Data analysis refers to the manner in which the researcher intends to meaningfully arrange both primary and secondary data collected during the course of a research study (Bernard, 2010:123). The data analysis approach adopted needs to be in line with ensuring that the objectives of the study are achieved. Data analysis will usually involve reducing the accumulated data to a manageable size and will include the development of summaries, the identification of patterns and the application of statistical techniques (Seale, 1999:470). Various research studies make use of different tools in analysing their data; these include content analysis, thematic analysis and other statistical analysis tools. In meeting the objectives of this study, the thematic data analysis technique was utilised and was the main tool used in making sense of the data collected from in-depth interviews and document analysis. The following section will give a detailed account of thematic analysis and on how it has been used in this study.

### 4.6.1 Thematic analysis

Thematic analysis is a technique that has mainly been used in research studies involving qualitative data and has recently been identified as a foundational method of qualitative analysis by a number of researchers (Stirling, 2001:386). It involves searching and identifying common threads that are recorded across an interview and the analysis provides an accurate account for multifaceted and sensitive phenomena (Smith et al, 1992:73). Thematic analysis can also be described as a method for analysing, identifying and reporting patterns (themes) within data, explaining the various aspects of a research topic (Braun and Clarke, 2006:79). Delanty and Strydom, (2003:33) describe the approach as involving the identification of both implicit and explicit ideas within the data pool and grouping them into themes. The thematic analysis technique distinguishes, describes and groups data into rich finer details, giving an interpretation of the various sections of the subjects being investigated (Braun and Clarke, 2006:79). The technique is being highly flexible as it categorises data into different themes that are relevant to the subject under investigation; the technique aims to ensure that the different themes arising in any document and interview transcripts are clearly identified and categorised into classes in order to facilitate an accurate analysis (Bloor and Wood, 2006:55).

Organising data in thematic analysis is achieved through identifying common themes and dividing the research information into chunks and units that can be easily and successfully analysed (Stirling, 2001:400). The common themes intend to capture important trends in the data that are useful in meeting the objectives of the research study and they usually categorise the data set into patterned responses or meanings (Baxter and Jack, 2008:550). The themes arising in organising the data for this study have included supply chain management variables, such as responsiveness, agility, flexibility, efficiency, lead time and cost efficiency. This structuring and display of data helps in organising the information and data collected for accurate interpretation.

#### 4.6.1.1 The steps involved in thematic analysis

Thematic analysis as a data interpretive process is one of the essential qualitative research methods that involve searching data systematically to identify arising patterns. For this to be successfully carried out there are steps that have to be followed in ensuring that the process is

accurate and reliable. These steps involve activities such as reading through the data sets (transcripts) repeatedly and breaking the data down into themes and categories (Terre Blanche et al, 2006:328). Some of the steps followed for this research study include the familiarisation with and immersion in the data, creation of themes, coding, elaboration and interpretation, and checking. However, in order for these steps to be properly carried out, the process of transcribing information gathered during the in-depth interview sessions should first be conducted. All the steps in thematic analysis depend on how the data is transcribed and this is described in the following section.

- *Step 1: Transcribing the interview recordings*

Once recordings have been made of all the interview sessions, the next step involves transcribing the interviews. Transcripts make the patterns of the recordings transparent and accessible, which allows one to be able to see the patterns that emerge in each interview session. Saunders, Lewis and Thornhill (2012:145) describe the process of transcribing as involving the reproduction of a recorded account and presenting it as written text.

The transcription process is in itself a data analytical process that needs to be carefully carried out and requires much commitment in terms of time. Audio transcription can be done with the aid of a transcribing machine that normally has a play back, rewinding and stop option and this allows the researcher to be able to accurately listen to all the pieces of data (Terre Blanche et al, 2006:139). During the in-depth interview sessions, the interviewer had a recording machine that captured all the conversations and, in addition, notes were taken in order to ensure that all the highlights of the sessions were captured. After the transcribing of all the interview sessions, the other steps of thematic data analysis can then be implemented as outlined in steps 2 to 6 below.

- *Step 2: Familiarisation and immersion in the data*

For an effective data analysis to be carried out it is important for the researcher to have a preliminary understanding of the data. The researcher needs to be fully immersed in the data and dedicate time to studying the texts (the interview and transcript notes) repeatedly (Sekaran,

2003:65). This allows the researcher to fully comprehend the depth and breadth of the data; it is also during this stage that frequent and important themes are discovered which can prove to be crucial in answering the research questions. Carrying out this step properly will ensure that the researcher knows the data well and is easily able to identify where various and similar trends of data can be found and what types of interpretation are likely to be supported by individual data sets (Terre Blanche et al, 2006:140).

- *Step 3: Inducing themes*

Researchers such as Baxter and Jack (2008), Berg (2009) and Bernard (2010) disagree about which step comes first: coding or inducing themes. This study followed the approach of identifying the themes in the data first before the coding process begins. Themes ideally should arise naturally from the data sets and ensure that the research questions can be answered and objectives achieved (Stirling, 2001:400). There are no prescribed procedures for the process of inducing themes, so in this study categories and themes have been induced mainly from following the language used by informants during interviews.

This is a study that involves gaining insight into supply chain management best practices and therefore many themes and categories have been identified within the data sets, addressing a broad array of issues that directly respond to the research questions. After the themes have been induced, they need to be fully developed and individually investigated in order to determine if they are relevant in meeting the objectives of the study (Terre Blanche et al, 2006:141). This helps in ensuring that all the trends that arise in the interview transcripts have contributed towards achieving the goals of the study and those that are not relevant are eliminated.

- *Step 4: Defining and naming themes*

This is an important step within the analysis as it allows for the alignment of the data collected with the objectives of the study. The individual themes that have been developed during the previous step to be further refined. The significance of this phase lies in the way in which it scrutinises each theme so as to determine what it represents and what it does not represent. This

process is also a way of assessing if all the themes that have been adopted are of relevance to the study; this evaluation builds up the confidence of the researcher and assures the accuracy and reliability of the processes involved (Willig, 2003b:162).

- *Step 5: Developing categories and a coding scheme*

The process of inducing and developing themes needs to take place simultaneously with coding the data as this tends to save time and also promotes consistency. Identifying the immense detail and complexity of the data features is important and this is done by means of developing codes through the use of a coding scheme. Coding can be described as the step in which data is categorised into chunks of text and placed in different categories so as to allow for easy retrieval and analysis of the data (Marks and Yardley, 2004:62). Coding can be done using phrases, sentences or paragraphs and these are coded in relation to the richness of their content in representing a theme.

The process of coding is usually taxing but it is a crucial step so that the coding is able to provide answers for the underlying questions of the study. Coding units, used in order to fine-tune the data, can consist of sentences or phrases; in this way coding allows the researcher to count how often in a single interview or article the code occurs and to analyse the relationship of a code to others in terms of occurrence or sequencing (Terre Blanche et al, 2006:115). Codes should not be too broad or overlapping as they will then not be able to serve their intended purpose of distinguishing the different aspects that appear in a transcript. A code should ideally have a label which describes the operationalisation of what the theme concerns; one textual extract will be labelled with more than one code in cases where it covers more than one theme (Marks and Yardley, 2004:63).

According to (Berg, 2009:353) the key features of during the coding process are as follows:

- Patterns are noted in the data and these patterns are labelled in order to ensure that distinctions and variations in the data are identified. This has the effect of leading the researcher into directly answering the research questions of the study.

- The researcher decides on whether to code manifest or latent themes using either deductive or inductive coding categories.
- The codes are described in a coding frame, which should list their labels, detailed definitions and examples of text segments.
- The checking of the inter-rate reliability of coding ensures that coding decisions are made explicit and consistent.

- *Stage 6: Elaboration*

The induction of themes and the coding process categorises the data into different chunks, events and remarks, and some of these are combined in order to address the questions and objectives of the study. This allows the researcher to get a new view of the data and to gradually compare the sections of the data that are related. The process of elaboration uncovers new trends and in many instances the researcher realises that the data which is grouped under a single theme may actually point to different subjects and that there are other issues and themes that may come to light (Terre Blanche et al, 2006:138). This step is designed to ensure that all the finer nuances of meaning that have previously not been identified by the coding system are exposed. Braun and Clark (2006:90) are of the opinion that the codes within the different themes should be related but there should be a distinction between one theme and the other and this can only be properly achieved in the elaboration phase.

In this study the elaboration stage ensured that certain activities such as reviewing all the data extracts of a specific theme and reviewing the broader theme in relation to all the data sets were carried out.

### 4.6.2 Document Analysis

The review of different documents describing the state of humanitarian supply chains has played an important role in this study. Document analysis as described by Babbie and Mouton (2001:43) as a form of qualitative research technique in which documents are interpreted by the researcher in order to derive an insight pertaining to a specific subject or topic. For this study the analysis of documents involved the review of UNWFP yearly supply chain and logistics reports describing the progress and challenges that the organisation has encountered during the different disaster

relief operations. There are different categories of documents that have been reviewed in ensuring that all efforts are directed towards ensuring that the objectives of this study are achieved and these included;

- Public records: The official records provided by the United Nations World Food Programme and other active relief organisations through their website and other media platforms. These included the Executive functional reports and also Project Update reports, these gave an important view-point of the projects, challenges and successes of the humanitarian community in southern Africa.
- Peer reviewed Journal Articles: There are a number of articles that have been published in respect to the subject of humanitarian supply chains and most of these are based on specific natural disaster occurrences. The literature review of this study has been informed by the studies conducted by different institutions in respect to the natural disaster response operations.

The data derived from these documents has been organised and combined with the primary data collected through interviews to form themes and categories that have been used in describing the main findings of the study, as will be later seen in Figure 5.1 illustrating the thematic map.

## 4.7 QUALITY OF THE RESEARCH

In conducting a research study it is important to ensure that there are measures that should be adopted for maintaining the accuracy, reliability and validity of the data collected. For qualitative research the concerns of the researcher are focused on whether they have employed relevant techniques that will aid them in getting the right information for achieving the objectives of the study. For many research studies qualitative research has often been evaluated using methods widely used for quantitative research. However, many researchers argue that the difference in nature and purpose between quantitative and qualitative studies sanctions the use of the same criteria in determining reliability and validity (Cho and Trent, 2006:325).

Quality in any research study is important and therefore one of the feasible methods used in this research study is triangulation of data, which offers the researcher an opportunity to approach the topic from different perspectives in order to identify the differences and the key areas relating to

the context being examined (Marks and Yardley, 2004:17). Blumberg (2011:504) defines triangulation as the process of verifying information through the use of multiple sources in order to increase the validity and reliability of the concepts under investigation.

Triangulation has been achieved through documentary analysis and in-depth interviews as this combination allows some of the issues discussed during the interview sessions to be justified using reports and publications pertaining to the organisation. In-depth interviews have been designed so that different participants within the supply chain function could be interviewed to determine their perceptions regarding to issues of responsiveness, agility and flexibility of supply chains during natural disaster operations. Denzin and Lincoln (2005:454) state that triangulation is a process of using multiple perceptions to clarify meaning and to verify the repeatability of an interpretation.

During the data collection and analysis stages of this study, many options were explored in ensuring that relevant and high quality data was collected from the in-depth interview sessions and also from the documentary analysis. The three main areas that have been given attention in ensuring reliability and trustworthiness are credibility, transferability and dependability and these are detailed in Table 4.5:

**Table 4.5: Measures to ensure reliability and trustworthiness of the data**

| VARIABLE | DESCRIPTION | TOOLS |
|---|---|---|
| **Credibility** | This mainly focuses on ensuring that the study measures or tests the concepts which it has been designed for. Some of the questions discussed include testing how congruent the findings are with reality (Patton, 1999:1190). The main focus is therefore on ensuring that all the approaches that are used in conducting the study maintain the quality of the data and that it is a true representation of the subject under investigation. Credibility for this research study was emphasised during the in-depth interview sessions and also during the process of | Some of the tools followed in ensuring credibility in the study can be described as;<br>i. The use of established qualitative research methods.<br>ii. The use of purposive sampling in identifying participants.<br>iii. Triangulation, which involved the combined use of both interviews and document analysis and included a wide |

| | | |
|---|---|---|
| | documentary analysis. | pool of diverse participants.<br>iv. Background, qualifications and experience of the investigators were highly emphasised.<br>v. Examination of previous research findings to act as a guide.<br>vi. Tactics to help ensure the honesty of informants when contributing data. |
| **Transferability** | The variable is described as being concerned with whether the findings of the study can be applied to other similar studies. However, in qualitative studies this has been identified as being impossible to achieve, since the findings of a qualitative enquiry are specific to a particular environment and therefore it can be a challenge to demonstrate if they are applicable to other situations (Shenton, 2004:70). For the purposes of this study it is important to ensure that the findings and data can be easily transferable to other humanitarian organisations as it offers a framework of how they can organise their disaster operations. | Some of the tools include:<br>i. Recording and transcribing the interview sessions to allow other researchers access them.<br>ii. Known data collection and analysis methods were used and this has the influence of allowing other researchers to evaluate the studies. |
| **Dependability** | The variable asserts that if similar techniques in the same context and under the same conditions are repeated, then similar results would be obtained (Shenton, 2004:69). The researcher needs to be able to identify the different steps in order to claim that the study and methods used are dependable, and the processes involved should be reported in detail to allow other researchers the opportunity to adopt them in similar studies. | In order to allow people to have an understanding of the processes involved, the following have been included;<br>i. A detailed description of the research design and how it was implemented.<br>ii. A detailed data gathering process.<br>iii. A reflection on the process enquiry conducted. |

| | | |
|---|---|---|
| **Reliability** | Reliability is the characteristic of measurement that gives an emphasis to the accuracy, precision and consistency of the data and information used for the study; it is a key concept in trustworthiness (Cooper and Schindler, 2008:352). There is need to ensure that the research techniques carried out are focused on the intended population and also that the individuals that are used for the study are aware of the variables that are being investigated. | Some of the measures taken include:<br>i. Ensuring that consistency and uniformity is maintained across all the interviews.<br>ii. The use of a tape recorder during the interviews in order to ensure accuracy and to allow for repeated verification.<br>iii. Independent transcribers used in order to avoid bias.<br>iv. The data used has been collected only from the intended humanitarian organisation and from the intended participants. |

## 4.8 ETHICAL CONSIDERATIONS

For the research to be conducted in an appropriate manner, ethical clearance was applied for and granted by the University of KwaZulu-Natal Ethics Committee. This clearance is used for the purposes of determining whether the research and the methods used in the process of collecting and analysing data are considered as being morally and ethically acceptable. Two areas that researchers in qualitative studies are usually concerned about when ensuring that the correct research approaches are followed are obtaining informed consent and also ensuring that confidentiality (right to privacy and protecting identity) is emphasised. How the different ethical variables arising in the study have been dealt with is described below.

### 4.8.1 Informed consent

An informed consent letter was attached to all the interview guides and the participants were freely given a copy of the document in order to ensure that their involvement in the study was voluntary. An informed consent letter relates to the idea of voluntary participation in a research

study (McGivern, 2006:28). In this document the participants were informed of their right to withdraw from the study whenever they saw fit. Before the in-depth interviews were conducted, the participants were given a detailed description of the objectives of the study and of the methods used in collecting and analysing the data so that they understood and approved of these. Since this study involved the participation of the UNWFP, the researcher negotiated the terms of reference with the organisation so as to prevent any conflicts of interest.

### 4.8.2 Confidentiality

In any research study there is a need for the researchers to ensure the anonymity and confidentiality of participants and the data that they will be providing; this means that the researchers should pledge to protect the well-being and the interests of the respondents. In ensuring confidentiality, all the names of the interviewees have been kept confidential and have not been mentioned in any of the sections of the study. Also the intention of the researcher is to keep all the recordings confidential and destroy them after a period of five years. The right to privacy and confidentiality has also been maintained for all the participating individuals and humanitarian organisations.

### 4.8.3 Limitations of the Study

The limitations encountered during this research study are summarised as follows:

- The research study was limited to only one humanitarian organisation and therefore will not able to offer a sufficient insight into the general state of humanitarian supply chains during humanitarian disaster operations in southern Africa.
- The conclusions and recommendations cannot be generalised as a representation of the state of humanitarian supply chains since the natural disaster operations have various characteristics.
- Setting up meetings with the personnel of the UNWFP was a challenge due to the fact that there were two emergency operations that the organisation was dealing with at the time of the study, namely, the Mozambique flooding, which occurred in December-January, 2015 and Ebola crisis meetings.

- Some information and documents could not be made available to the researcher as a result of organisational policies; this information could have been useful in shaping the overall findings of the study.
- The researcher also wanted to be part of an ongoing humanitarian relief operation conducted by the UNWFP but this has not been achieved as a result of insufficient funding for the initiative.

## 4.9 CONCLUSION

This chapter has focused on giving a detailed account of the steps followed in collecting and analysing the data. It has discussed the available research approaches that are used by researchers and how these influence the direction and shape of the study. The adoption of the research map followed in this study has been focused on, ensuring that the objectives and the research questions are sufficiently achieved.

The chapter has provided a description of the qualitative research design and why this research study has been categorised as qualitative. The qualitative research design ensures that the phenomena under investigation are well understood and explained. The chapter has also explained the research approaches that can be used during research studies, such as exploratory, case study, descriptive and explanatory. This study, in order to properly attain its objectives, makes use of the exploratory and the case study research approach; the chapter has justified why the researcher has use the combined approach.

This chapter has given detailed insight into the data collection methods, which have mainly been categorised as both primary and secondary data. Documentary data and the use of in-depth interviews are the data collection tools that have been used as they are the feasible methods that can be employed in order to achieve the stated objectives and research questions. In analysing the data collected through the use of qualitative interviews, thematic analysis is employed. Thematic analysis as a data analysis tool for qualitative research studies has been discussed in relation to how it is used and the different steps that are followed. Since this has been a widely

used method among researchers the chapter discussed the advantages and disadvantages associated with the use of the data analysis technique.

The chapter went on to discuss the measures that were taken in ensuring that the trustworthiness, reliability and dependability of the study were achieved. The steps such as triangulation that were implemented in improving the quality of the study were discussed. In addition, there was a brief discussion on the ethical considerations implemented during this study, and these include using the informed consent and ensuring that privacy and confidentiality is encouraged.

In conclusion, the different steps and processes that have been used in collecting and analysing the data have been outlined in this chapter. Some of the processes discussed involved how the data collected from interviews were transcribed and later analysed using the thematic data analysis technique.

# CHAPTER 5

# DISPLAY AND ANALYSIS OF THE RESEARCH RESULTS

## 5.1 INTRODUCTION

This research study has been designed to achieve specific research questions and objectives and the previous chapters have contributed to ensuring that these are attained. The field of humanitarian supply chain management is receiving significant attention because of the influence it has on ensuring that disaster operations are successful carried out. The main areas of contribution are aimed at identifying the supply chain management best practices that can be implemented during natural disaster operations for improved efficiency and success.

The previous chapters (Chapters 1, 2 and 3) provided a detailed literature review on how humanitarian disaster operations in southern Africa are conducted and how best they may implement agile, responsive and flexible supply chain management best practices. In the previous chapter (Chapter 4), the research methodology philosophy was reviewed and the different tools used in collecting and analysing the data collected for achieving the objectives of the study were discussed. The main data collection technique involved the use of structured in-depth interviews and literature compilation; the thematic data analysis technique used in synthesising the data sets was also explained.

This chapter essentially provides a detailed reflection and analysis of the data sets collected during the study. The focus is on ensuring that this analysis is carried out in order to achieve the objectives that have not been met in the course of the study. Data analysis has followed the thematic analysis technique and the strategy followed in displaying the data will be through the use of a thematic map, in which the transcribed data is categorised into different sections (themes). The thematic map ensures that the data variables are grouped into categories namely CSFs and the pillars of supply chain management best practices. In order to give a descriptive account of the data, these categories will be individually discussed and the main themes and codes arising will be outlined. This chapter will ensure that all the relevant issues arising from the empirical data collection are discussed, and any other critical data explaining the supply chain management best practices implemented by the UNWFP are displayed.

## 5.2 OVERVIEW OF RESEARCH OBJECTIVES

It is important that, before analysing the data collected during the research study, the main research objectives that will be achieved in this chapter be revisited and stated. This will ensure the reliability and accuracy of the data in fulfilling these main goals. This is a broad study designed to provide insight into the supply chain management best practices implemented during natural disaster occurrences. As earlier stated, some of the objectives of the study have been achieved in the previous chapters; Table 5.1 is a summary of how the main objectives have been achieved and in which chapters. Having collected data that is relevant for answering the objective, this chapter will make sense of all these findings through displaying and properly analysing their relevance.

**Table 5.1: Research objectives of the study**

| RESEARCH OBJECTIVE | CHAPTER AND DATA COLLECTION TOOL |
|---|---|
| 1. To understand how efficient customer responsiveness can best influence humanitarian organisations in delivering successful natural disaster operations. | • **Secondary data: Peer reviewed journal articles and organisational reports.**<br>• ***Covered in Chapter 2*** |
| 2. To understand the positive influences associated with adopting agile supply chain management principles during natural disaster operations in southern Africa | • **Primary data: In-depth interviews**<br>• **Secondary data: Analysis of reports and other publications**<br>• ***Covered in Chapter 3 and Chapter 5*** |
| 3. To determine how virtual supply chains can best influence and facilitate efficiency during natural disaster operations in southern Africa | • **Primary data: In-depth interviews**<br>• ***Covered in Chapter 5*** |
| 4. To understand the advantages associated with humanitarian organisations operating as a system of networks "network based" during natural disaster operations | • **Secondary data: Literature review**<br>• **Primary data: In-depth interviews**<br>• ***Covered in Chapter 3 and Chapter* 5** |

## 5.3 RESULTS OF THE STUDY

This section offers a detailed discussion of all the primary and secondary data collected. This is essential in order to define the direction of the study. However, before the main issues of the study are addressed, the efforts, contributions and roles played by the UNWFP as one of the largest humanitarian organisations that is actively involved in the region of southern Africa will be discussed. Since some of these issues are not illustrated in the thematic map, they need to be clearly outlined as they have directly influenced the organisation in carrying out its disaster operations and can also provide direction for other humanitarian organisations in structuring their operations. In displaying the results, an overview of the main findings regarding the UNWFP is first provided and then the different sections presented in the interview guide will be individually dealt with and a comprehensive analysis presented.

### 5.3.1 Overview of the United Nations World Food Programme

The UNWFP is one of the largest humanitarian organisations actively involved in responding to natural disaster occurrences in southern Africa. The organisation has conducted numerous natural disaster operations ranging from slow onset disasters to quick and unpredictable natural disaster response operations. Some of the issues that have been identified include the main strategic goals and concerns of the organisation, its response operations in the region and the profile of its employees and partners. These issues will be discussed in the sections that follow.

#### 5.3.1.1 Strategic goals and concerns of the UNWFP

The organisation is driven by its mission which is the elimination of the increasing need for food aid as a result of disaster occurrences. This has been described through the various targeted interventions that are needed to help improve the lives of vulnerable people. Vulnerable people comprise those who are either in need of food aid as a result of poverty, either permanently or during crisis periods, or who do not have the resources to obtain the food required by their households. The core policies and strategies of the organisation are aimed at meeting these emergency food needs through performing the associated logistics support activities and reaching out successfully to the affected victims. The main objective is primarily to save lives, to

protect livelihoods during emergencies and to improve the quality of life of victims in the affected communities during the most vulnerable times.

As the main focus of this research study is on providing insight into the supply chain management best practices that are implemented during disaster operations, it was essential to determine some background information pertaining to the organisational supply chain structures of the UNWFP. Supply chain management as defined by Chopra and Meindl (2013:13) describes all the parties that are involved in fulfilling the needs of the customers. It does not only include manufacturers and suppliers but other factors such as warehouses, retailers, transporters and the targeted customers. Interacting with the participants who voluntarily took part in this study provided insight into the supply chain activities carried out by the UNWFP. Some relevant comments are given in *Statements 1 and 2* below:

"*Our organisation has different supply chain management areas which during the years have become its main areas of expertise. These include its preparedness and being ready, timely response to disaster emergencies, procurement of food and humanitarian supplies, presenting the right supplies at the right time and the logistics which mainly involve the delivery of supplies*". [*Statement 1*]

"*The organisational core purposes are based on saving lives and the protection of livelihoods through the provision of leadership and the logistics capacity required. This therefore means that the organisation is actively involved in delivering the right product, at the correct quantities, at the right place, time, cost and at the right condition*" [*Statement 2*]

Like any other organisation the UNWFP strives towards ensuring that it manages a supply chain that is competent and efficient in order to address the needs of its targeted customers, who are mainly the beneficiaries.

#### 5.3.1.2 Insight into the UNWFP response operations in southern Africa

The humanitarian disaster relief operations that the organisation has been carrying out in the region have mainly focused on seven countries: Mozambique; Zambia; Namibia; Malawi; Zimbabwe; Swaziland; and Madagascar. In these countries the main natural disaster occurrences

that have consistently been experienced comprise flooding, droughts and epidemic outbreaks. These have had varying effects on the communities as they have occurred at different magnitudes, posing different challenges. The UNWFP to date has played an important role in successfully responding to natural disaster occurrences through its innovative supply chain management practices that are aimed at response excellence.

Table 5.2 provides some examples of the disaster operations conducted by the organisation in recent years;

**Table 5.2: Examples of the disaster operations conducted by the UNWFP**

| Year of Occurrence | Hazard/ Disaster Occurrence | Areas Affected | Number of affected persons |
|---|---|---|---|
| 2001 | Cyclone Bingiza–heavy storms, flooding and strong winds | Madagascar (Mananara, Mandritsara and Soalala) | 80 000 |
| 2011 | Flooding and Cholera outbreak | Zimbabwe (Chipinge, Bikita, Buhera and Chimanimani) | 1 200 |
| 2011-2012 | Drought occurrences | Malawi | 1,97 million beneficiaries received food aid. |
| 2012 | Tropical storms and flooding | Mozambique (Provinces of Maputo, Gaza and Inhambane) | 108 048 (25 880 households) |
| 2014 | Flooding | Malawi (District of Nsanje, Phalombe and Chikwawa) | 162 000 displaced people |

### 5.3.1.3 Profile of the participants

This section presents the profile of the participants of this study. All participants in this study have a strong supply chain management background and were able competently to discuss the practices that the UNWFP has implemented. Table 5.3 provides a summary of the respondents' profiles.

**Table 5.3: Summary of respondent profile**

| CHARACTERISTICS |
|---|
| **Gender:**<br>A total of 5 participants were involved during this research study and within these 4 were male and 1 female. |
| **Qualifications:**<br>Most of the participants have different university qualifications in the Engineering, Project Management and Supply Chain Management disciplines. They all have an average of 5 years work experience in the humanitarian environment. |
| **Job Title:**<br>The job titles held by the participants at the UNWFP include: Regional Logistics Officer, Procurement and Logistics Specialist and Logistics Planner. |
| **Years with the company:**<br>The participants have been involved in many operations with the UNWFP and they have an average of 10 years each with the organisation. In those 10 years, an average of 7 years have involved in relief operations within southern Africa and the other 3 years to operations outside of the region. |

Regarding their involvement in different natural disasters, some of the participants shared their experiences during some of the assignments in which they were actively involved. This also indicated the steps and procedures that are carried out by the organisation in the event of a natural disaster occurrence. Some of their responses have been directly quoted in providing a description of their roles:

*"Delivering aid to the affected regions of Mozambique was one of the most challenging tasks I have been involved in. An average of two-thirds of the villages of Chokwe and Chihaquelane could not be accessed by road during the rainy season and half of the population in the area was living below the poverty line. We were determined though to effectively deliver aid to these vulnerable villages."*

"*Limited access to the affected areas continues to be one of the challenges that affect humanitarian response operations, During my involvement in the response operations after the*

*Lucungo river basis flooding, which seriously damaged a large number of roads and bridges, especially in Zambezia, 70% of the province was unreachable by road.*"

These comments provide an indication of the activities of the UNWFP during disaster operations. There also have been continued attempts of ensuring the implementation of supply chain management best practices during relief operations. Some of the practices adopted will be discussed in the following sections of this study.

## 5.4 IN-DEPTH INTERVIEW DATA ANALYSIS

The data collection technique that has been used for this research study is thematic analysis. This technique requires that the different data sets be grouped into specific themes, categories and codes. This then allows for the important subjects that arise within the transcripts to be individually identified, investigated and discussed (Baxter and Jack, 2008:548). This has the benefit of sufficiently providing an accurate response to the objectives and questions of the research study. A thematic map has therefore been designed to identify and discuss all the themes, categories and codes that are reflected within the data sets. The themes created are directly related to the broader research question that involves an exploration into the supply chain management best practices that are currently implemented by the UNWFP during their humanitarian disaster operations in southern Africa.

One of the advantages of the thematic approach is that it can identify all the different themes that arise within the data. In this case the themes displayed in the thematic map are grouped into two, namely, the CSFs and the pillars of supply chain best practices. In this way all the supply chain best practices that are implemented by the organisation are clearly reflected. The CSFs offer an in-depth account of some of the variables which the organisation focuses on when delivering its disaster operations, including how they manage these success factors in order to achieve supply chain excellence. The group of supply chain management pillars was created in order to give an account of the main concepts of supply chain that the organisation focuses on when structuring their supply chain management practices. These two thematic groups have been drawn from the data provided by the participants of the UNWFP and also from the secondary data sources.

The following sections of this chapter provide a detailed account of the thematic map, which is a display of the two main groups and the themes, categories and codes of data that have been

formulated. This provides a rich picture of the main issues that have been highlighted and also ensures that the objectives of the study are achieved. Figure 5.1 below is the thematic map showing the two groups of themes, namely, the CSFs and the pillars of supply chain practices.

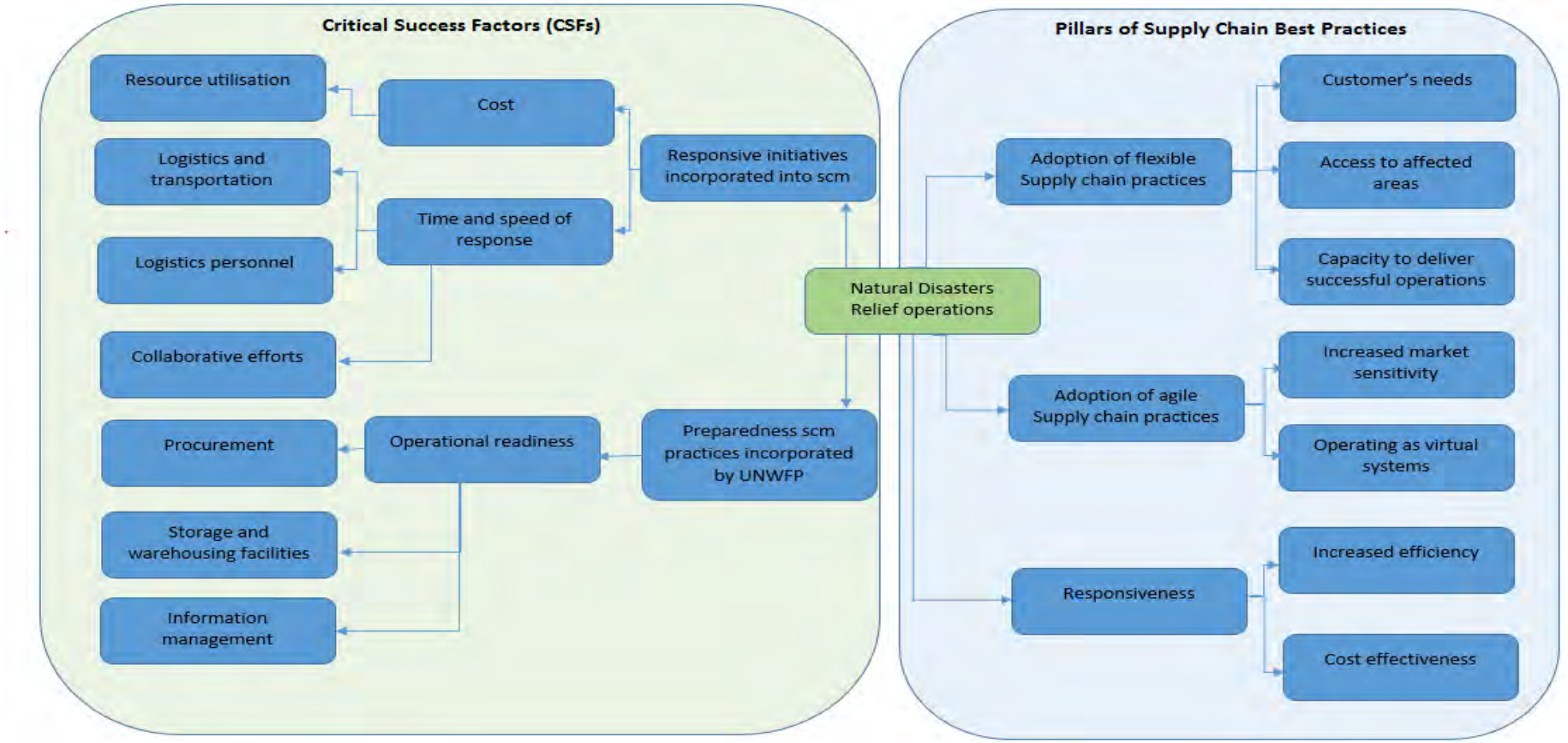



**Figure 5.1: Thematic Map**

These groups highlighted in Figure 5.1 are discussed in the sections that follow and, in order to provide an accurate account of the data provided, verbatim quotes from the interviews are given.

## 5.5 CRITICAL SUCCESS FACTORS

There is a need for organisations to identify the CSFs that influence their ability to achieve their objectives. Therefore organisations need to make sure that their supply chains have been designed in such a way that they are able respond to 'customers' during disaster operations. CSFs are described by Pettit and Beresford (2009:452) as the areas within a supply chain where, when overall results are satisfactory, the organisation would have performed well in the particular areas.

It is evident that there are areas of the supply chain to which the UNWFP attaches greater focus and value as they influence the outcomes of its disaster operations. The data also identified the different practices that the UNWFP implements during disaster responsiveness and preparedness. This is as a result of the different goals and objectives that UNWFP seeks to achieve within these phases. The main CSFs of the UNWFP are displayed in the map illustrated in Figure 5.2, and these individual success factors have been identified as the main themes.

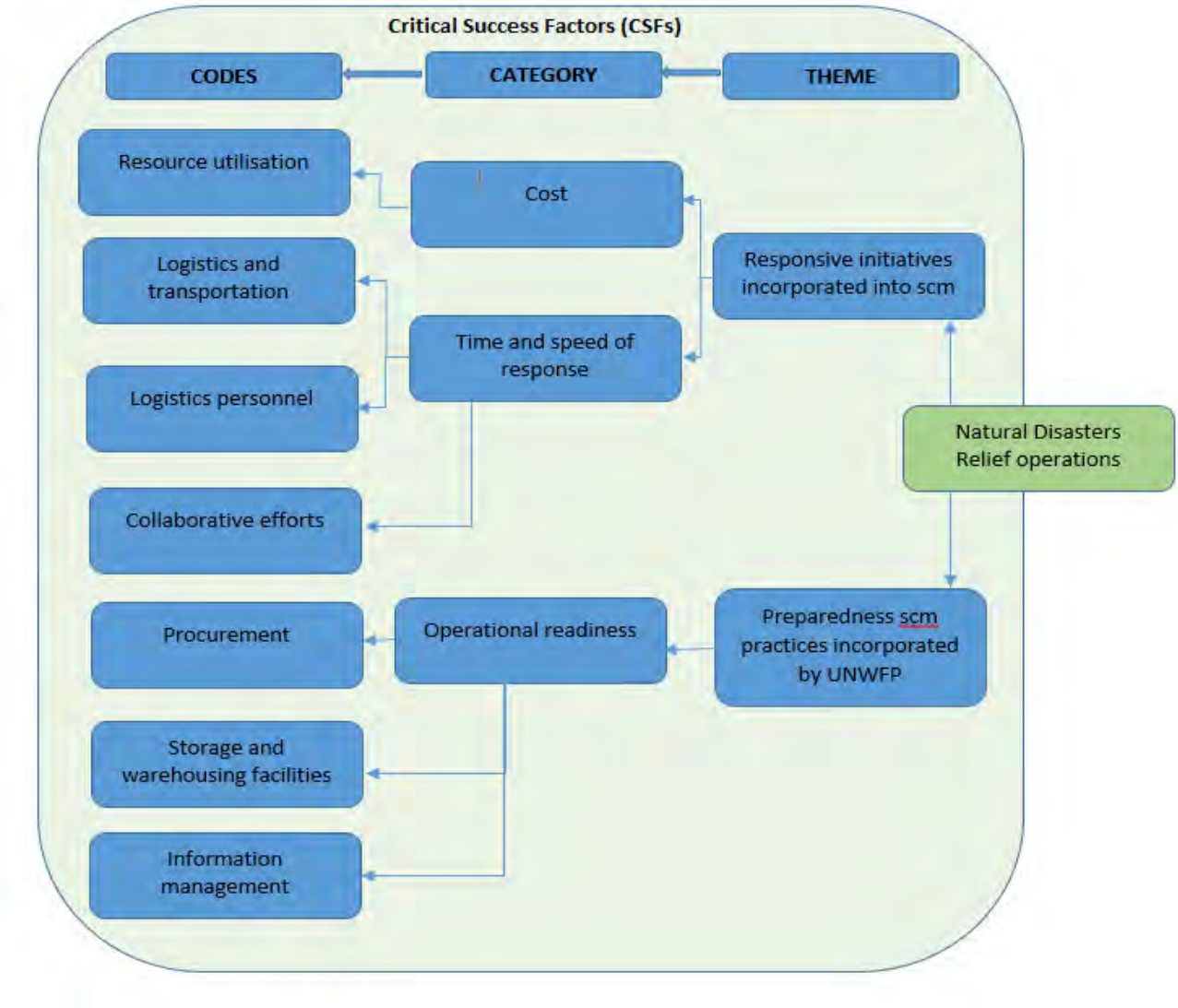



**Figure 5.2: Map showing the CSFs**

### 5.5.1 Theme 1: Responsive initiatives incorporated into supply chain management

When performing natural disaster operations there are responsive initiatives that the UNWFP pays particular attention to, more especially with onset natural disaster occurrences. This has been identified as one of the important themes prominently appearing within the data sets. It is related to the efforts made by UNWFP in ensuring that it is in a position to conduct operations that are responsive to natural disaster occurrences.

There are occurrences that are sudden and that allow UNWFP little or no time for preparation and therefore there is a need to be always ready to initiate immediate response operations. This means that there are CSFs that UNWFP focuses on in ensuring that its supply chains are highly responsive to disaster occurrences. However, in planning and implementing the responsive strategies, there are different variables that are influential, such as cost, time and speed, which have been discussed as the categories below. As mentioned previously, the thematic data analysis technique creates different chunks and sections of data in order to ensure that the main findings are properly discussed. The following section discusses the main categories and codes of the main theme.

#### 5.5.1.1 Category 1: Cost

During its natural disaster relief operations, UNWFP seeks to ensure that it delivers relief aid to the affected regions at a reasonable cost. When carrying out its mandate, the UNWFP concentrates on delivering operations as cost effectively as possible. Cost is of great significance and has been identified as one of the important categories that influence how the UNWFP decides to manage its supply chain variables and more especially the CSFs. This is illustrated in the following quotation from the Regional Logistics Officer:

"*One of the challenges that we face as an organisation is funding. We heavily depend on donor funding in order to initiate disaster operations, and most of the times funding is not sufficient, which means that we have to implement tighter measures in order to save costs*."

The discussion outlines the extent to which cost is influential in determining the disaster responsiveness decisions made in the event of a disaster occurrence. Cost and funding structures play a significant role in determining the best practices implemented by the UNWFP, particularly in a region such as southern Africa which is made up underdeveloped countries. Despite the challenges posed by the availability of funds, careful consideration has been given to ensuring that there is an emphasis on properly managing cost variables in designing their supply chains.

The participants stated that the UNWFP has put in place measures to ensure that the delays in organising and initiating relief operations as a result of the lack of funds are avoided. Some of the initiatives identified by the participants are directly quoted:

"*The UNWFP has what it terms the Immediate Response Account (IRA) which is aimed at improving programme effectiveness through ensuring that there is timely and predictable funding. This fund also allows the organisation to respond quickly to life threatening emergencies as it provides timely funding to projects."*

*"The flexibility of the IRA as a mechanism enables the UNWFP to respond to impending emergencies on the basis of funds available in the account at that time.*"

The IRA as a multilateral funding facility enables the UNWFP to provide immediate assistance in emergencies. However, with this fund the allocations are made in anticipation of donor contributions. Despite the availability of such measures to ensure the availability of funds for immediate disaster response operations, the organisation still faces the challenge of ensuring that these funds are adequate to provide for the immediate needs of the affected communities:

*"The ability to initiate successful response operations is usually limited to the amount actually available in the IRA.*"

Therefore, it can be concluded that cost and availability of funding are some of the main variables considered in initiating disaster response operations, as they influence how critical supply chain management variables are organised. The organisation also focuses on ensuring that the available resources, including funds are efficiently utilised in order for successful and sustainable relief operations to take place. Efficient resource utilisation is one of the CSFs.

- *Code 1: Resource utilisation*

Resource utilisation is explained as the manner in which an organisation achieves a desirable level of productivity through its use of resources (Simchi-Levi et al, 2008:45). The UNWFP has a diverse range of resources that it uses in organising its response operations. These resources range from infrastructural to financial resources. The goal is usually to ensure that these resources are efficiently utilised in carrying out any response operations commissioned by the UNWFP.

"*It is the responsibility of the Executive Directors of the UNWFP to ensure that they make the optimum use of all available resources encompassing commodities, cash and services as much as possible*".

The occurrence of a natural disaster always results in the UNWFP mobilising resources internally and externally in order to initiate immediate disaster response operations. All the participants indicated that there is usually a shortfall in terms of the resources needed to conduct response operations, especially in the event of disaster occurrences of high intensity. The UNWFP, through its various disaster response teams, ensures that it implements supply chain management systems for effective response that are cost effective and can provisionally address the needs of the affected communities.

The regional logistics officers alluded to the fact that during the initial stages of disaster response, cost effective, efficient logistics and transportation initiatives are implemented, so that they are able to provide aid to the affected communities despite the limited amount of resources available.

#### 5.5.1.2 Category 2: Time and speed of response

Time and speed of response are vital when responding to any disaster occurrence. These factors are influential in determining the manner in which the UNWFP designs its supply chain management variables. These factors are jointly identified as the critical factors that determine the success of response operations carried out by the organisation. A number of participants acknowledged that time and speed are important in ensuring that the organisation conducts effective response operations:

"*...Our core function is effective response to emergencies, and therefore speed, coherence and appropriateness of response are important in saving lives and alleviating suffering. The use of measures that allow for timely decision making and speedy response are implemented.*"

"*In the event of a sudden natural disaster occurrence the clock starts ticking, time is often our worst enemy. Therefore being as prepared as possible is a top priority for UNWFP.*"

The UNWFP has mainly focused on ensuring that it delivers response operations at the right time and speed. Therefore the individual codes discussed below will offer an insight into how this has

been achieved through the logistics and transportation, logistics personnel and collaborative efforts that the organisation has actively managed as its CSFs.

- *Code 1: Logistics and Transportation*

Logistics and transportation are considered as some of the main determinants that the UNWFP focuses on in ensuring that it delivers responsive disaster operations. Almost all the natural disaster occurrences conducted by UNWFP require the movement of material supplies and personnel or equipment from different locations to the affected areas. The functions carried out by the organisation during response operations have been clearly stated by some of the participants in the following quotations:

*"I am of the belief that logistics is at the core of UNWFP operations. In southern Africa we have distributed over a million metric tonnes of food, and we have faced the growing challenges of having to reach an estimated average of 30 million beneficiaries across some of the toughest terrain in the region."*

*"The basic objective of the logistics and transportation effort of the organisation is to ensure that the commodities are transported in the most efficient, timely and cost effective manner."*

Given this task, the UNWFP ensures that it properly organises its logistics and transportation through the use of competent strategies. An example is its management of an efficient and timely logistics and transportation service through investing in 60 aircraft, 40 ships and 5000 trucks which can be operated on any day at any time, resulting in the ability to manage large scale and complex operations effectively. Because of its diverse pool of logistics and transportation infrastructure, UNWFP is in a good position to respond to any form of disaster occurrence within the region, as stated by one of the participants:

"*During our response operations in Mozambique during the 2012 floods, the road network was impassable and hampered access to the affected communities. Air transport was then deployed which presented the fastest way in which we could transport humanitarian supplies and personnel to the affected areas at the minimum possible time."*

One of the practices implemented by UNWFP in its attempt to influence the speed of responsiveness, despite the nature and capacity of disaster operations, is the use of the logistics cluster approach. The logistics cluster involves a number of humanitarian organisations which are actively involved in the region and which coordinate logistics and transportation efforts in order to improve responsiveness. This approach and how it influences disaster responsiveness is best described by highlighting the statements of some of the participants:

*"In ensuring that life-saving humanitarian supplies reach the affected communities at the right time and at the right quantities, the Logistics Cluster provides effective coordination of the logistics sector and augments logistics infrastructure in providing essential logistics services for the humanitarian community as a whole."*

"*As the global leader of the Logistics Cluster, the UNWFP is responsible for ensuring that there is a coordinated, efficient and effective logistics response for each emergency."*

In addition to its transportation and logistics infrastructure, the organisation depends on the partnerships that it creates with various logistics and transportation service providers who are able to offer their level of expertise, especially during relief operations involving complex environments. Some of the organisations that have partnered with UNWFP include DHL, TNT Logistics and various other prominent transportation and distributions organisations.

A summary of some of the steps put in place by UNWFP in order to ensure that they attain a desirable level of timely responsiveness through their logistics efforts include:

- The use of the United Nations Humanitarian Air Service (UNHAS), which is useful when transporting life threatening supplies quickly to inaccessible and remote areas and also efficiently positions relief workers in the affected areas.
- The utilisation of the United Nations Humanitarian Response Depot (UNHRD) network, in its attempt to reduce its response times when moving supplies across regions. The UNWFP has been working towards reducing its response time through establishing strategic locations across the world for storing essential relief supplies.

- *Code 2: Logistics personnel*

One of the underlying determinants of the speed of response for UNWFP is the availability of experienced and competent logistics and humanitarian personnel. The organisation has made efforts to ensure that, in any disaster response operation it conducts, it has access to a large pool of experienced personnel which it can utilise.

Some natural disaster occurrences are overwhelming due to their nature and the magnitude of damage caused usually results in organisations failing to successfully initiate timely and responsive operations. The UNWFP prides itself on having a diverse pool of personnel within its different national, regional and international offices, estimated to be 11 500 in total, who are trained to respond effectively to any form of natural disaster occurrence. One of the participants described one of the measures taken by the UNWFP in ensuring that their speed of response operations is enhanced by experienced logistics and supply chain personnel:

*"The organisation usually maintains emergency staff rosters and stand-by partnerships, and these can be easily deployed to kick start logistics operations in the event of a sudden disaster occurrence."*

*"As an organisation we keep an updated list of all the employees who have a significant level of experience when dealing with certain natural disaster occurrences. These are called upon on assignments when the need arises in the affected regions and these employees will have to be available within 48 hours."*

During the process of data collection some of the personnel had just arrived in the Johannesburg regional offices after having been deployed on assignments to Mozambique which involved response operations in the flooding areas, while others had been deployed to Liberia and other West African countries affected by Ebola.

- *Code 3: Collaborative efforts*

Collaborative efforts are essential in ensuring that response operations are successfully carried out. The UNWFP considers partnerships with the government and other humanitarian organisations during its response operations as the only solution for ensuring that these

operations are coordinated, immediate and timely. A number of the statements by the participants indicate clearly why the UNWFP has invested in collaborative efforts:

*"…. As an organisation we are not able to successfully deliver response operations on our own. Therefore we have five types of collaborative partnerships that we strive to create and maintain in the event of a disaster occurrence; these are with national governments; other NGOs operating in the area; other UN based organisations such as the Food and Agricultural Organisation (FAO); the International Fund for Agricultural Development (IFAD); and corporate partners who have more expertise in areas such as communication technology, logistics and information management."*

Collaborative efforts involve ensuring that agreements have been reached with the different governments so that the supplies that need to be transported during the operations are able to move from one area to another with minimum or no interference from government. The UNWFP also ensures that, with immediate and sudden disaster occurrences, it explores all the avenues possible in order to gain access to all the information that can be of assistance when structuring their response operations. They also concentrate on collaborating with other organisations that are actively involved in the region in order to utilise some of the competencies offered by these partners.

The UNWFP as an organisation holds the vies that successful natural disaster operations can only be achieved when the right information, right infrastructure, right personnel and the right policies are in place, which can be attained through maintaining collaborative efforts and partnerships.

### 5.5.2 Theme 2: Preparedness supply chain management practices incorporated by the UNWFP

The second relevant theme within the group of CSFs pertains to the supply chain management practices that the UNWFP implements in order to be better placed to respond to any natural disaster occurrences through adequate preparation.

The first theme looked at the response practices that the organisation puts in place when faced with sudden disaster occurrences where it would not have had enough time to prepare for the disaster operations. However, in this second theme, most of the factors outlined are the initiatives that UNWFP has put in place in order to properly respond to any approaching disaster occurrences. This theme puts into perspective the various factors that enhance the supply chain readiness of the UNWFP as it carries out a detailed risk analysis of the diverse factors that can be credited to its success during natural disaster operations. The following discussion outlines the steps that are usually taken before a disaster occurrence and how these are managed when a disaster occurs.

The category discussed under this theme is operational readiness, as this is the underlying objective which the UNWFP seeks to achieve in implementing various preparedness measures. The main supply chain variables that are critical in achieving this include procurement, storage and warehousing facilities and information management. These therefore form the main codes that will be discussed in giving an account of the major supply chain practices that are influential in determining the success of disaster operations.

#### 5.5.2.1 Category 1: Operational readiness

Operational readiness is a desired variable which the UNWFP always seeks to attain in order to enhance its ability to carry out disaster operations successfully. This implies that all its efforts are aimed at ensuring that all supply chain management related variables are properly planned, configured and arranged in order to be able to withstand the challenges posed by disaster occurrences of any nature, volume or magnitude. The data findings have provided an insight into the CSFs considered by the UNWFP as being influential in determining its state of operational readiness. That the organisation attaches much importance to its preparedness initiatives can be observed from the extracts below directly quoted from some of the participants:

*"... for us being prepared would mean that we have the right information to take good decisions at the right time."*

*"…….preparedness in our context means that we have the right plans in place in order to deliver help quickly and more effectively."*

*" ... being prepared means reducing the risks posed by disasters, this being the main priority of the WFP."*

*"With corporate emergencies, there is usually the requirement of an activation of temporary emergency response procedures, systems and tools which the organisation would have prepared in anticipation for such occurrences"*

It is clear from the statements made by the participants, that preparedness is considered as the foundation of supply chain excellence at UNWFP. Hence the organisation has constantly implemented supply chain management related practices that emphasise preparedness and operational readiness in areas such as procurement, storage and warehousing and information management, the main codes of the theme that are further discussed below.

- *Code 1: Procurement*

The UNWFP purchased an estimated 2.2 million metric tonnes of food commodities valued at USD 1.25 billion in 2014 for use during its food assistance operations in 73 countries. During natural disaster occurrences there is usually little or no time available to carry out the procurement process for any relief supplies needed. Therefore, in order to address this challenge the organisation has identified possible ways in which it can properly manage the procurement process. The participants indicated that the UNWFP generally is of the belief that any successful relief operation involves a consistent and uninterrupted supply of relief items to the affected areas. This is achieved through implementing preparedness measures within the organisational procurement system.

The understanding is that there are longer lead times associated with identifying a need, procuring the supplies and delivering them to the affected areas, which usually results in failure to initiate quick response operations to save lives. The discussions pertaining to procurement therefore involved a description of the initiatives to ensure that in the event of a disaster occurrence the organisation is always able to maintain a regular and uninterrupted flow of supplies from suppliers to the affected communities. Some of the initiatives adopted reported on by the participants are outlined in the statement below:

*"Whenever possible we purchase food and disaster supplies from the local markets, it is through our regional and country offices that we identify a potential pool of suppliers for critical items such as rice, wheat, maize, sorghum and millet, so that when the need arises, there are always suppliers available and who are closely located to these affected areas."*

*"We have developed innovative approaches in order to ensure that there is a steady and constant supply of relief supplies. Food supply agreements are one example that come to mind, and these allow us to be able to enter into agreements with supplies before a need arises and it is through these that we have gained significant cost savings as an organisation."*

These statements suggest some of the steps that the organisation takes in carrying out its procurement and ensuring that it is prepared for any natural disaster operations. The sourcing strategies adopted by UNWFP can be summarised as being driven by:

a. **Seasonal purchases and blanket orders-**for commodities that the organisation has rapidly been using in the region. These include rice, wheat, sorghum and millet of which the UNWFP arranges for seasonal purchases through blanket orders. In this way the supplies can be accessed or requested from the suppliers whenever a need arises.
b. **Local and regional procurement–**whenever possible the organisation prefers that all the relief supplies that it uses during response operations be sourced locally or regionally so that it minimises the delivery lead times. This has seen the organisation developing a diversified supplier base which includes small holder suppliers who appear on the national government databases.
c. **Grounded on market intelligence–**the organisation ensures that it properly carries out detailed market intelligence and selects suitable suppliers based on their levels of quality and also on the exact needs of the different communities at risk of being affected by disaster occurrences. This implies that when a disaster occurs UNWFP goes ahead with its procurement instead of deploying assessment teams because the market intelligence gathering would already have been carried out (forward forecasting and planning).
d. **Optimal price, contract and market mechanisms-**in order to ensure that the organisation gets the right price for the relief supplies that it procures, it enters into strategic contracts with different suppliers through strategic contracts.

During the discussions it was also determined that there are minimum preparedness actions (MPAs) that the UNWFP follows when carrying out its procurement: these are illustrated in Table 5.4:

**Table 5.4: Minimum Preparedness Actions**

| Food Procurement | | | | |
|---|---|---|---|---|
| No. | Minimum Preparedness Actions (MPAs) | Done | Deadline set | To be initiated |
| 1 | Identify the type and quantity of food that can be rapidly procured, borrowed and processed locally and regionally. | | | |
| 2 | Monitor the prices and availability of the main local food commodities. | | | |
| 3 | Compile a list of existing and potential local food suppliers, including private traders, parastatal organisations and national strategic grain reserves. | | | |
| 4 | Ensure that contact has been established with national authorities regarding import and export restrictions, local legislation, and the availability of local product specifications. | | | |
| 5 | Ensure that the staff beyond the procurement team are familiar with rules governing local purchases. | | | |

[1]

- *Code 2: Storage and warehousing facilities*

Without any reasonable doubt being prepared for any natural disaster occurrence means that the UNWFP is in a position to respond sufficiently to the needs of the affected communities through the provision of all the necessary relief supplies. When a disaster strikes, the organisation ensures that it has all the resources needed and also that these critical items quickly reach the affected communities. Steps involving the strategic pre-positioning of stocks, such as operations support equipment, food and non-food item, allow the organisation to deliver timely aid to the affected areas when required.

In order to enhance its preparedness and readiness for responding to disaster occurrences, the organisation is actively involved in managing the UNHRD. The participants described this as a

[1] Minimum Preparedness Actions (MPAs) provided by one of the participants through referring the interviewer to a UNWFP Preparedness Handbook.

major initiative in which the organisation has invested so as to ensure that it is prepared to initiate and conduct successful disaster operations. The concept is briefly described in the following extracts:

"*With an increasing number of disaster operations that we conduct on an annual basis in the region, pr-epositioning of support equipment and stockpiling of relief supplies such as medical kits, food items, operational support equipment and shelter items has been the only possibility towards strengthening and enhancing organisational response efforts in the event of a disaster occurrence."*

*"The UNHRD network managed by the WFP is a preparedness initiative that ensures that sufficient supplies are stockpiled in strategic areas to support relief efforts."*

The UNWFP makes strategic decisions that affect its global operations and this means that response operations conducted in southern Africa are also influenced by the decisions regarding the location of global warehouses. The strategic hubs created by the UNWFP are based in Ghana, the United Arab Emirates, Malaysia, Panama, Italy and Spain. They are located in close proximity to areas that are prone to disaster occurrences and also close to transport networks such as airports, ports and main roads. This has resulted in the increased ability of the organisation to conduct quick response operations as discussed by the participants:

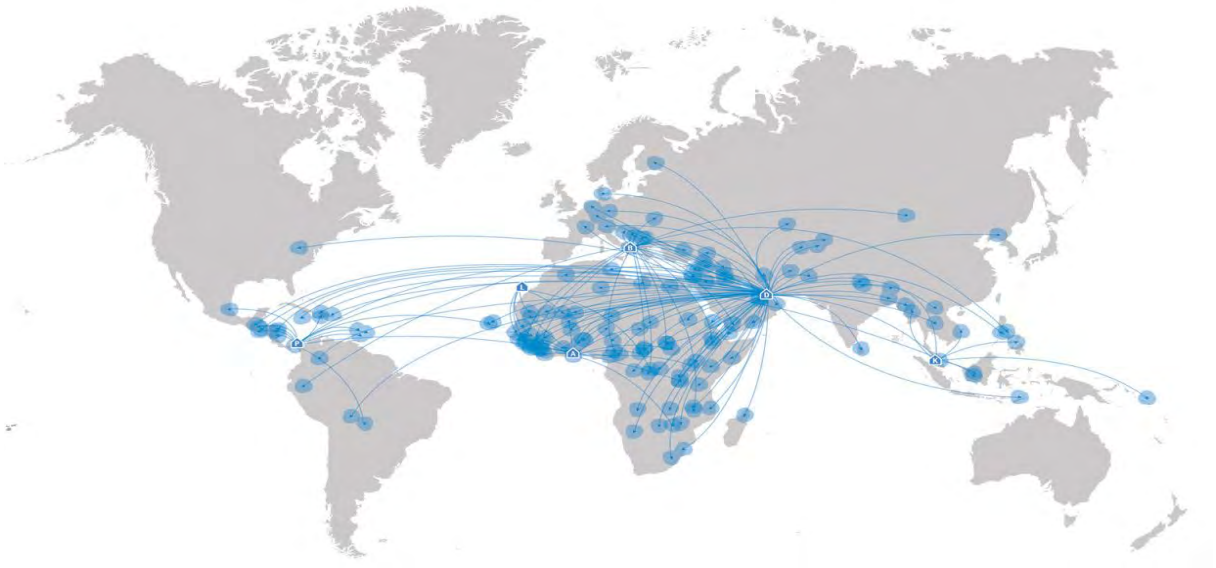
*"Our pro-active positioning of supplies allows us to be able to deliver relief items to the affected areas in any part of the region within 24-48 hours."*

Among some of the benefits that the UNHRD concept gives the UNWFP include the immediate mobilisation of relief items, cost efficiencies through the use of a single network of procurement, deployment of relief supplies and harmonisation of relief items where relief actors are able to lend and borrow items among themselves when needs arise.

Figure 5.3 provides a display of the movements involved in the delivery of essential relief supplies from different strategic locations within the regional Bureau of Southern Africa, which

encompasses Lesotho, Madagascar, Malawi, Mozambique, Namibia, Swaziland, Zambia and Zimbabwe.

**Figure 5.3: Operational highlights of emergency response shipments into Southern Africa**[2]



The use of strategic prepositioning locations has been one of the main areas of success for the organisation during disaster operations as discussed during the interview sessions:

"*Our latest response operations in the region involved the provision of supplies to the communities of Mozambique who had been affected by floods. A number of supplies were delivered within 24 hours after the government had issued an appeal. Immediate supplies were requested from Accra and thereafter more supplies were received from the other storage facilities giving the UNWFP the ability to sustain the relief operations."*

[2] Figure 5.3 has been provided by one of the participants as it gives a detailed illustration of the positioning of strategic warehouses and how these serve in addressing southern Africa natural disaster operations.

- *Code 3: Information management*

In order for the UNWFP to enhance its ability to be readily prepared to initiate successful natural disaster operations, measures to encode and decode information relating to disaster occurrences have been implemented. To ensure successful disaster operations an organisation has to be able to use the information sources relating to a disaster occurrence properly and structure and organise its response strategy accordingly. As stated by one of the participants:

*"Being prepared for disaster occurrences is our top priority at the UNWFP, and therefore it is important that we have the knowledge of all the facts and figures involved in order to make the best decisions."*

*"Our response operations are designated on the basis of proper analysis of five specific variables: scale, complexity, urgency, capacity and reputational risk. Therefore there are efforts that are continually being made towards gathering information pertaining to different variables that need to be analysed before initiating disaster operations."*

It was also indicated that proper management of information relating to the disaster occurrence has been the only tool by means of which the organisation initiates successful disaster operations. To be prepared for disaster operations, the organisation has invested in forecasting measures that can identify the nature and magnitude of the approaching disaster occurrence, the impact that it might have and the communities that would be affected. Some of the measures aimed to achieve such early warning systems and rapid impact analysis have been summarised below:

i. Early Warning Systems (EWS)

In the case of predictable natural disaster occurrences such as earthquakes and floods, warning flags are considered as the best defence that the UNWFP has towards a disaster occurrence. Proper technological systems able to determine the magnitude of an approaching natural disaster are implemented. Through these systems the organisation is able to collect and analyse information pertaining to natural and man-made hazards. Therefore, from a preparedness perspective, after having determined and accessed the trends associated with a specific disaster

occurrence, the organisation is then able to either mitigate or initiate timely response operations that will match the needs arising from this occurrence:

*"One of our comparative advantages lies in our ability to perform early warning and hazard analysis, which is essential for emergency preparedness."*

The UNWFP has also developed an Inter-Agency Standing Committee (IASC) Humanitarian early warning service, HEWSweb, which is the platform for global humanitarian early warning. Data mining efforts have also been incorporated through partnering with research institutions, and it is through these efforts that the organisation is able to put in place proper measures to address the specific needs likely to be created by the disaster occurrence.

ii. Rapid impact analysis

Technological devices have been incorporated in order to predict some of the approaching disaster occurrences. O of the participants had this to say regarding these measures:

*"… The unpredictable weather patterns brought by climate change mean that more and more people will continue requiring assistance from the UNWFP, and therefore in order to ensure that we deliver excellent response operations we need to be able to track approaching disaster occurrences and prepare for them."*

*"As the WFP we keep thinking ahead in order to be prepared to help, and for this to be achieved we have made efforts in ensuring that we have all the information that may be useful in initiating disaster operations."*

There are emergency assessment teams that are periodically sent to the different disaster prone areas in order to gather information that will be useful during the disaster operations. For instance teams have been deployed in flood risk areas such as Mozambique and Madagascar, their role being to collate all the information that is deemed important for future flooding occurrences in the region.

Although it is still a challenge to quantify the exact damage caused by a natural disaster occurrence, the organisation has developed a reliable emergency assessment team that is

immediately deploys to assess and quantify exactly what relief supplies will be needed, for how many and for how long. The information gathered by the team is used in drawing up the emergency operations (EMOP); the information provided describes who gets the assistance, what rations and portions are given and also the type of transport that can be used. The organisation has therefore invested its efforts in training and improving the skills of the assessment teams in order to ensure that they are always ready to perform their tasks competently.

The use of ICT tools is also identified as one of the success factors enabling the organisation to respond efficiently to disaster occurrences. Expert engineers from the Fast Information Technology and Telecommunications, Emergency and Support Team (FITTEST) are always available to be dispatched to emergencies with all their equipment so as to ensure that communications are enabled within 48 hours of a disaster occurrence, to allow for the proper co-ordination of activities.

This section of the findings has provided an account of the CSFs of supply chain management that influence the ability of the UNWFP in being prepared for natural disaster occurrences. The main issues discussed have involved procurement, information management, storage and warehousing initiatives, all of which are intended to enhance the operational readiness of the organisation to deliver relief aid.

## 5.6 PILLARS OF SUPPLY CHAIN MANAGEMENT BEST PRACTICES

The main research objectives of this study are to provide insight into the supply chain management best practices that are implemented by the UNWFP in order to achieve successful disaster operations. This section lists some of the important pillars of supply chain management best practices that have been mentioned during the interview sessions. These pillars influence the approach that the organisation has taken towards designing the different supply chain management activities in which it conducts during disaster operations.

The thematic map presented in Figure 5.4 provides insight into how the UNWFP has been able to initiate supply chain best practices. The best practices implemented ensure that the supply chains incorporate flexibility, agility and responsiveness. As indicated earlier (Chapter 3), the

organisation has implemented practices aimed at ensuring that disaster operations are effectively carried out and therefore the different practices adopted have been aimed at ensuring that UNWFP supply chains are flexible, agile and responsive. This section therefore seeks to provide further insight into the positive outcomes associated with the adoption of supply chain best practices that are flexible, agile and responsive. In essence this gives a rich description of what the UNWFP has attained in properly managing the various CSFs that are influential in its supply chains.

The thematic map in Figure 5.4 provides a detailed illustration of the specific factors that the organisation achieves through its implementation of supply management practices that are motivated by flexibility, agility and responsiveness.

### 5.6.1 Theme 1: The adoption of flexible supply chain management practices

The level of complexity of some of the environments in which the UNWFP operates has been influential in driving it to adopt flexible supply chain practices, in order to ensure that it effectively responds to the growing number of diverse natural disaster occurrences in the region. The UNWFP takes a strategic approach in ensuring that it incorporates supply chain management practices to influence improved flexibility positively during disaster operations periodically carried out.

As previously stated, in southern Africa UNWFP is actively involved in assisting communities in various remote areas affected by flooding, epidemic outbreaks and droughts. For the UNWFP adaptation in these different conditions is attained through ensuring that flexible supply chain practices are adopted. The organisation therefore prides itself on the firm commitments it has made in being actively engaged in fragile environments despite the challenging circumstances it encounters.

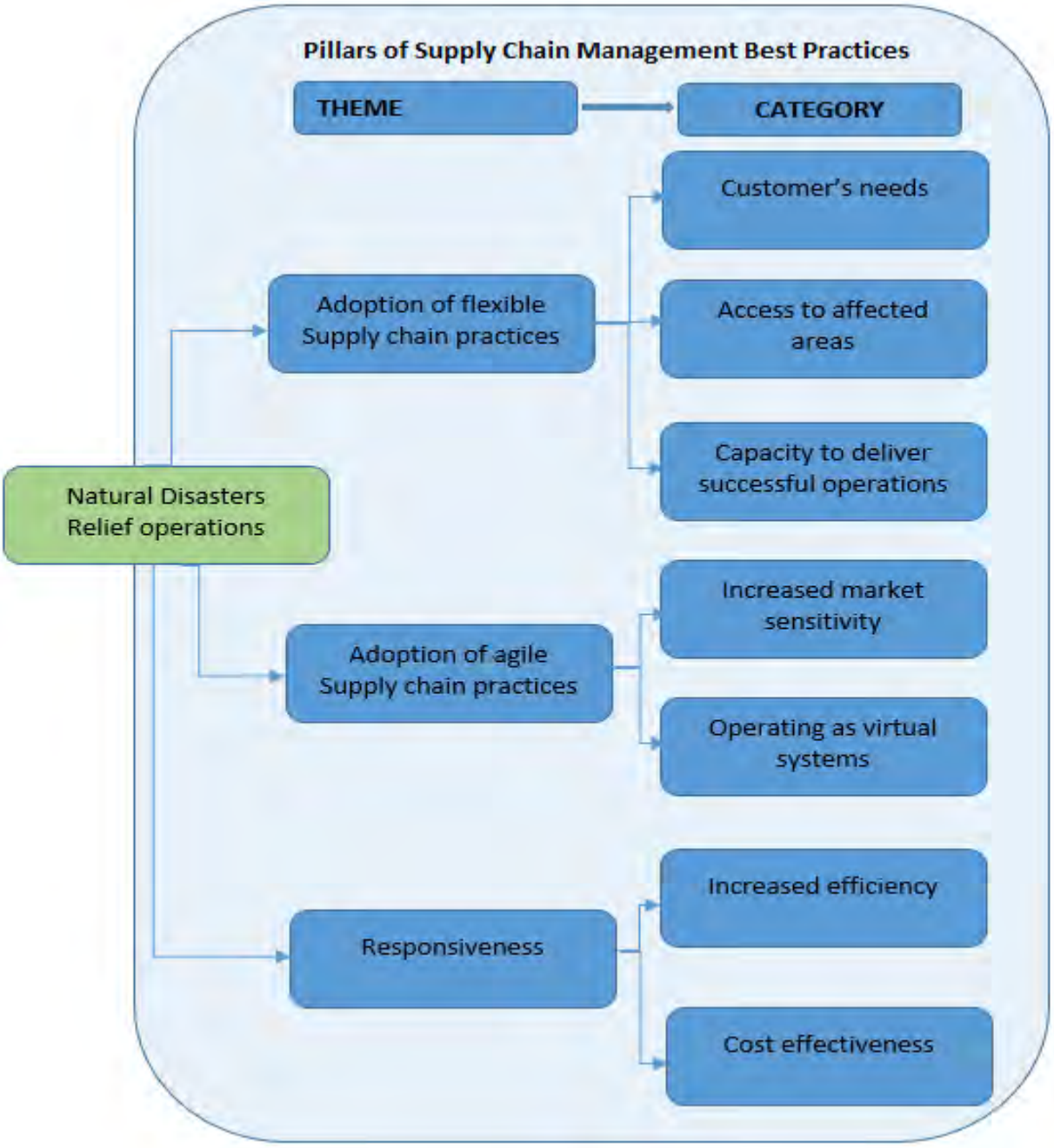



**Figure 5.4: Thematic map illustrating pillars of supply chain practices**

The range of flexible supply chain management practices that the organisation has adopted mainly encompasses its policies pertaining to how it manages partnerships created with other

stakeholders and the infrastructure in which it has invested. These initiatives ensure that the organisation achieves specific variables that are important in ensuring that disaster operations are successful. Some of the main areas that are illustrated and discussed below include the ability of the organisation to meet intended customer needs, access to the affected areas and the capacity of the organisation to address disaster occurrences. These main categories are dealt with in the sections that follow and describe how being responsive ensures that the UNWFP effectively delivers successful and efficient disaster operations.

#### 5.6.1.1 Category 1: Customer/beneficiary needs

Fulfilling the needs of the affected communities is the core objective of the organisation, and this is primarily achieved through the implementation of flexible supply chain practices. The focus of the UNWFP is on delivering food supplies and other related disaster needs to the right communities at the right time and ensuring that there are sufficient staff and materials available to send to these affected areas. The core objective aims at ensuring that services and infrastructure support are provided to all the affected and vulnerable communities.

Many efforts and examples were discussed and illustrated by the participants and they give a good indication of the efforts made by the UNWFP towards improving customer/beneficiary responsiveness. The UNWFP considers all its beneficiaries as the main target customers as all efforts and attempts are directed towards them with the goal of fulfilling their required needs. For example, in 2012 the UNWFP distributed an estimated 230, 862 metric-tonnes of food to 5,347,786 million beneficiaries. These figures have been gradually increasing with time, implying that the beneficiaries of the services and support offered by the UNWFP has increased. In order to have a positive influence in responding to these rising disaster occurrences and beneficiary needs, the organisation has taken the approach of addressing the specific needs of communities and beneficiaries individually.

Some of the verbatim quotes extracted from the various participants are included below in order to demonstrate how the disaster operations conducted by the organisation are sensitive to various customer needs:

*"As an organisation we have adopted a beneficiary focused approach, which is driven by being sensitive to all the needs of the communities that we are involved in. One of the key policies that we used during the Zambia food crisis (drought) involved '**cash and vouchers'.**"*

The cash vouchers have mainly been used in areas that have been hard hit by food shortages (droughts); these are usually a substitution for the traditional ways of providing food and are considered as being more flexible. The cash transfers and vouchers can be used by the beneficiaries in getting the type of supplies that they require from the selected shops/outlets. These are, however, used only in environments where access to food rather than availability is the problem. Through this the UNWFP has been able to provide the financial means by which beneficiaries can get their preferred supplies in order to satisfy their individual needs. It has also resulted in an improved speed of response since processes including procurement, transportation and distribution are eliminated.

All the attempts made by the organisation to transform supply chain management variables, such as procurement, warehousing, distribution and supplier management, are aimed at ensuring that it is able to initiate operations that are relevant to the affected areas. Some of the participants had this to say:

*"Following the floods in Malawi the UNWFP delivered daily food rations of 200g High Energy Biscuits (HEB) to 14,000 households (77,000 people) identified as being the most vulnerable. This was successfully conducted and each person at one point was given supplies to cover them for five days."*

*"The UNWFP has been involved in different projects aimed at improving the livelihoods and reducing the vulnerability of communities during natural disaster occurrences. Some of our main activities involved attending to the needs of communities affected by severe droughts in Chikwawa in Malawi, as well as the flood affected areas in Mozambique. The needs of these communities were very different ranging from the need for water, food items and sanitary supplies."*

The different challenges caused by flooding, droughts and epidemic outbreaks usually result in a rising demand for various relief supplies such as high energy biscuits, maize, wheat, sorghum

and many other cereals. Through its different policies the UNWFP ensures that it addresses the different needs of beneficiaries. The organisation essentially is responsive to the needs of its intended beneficiaries through its strategic policies, including improved efforts to assess the needs of the affected communities and also to improve emergency communications. Efforts continue to be made to ensure that all the natural disaster occurrences that are experienced in the region are properly managed through carrying out proper assessments and information management in order to understand the needs of the beneficiaries and thereby promptly address them.

#### 5.6.1.2 Category 2: Access to the affected areas

One notable impact of disaster occurrences is the amount of infrastructural damage which they cause, such as the disruption of railway systems, bridges, roads, public dwellings and port systems. This effectively means that UNWFP struggles to gain a safe passage to provide aid through distributing relief supplies to the affected areas. The organisation, however, manages to counter these conditions through a highly advanced transportation and logistics infrastructure that enables it to be more flexible in accessing different areas affected by various natural disaster occurrences. Considering that disaster occurrences are of different impacts and magnitudes and that they often occur in secluded and remote areas, this means that the organisation must be in a position to access all the affected populations in the least possible time to avoid increased suffering. The successes have mainly been attained as a result of the implementation of measures such as the use of the UNHAS (air services) and the Rapid Response Mechanism; these successes have improved the ability of the organisation to access various areas. In this context, the following are some quotes from the participants:

*"....the UNHAS programme has allowed UNWFP provision for access into important priority destinations enabling humanitarian staff to begin the work of assessing needs and initiating timely response operations."*

*"There is an integrated Rapid Response Mechanism that ensures that teams of humanitarian personnel are mobilised and flown into the most remote areas of southern Africa, so as to provide urgent humanitarian supplies."*

*"Usually in areas where our access is compromised, the use of airdrops is considered and many other available modes of transport that enable the UNWFP access to its intended beneficiaries."*

*".. one particular instance that comes to mind are the South African helicopters and cargo planes that were dispatched after Cyclone Galifio. These played an important role during the emergency relief operation in distributing aid to areas that were still inaccessible due to the flood waters."*

Accessibility for the UNWFP is mainly achieved through a diversified pool of transportation infrastructure, which allows the organisation to be able to access the different areas in which a natural disaster would have occurred. Other determinants of access to affected areas include the ability of the organisation to identify the affected areas through effective information management and also the collaborative efforts offered by the other partners through the cluster approach. These have a positive contribution towards ensuring that the flexible approaches implemented enhances the organisation's access to all the affected areas.

#### 5.6.1.3 Category 3: Capacity to deliver successful operations

It has become clear that UNWFP, as a result of adopting flexible supply chain management practices, is able to handle disaster operations of varying capacities. The participants explained capacity as the ability of the organisation to conduct operations of different volumes, in various areas, at different times and also to provide a diverse range of services and relief supplies. This ability is mainly influenced by the increased presence of the organisation through its different centers; in southern Africa the regional office is in Johannesburg, and there are different country offices in the other seven countries in the region. These offices usually take charge in responding to any disaster occurrences within their boundaries and, if need be, other regional and international offices may assist.

For the UNWFP, capacity building is one of the main core competencies that it has achieved overtime through various tools as noted from the data:

*"Our mandate as an organisation lies in supporting natural disaster prevention, preparedness and response to vulnerable communities. We have therefore developed distinct comparative*

*advantages in areas involving analysis, capacity development and operational capacity to strong inter-agency leadership."*

*"The scale of some of the operations that we have been actively involved in in the region has been impressive, to think of the fact that we delivered timely relief support in eastern Madagascar after the occurrence of Tropical Storm Hubert, which displaced 11 000 people. With the help of the national office we managed to respond and reach out to all the affected communities within 48 hours"*

*"In one day in the town of Fort Dauphin in Madagascar after a serious cyclone, we scheduled the delivery of 73 tonnes of food aid for an estimated 21 000 beneficiaries who had been affected by the storm."*

From these comments, it is clear that the organisations' logistics capacity is able to adapt to the various levels of demand resulting from the different disaster occurrences. The UNWFP, through its different strategies in assessing disasters, moving and transporting supplies in which it has invested, is able to initiate and conduct disaster operations of different sizes and magnitude.

### 5.6.2 Theme 2: The adoption of agile supply chain management practices

This section presents another of the relevant themes that were highlighted in the data analysis. It covers a description of all the agile supply chain management practices implemented by the UNWFP during natural disaster operations. Agility is defined as representing the ability of an organisation to succeed in an environment characterised by unpredictable and constant changes (Olurontuba and Gray, 2006:116). Every natural disaster occurrence is unique and presents different challenges which the UNWFP needs to address in order to manage the relief operations successfully. Some of these challenges include insufficient funding to begin disaster operations, the weather patterns involved, accessibility, terrain and availability of resources. Implementing agile supply chain management practices at the UNWFP implies that it is able to easily adjust to the prevailing levels of unpredictability.

The UNWFP is heavily involved in ensuring that it has the ability to adapt to the changing environment since it is involved in conducting various disaster operations in different locations.

Under this theme, the main attributes that the organisation has achieved through the implementation of agile supply chain practices will be outlined. Increased market sensitivity and operating as virtual systems are the advantages that have been associated with organisations implementing agile supply chain management practices; these are discussed as the main categories of this theme.

#### 5.6.2.1 Category 1: Increased market sensitivity

Market sensitivity means that the UNWFP is able to initiate disaster operations in any location and at any given time. The ability with which the organisation is able to initiate disaster operations is heavily dependent on different factors. These factors include the availability of funds and donors to support the operations, as well as other initiatives that emphasise how UNWFP can easily respond to the increasing needs of the affected communities.

The availability of funds and donors to support response operations is most important in order to allow the UNWFP to begin a successful disaster operation. The organisation makes efforts to ensure that, despite the instability of the donor community, funds are available to support disaster operations. These efforts include forging partnerships with the corporate and public sector, who usually are the first to respond when a disaster occurs. For example, during the 2014 floods in Mozambique, the government of the Republic of South Africa was one of the first donors to pledge funds and provide military infrastructure and personnel. One of the participants indicated how consistent streams of funds and donor contributions enhance agility within the organisation's supply chain:

"*The erratic weather patterns that resulted in drought occurrences in Malawi, Zambia and Zimbabwe in 2012 resulted in the Department of Agriculture (South Africa) providing monetary aid to the UNWFP. The terms attached to this fund ensured that supplies should only be procured from small holder farmers registered with the Department.*"

Although the UNWFP sometimes receives funding that is aimed at addressing short term direct or specific relief operations, much is also credited to the speed at which it initiates general appeals to donors in the event of a disaster occurrence, as indicated by one of the participants:

*"We have multilateral contributions from donors where the UNWFP determines how these will be used and also in which specific disaster operations. In other words no particular terms and conditions are attached. This allows for increased flexibility in responding to any disaster operations."*

However, the funding element is primarily a contributor to the practices that the organisation implements to ensure that disaster operations are conducted successfully despite the uncertain and dynamic humanitarian conditions. Some of the initiatives to ensure that it improves on its agility include the pre-positioning of supplies and also the conducting of sensitivity needs assessment. These are discussed in the next section.

- *The pre-positioning of supplies:*

The pre-positioning of supplies effectively reduces risk in anticipation. Generally the UNWFP has invested in efforts to ensure that there are different hubs which it manages. These are designed to facilitate action in response operations that may present various challenges. The pre-positioning of supplies in specific locations was highlighted and discussed earlier in Figure 5.3.

- *A sensitivity needs assessment mechanism:*

The aim of a sensitivity needs assessment mechanism is to ensure that proper assessment of the disaster needs is efficiently carried out so that relevant aid is provided to the affected communities. The UNWFP has an assessment team trained and equipped to identify the needs arising after any disaster occurrence. The motivation is the fact that getting the right information regarding a disaster assists the organisation in designing relief operations suitable for the affected area. This has been summarised in a statement provided by a participant:

*"What enhances our degree of agility within our supply chains is the ability to determine (read) and respond to real demand."*

Despite the challenges associated with identifying the needs of the affected communities before initiating response operations, the UNWFP is able to directly respond to the affected communities. The organisation is able to address most of the challenges that it faces through maintaining visible partnerships as indicated in the statement by one of the participants:

*"Each disaster occurrence is unique and presents a different set of constraints and therefore in overcoming this, the UNWFP works closely with the other humanitarian organisations and partners in determining the needs and requirements."*

Agile supply chain management practices are a foundation to the success of humanitarian disaster operations because they influence the ability of an organisation in responding to various disaster operations.

#### 5.6.2.2 Category 2: Operating as virtual systems

One of the practices that the organisation focuses on which ensures that it is able to respond to the different humanitarian relief challenges has been investing in virtual systems, promoting and facilitating the effective movement and management of important information. The information ensures that specific factors related to the disaster occurrence such as accessibility, terrain of the area, the extent of the damage and the exact location are known. This also ensures that the organisation is able to track all the information that may be of benefit during disaster operations and also that its supply chains are integrated; this has seen the UNWFP partnering with GT Nexus for Logistics Visibility and Supply Network Agility. Most of the participants indicated that supply chain agility is one of the most important pillars that determine the success of the UNWFP and this has effectively been achieved through the design of proper management of networks as explained in the following statement by one of the participants:

*"The UNWFP operates a global supply chain that needs to be highly agile, meaning that there needs to be an ability to deliver the right supplies to the affected areas, the visibility of the cargo and movement of deliveries is the main variable to running an agile network."*

Some of the services provided by the system are constant updates on the status of the various shipments and the provision of relevant information to the different partners pertaining to the disaster occurrence.

### 5.6.3 Theme 3: Incorporating responsiveness into the supply chain

Responsiveness is one of the themes that have been discussed during the data collection; the UNWFP is constantly working towards incorporating responsive supply chain management practices into its supply chains. These practices influence the manner in which the organisation is able to respond to natural disaster occurrences, by conducting and delivering timely operations and also by fulfilling the exact needs of the beneficiaries. As discussed earlier in Section 5.5, the main initiatives implemented to ensure that it is highly responsive are the CSFs determining the success of relief operations.

This theme discusses the diverse advantages that are incurred by the organisation as a result of implementing responsive supply chain practices. The main categories that will be discussed in this theme in order to describe the advantages associate with responsive supply chain practices are increased efficiency and cost effectiveness. The participants provided a detailed account of how the disaster operations performed by the organisation to date have attained a desirable level of efficiency and cost effectiveness.

#### 5.6.3.1 Category 1: Increased Efficiency

The efforts that the organisation has been implementing in its supply chain focuses on ensuring that there is increased efficiency during disaster operations. Efficiency is identified as being at the heart of the organisation's work. During disaster operations every minute is vital when comes to reaching out to the most vulnerable and providing them with essential food supplies. Some of the participants had this to say about how efficiency has been attained by the UNWFP:

*"... We constantly ensure that we drive towards efficiency in an attempt to improve on our competitiveness and delivering on the trust and confidence in which our beneficiaries and donors have placed in us."*

*" ... In ensuring that the UNWFP is responsive to natural disaster occurrences, we have made strategic and critical investments in infrastructure and technology which has encouraged innovation across the organisation and has been a visible means towards fostering efficiency."*

The findings indicate that UNWFP considers efficiency as being the economic measure of how inputs and resources are converted into results. In other words, it illustrates how UNWFP is able to make use of diverse infrastructural resources and employee capability to deliver fast and timely response operations. The UNWFP, after conducting numerous disaster operations in the region, has dedicated time and effort towards ensuring that it is ready to respond efficiently to rapid onset and protracted emergencies. In enhancing its ability to be responsive, some of the activities on which it has focused include preparedness and forward planning in procurement, in shipping and transportation and also in programme implementation and distribution. Some of the critical strategies facilitating responsiveness can be derived from the statement below:

*" ..Increased access to relief personnel and supplies is very important when faced with a sudden disaster occurrence. The UNWFP's ability to efficiently respond to the growing disaster occurrences has been facilitated by the rapid response that is offered by the standby partners, humanitarian relief depots and the forward positioning of supplies."*

This section has provided an account of some of the operational advantages to the organisation as a result of implementing supply chain best practices aimed at promoting responsiveness.

#### 5.6.3.2 Category 2: Cost Effectiveness

The organisation, through implementing its different supply chain management tools, has achieved increased cost effectiveness. Although few of the participants openly discussed how the UNWFP has been able to achieve these cost benefits, this category presents it as a critical advantage that has also been enhanced by mainly responsive supply chain practices. The statement that follows has been directly quoted from a participant:

*".. our organisation remains at the forefront in terms of delivering cost-effective humanitarian assistance and continues to contribute to greater efficiency throughout the UN system."*

It is not entirely clear how the practices that UNWFP has implemented to ensure that it is responsive have resulted in cost effectiveness. The participants are all in agreement that cost is an important determinant during disaster operations and that, because of the insufficient funds available to support operations, emphasis is directed towards increased cost savings through ensuring that all the funds are put into proper use.

For example, cost efficiency has been incorporated into UNWFP procurement activities, such as the use of import parity, as explained by one of the participants:

*"…The import parity approach is aimed at ensuring that there is the efficient comparison of the local and international sourcing, delivery costs and lead times involved. Based on this comparison the organisation determines the best alternative, in cases where time is not an overriding issue, the lowest cost is chosen."*

There are many other supply chain responsive practices, such as logistics and transportation related initiatives, implemented by the UNWFP. These initiatives have effectively resulted in the achievement of significant cost savings and effectiveness. A few of these have been highlighted by the participants. For example, through the Global Vehicle Leasing Programme (GVLP) the organisation is able to reduce the vehicle procurement bill for the individual country offices. Through this, UNWFP is able to improve its response capability by increasing the number of vehicles available to assist during disaster operations. The vehicles are procured centrally by the UNWFP's International office and leased to the different country offices.

In addition, the UNWFP has also been able to improve its response capability, through the UNHAS, which is the main tool used in order to initiate timely response operations in areas that are not accessible. Cost efficiency is identified as one of the main driving factors in operating this service, as competitive bidding is exercised in selecting charter aircrafts in an effort to lower costs. It has been discovered that practices such as pre-positioning of supplies and the use of purchase agreements has resulted in significant cost efficiencies for the organisation as noted by one of the participants:

"*.. During disaster occurrences the prices of essential commodities usually rise as a result of the increase in demand. Because we have been able to identify how markets operate, our practice of prepositioning supplies and procuring supplies before a disaster occurrence has meant that we avoid the purchasing supplies at inflated prices to support disaster operations.*"

Therefore it can be concluded that the implementation of responsive supply chain practices has resulted in the organisation enjoying a desirable level of cost effectiveness.

This section has focused on providing a detailed discussion of the pillars of supply chain management that influence the supply chain management best practices implemented by the UNWFP. The main discussion areas have aimed at describing some of the positive factors associated with the adoption of flexible, agile and responsive supply chain practices.

## 5.7 CONCLUSION

The aim of this chapter was to ensure that all the research questions and objectives of the study are sufficiently answered through conducting a relevant data analysis approach. Thus, firstly, the main objectives of the study were discussed in order to ensure that the data analysis and display approach followed directly responds to the research study.

Data analysis is mainly designed to ensure that all of the secondary and primary data collected through document analysis and in-depth interviews is synthesised and interpreted in order to address the main research questions for the purposes of attaining the objectives. The thematic data analysis approach was followed which ensured that all the data sets were categorised into specific themes, categories and codes.

The aim of the research study was to provide insight into the supply chain management best practices implemented by the UNWFP during natural disaster operations. The researcher in conducting the data analysis categorised the data into two important classes. Thus, in identifying the supply chain best practices there was a firstly discussion of CSFs (CSFs), which embody all the main supply chain management practices that the UNWFP aims at successfully managing

during its responsiveness and preparedness stages. In discussing and displaying the data, responsiveness and preparedness have been the main themes discussed. Thematic analysis as explained earlier in this chapter categorises data into chunks which are relevant towards answering the objectives of the study. Thus, in further exploring CSFs, the main categories explored comprised cost, time and speed and also operational readiness. The data has been further categorised into codes, namely, logistics and transportation, resource utilisation, warehousing and storage, collaborative efforts and procurement. The use of thematic analysis has ensured that the researcher explored the CSFs implemented by the UNWFP and how these were attained.

The other class of data discussed provided a reflection on the main pillars of supply chain management that the UNWFP enforces in adopting supply chain best practices. The main themes that have been created in order to offer more insight into the subject are flexibility, agility and responsiveness. In further explaining these themes it is evident that the UNWFP has been able to incur significant operational advantages. These advantages include properly addressing the customer/beneficiary needs, improved access to the affected areas, ability to operate as virtual systems and improved cost efficiencies.

This chapter therefore has addressed the main objective pertaining to the supply chain best practices that are implemented by UNWFP during disaster operations and has also identified some of the benefits associated with the implementation of these practices. The next chapter provides a detailed discussion of the findings and provides recommendations regarding what UNWFP could focus on to further improve the agility, flexibility and responsiveness of humanitarian supply chains.

# CHAPTER 6

# CONCLUSIONS AND RECOMMENDATIONS

## 6.1 INTRODUCTION

This chapter comprises the conclusion to the study and also proposes recommendations. First an overview of the research study is provided. Then follows a discussion of the research questions and objectives and how they have been dealt with in the study. The aim is to provide an overarching discussion of the main findings drawn from both secondary and primary data sources and to draw from this the principal conclusions and recommendations regarding the research problem and objectives. This involves exploring how the individual objectives of the study have been achieved, making particular mention of which objectives have been addressed in the different sections. The main discussion includes a brief description of the main findings and also offers relevant recommendations and conclusions.

Humanitarian organisations are continually looking for more efficient ways in which they can successfully manage their supply chains during disaster operations. Therefore, the conclusions derived from this study may offer feasible solutions to the management and control of disaster relief supply chains in order to enhance the success of disaster operations. In addition, the main areas for future research will be identified so as to allow other researchers to look for ways in which humanitarian organisations can further address some of the supply chain management challenges that they face.

### 6.1.1 Overview of the research study

This section presents an overview of the different chapters of the study. The study mainly comprises an extensive discussion of the supply chain management best practices implemented during natural disaster operations in southern Africa, using a case study of the UNWFP. The UNWFP was chosen for this study because of the role it has played in responding to natural disaster occurrences that are frequently experienced in this region. Its record of success during response operations offers a framework in terms of which the field of humanitarian supply chain can be improved. The focus of this study is on identifying supply chain management best practices that can be suitably applied within the humanitarian context and also which can

positively influence relief operations. The research study therefore has been able to address the different challenges faced by humanitarian organisations and has also discussed how best organisations such as the UNWFP have incorporated various supply chain practices in order to effectively respond to natural disaster occurrences.

An overview of the chapters in this study is as follows:

***Chapter 1*** provided a brief background of the research study and expanded on the different parameters of the study that were presented in the form of objectives and research questions. It also provided a broader discussion of the research problem and of the specific challenges that have motivated the direction of the study. Some of the areas that were also covered in the chapter include the justification of the research study and the possible limitations encountered during the different phases of the research study.

***Chapter 2*** covered an extensive range of issues relating to humanitarian supply chains. It provided a description of the various factors that are involved in humanitarian supply chains. This included probing and discussing the main challenges involved during the humanitarian response cycle that is usually followed. It was also essential for definitions of supply chain management, insight into humanitarian operations and natural disaster occurrences to be provided in order to have a better understanding of the concepts that the study mainly focuses on. The chapter further discussed the main advantages related to the adoption of supply chain management best practices during relief operations and presented a picture of the field of humanitarian supply chains.

***Chapter 3*** mainly focused on the conceptual framework of the study. The main discussion areas provided an account of how the concept of (CSFs can be implemented in humanitarian supply chains in order to enhance performance during ongoing disaster operations. In addition, the implementation of agile, responsive and flexible supply chain best practices was explored with the intention of identifying the main advantages associated with the implementation of these supply chain management best practices. Although the implementation of these practices is usually a challenge within humanitarian supply chains as a result of the dynamic challenges faced, this chapter addressed how these concepts can be best adopted within that context.

***Chapter 4*** presented the research design, techniques and tools used in collecting the relevant data used in this study. The research techniques used were mainly guided by the objectives of the

study that have been extensively described in chapter 1. This study has been defined as a qualitative study that followed the case study approach in meeting the objectives. These methods were discussed in the chapter together with the data collection tools that were used. These involved secondary data sources through the review of academic journals and reports, and the primary data sources used included in-depth interviews using a semi-structure interview guide. The chapter also gave a description of the thematic data analysis technique which was used. This technique involves the creation of codes, categories and themes. The chapter concluded with identifying the processes of thematic analysis in this study and how the data can be used in meeting the objectives.

*In **Chapter 5*** the primary focus was to present, analyse and interpret the data collected through the various data collection methods used in order to accurately meet the objectives of the study. The presentation mainly followed the steps of analysing data which are involved in thematic analysis. The raw data was transcribed and categorised into different themes that provided essential information regarding the research topic. The study was interested in providing insight into the supply chain management best practices. The data was therefore displayed into two main classes which included CSFs and the pillars of supply chain management best practices. The analysis mainly aimed at identifying what the two classes of data present regarding the implementation and adoption of supply chain management best practices during natural disaster operations. Most importantly the presentation and analysis of the data was done in reference to the research objectives of the study that have been individually revisited and displayed.

*In **Chapter** 6,* the results are discussed and conclusions drawn from the main research objectives.

## 6.2 REFLECTING ON THE RESEARCH OBJECTIVES AND RESEARCH QUESTIONS

This chapter reflects on the main research objectives and questions of the research study. These formed the basis of this research study and it is important to indicate how they have been achieved and met during the course of the study. Having achieved all the objectives of this study, conclusions and recommendations are made in order to make an overall contribution to the body of knowledge and also to improving and developing the field of humanitarian supply chains

especially for organisations that are actively involved during natural disaster occurrences in southern Africa.

**Table 6.1** is an illustration of the main objectives and questions of this research study; it gives a brief description on how these objectives have been achieved.

**Table 6.1: Reflecting on the main research objectives and questions**

| RESEARCH OBJECTIVE | MAIN RESEARCH QUESTION |
|---|---|
| 1. To understand how efficient customer **responsiveness can best influence humanitarian organisations** into delivering successful natural disaster operations. | To what extent can customer responsive supply chain management principles be practically adopted to positively influence humanitarian natural disaster operations in southern Africa? |
| 2. To understand the **positive influences associated with adopting agile supply chain management** principles during natural disaster operations in southern Africa | How can market sensitive, flexible and adaptive supply chains influence excellence during humanitarian natural disaster operations? |
| 3. To determine how **virtual supply chains can best influence** and facilitate efficiency during natural disaster operations in southern Africa. | To what extent is the implementation of the concept of virtual supply chains of significance to the success of humanitarian disaster operations in southern Africa? |
| 4. To understand the **advantages associated with humanitarian organisations operating as a system of networks "network based**" during natural disaster operations | What are the possible effects of managing a supply chain as a network to humanitarian natural disaster operations in southern Africa? |

As indicated earlier, the motivation of this research study was on identifying the supply chain management best practices that can be best implemented in helping humanitarian organisations in dealing with the challenges that they face during natural disaster operations. In ensuring that the research study responds to the research problem, four research objectives and questions were deemed appropriate as illustrated in Table 6.1 and these essentially ensured that the main purpose of the study was attained.

The next section of this chapter will therefore provide a summarised discussion of how each of the research objectives has been achieved and how it has contributed towards addressing the main research problem presented in the study. These discussions are derived from both secondary and primary data sources collected during the research study in an attempt to provide insight into the supply chain management best practices for natural disaster operations in southern Africa.

### 6.2.1 Objective 1:

> To **understand how efficient customer responsiveness** can best **influence humanitarian organisations** in conducting successful natural disaster operations.

The extensive literature search carried out in *Chapters 2 and 3* offered an important description of the need of humanitarian supply chains to be responsive to a myriad of natural disaster occurrences experienced in southern Africa. In order to have a clear understanding of the responsiveness efforts that should be involved during natural disaster operations, the main natural disaster occurrences that have been experienced in southern Africa were identified and explored in order to allow relevant customer responsive initiatives to be adopted which are relevant to the specific disaster occurrences.

Table 6.2 identifies the main natural disaster occurrences that have been experienced in southern Africa and the main challenges they pose. An understanding of the disaster occurrences, together with the challenges and needs that they generate, presents an opportunity for humanitarian organisations to become responsive to the various needs and therefore enhance their customer or beneficiary responsiveness.

**Table 6.2: Main disaster occurrences and the corresponding beneficiary needs**

| Disaster Classification | Disaster Occurrence | Main Characteristics | Customer/Beneficiary needs |
|---|---|---|---|
| *Hydro-meteorological disasters*; | Flooding, cyclones and flash floods | • Massive torrential rains (heavy rains).<br>• Displacing households.<br>• Destroying infrastructure and communication networks.<br>• Limited access and movement between areas. | • Relocation to unaffected areas.<br>• Provision of temporary shelter, clothing and sleeping material.<br>• Provisions of uninterrupted food supplies and clean drinking water. |
| | Droughts and widespread starvation | • Acute food shortages triggered by a decline in cereal and crop production.<br>• More communities requiring food aid.<br>• Children are usually the most vulnerable group. | • Transportation of food supplies to the affected communities.<br>• Main food supplies on demand including grains, cereals, tinned foods and high energy biscuits.<br>• Implementation of measures that are aimed at improving food sustainability (Long term initiatives) |
| *Biological disasters*; | Epidemic outbreaks | • Involves outbreaks of diseases such as cholera, typhoid, and malaria among others.<br>• Affects specific areas and needs to be properly managed.<br>• Affected individuals need proper medical and food supplies. | • Provision of medical care and supplies to affected areas.<br>• Implementation of measures to prevent the diseases from spreading to other areas.<br>• Provision of consistent and uninterrupted food supplies to the affected areas. |

Customer responsiveness is an important variable which humanitarian supply chains should focus on achieving. The basis of customer responsiveness lies in understanding the broader environment of the disaster occurrences experienced in southern Africa and the main needs that they generate. In order to clearly understand the context of humanitarian supply chains, secondary and primary findings described the dominating characteristics of humanitarian supply chains which organisations should properly address when dealing with natural disaster occurrences. Presenting and discussing these findings offers an opportunity for humanitarian organisations to adopt supply chain management best practices that are aligned to the main problems faced. This essentially means that they are in a better position to respond to customer and beneficiary needs.

Table 6.3 summarises some of the challenges identified in the study that need to be properly controlled and managed during humanitarian disaster operations. Dealing with these allows organisations to be customer or beneficiary responsive.

**Table 6.3: Main dominating factors in humanitarian supply chains**

| **Main Variable** | **Underlying factors** |
|---|---|
| 1. Demand uncertainty | • It is almost impossible to determine an accurate demand forecast for the various relief supplies generated by a disaster occurrence.<br>• Highly irregular demand figures.<br>• Sudden disaster occurrences results in organisations having little or no time to assess and monitor demand patterns.<br>• Supplies are usually pushed to the beneficiaries with little or no knowledge of their needs. |
| 2. Irregular supply patterns | • There are diverse material supplies that are required after a natural disaster occurrence.<br>• During the later stages of disaster operations there is a drastic increase in supplies needed by affected communities.<br>• Supply patterns are influenced by availability of suppliers and the areas affected by disaster occurrences. |

| | |
|---|---|
| 3. Shorter Lead times | • Humanitarian projects usually have to be carried out within a short time lags, so response needs to be initiated immediately after a disaster occurrence.<br>• This means that demand assessments, procurement and transportation and delivery activities must be carried out in the least time possible. |
| 4. Insufficient information | • There is usually insufficient information available in aiding organisations to properly plan their operations.<br>• Usually after a disaster occurrence there is little or no information available pertaining to the magnitude of the occurrence, the number of affected people and the approximate demanded supplies. |
| 5. Insufficient resources | • Humanitarian organisations are dependent on donor funds.<br>• Response operations are only carried out when there are available funds to support procurement and distribution of the supplies needed by beneficiaries.<br>• Usually response operations are conducted in areas that have destabilised infrastructure such as road, rail and other transportation networks as a result of disaster occurrences. |

*Objective 1* aimed at providing insight into how customer responsiveness needs to be incorporated into humanitarian supply chain practices in order to ensure that humanitarian organisations conduct successful disaster operations. This insight was achieved through developing an understanding of the main natural disaster occurrences experienced in southern Africa and also the needs that they generate. Efficient customer responsiveness is a concept aimed at ensuring that the operations and practices that are adopted by an organisation are sensitive to the needs of the end users. During humanitarian relief operations the focus is on ensuring that the UNWFP and other active organisations respond to the immediate needs of vulnerable communities affected by flooding, droughts, epidemics or earthquakes. In ensuring that customer responsiveness is attained, the findings indicate that coordinated efforts during response planning enhance the organisation's ability to identify the critical needs and design ways on how to best address them. The main activities that are therefore carried out during response planning that ensure customer responsiveness are briefly discussed below:

i. Effective needs assessment and information management

Arguably, effective responsiveness during natural disaster operations is mainly driven by the proper encoding and decoding of information pertaining to the disaster occurrence. For humanitarian organisations sufficiently to address the needs of the affected populations, they should be aware of the main needs of the affected areas, the number and areas affected and also the magnitude of the disaster. This can only be achieved through conducting an effective needs assessment through gathering the correct information from the affected areas.

The secondary findings were that timely response entails that material supplies are quickly procured from the different suppliers, relief aid workers and teams transported to the affected areas, transportation and other service providers contracted and material supplies properly organised so that they reach the intended populations. Therefore, without properly conducting a needs assessment, it is nearly impossible for these to be achieved and thus disaster relief operations might be greatly affected.

The proper management of information during the critical stages of disaster operations also assists organisations in being sensitive to the needs of the affected communities. It is essential for humanitarian organisations to accurately match demand and supply through determining the exact needs of the affected communities. This will avoid situations where supplies provided are not suitable for the affected communities and beneficiaries. Proper information management is vital in determining the manner in which disaster operations are organised, since relief organisations become aware of the disaster occurrence they are dealing with.

ii. Mobilising supplies for response operations

Customer responsiveness entails that the underlying needs of the customer/beneficiaries are sufficiently fulfilled. Therefore, in the case of disaster operations, when humanitarian organisations have properly carried out a needs assessment, they are able to make the necessary efforts to ensure that they fill the needs of the affected communities. This is usually done through mobilising supplies from different donors and suppliers. In the case of the UNWFP, an appeal to the main donors and sponsors, who include the public and private sector, is issued indicating the

exact supplies and funds required. The organisation also explores the options of using its internal funds. The main drive is to ensure that the main supplies needed are mobilised to support at least the immediate needs of the beneficiaries during the initial stages of disaster operations. This marks an important step towards meeting the demand of the affected communities.

iii. Properly reaching out to the disaster affected areas

This is the stage that spells out the overall success of natural disaster operations. After having identified the beneficiary needs and mobilised supplies, it is important for this cycle to be completed by timeously transporting these supplies to the affected communities and also by ensuring that the flow of supplies is maintained up to the point when the situation in these areas returns to its normalcy.

iv. Coordinating response efforts between stakeholders

This stage is characterised by the emphasis on collaborative efforts carried out by humanitarian organisations in an attempt to enhance their efficiency and ability to conduct successful disaster operations. Properly meeting the needs of the affected communities would usually require a diverse range of financial and infrastructural resources, which can only be attained when disaster organisations come together and coordinate their efforts. There has been a rise in these efforts through the use of the UNWFP cluster approach, which has seen organisations making joint efforts in responding to disaster operations, effectively resulting in improved customer responsiveness. Effective collaboration between aid organisations greatly influences the speed of response as it improves the ability and performance of the supply chain and logistics systems in carrying out various disaster operations.

Conclusion

To conclude this section, the primary and secondary findings dealt with the benefits of ensuring that the concept of efficient customer responsiveness is incorporated in humanitarian relief supply chains, particularly during relief operations. The idea is to ensure that all the efforts are incorporated in an attempt to fulfil and satisfy the needs of the affected communities and thereby

reduce the level of suffering caused by natural disaster occurrences. In meeting ***objective 1*** there has been an exploration of the options available in adopting customer responsive practices in humanitarian supply chains during response operations. Therefore the main characteristics and challenges faced during these occurrences were described and practices were adopted as influenced by the main challenges and the needs of the beneficiaries.

In ensuring that humanitarian organisations maintain and improve their ability to respond to customer needs it was recognised that they need to invest in conducting proper needs assessments and that they also have to dedicate their efforts to mobilising the supplies needed for relief operations. Lastly, they have to ensure that they properly reach out to the different affected communities and areas through properly organised and utilised distribution channels. These are the main pointers that were gathered from a series of in-depth interviews and report analysis carried out during this study. Customer and beneficiary responsiveness is one of the most essential variables which humanitarian organisations should continually implement in their supply chains, as they are driven by the need to fulfil the needs of communities affected by disaster operations.

### 6.2.2 Objective 2:

To understand the **positive influences** associated with **adopting agile supply chain management principles/practices** during natural disaster operations.

The research study has mainly focused on exploring the supply chain management best practices that can be implemented in humanitarian supply chains. Therefore, *objective 2* was achieved through the identification and discussion of how some of the practices adopted can positively influence natural disaster operations, presenting an overview of how agile supply chain management related principles are essential. The secondary and empirical findings sufficiently covered this objective through a critical review of agile, flexible, adaptive and responsive supply chain practices that are closely related.

Agility has been defined as the ability of an organisation to cope in a dynamic and continuously changing environment and to remain successful in meeting its core objectives (Agility Forum, 2000). In addressing this objective of agility, it was important to refer to the main research question which incorporated all the variables and practices aimed at attaining supply chain management agility.

There are a range of advantages experienced by humanitarian organisations as a result of implementing agile supply chain practices, which have resulted in the supply chain being described as market sensitive, flexible and adaptive. Table 6.4 summarises some of the main advantages associated with the supply chain management best practices discussed in the study:

**Table 6.4: Main attributes associated with supply chain best practices**

| Supply chain practices | Main drivers | Positive attributes |
|---|---|---|
| *Agile* | Efficiency during response | ▪ Increased market sensitivity |
| *Responsive* | Timely operations<br>Speed of response | ▪ Increased efficiency<br>▪ Cost effectiveness<br>▪ Successful operations |
| *Flexible and adaptive* | Cost efficiency<br>Operational readiness | ▪ Ability to meet the needs of the customer/beneficiaries<br>▪ Improved access to the affected areas<br>▪ Increased capacity in addressing the needs of the affected areas |

This study had an extensive focus on the main attributes derived from the implementation of agile supply chain practices. As identified in Table 6.4, there are a number of advantages associated with these practices that have been summarised as encompassing operational and cost efficiency and also improved speed and time of operations. In addressing the importance of agile, flexible and responsive supply chains, the emphasis of this research study has been on determining the main factors that need to be properly managed in ensuring that humanitarian

supply chains are agile. The research study identified these as being the main CSFs of a humanitarian supply chain to which organisations such as the UNWFP pay particular attention in order to derive all the benefits associated with agile, flexible and responsive supply chain practices.

This study dealt with the main areas in which humanitarian organisations such as the UNWFP continually manage and control in their attempts to ensure that their supply chains are agile, flexible and responsive. *Objective 2***,** through exploring the different advantages associated with the implementation of supply chain best practices, was achieved and the findings suggest that, in order for organisations active in southern Africa to succeed during their relief operations, they need to consider the implementation of agile, responsive and flexible supply chain practices.

## Conclusion

The research findings clearly illustrate the main benefits associated with the adoption of supply chain management best practices for implementation during natural disaster operations. Essentially the main findings have focused on what these concepts involve and what effects they have on the entire supply chain. Some of the advantages are illustrated in Figure 6.1, which offers a summary of the advantages associated with adopting agile, flexible and responsive supply chains during relief operations.

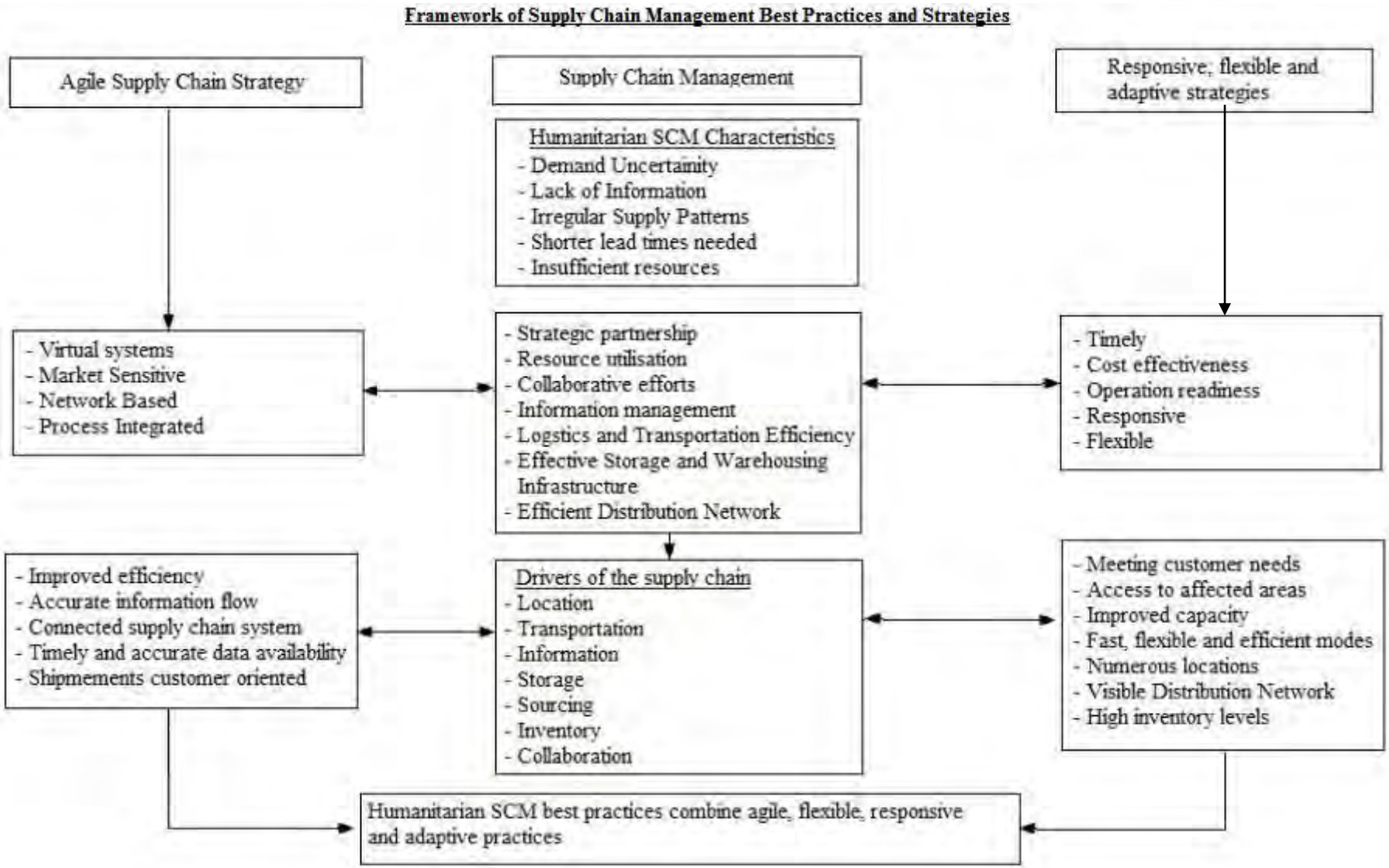



**Figure 6.1: Display of the supply chain management best practices and associated benefits**

### 6.2.3 Objective 3:

To determine how the **virtual supply chains influence and facilitates efficiency** during natural disaster operations in southern Africa.

The research study has provided insights into how efficiency during humanitarian disaster operations is influenced by the emphasis on virtual supply chains. Virtual supply chains are described as systems embracing the integration of different stakeholders and parties involved during natural disaster operations. For organisations such as the UNWFP and many other prominent humanitarian relief organisations involved in southern Africa, virtual supply chains are achieved through the use of computer aided information management tools. These are used in order to encourage the efficient flow of information that is essential in organising and coordinating relief operations. During natural disaster operations information management plays an important role as it provides the foundation of disaster operations which are usually determined by the nature of the disaster occurrence and also on the demand generated by the occurrence.

***Objective 3*** has been addressed in the different sections of this study and the role that virtual systems in supply chains play in facilitating operational efficiency has been dealt with. The research study has discussed a myriad of activities that are involved during relief operations which can be properly coordinated through virtual systems; these are illustrated in Figure 6.2.

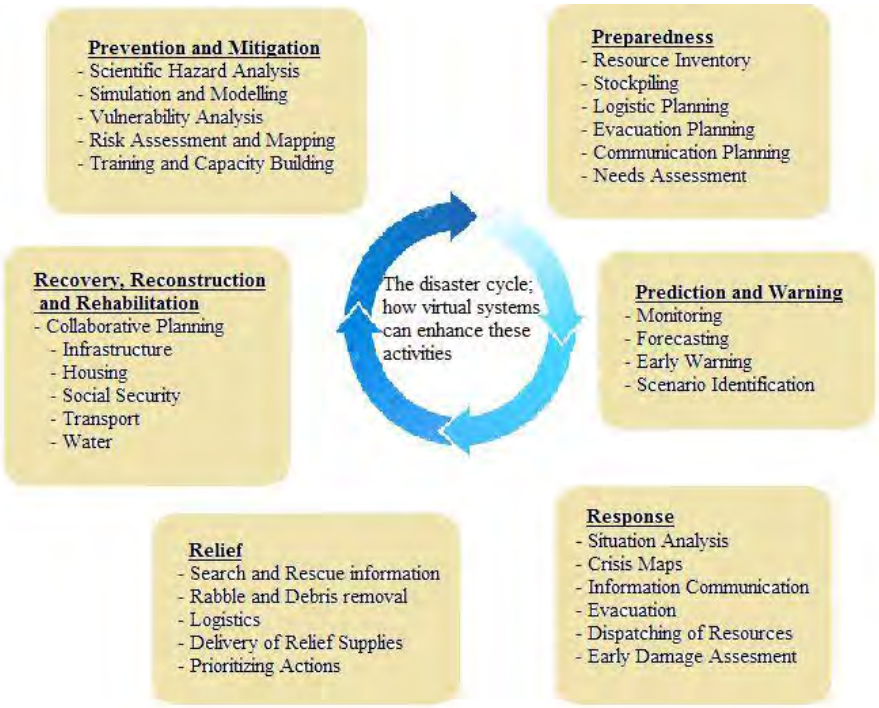



**Figure 6.2: Main activities involved during humanitarian operations.**

This study has provided insight into the role that virtual supply chains contribute to the success of disaster operations conducted by the UNWFP and therefore suggests opportunities for these to be adopted by other humanitarian organisations in their supply chains. The main contribution has been their role in fostering collaboration among different stakeholders. Some of the success factors of using virtual systems have been evident through providing early warning systems, rapid impact analysis, warehousing and transportation and in procurement and supplier collaboration, as summarised in Table 6.5.

**Table 6.5: Implementing virtual systems in the various stages of disaster operations**

| Stage | Description | Positives |
|---|---|---|
| *Early Warning Systems (EWS)* | ▪ This stage usually incorporates a co-ordinated network of systems used to detect the possible occurrence of natural disaster occurrences. This has mainly been essential for hydro-meteorological natural disaster occurrences in which organisations rely on the direct feed from weather | ▪ This has allowed humanitarian organisations enough time to prepare for approaching disaster occurrences through mobilising resources and supplies.<br>▪ This has largely been credited for allowing humanitarian organisations time to determine the different roles |

| | | |
|---|---|---|
| | services regarding possible approaching disasters.<br>▪ The ICT and technological systems usually aid different organisations with specific information regarding the geographic locations in which these disasters would strike and at what specific times. | they can individually assume during disaster operations before a disaster strikes. |
| *Rapid Impact Analysis* | ▪ During this stage the ICT tools that are implemented include the FITTEST for the purposes of determining the extent and impact of disaster occurrences.<br>▪ For the UNWFP and other humanitarian organisations to effectively respond to disaster occurrences they must be aware of the actual impact of the disaster occurrence. | ▪ One of the important factors that contribute towards delivering successful disaster operations pertains to determining needs and challenges before response.<br>▪ Teams and tools that are responsible for impact analysis help in determining the needs and also identifying what resources are needed for the operation. In such cases humanitarian organisations are able to share resources during an operation. |
| *Warehousing and Transportation* | ▪ Providing humanitarian organisations the ability to locate and track the availability and movement of supplies has been made a possibility through the use of innovative IT systems.<br>▪ The UNWFP and other organisations have been using warehouse systems provided by private companies such as TNT and DHL among others. | ▪ These efforts have played an important role in ensuring that organisations are continually updated on their service levels, tracking supplies allows them to also be able to follow up on the status of materials.<br>▪ In cases where the UNWFP manages a network of warehouse and storage hubs, connecting these through a system has allowed the organisation to respond to any disaster occurrence in the region through the redirecting supplies. |
| *Procurement and supplier collaboration* | ▪ In order for humanitarian operations to be successful, supplier management and procurement should be properly managed and this has resulted in the use of information sharing tools that are aimed at improving the communication | ▪ A well-coordinated supplier network that facilitates effective procurement is essential as it allows organisations to receive and distribute supplies at the right time.<br>▪ It facilitates quicker decision making, |

| | | |
|---|---|---|
| | between the suppliers and the humanitarian organisations.<br>▪ Essentially these create an environment where procurement can be done using computer aided systems that regulate the speed and accuracy of finalising purchases. | directly influencing the speed at which supplies can be made readily available to the affected areas. |

Conclusion

To conclude this section, it was found that virtual supply chain systems are mainly used in ensuring that there is improved visibility within the supply chain and therefore the focus is on the timely management of the flow of information. With the improved flow and sharing of information there is the increased opportunity of fostering collaborative efforts among humanitarian organisations. Through the cluster system, the UNWFP together with other organisations, have integrated their operations in an attempt to improve the speed and efficiency of their response. The presence of accurate information can be used to assist in ensuring that organisations implement the right decisions when faced with various challenges. The UNWFP has jointly invested in information communication platforms in order to facilitate the efficient and timely flow of information. These efforts are mainly aimed at ensuring that the humanitarian organisations have access to information in order to help them in conducting early response through properly managed Early Warning Systems (EWS) and Rapid Impact Analysis.

### 6.2.4 Objective 4:

To understand the **advantages associated with humanitarian organisations** operating as a **system of networks "network based"** during natural disaster operations.

The primary and secondary research findings of the study suggested the interpretation of the concept of "network based" as representing collaboration between organisations in sharing information, infrastructure and other competencies in order to sufficiently respond to disaster occurrences. ***Objective 4*** was achieved throughout this study as a description of the cluster approach system was provided; the system is utilised by the UNWFP in ensuring that humanitarian organisations that are actively involved in southern Africa share information

and also conduct relief operations collectively. There are numerous benefits identified from collaborating efforts among all the stakeholders involved during relief operations.

Essentially the research study identified the CSFs which humanitarian organisations seek to achieve in their attempt to deliver successful relief operations. It was found that combined efforts and operating as a system would ensure that the CSFs are successfully implemented and achieved.

Figure 6.3 identifies some of the CSFs discussed in the *chapters 2 and 4* and with combined efforts these are successfully attained due to the fact that humanitarian organisations can share their competencies for the common good of delivering successful relief operations.

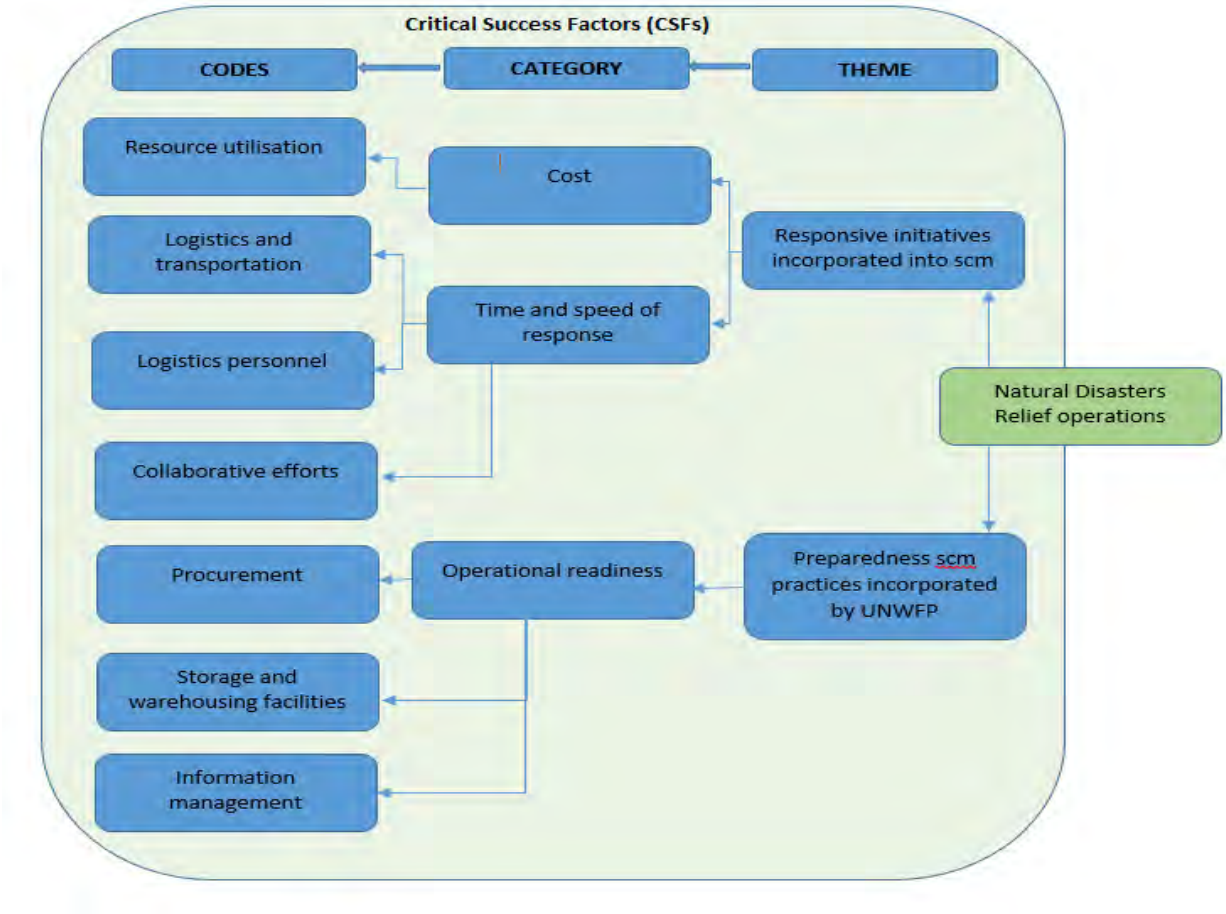



**Figure 6.3: Map illustrating on the main CSFs**

Table 6.8 identifies some of the main variables that can more easily be achieved when humanitarian organisations direct their efforts towards working together within a network. In addition to the factors illustrated above, the main advantages explored indicated that this co-operation results in humanitarian organisations being prepared and highly responsive to humanitarian disaster occurrences.

Conclusion

To conclude this section, in view of the findings of this study, it is apparent that there are various advantages associated with the concept of integrating humanitarian supply chains of different organisations into one network. This integration essentially refers to the idea of collaborating in all operational, tactical and strategic supply chain management activities and also implies that there are increased opportunities available for humanitarian organisations in attaining their CSFs. CSFs need to be properly planned and managed in order for humanitarian supply chains to be a success. However, there are more opportunities that need to be explored in ensuring that humanitarian organisations operate as network in order to overcome some of the supply chain challenges that have resulted in the increased loss of lives as a result of natural disaster occurrences.

## 6.3 RECOMMENDATIONS

The implementation of supply chain management best practices during humanitarian disaster operations has been dealt with during this research study. The main focus has been on how the UNWFP is able to coordinate its supply chains in order to ensure that they are efficient and effective during their response operations. Various shortcomings were identified regarding the supply chain management best practices that are used during disaster operations. The main practices implemented were discussed and displayed as a framework; much still needs to be done in order to ensure that humanitarian organisations align their supply chain best practices to those implemented by commercial supply chains. Given the challenges encountered during humanitarian relief operations, it is therefore important to offer recommendations for overcoming these challenges that are relevant for humanitarian operations in southern Africa.

The findings of this study identified the main advantages associated with the implementation of agile, flexible and responsive supply chain practices. The challenge is how these can be

fully implemented in order to ensure that humanitarian supply chains are effective in responding to disaster operations. This section of the chapter focuses on how the UNWFP together with the humanitarian community can efficiently adopt and implement supply chain practices that are responsive to beneficiary needs and that can positively influence relief operations. These are discussed in the following section.

### 6.3.1 Supply chain best practices

Best practices are described as resembling professional procedures that are accepted or prescribed as being most effective and suitable. Having identified some of the main practices used by the UNWFP and many other humanitarian organisations, it is recommended that additional practices be considered in order to further improve and develop these supply chains into operating at an optimal and desirable performance. There is also a need for the best practices adopted to be properly implemented in order for them to have an influence within the supply chain. In order for humanitarian supply chains to improve their performance and deliver efficient and successful disaster operations, they should improve their procurement, logistics and transportation, collaborative efforts, information management and distribution networks (that is, storage and warehousing facilities). The benefits of ensuring that best practices are implemented in these supply chain management variables have been described earlier in the study and are further illustrated in Figure 6.1.

The best practices that should be adopted by the UNWFP and the humanitarian organisations active in southern Africa are discussed below, with a clear indication of the observed gaps in the supply chain variable and of the best practices and the effects that they might have on the overall supply chain.

## Table 6.6: Recommendations for supply chain best practices

**Supply chain variable: Procurement**

***Visible Gaps*:**

- Failure to get supplies at the right time, price and quantities given the pool of available suppliers.
- The main concern is to ensure that procurement is transparent, shows accountability and is also efficient and cost effective.

***Best practices*:**

- Establishment of alliances with key suppliers, ensuring that these are collaboratively managed by humanitarian organisations to improve bargaining power. This also includes engaging in collaborative strategic sourcing.
- Some of the approaches to be followed include focusing on Total Cost of Ownership (TCO) for all the materials that organisations procure from various suppliers.
- Organisations need to optimise their sourcing processes such as negotiation planning.
- Maintaining long term agreements with potential suppliers as this can improve the supply capacity needed during disaster occurrences; long term agreements can include quantity flexibility contracts.
- Organisations should maintain an updated database of suppliers that have been evaluated and qualified, in order to avoid going through the procurement process in the event of a disaster occurrence.

***Possible effects:***

Improved spend management by humanitarian organisations and also ensuring that procurement is streamlined in order to achieve higher and desirable margins. Correctly conducting procurement results in organisations providing the right supplies at the right time to the affected communities.

**Supply chain variable: Logistics and Transportation**

***Visible Gaps:***

- There are underlying challenges regarding the transportation of personnel, infrastructure and the timely distribution of supplies to the affected areas.
- Humanitarian organisations incur high costs in performing logistics and transportation costs, which is usually taxing considering the availability of funding.

***Best practices:***

- Humanitarian organisations should explore the opportunities of using both in-house and outsourced transportation facilities.
- Use of technology to improve transportation performance will include real time tracking, thus allowing

carriers to identify the precise location and contents of their fleet.

- Organisations should evaluate the strengths and weaknesses associated with the different modes of transportation to different areas, which will enhance their decision making.
- Consider the use of transportation consultants in determining the effectiveness of current rates and carriers. This could result in humanitarian organisations negotiating best rates and carriers.

***Possible effects***

These would reduce the freight logistics costs incurred by the organisation. A well designed and optimised transportation system allows organisations to deliver at the right time and at a lowest cost.

**Supply chain variable: Information management**

***Visible Gaps:***

- Challenges pertaining to timely and accurately determining the needs of affected communities.
- Lack of visibility between the supply chain partners.
- Communication breakdowns during relief operations especially in severe disaster operations.

***Best practices:***

- The establishment of information exchange infrastructure that needs to be properly utilised and managed by active organisations.
- Implementation of improved and tested ICT systems for information exchange and decision support across all humanitarian organisations. Some of the prominent Logistics Information Systems (LIS) to be considered include Disaster Resource Network and Relief Web among others.
- Development of a common database that will be utilised by the humanitarian community in southern Africa to assist in organising disaster operations.

***Possible effects:***

This could assist humanitarian supply chains to improve data timeliness, data accuracy and applicability and also improve on information availability.

**Supply chain variable: Distribution Network**

***Visible Gaps:***

- There is need for the supply chain networks to be properly structured in order to be optimised.
- Existing networks lack efficiency; hence they are costly to manage and there are delivery delays, which affects efficient responsiveness.

***Best practices:***

- Identifying strategic locations in which to locate storage and warehousing facilities to effectively supply southern Africa. These can be managed and operated by different organisations using a cost sharing technique.

- Flexibility and uncertainty should be incorporated into the transportation networks.
- Utilising some of the channels implemented by commercial organisations, which could include partnering with 3PLs. All humanitarian organisations should consider learning from how the UNWFP works with organisations such as TNT and DHL.

***Possible effects:***

Increased beneficiary responsiveness through reducing delivery times. This positively impacts on the service levels to the intended beneficiaries. Optimally designing the distribution network could also ensure that there is a significant reduction in the distribution costs.

**Supply chain variable: Supply Chain Collaboration**

***Visible Gaps:***

- There is no evidence of humanitarian organisations actually collaborating on strategic issues which could result in benefits being attained during relief operations.

***Best practices:***

- The use of CPFR tools as this assists in facilitating demand planning using shared data.
- Implementation of joint capacity and demand planning.
- The incorporation of partnerships with the military and government as these are able to provide specialised capabilities.

***Possible effects:***

Allows for increased leverage and a better bargaining position with suppliers. This also enhances operational performance of the humanitarian supply chain.

## 6.4 LIMITATIONS OF THE STUDY

As in any other research study limitations that were encountered in the course of conducting this study which may have an overall effect on its outcomes. Discussing these limitations allows for possible direction on how future studies may be structured in order to avoid encountering similar limitations. The main limitations of this research study are as follows:

- Most of the participants originally approached to participate in the study were not available. This was as a result of the busy schedule of the UNWFP employees as they were involved in various assignments inside and outside of southern Africa. During the period in which the in-depth interviews were scheduled, there were floods in Mozambique and also some of the employees were assigned to East African countries affected by the Ebola outbreak. However, the researcher received assistance from the employees who were available despite their time constraints. All the interviews had to

be completed within 45 minutes due to the busy schedule of these participants. Nevertheless, the researcher managed to gather the relevant data and important information in order to address the objectives of the study.

- The UNWFP has country offices in almost all of the countries in southern Africa. These include Lesotho, Mozambique, Zimbabwe, Zambia and Malawi. For this research study, the empirical data was collected from the UNWFP regional office in South Africa. And because the regional office focuses on managing and regulating operations conducted by different country offices, it would have been desirable for the researcher to interact with participants from other country offices in order to get a perspective on some of their challenges and how they approach disasters. This would essentially provide a clearer picture of the efforts of the UNWFP.
- The humanitarian community in southern Africa is involved in a number of relief efforts which include some that are as a result of political, social and economic issues. Since the focus of this research study was on natural disaster operations, it was a challenge to isolate these because humanitarian supply chains of the UNWFP are designed for all humanitarian operations conducted in the region.
- One of the limitations of the study was the fact that some of the participants could not relate to the concepts of agile, flexible and responsive supply chains. Therefore the researcher had to first familiarise them with these so that they would be able to identify and relate how these are being implemented by the organisation.

Despite the limitations of the study, there are opportunities for future research. For every research study conducted there are opportunities for future research that are identified in order to encourage and attract other researchers into exploring them and providing further insight. Areas for future research are dealt with in the next section.

## 6.5 AREAS FOR FUTURE RESEARCH

Natural disaster occurrences in southern Africa are on the increase and, therefore, there is a need for innovative supply chain principles and practices to be implemented in humanitarian supply chains. In exploring the concepts of agile and flexible supply chains, individual case studies should be considered that will identify how organisations operate their supply chains during specific disaster operations. Future research efforts would be able to identify the way

forward with regard to how humanitarian supply chains can better emphasise and perform in different CSFs. Therefore research studies could be directed towards the following:

- Based on the frequencies of natural disaster occurrences in the region, identifying the main areas in which the distribution network should be structured. This can be achieved through a location analysis.
- Carrying out an in-depth definition of exactly what agility entails when it comes to humanitarian supply chains; this will ensure that proper and relevant practices are adopted.
- Describing how successful commercial supply chain best practices can be successfully adopted by humanitarian relief operations; this will also explore options on covering the gap that exists between commercial and humanitarian supply chains.

## 6.6 CONCLUDING REMARKS

This research study has been influenced by the increasing number of natural disaster occurrences which have been experienced in the southern Africa region and which have resulted in an increased number of disaster operations by humanitarian organisations. The consequences of disaster occurrences have varied from an increase in the loss of lives to the increased levels of suffering of the affected communities.

In the wake of this, humanitarian organisations have been motivated to improve their supply chain management practices in order to ensure that they improve their speed and efficiency during disaster response. Hence the implementation of supply chain management best practices has been considered. This study has focused on providing insight into the supply chain management best practices that are implemented by the UNWFP during its natural disaster relief operations in southern Africa. Humanitarian organisations active in the region have the similar objective of ensuring that their response operations are efficient and therefore the study has presented an opportunity for the humanitarian community to identify supply chain practices that can be successfully and practically implemented to ensure that their relief operations are improved.

The study also identified the gap that exists between commercial and humanitarian supply chains. Commercial supply chains have attained desirable levels of agility, flexibility and responsiveness. If similar practices are adopted for humanitarian supply chains, there is a

high probability that some of the consequences caused by disaster operations would be minimised. Not many studies have focused on the lagging behind of humanitarian supply chains, which has been identified as a contributing factor towards the loss of lives and suffering of the affected communities. This study thus makes a contribution to the practice in the humanitarian sectors, demonstrating that the success of humanitarian relief efforts lies with the improvement of humanitarian supply chain management practices.

The warning should be heeded that failure to invest time and effort in conducting research studies aimed at improving humanitarian supply chains will lead to a further loss of lives, as humanitarian organisations do not have the capacity and ability to deal with the increasing natural disaster occurrences.

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# LIST OF APPENDICES

## APPENDIX A: ETHICAL CLEARANCE

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

21 January 2015

**Mr Ngonidzahe Kenneth Ngwenya 210546162**
**School of Management, IT and Governance**
**Pietermaritzburg Campus**

**Protocol reference number: HSS/0032/015M**
**Project title: Supply Chain Management Best Practices during natural disaster operations in Southern Africa: A case study of the United Nations World Food Programme.**

Dear Mr Ngwenya

**Expedited Approval**

In response to your application dated 16 January 2015, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol have been granted **FULL APPROVAL.**

**Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.**

**Please note: Research data should be securely stored in the discipline/department for a period of 5 years.**

**The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.**

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

.....
**Dr Shenuka Singh (Chair)**

**/px**

cc Supervisor: Professor Micheline Naude
cc Academic Leader Research: Professor Brian McArthur
cc School Administrator: Ms Debbie Cunynghame

**Humanities & Social Sciences Research Ethics Committee**
**Dr Shenuka Singh (Chair)**
**Westville Campus, Govan Mbeki Building**
**Postal Address:** Private Bag X54001, Durban 4000
**Telephone:** +27 (0) 31 260 3587/8350/4557 **Facsimile:** +27 (0) 31 260 4609 **Email:** ximbap@ukzn.ac.za / snymanm@ukzn.ac.za / mohunp@ukzn.ac.za
**Website:** www.ukzn.ac.za

# APPENDIX B: INFORMED CONSENT

**UNIVERSITY OF KWAZULU-NATAL**
**School of Management, IT and Governance**

Dear Respondent,

**M Com Research Project**

**Researcher**: Ngonidzahe Kenneth Ngwenya (074 501 1600)

**Supervisor**: Professor Micheline Naude (033 260 6757)

**Research Office**: Ms P Ximba 031-2603587

I Ngonidzahe Kenneth Ngwenya am a Master of Commerce student in the School of Management, IT and Governance at the University of KwaZulu-Natal. You are invited to participate in a research project entitled: *Supply Chain Management Best Practices during natural disaster operations in southern Africa: a case study of the United Nations World Food Programme.*

The findings of this study will provide an insight into how supply chain systems can be best structured to deal with the levels of uncertainty encountered during disaster operations. Therefore through your participation I will be able to determine some of the important variables involved during humanitarian supply operations. The results of this survey will motivate humanitarian organisations into emphasizing on ensuring that supply chain efficiency during natural disaster operations is obtained that will result in minimizing the extent of suffering and damage caused by the natural disaster occurrences which have been increasing with time in the region

Your participation in this project is voluntary. You may refuse to participate or withdraw from the project at any time with no negative consequence. There will be no monetary gain from participating in this research project. Confidentiality and anonymity of records identifying you as a participant will be maintained by the School of Management, IT and Governance, UKZN.

If you have any questions or concerns about participating in this study, please contact me or my supervisor at the numbers listed above.

It should take you about 45 minutes/s to complete the interview. I hope you will be willing to participate in this research through allowing to be interviewed.

Sincerely

Investigator's signature_____ Date_____

**UNIVERSITY OF KWAZULU-NATAL**
**School of Management, IT and Governance**

**M Com Research Project**

**Researcher**: Ngonidzahe Kenneth Ngwenya (074 501 1600)

**Supervisor**: Professor Micheline Naude (033 260 6757)

**Research Office**: Ms P Ximba 031-2603587

**CONSENT**

I_____ (full names of participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project. I understand that I am at liberty to withdraw from the project at any time, should I so desire.

**I consent / do not consent to having this interview audio- recorded.**

_____ _____

Signature of Participant Date

# APPENDIX C: INTERVIEW GUIDE

**INTERVIEW GUIDE**

**(Proposed Interview Time: 45 minutes)**

**Date:** ----------

**Organisation:** ----------

**Person Interviewed:** ----------

**Capacity:** ----------

**INTERVIEW GUIDE**

## 1. INTRODUCTION

The introduction phase of this interview session will seek to ensure that the purpose of the study is clearly defined to the participants and also the role that they play in ensuring that the objectives of the study are met is made known. The aim of this section is to also assure the participants of confidentiality in the information that they will make available, also the interviewer will request permission to record the individual responses of the participants.

## 2. SECTION 1: GENERAL

**The aim of this section is to ensure that the participant is familiar with the concepts that will be mentioned in this study. Most importantly it will identify and define the roles in which the participants assume within the supply chain management system of the organisation. The intention is to have a clear understanding of the activities carried out by the organisation during natural disaster operations.**

### 2.1 INDIVIDUAL PROFILE

**The questions to be asked will include:**

- What is your title in the organisation?
- What is your job description and what are the various tasks and activities that you are responsible for during natural disaster operations?
- What is the number of natural disaster operations that you have been part of and what are the supply chain management related activities you have been responsible for during these operations?

### 2.2 ORGANISATIONAL PROFILE

**The questions on this section will include:**

- What is the approximate number and nature of natural disaster operations that the organisation has actively conducted in southern Africa?
- Can you provide a brief description of the nature of natural disaster operations that the organisation has carried out to date?
- What are the notable successes that the organisation has identified from conducting its natural disaster operations?
- What are the challenges that the organisation has experienced during its natural disaster operations?

## 3. SECTION 2: DISASTER PHASES

**This section seeks to gain an understanding of the different activities performed by the organisation during the various phases of the humanitarian cycle. Gaining an understanding of the supply chain management activities that they carry out and focus on is crucial for the purposes of this study. The phases that will be addressed in this section include the preparedness, response and mitigation phase.**

### 3.1 PREPAREDNESS STAGE

The questions to be asked will include:

- What are the underlying goals and objectives that the organisation focuses on in managing its preparedness phase?
- What are the supply chain management activities that are considered as being part of the organisations disaster preparation stage?
- How does the organisation plan, regulate and manage the supply chain management activities performed in the preparedness stage?
- Are you able to give a brief insight of how the organisation organises these specific supply chain management variables during its disaster preparedness phase. (*Follow up question*)
    i. Supplier management?
    ii. Transportation, Logistics and Storage systems?
    iii. Logistics personnel training?

iv. Collaborative efforts with key stakeholders including donor organisations, vulnerable communities and national government?

- Since natural disaster occurrences are very different and they pose different challenges, how does this affect or influence the preparedness phase?

### 3.2 RESPONSE STAGE

The questions will include:

- What are the underlying supply chain management goals and objectives of the response phase?
- Is there a generic or standard response strategy implemented by the organisation when conducting its natural disaster operations?
- Can you give an overview of the activities that are conducted during the response phase, and how these are managed and co-ordinated?
- Since the humanitarian relief operations are of a diverse and dynamic nature, what supply chain management response measures have been put in place in order to address the specific needs of each natural disaster occurrence?
- What are the steps followed in responding to a natural disaster occurrence, the response must describe the processes involved:
  i. Soon after a disaster occurrence (immediate stage, the first 7 days)?
  ii. During the middle phase of the disaster occurrence (sustaining stage, above 2 weeks)?
- How does the organisation implement and manage the following supply chain management activities during its disaster response phase?
  i. Needs assessment and procurement?
  ii. Logistics management and distribution?
  iii. Resource mobilisation?
  iv. Warehousing and inventory management?
- What are the common supply chain management challenges that are commonly encountered during the response stage?

## 4. SECTION 3: SUPPLY CHAIN MANAGEMENT PRACTICES (PILLARS)

**It is critical to determine if the humanitarian organisation is influenced by the different supply chain management best practices principles in conducting and designing its response activities. This section therefore seeks to determine how flexible, responsive and agile supply chain management pillars are implemented during the natural disaster management cycle.**

### 4.1 RESPONSIVE PRACTICES

The questions that will be asked will include:

- What are the steps taken by the organisation in ensuring that the supply chain practices are;
    i. Responsive to the different natural disaster occurrences that take place in southern Africa?
- Responsive to the customer needs (disaster occurrence victims).
- What are the steps that the organisation has taken in ensuring that it adopts supply chain management practices that facilitate efficient responsiveness to the customer needs (disaster victims)?

### 4.2 FLEXIBLE PRACTICES

The questions to be asked will include the following:

- Are there any supply chain management initiatives that have been adopted by the organisation that have increased the organisations flexibility in dealing with the dynamic needs of the affected communities?
- What are the supply chain management initiatives that have been done in ensuring that there is improved flexibility in the;
    i. Procurement of disaster supplies?
    ii. Transportation and logistics systems to different geographical locations?
- Flexibility in supply chain management means that the organisation is in a position to comfortably respond to the different natural disaster operations by simply adjusting its supply chain variables, are you of the view that the organisation has displayed a satisfactory level of flexibility in conducting its disaster operations?

### 4.3 AGILE PRACTICES

The main focus areas that will be investigated in this section include the four variables of agility comprising of organisations focusing on virtual, network based, market sensitive and process integrated supply chains.

The questions that will be asked include:

a. **Market sensitive**
    - Briefly discuss on the steps that the organisation has taken in ensuring that their supply chains are sensitive to the changing needs of consumers during natural disaster operations?
    - Are there any systems in place that monitor the needs of the customers (disaster victims) and respond to their requirements?

b. **Virtual**
    - Are there any steps that are put in place in ensuring that there are collaborative efforts carried out between all the stakeholders involved during disaster operations?
    - Is end-to-end visibility achieved during the natural disaster operations?

c. **Network based**
    - Are there any initiatives put in place that ensure that the organisation can leverage other stakeholder capabilities during the natural disaster operations?
    - Does the organisation combine with other similar disaster organisations during its natural disaster operations in other words is the organisation a network orchestrator?

**Thank you for your participation. We greatly appreciate your involvement**