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Information sharing and information quality in Southern African humanitarian supply chains during disaster response

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Orientation: A global increase in the frequency and severity of disasters has underscored the critical need for more effective humanitarian supply chains (HSCs) and the optimisation of humanitarian organisation (HO) operations.

Research purpose: This study explored the role of information sharing and information quality between HOs in Southern Africa during disaster response.

Motivation for the study: The effectiveness of HSCs is heavily reliant on the efficient sharing of high-quality information. Despite research addressing various challenges in humanitarian logistics, significant gaps remain, particularly concerning information sharing and quality during disaster response efforts. These challenges are even more pronounced in developing countries, where the complexities of communication and infrastructure exacerbate the issue.

Research design, approach and method: Data were collected through semi-structured interviews with 10 participants who are employed by humanitarian relief organisations in Southern Africa. A thematic analysis approach was used to analyse the data.

Main findings: The study reveals that effective information sharing during disaster response is crucial for coordination, transparency and efficient operations, facilitated through methods such as meetings, humanitarian relationship management and cluster-based approaches. Quality information, characterised by accuracy, clarity and trustworthiness, is ensured through dedicated quality assurance teams, manual vetting and data cross-checking. However, significant challenges persist, including information duplication, lack of inter-actor sharing and ethical issues, highlighting the need for improved tools and processes to address these barriers.

Practical and/or managerial implications: Practitioners can leverage the insights from the findings of this study to develop and implement proactive strategies for information sharing and quality, enhancing their effectiveness in future disaster responses.

Contributions and/or value add: This study contributes to knowledge by elucidating the specific roles of information sharing and information quality within HSC disaster response. It also identifies the methods and tools employed to enhance these aspects, with a particular focus on the Southern African context.

Keywords: information sharing; information quality; disasters; humanitarian supply chains; generic qualitative research; Southern Africa.

Introduction

The occurrences of disasters have recently increased, resulting in the acceleration of disaster relief efforts in Southern Africa (Chari, Ngcamu & Novukela 2020:2042; Ngwenya & Naude 2016:1, 8). Disasters mainly affect humans' basic livelihoods and have major implications on a country's economy and infrastructure (Kabra & Ramesh 2016:79). To relieve the impact of these disasters, humanitarian actors work together and form a humanitarian supply chain (HSC) (Damoah 2022:143; Kabra & Ramesh 2016:80). Within an HSC, humanitarian organisations (HOs) focus on both continuous development work and disaster relief where HOs primarily focus on disaster response, in addition to planning and mitigation (Abiodun 2014:10). The proficient sharing of quality information enables an effective and coordinated response between HOs and other humanitarian actors to these disasters (Altay & Labonte 2014:52; Dubey, Altay & Blome 2019a:170; Khan, Lee & Bae 2019:2081).

Background

Disasters are manmade or natural occurrences that interrupt the work of a society or area and affect humans, the economy, infrastructure and the environment (Oktari et al. 2020:2213; To & Kato 2018:729). Man-made disasters occur when human activities cause disasters, while natural disasters are sudden onset, for instance, a tsunami, or slow onset, for instance, a drought (Damoah 2022:132; Van Wassenhove 2006:476). Disasters are managed through disaster relief phases, namely: (1) mitigation; (2) preparedness; (3) immediate response; and (4) reconstruction (To & Kato 2018:729). Humanitarian supply chain's overarching goal is to alleviate the suffering of people affected by a disaster (Damoah 2022:130).

Damoah (2022) defines a HSC as:

> [*T*]he process of planning, implementing and controlling the efficient, cost-effective flow and storage of goods and materials, as well as related information, from point of origin to the point of consumption to alleviate the suffering of vulnerable people. (p. 130)

Humanitarian supply chains are dynamic because of their complex nature, ability to manage high staff turnover rates and time pressures to alleviate the suffering of vulnerable people (Damoah 2022:133; Kovács & Spens, 2007:104; Van Wassenhove 2006:477; Yadav & Barve 2019:684). Humanitarian supply chains are also known for coordinating with many humanitarian actors simultaneously (Kovács & Spens, 2007:104; Najjar et al. 2019:468; Van Wassenhove 2006:477).

Humanitarian actors comprise different organisations and stakeholders involved in disaster relief efforts, either directly or indirectly, and all have different funding sources, mandates and technical expertise (Jarrett et al. 2021:2; Kabra & Ramesh 2016:80). Therefore, a single humanitarian actor cannot control the outcome of relief operations, and various actors participate in HSCs (Damoah 2022:133; Maghsoudi & Pazirandeh 2016:127). Humanitarian actors in the HSC include, among others, donors, the military, logistic providers, governments, vulnerable people and other non-government organisations (NGOs) (Du et al. 2020:2; Kovács & Spens 2007:106). Humanitarian organisations provide essential relief items, such as shelter, medicine, food and water, to vulnerable people through HSCs (Abidi, De Leeuw & Dullaert 2020:128; Najjar et al. 2019:467).

Humanitarian supply chains should be able to provide relief despite insufficient information, as disasters generally require immediate response (Kovács & Spens 2007:108). Hence, information is an important attribute of the successful functioning of HSCs and alleviating the suffering of vulnerable people (Najjar et al. 2019:468). The flow of information between actors, including HOs, usually consists of information sharing, data collection and information processing (Altay & Labonte 2014:55).

Information sharing is defined as the creation and dissemination of information, and it improves the execution of HSCs and HOs operations (Agarwal, Kant & Shankar 2022:11; Dubey et al. 2019a:161; Kabra & Ramesh 2015:93; Maghsoudi & Pazirandeh 2016:126). In HSCs, information sharing is facilitated through coordinating humanitarian actors on the availability of resources, the needs of those affected by disasters and the overall circumstances of the specific disaster (Altay & Pal 2014:10177). Information sharing also creates transparency, allowing HSC actors to understand their role in disaster relief to achieve a coordinated response (Dubey et al. 2019a:163; Dubey et al. 2020:14; Khan et al. 2019:2081). However, a poor response to disasters is evident when there is a lack of information and resource sharing between HSC actors (Dubey et al. 2019b:120).

Problem statement

As a successful disaster response is achieved through the efficient flow of information, it is also achieved through the efficient flow of quality information facilitated by data collection and information processing (Altay & Labonte 2014:66; Dubey et al. 2019b:120). The quality of information indicates sharing of correct and relevant information (Altay & Pal 2014:1017). It is consequently important because higher levels of information sharing improve the quality of shared information (Najjar et al. 2019:470). In a disaster response, assessing the quality of the information, more specifically, collecting and processing data has proven to be a challenge (Altay & Labonte 2014:53; Bag, Gupta & Wood 2020:7). This is because there is a lack of current, accurate and comprehensive information, and a lack of software and physical systems to collect and process this information through (Altay & Labonte 2014:53; Bag et al. 2020:7). These challenges hinder data collection and the volume and variety of information that needs to be processed (Bunn 2022:1; Mohamad, Yunus & Harith 2018:1).

Despite various disasters globally, disaster relief has still been neglected (Damoah 2022:133). Najjar et al. (2019) have explored the impact of information quality and information sharing on HSC performance. While Altay & Labonte (2014) focussed their study on the challenges in information management during disaster response, Damoah (2022) investigated the critical success factors of HSCs. However, these studies focussed on a specific disaster or disaster type that does not consider different disasters.

Research on the responsiveness of HSCs in Southern Africa has been neglected (Ngwenya & Naude, 2016:8). This is unfortunate as this region has, in recent years, been the victim of many disasters that require humanitarian assistance (De Waal & Vogel 2016:1922). Therefore, the first limitation in current research this study identifies is the lack of research on disaster response in Southern Africa. In addition, the second limitation that this study identifies in current research is the lack of research on information sharing and information quality in HSCs. There is a need for research on how information sharing is facilitated within HSCs when faced with a disaster (Suifan et al. 2020:118). This is needed to encourage humanitarian actors to share relevant information

(Suifan et al. 2020:118). Understanding information quality has also been an area that should receive more attention from researchers as false and misleading information attracts more donations, and information accuracy proves challenging (Altay & Pal 2014:1025; Suifan et al. 2020:118).

The purpose of this generic qualitative study is to explore the role of information sharing and information quality in HSCs, specifically during disaster relief. In addition, this study explores how information is shared and how information quality can be ensured during disaster relief. This study focusses on HOs responding to man-made or natural disasters in developing countries, specifically Southern African countries.

The study is guided by the following research questions:

- What is the role of information sharing in HSCs during disaster response?
- What is the role of information quality in HSCs during disaster response?
- How is information shared in HSCs during disaster response?
- How is information quality ensured in HSCs during disaster response?
- What is the information sharing and information quality challenges during disaster response?

This study validates the critical roles of information sharing and quality in humanitarian HSCs and expands existing literature by identifying additional roles, methods and tools for enhancing these aspects. It also highlights new challenges related to information sharing and quality. By increasing awareness and providing practical strategies, this study equips practitioners with the knowledge needed to improve information management in HSC disaster responses.

The remainder of the article is structured as follows: Firstly, it examines the theoretical background of HSCs, HOs and disaster response, with a focus on Southern Africa. Secondly, the research methodology is detailed. The study's findings are then discussed. Thirdly, the article concludes with a summary of the findings, contributions, limitations and recommendations for future research.

Literature review

Humanitarian disasters

Disasters either directly cause or pose a significant threat of death, disease or injury to affected individuals or are of such magnitude that vulnerable populations cannot survive using their own resources alone (Abiodun 2014:10; Dubey et al. 2019a:160; Kovács & Spens 2009:515; Uys 2005:406). Disasters can be sudden or slow onset, local or global, manmade or natural events that damage the environment, property or infrastructure (Abiodun 2014:10; Dubey et al. 2019a:160; Kovács & Spens 2009:515; Uys 2005:406).

For instance, a sudden-onset man-made disaster would be a chemical leak or a terrorist attack, whereas a slow-onset man-made disaster could be a political or refugee crisis (Van Wassenhove 2006:476). It is important to note that man-made disasters can be prevented, while natural disasters can only be prepared for (Kovács & Spens 2009:510). A natural disaster is a possibility that a natural occurrence is damaging to the environment, infrastructure and humans (Damoah 2022:132). For instance, a sudden-onset natural disaster would be a tornado, earthquake or hurricane, whereas a slow-onset natural disaster would be a drought (Van Wassenhove 2006:476). Disaster relief focusses on the planning of transporting equipment, food, first-aid material and the rescue of personnel from a supply point to disaster locations in an effort to safely and quickly evacuate and transport materials and vulnerable people to health care centres (Kovács & Spens 2007:101).

The first phase of disaster relief is mitigation. Mitigation is the procedures (i.e., capacity building, awareness and physical development) implemented to prevent a disaster or reduce the impact thereof (Altay & Green 2006:480; Oktari et al. 2020:3). If information from previous disasters is documented properly, it can be used in mitigation strategies to protect vulnerable communities (Altay, Prasad & Tata 2013:366). When planning these mitigation strategies, it is important to ensure that the information used is current, as regional disaster risks changes over time (Altay et al. 2013:366). The second phase of disaster relief is preparedness. Preparedness can be defined as 'effectively anticipate, respond to, and recovering from, the impacts of likely, imminent or current hazard events or conditions' (Bealt & Mansouri 2018:141). It is important to identify threats, identify key suppliers, develop information communication technologies and expand the collaboration base of HOs in this stage because HOs need to have accurate information to be prepared for disasters (Negi & Negi 2021:45; Van Wassenhove 2006:481). Preparedness consists of activities such as the formulation of a plan, obtaining equipment, training for the plan and implementing the plan (Altay et al. 2018:5). Pre-positioning also occurs in the preparedness phase by placing essential goods in warehouses located close to disaster-prone areas (Van Wassenhove 2006:481).

The third phase of disaster relief is the response that occurs during or directly after the disaster occurred (Bean et al. 2010:41). It is here where any harmful effects that were created by the disaster are managed by HOs to minimise suffering and death (Abiodun 2014:17; Oktari et al. 2020:3). Disaster response is influenced through three main factors, namely (1) the level of planning prior to the disaster phase, (2) the number of times the plans are rehearsed and (3) the degree of prior experience of humanitarian actors (Al-Dahash, Kulatunga & Thayaparan 2019:295). As most disasters require an urgent response, response activities include, among other things, the deployment of those responding to the disaster, organisation of resources, fulfilment of basic needs, firefighting, evacuation of vulnerable people, rebuilding infrastructure and the rescue, protection and managing of refugees (Abiodun 2014:1; Altay

& Green 2006:480; Negi & Negi 2021:46; Oktari et al. 2020:3). Consequently, effective coordination and information sharing between humanitarian actors is vital for this phase to ensure an adequate response (Bealt & Mansouri 2018:133; Negi & Negi 2021:46,49).

The fourth and last phase of disaster relief is reconstruction. The reconstruction phase is carried out after the disaster relief has been executed (Negi & Negi 2021:46). This phase consists of the demolition, construction, recycling and removal of wreckage caused by the disaster (Bealt & Mansouri 2018:135). Collaboration and coordination between humanitarian actors play an important role in the reconstruction phase to ensure the success of the reconstruction phase (Kovács & Spens 2007:104). This is especially true because many factors affect the nature and extent of recovery, including the nature and effects of the disaster itself, the extent to which the government and other organisations intervened following the disaster and the ability of individuals and communities to adjust to a post-disaster world (Hettige, Haigh & Amaratunga 2018:1291).

Disaster relief in Southern Africa

Developing countries usually lack appropriate infrastructure and insufficient storage and transportation facilities (Ali et al. 2021:8). Therefore, most rural areas in developing countries are inaccessible because of poor infrastructure (Chari et al. 2020:2044). This poses a huge problem as any minor disruption in transporting goods can have dire consequences for people suffering from a disaster, people responding to the disaster and the government (Chari et al. 2020:2044). Consequently, resources are not always readily available, especially in developing countries, such as countries in Africa (Damoah 2022:132). Southern Africa has experienced various natural disasters, such as droughts, fires, floods, diseases and epidemic breakouts (Ngwenya & Naude 2016:1). These disasters are categorised as both sudden-onset and slow-onset disasters. For instance, the Southern African region has experienced four cyclones in two decades, with the fourth cyclone (i.e., a sudden-onset natural disaster) being the worst tropical cyclone to occur in the Southern hemisphere's recorded history (Chari et al. 2020:2042). Lesotho, Zambia and Malawi also experienced extreme droughts (i.e., slow-onset natural disasters) in 2007–2008, resulting in 5.9 million people requiring food assistance (Ngwenya & Naude 2016:1).

Although the Southern African region is more stable in terms of political unrest than the rest of Africa, it is not without political predicaments and armed conflict and is therefore faced by man-made disasters (Olasya 2022:85). An example of a man-made disaster in Southern Africa is the conflict in Northern Mozambique. Between 2017 and 2021, approximately 2600 to 2800 people lost their lives, and 1 million people were misplaced (Kempen 2021:16). South Africa has experienced the worst event of looting to date amounting to damages of over R50 billion. This political unrest occurred in two provinces, namely Gauteng and KwaZulu-Natal during July 2021 (Africa, Gumbi & Sokupa 2021:34; De Waal 2021:78). Humanitarian organisations such as ReBuild SA, UNICEF and Gift of the Givers aim to supply water, food and non-food items to communities affected by these disaster events (Negi & Negi 2021:46). However, HOs operating in Southern Africa face information management challenges as there is a lack of information sharing between different humanitarian actors (Mamabolo & Sebola 2021:128–129). This lack of coordination between humanitarian actors can lead to resource wastage, poor relief aid distribution, duplication of relief activities, loss of lives and increased operating costs (John et al. 2019:1228). Consequently, humanitarian actors should share information among themselves to ensure an efficient and effective disaster response to avoid the extended suffering of communities affected by a disaster (Agarwal, Kant & Shankar 2020:11; Dubey et al. 2019a:160; Siawsh et al. 2021:3593).

Humanitarian supply chains

The willingness of HSC actors to support HSC activities determines the success of HSC management (Damoah 2022:132). An HSC is a means to alleviate the suffering of people affected by a disaster and to rehabilitate them to a better condition (John et al. 2019:1228). Humanitarian supply chains are distinctly different from commercial supply chains because HSCs require more urgent responses and do not have end customers but beneficiaries (Tabaklar et al. 2015:284). An HSC's information is often more unreliable, while the information in a commercial supply chain is more precise (Abiodun 2014:19).

The more complex the social and economic impact of a disaster, the more complex the humanitarian setting (Bealt & Mansouri 2018:124). Complex environments also increase the challenges of coordination between humanitarian actors (John et al. 2019:1228). Reasons for the complex environment include the intensity and nature of the disaster, shorter lead times, sudden occurrence, a lack of resources, the unpredictability of demand, the high stakes associated with timely deliveries, the location and timing of the disaster and donors' supplies (Abiodun 2014:18; Agarwal et al. 2022:11; Kovács & Spens 2009:507; Maghsoudi & Pazirandeh 2016:128). The magnitude, nature and location of an emergency affect the design and operation of an HSC (Abiodun 2014:11). Humanitarian organisations usually operate in areas with improper transportation infrastructure, which influences the success of operations as accessibility becomes a challenge (Ngwenya & Naude 2016:2). Humanitarian organisation employees also experience various challenges including, long working hours and operating in politically unstable or dangerous environments (Abiodun 2014:24). This causes high pressure and burnt-out employees and employee retention and high staff turnover challenges for HOs (Abiodun 2014:25; Van Wassenhove 2006:480).

Information sharing and information quality

The flow of information comprises information sharing, data collection and information processing, and is considered a

challenge as humanitarian actors typically do not have reliable information about how and where to respond to disasters after arriving at the disaster site (Abiodun 2014:16; Altay & Pal 2014:1019; Day, Junglas & Silva 2009:644; Dubey et al. 2019a:160). This lack of information can cause further harm to an affected community (Mamabolo & Sebola 2021:130). When relevant information is not available nor shared between humanitarian actors, there is a delay in decision-making, which can have devastating consequences, such as the loss of lives and impact on livelihoods (Bjerge et al. 2016:1; Waring et al. 2018:592).

Subsequently, the quality of information shared during disaster response is becoming an increasingly more important role between humanitarian actors because accurate information is required to best support vulnerable people affected by a disaster (Kirac & Milburn 2018:498; Suifan et al. 2020:127). High-quality information sharing increases humanitarian response efforts' efficiency and speed (Suifan et al. 2020:127). Information sharing and information quality are discussed next, with data collection and information processing incorporated into information quality. Information technology and other technologies used as tools to enhance information sharing and information quality are explored in this section.

Information sharing

Information sharing is important because it is essential for successful humanitarian operations (Agarwal et al. 2022:11; Maghsoudi & Pazirandeh 2016:126). Information sharing facilitates timeliness and collaboration between humanitarian actors, and disaster relief cannot be achieved if relief organisations do not share information effectively and efficiently (Bealt & Mansouri 2018:139; Dubey et al., 2019b:120). Subsequently, a lack of information sharing between humanitarian actors impedes the success of disaster relief operations in HSCs (Negi & Negi 2021:65).

Many challenges hinder sharing of information during a disaster response. For example, HOs sometimes do not share information with HSC actors as they compete for donations and media coverage (Altay & Pal 2014:1025). Furthermore, decision-makers may be strained by too much information, placing strain on their cognitive abilities already limited by complex environments (Waring et al. 2018:594). Humanitarian actors should therefore collaborate with HOs through sharing resources and information to overcome these challenges (Dubey et al. 2019b:4). For instance, sharing information between humanitarian actors in a cluster is also vital for successful, effective and efficient operations (Altay & Pal 2014:1015; Damoah 2022:134). A cluster is a hub through which information is shared to ensure an effective and coordinated humanitarian response (Altay & Pal 2014:1015; Shittu, Parker & Mock 2018:382).

Information sharing between humanitarian actors creates transparency, which allows improved decision-making that ultimately improves disaster response (Dubey et al. 2019a:163–164; Khan et al. 2019:2). Information transparency includes accuracy and clear disclosure of the information (Khan et al. 2019:4; Shayganmehr et al. 2021:2). Humanitarian organisations are experiencing increasingly more pressure to become transparent to a greater extent (Khan et al. 2019:2). For example, it is crucial to be transparent with donors as they desire transparency to ensure funds are used efficiently (Anjomshoae et al. 2017:200; Khan et al. 2019:2; Patil, Shardeo & Madaan 2021:1974). Subsequently, poor transparency may lead to poor collaboration between humanitarian actors, and poor collaboration compromises the successfulness of HSCs, which ultimately leads to unsuccessful disaster relief efforts (Dubey et al. 2021:2; Shayganmehr et al. 2021:3). For this reason, the sharing of information is vital to the successful relief of disasters (Negi & Negi 2021:65).

Information quality

Effective relief operations depend on the quality of information regarding the people and regions affected by a disaster (Shayganmehr et al. 2021:2). When there is a lack of comprehensive, current and accurate information or when too little or too much relevant information is gathered, humanitarian actors' decision-making process becomes exceptionally challenging (Altay & Labonte 2014:53). This is especially true because the assessment of information quality, information timeliness and the accuracy of information must usually be adjusted as circumstances change during a disaster response (Altay & Labonte 2014:53; Kabra & Ramesh 2016:84). The quality of information that is shared in HSCs is encouraged to improve the response and integration of disaster relief (Suifan et al. 2020:120).

The reliability and quality of information depend largely on how the information was collected (Altay & Labonte 2014:60). Therefore, collecting data and learning from past performance is critically important for the execution of HSCs (Jeble et al. 2019:615). Information is commonly collected through aerial flyovers, on-ground assessments and emergency reporting systems (Kirac & Milburn 2018:486). Although various methods exist to collect data, data collection still faces many challenges. Patil et al. (2021:995) identified poor data collection as a challenge because data protection policies prevent proper data collection. For instance, in South Africa, the *Protection of Personal Information (POPI) Act* is continually being disrupted by technologies that change how information is processed, stored and shared (Kandeh, Botha & Futcher 2018:1). Moreover, the willingness of actors to share information can affect the ease of collecting information (Altay & Pal 2014:1018). In addition, emergency calls can overwhelm reporting systems and pose data collection challenges (Kirac & Milburn 2018:486). Other information quality challenges regarding data collection include inconsistent data formats, inaccessibility of the information, storage media misalignment, unreliable information and inadequate information streams (Altay & Labonte 2014:60). Consequently, taking the foregoing into consideration, it is evident that data collection plays a crucial role in information quality during disaster response.

For humanitarian actors to make decisions that will improve disaster coordination, they need to process substantial amounts of data (Dubey et al. 2019b:7). Unfortunately, because of the time sensitivity of HSCs, not all data can be processed (Bag et al. 2020:6). However, humanitarian assistance can be enhanced by improving information processing capabilities because it will improve the organisation's performance (Dubey et al. 2019b:129, 132, 151). The information processing theory (IPT) proposes that the more information processing requirements an organisation has, the greater should be the organisation's capability to process information, lessen uncertainty and improve performance (Zhu et al. 2018:50). Information processing is critical to make effective decisions and coordinate humanitarian relief operations (Gupta, Altay & Luo 2019:1154). Information processing can be facilitated through information technology, and therefore, the following section will elaborate on the role of information technology in information sharing and information quality (Kabra & Ramesh 2015:145).

The role of information technology in information sharing and information quality

Information technology is used to gather, process and share information and comprises software, hardware communication technology and data (Kabra & Ramesh 2015:145). Information technology and social media are being used increasingly in every-day life (Murayama, Scholl & Velev 2021:1078). Modern technologies can improve operations, increase the safety of employees and extend the range of observation and communication (Abiodun 2014:26). Consequently, information technologies decrease response times in relief operations (Kabra & Ramesh 2016:83).

Information technology is a driver for coordination because it is used to communicate and transfer information between HSC actors (Dubey et al. 2019a:162; Kabra & Ramesh 2016:83). This can be done through various technologies such as big data analytics. Big data analytics can be used by HOs to collect data from various sources and to increase their information processing capabilities (Dubey et al. 2019b:13). Blockchain technology is another technology that is used to increase transparency between HSC actors (Shayganmehr et al. 2021:4), as blockchain technology integrates peer-to-peer transmission, encryption, distributed storage, consensus and other technologies (Si et al. 2019:1028).

Although these technologies effectively assist information sharing and information quality, it is difficult to implement them in developing countries for various reasons. For example, developing countries probably do not have the capital to finance these technologies. A stable Internet connection is also a problem in developing countries (Hsiao, Lin & Huang 2010:6361). Developing countries, such as South Africa, must also overcome the challenge of power outages. Consequently, developing countries generally use low-cost technologies that do not require special skills to operate. This is especially important because being familiar with and understanding the technology plays an important role in collecting, processing and sharing information (Bjerge et al. 2016:3). Technologies that do not require special skills to operate and can easily be used in developing countries include Google Drive, emails, WhatsApp, phone calls and text messages.

Methodology

Research design

This study used a generic qualitative research design to explore the role of information sharing and information quality in HSC disaster response. A generic qualitative research design was deemed appropriate for this exploratory study as it is interested in understanding people's reports of their beliefs, attitudes, reflections or opinions on their experiences (Percy, Kostere & Kostere 2015:78).

Sampling

The unit of analysis for this study was HOs operating within the Southern African humanitarian space. Ten middle- and senior-level employees working for these HOs formed the unit of observation for this study. Purposeful sampling was used to select organisations and potential participants (Doyle et al. 2020:446). Homogenous sampling was used to purposefully select participants and organisations. Homogenous sampling comprises inclusion and exclusion criteria used to identify suitable participants as the criteria are detailed (Robinson 2014:26). Subsequently, homogenous sampling allows for information-rich data to be collected.

For an organisation to be eligible to participate in this study, it had to comply with certain inclusion criteria. The organisation should provide disaster relief in the humanitarian space in Southern Africa and should have responded to a man-made and/or natural disaster within the last 2 years to ensure that the organisation could supply the researchers with valuable and relevant information. The organisation's size differed from small to large because different HOs responded to different disasters. Individual participants also had to comply with certain inclusion criteria to participate in this study. Firstly, the participants should work for an HO operating in Southern Africa. Secondly, this participant had to be a middle to senior manager with at least 2 years' experience in the humanitarian sector. Thirdly, the participant needed to be actively involved in the decision-making process for disaster response in Southern Africa to ensure the collection of relevant and applicable data.

After seven interviews, all themes, sub-themes and codes were determined. Three additional interviews were conducted to ensure that no new substantial information was obtained and that data saturation was achieved (Francis et al. 2010:1239). Data saturation is an indicator that adequate information has been collected and that additional interviews will provide little or no new information (Stephen et al. 2015:1781). Table 1 outlines the demographics of this study's participants.

TABLE 1: Profile of study participants.

Pseudonym	Organisation	Years of service at organisation	Position	Gender	Duration of interview
P1	O01	5	Project Manager	Female	00:39:41
P2	O02	14	Senior Social Worker and Head Project Lead	Female	00:52:16
P3	O03	6	Deputy Chief Executive: Communications	Female	01:05:34
P4	O04	2	Disaster Manager	Female	00:41:36
P5	O05	18	Logistics Manager	Female	00:28:09
P6	O06	4	General Manager	Female	00:20:39
P7	O07	2	Non-Profit Organisation Liaison	Female	00:37:39
P8	O08	3	Regional Procurement Manager – Southern Africa	Female	00:29:03
P9	O08	7	Nutrition and Disaster Response	Female	00:52:28
P10	O10	7	Director – Senior Partnerships, Corporate and Government	Male	01:22:00
Average:					**00:45:17**

Data collection

This study employed semi-structured interviews to collect data. These interviews were directed by a discussion guide after thoroughly reviewing the current literature. A pre-test was conducted with a participant who met the inclusion criteria. This pre-test formed part of the data set used in this study as only minor changes were made. Once these interviews were conducted, it was immediately transcribed using transcription software, after which the recordings were re-played to ensured that the transcriptions were verbatim.

Data analysis

Thematic analysis was used to analyse the data. Thematic analysis entails 'identifying, analysing, organising, describing, and reporting themes found in a data set' (Nowell et al. 2017:2). A preliminary inductive analysis was conducted after the researchers became familiar with the data (Creswell 2012:243). Literature was then analysed to identify *a priori* codes combined with the inductive codes to create a master code list. ATLAS.ti 22 software was used to label relevant data. After the data were analysed, redundant codes were eliminated, and interchangeable codes were combined to form part of the refinement process (Braun & Clarke 2012:61). The remaining codes were integrated into appropriate themes and sub-themes; codes were used to formulate the study's findings.

Trustworthiness

Trustworthiness is the degree to which the recipient has confidence that the information provided is without bias and is valid (Mumuni et al. 2020:161). The criteria used to ensure the trustworthiness of this study is credibility, dependability, transferability and confirmability (Shenton 2004:64). The credibility of this study was ensured by continuously providing a summary of understanding during the interviews, asking iterative questions to clarify subjects and reiterate the study's voluntariness (Polit & Beck 2012:591; Shenton 2004:66–68). Dependability was achieved by ensuring clear inclusion criteria and by keeping a record of all research procedures (Elo et al. 2014:4). For this study, transferability was achieved by providing sufficient information regarding the context of the study and an in-depth explanation of the phenomenon this study aims to investigate (Shenton 2004:73). The context of this study described the methods in which data are collected, the location and number of organisations interviewed, and the length and date that the semi-structured interviews were conducted. To help achieve confirmability, the researchers made detailed notes regarding the development of themes (Nowell et al. 2017:8).

Ethical considerations

Ethical approval to conduct this study was obtained from the University of Pretoria Faculty of Economic and Management Sciences Research Ethics Committee (No. u18032975/2022). Before each interview, all participants were provided with a consent form. This form emphasised that the interview was voluntary and confidential. The researchers ensured that each participant understood and signed the consent form before the interviews commenced. Moreover, each participant's anonymity was ensured through using pseudonyms.

Findings

This study established five main themes linked to the five main research questions. These themes are discussed in the sub-sections. To strengthen the findings, raw data extracts are provided, and the themes are linked to relevant literature. These themes are outlined in Table 2.

Theme 1: The role of information sharing during humanitarian supply chain disaster response

This theme explores the various roles that information sharing plays during HSC disaster response.

Coordination and collaboration

Nine participants indicated that sharing information or participating in collaboration and coordination practices helps humanitarian actors coordinate and collaborate better. Coordination and collaboration include sharing information and partnering with other humanitarian actors to alleviate the suffering of vulnerable people. This can be done through timeous disaster response and by supplying essential goods and services. The participants emphasised the importance of coordination and collaboration between humanitarian actors in information sharing during HSC disaster response as

TABLE 2: Summary of research questions, themes and sub-themes.

Research questions	Themes	Sub-themes
Research question 1: What is the role of information sharing in HSCs during disaster response?	The role of information sharing during HSC disaster response	• Coordination and collaboration • Transparency • Contingency planning and preparedness • Efficient disaster response
Research question 2: What is the role of information quality in HSCs during disaster response?	The role of information quality during HSC disaster response	• Information accuracy • Information clarity • Trustworthiness
Research question 3: How is information shared in HSCs during disaster response?	Information sharing approaches	**Information sharing methods:** • Meetings • Humanitarian across relationship management • Cluster-based approach **Information sharing tools:** • Virtual communication • Databases and web-based platforms
Research question 4: How is the quality of information ensured in HSCs during disaster response?	Information quality assurance	**Information quality assurance methods:** • Information quality teams • Manually vetting beneficiaries • Cross-checking data • Historical data **Information quality tools:** • Spreadsheet • Paper-based documents • Databases
Research question 5: What is the information sharing and information quality challenges during disaster response?	Information sharing and information quality challenges	**Information sharing challenges:** • Duplication of information • Lack of information sharing between humanitarian actors • Lack of information sharing tools • Misinterpretation of information **Information quality challenges:** • Information ethics • Data collection challenges • Lack of information quality process and methods • Lack of information quality tools

HSC, humanitarian supply chain.

various humanitarian actors can share their expertise, capacities and resources with each other. Therefore, one organisation cannot respond to a disaster on their own, as illustrated by the following quotation:

> ' … not every organisation can respond to everything ... So each supplier, each NGO can take over a certain department of the response. So O08 would generally take the medical side of it. Like O05 is very logistics orientated, the food side of it as well. Yeah, it just depends on the expertise, and it can be, it doesn't always happen. And a lot of organisations tend to take a, do their own thing basically. But yeah, I think if we shared information more, it would be a pretty much a, a better response, but yeah, doesn't always happen.' (P08, female, regional procurement manager – Southern Africa)

Transparency

Seven participants indicated that their operations are transparent and communication channels with other humanitarian actors are open during HSC disaster response. Transparency is the open sharing of information between humanitarian actors. Participants indicated that transparency is important because if the information is withheld, it can lead to the duplication of information, disaster relief efforts and resources. Furthermore, transparency between the HO and its donors is important to ensure future funding, as displayed in the following extract:

> '… I think it a good thing to be transparent. And in the sharing of the information specifically … If we are working through the same disaster, that everybody knows what we have collected, money or clothes or food or whatever, and what we have done with it. So, I think you must be very transparent in the sharing of your information. You must be an open book because at the end of the day, it's not your money. You have to be accountable. And so sharing the information of what you've received and what you are giving out is of paramount.' (P01, female, project manager)

Preparedness and contingency plans

Six participants indicated that information sharing enables organisations to share lessons learnt from past disasters to better prepare for future disasters. Disaster preparedness and contingency plans relate to proactively strategising to reduce the likelihood and severity of disasters. Participants indicated that they could use the shared information continuously as a guideline for when a disaster occurs, as stated in the following extract:

> 'We take our data and we send it to the Department of Social Development. The [Department of] Social Development then launch that data and build a framework or a there's a word that I'm looking for. They build a database around that on the information we give them. So the Department of Social Development, a year later or whatever will it, that database will, did come back to all of us. So the next time is disaster anywhere. We'll be using that database as a framework to do our next round of humanitarian or disaster work.' (P10, male, director – senior partnerships, corporate and government)

Efficient disaster response

Eight participants confirmed that sharing information during HSC disaster response results in more efficient disaster response. Efficient disaster response refers to responding to the disaster in the least costly and timeous manner without compromising the quality of the response efforts and the optimisation of resources. Participants confirmed that when they share information among each other during HSC

disaster response, the response to disasters is more efficient. Humanitarian organisations also avoid neglecting certain territories, as confirmed in the following quotation:

> 'And also just to be efficient, you know, it's like, are we reaching the people with what they really need? You know? So yeah it's essential. Transparency is very important, but also efficiency. Because you, you know, I mean you want to reach people and achieve what you want to achieve with the best, in the best possible way and not wasting money.' (P05, female, logistics manager)

The findings from this study are consistent with the literature regarding information sharing promoting coordination and collaboration among humanitarian actors, improving transparency and preparing contingency plans for future disasters (Dubey et al. 2019a:163, 2020:14; Khan et al. 2019:2081; Negi & Negi 2021:45; Van Wassenhove 2006:481).

Theme 2: The role of information quality in humanitarian supply chain during disaster response

This theme explores the various roles that information quality plays during HSC disaster response.

Information accuracy

Seven participants indicated that information accuracy is important to achieve information quality. Information accuracy relates to having correct and relevant information that will aid HOs in responding efficiently and effectively to disasters. Participants indicated that information accuracy is important to ensure correct aid is provided to beneficiaries, as stated in the following extract:

> 'So information is power, right? Knowledge is power. If you don't get the right information, you're not going to send the, what is needed to the right place.' (P09, female, nutrition and disaster response)

Information clarity

Three participants mentioned that information needs to be clear for HOs to respond accurately to beneficiaries. Information clarity relates to how comprehensible and coherent the information is. Participants identified that information clarity is important for HOs to avoid any miscommunication among humanitarian actors, as illustrated by the following quotation:

> 'So yes, the quality of information is very important, because you need to send a clear message, especially if you are if you're sending out a call to action. You need to have a clear message that you are trying to send out there and trying to share so that people from the get-go understand what it is that you need from them.' (P07, female, NPO liaison)

Trustworthiness

Seven participants indicated that their information needs to be trustworthy to respond to disasters. Trustworthiness is concerned with the credibility and dependability of the data. Participants mentioned that they need to receive trustworthy information to consider responding to a disaster, as illustrated in the following extract:

> 'Yeah, because it needs to be trustworthy. I'm not going to just respond to anything. I need to vet the situation and verify that it's accurate information. So the quality of the communication is obviously very important, needs to be coming from a trusted source.' (P06, female, general manager)

The findings from this study corroborate with literature in confirming that information accuracy, information clarity and information trustworthiness promote sharing information during HSC disaster response (Dubey et al. 2019a:163; Khan et al. 2019:4; Shayganmehr et al. 2021:2).

Theme 3: Information sharing approaches

This theme explores the information sharing approaches during HSC disaster response. Humanitarian organisations and other humanitarian actors use different methods and tools to increase the efficiency and effectiveness of information sharing during HSC disaster response.

Information sharing methods

Ten participants mentioned that they used meetings to share information among humanitarian actors. Meetings relates to ad-hoc meetings as needed or regular meetings. Participants indicated that meetings allow them to rapidly share information and discuss how to respond to the disaster, as illustrated in the following extract:

> 'So we were packing a thousand relief hampers a day and we straight away got on Zoom meetings every morning with the KZN response team, which are four other organisations. Every morning we'd meet, what are, where, who are the problems, which are the areas that are under threat, where the call is coming from ….' (P09, female, nutrition and disaster response)

Eight participants indicated that their relationships with other humanitarian actors increase the successfulness of information being shared. Humanitarian actors' relationship management refers to having and maintaining relationships with other humanitarian actors. Participants indicated that their relationships with other humanitarian actors have allowed them to share information and resources more effectively, as mentioned in the following extracts:

> '… if I didn't have the relationship with the people that we work with on the ground, we wouldn't have, we wouldn't picked that up. And so bringing people into the story and bringing other organisations into the story and sharing data, and sharing beneficiaries and sharing pin drops of where you've delivered stuff so that it goes onto a map is really, really important. Really, really important.' (P09, female, nutrition and disaster response)

> 'I think from those coffee conversations, we are able to build a network so that the information can flow freely.' [Translated] (P03, female, Deputy Chief Executive: Communications)

Four participants indicated that they use their network to form clusters and share information more effectively. Cluster-based approaches is concerned with humanitarian actors who act as a central hub through which information and

resources are shared. Participants mentioned that using clusters is vital to achieving an efficient disaster response but is not used as effectively as it could be, as stated in the following quotations:

> 'So in terms of having a cluster, the cluster, the idea of the cluster is to be able to share information, which now that I'm thinking that should be the, yeah, we should use clusters much more efficiently, but yeah, it doesn't always work out.' (P08, female, regional procurement manager – Southern Africa)

> ' … we already have clusters, very informal clusters, through relationships, back clusters across the country. I think they were already, they're just, we all just need to find each other. And I think that's what we doing right now.' (P09, female, nutrition and disaster response)

Information sharing tools

Ten participants indicated that they use virtual communication and/or the media to share information with humanitarian actors. Virtual communication includes WhatsApp, phone calls and emails used to share information. Media involve radio stations, newspapers and other social media platforms that share information. Participants indicated that they use these technologies to share information although sometimes it is difficult because not all humanitarian actors have access to these devices, as illustrated in the following quotations:

> '… that's where we start picking up the phone, picking up the WhatsApps, the emails, and then finding ways to work together ...' (P07, female, NPO liaison)

> 'I think information coming through almost immediate these days with Twitter, Instagram, Facebook, WhatsApp, phone calls, the news, the radio, TV. And there's always somebody listening to something. Yeah, and then it just gets to us.' (P01, female, project manager)

Ten participants indicated that they use databases and web-based platforms to share information. Databases and web-based platforms represent any internal or external online platform that humanitarian actors can access to share information. Participants mentioned these platforms were important for accessing real-time data, as illustrated in the following extract:

> 'Then us as O04, we are also having a platform which we also established, especially during the KZN floods to provide real-time data. We are able to have each and every day, at any time, we are able to share reports from that platform and also engage different actors live on that platform to ensure that at least everyone is aware of what we are doing and the way we are doing it ….' (P04, female, disaster manager)

This study is consistent with current literature by confirming that cluster-based approaches are used to share information among humanitarian actors (Altay & Pal 2014:1015; Damoah 2022:134). Furthermore, this study corroborates with current literature by validating that HOs use virtual communications, the media, databases and web-based platforms as information sharing tools (Dubey et al. 2019a:162; Kabra & Ramesh 2016:83; Murayama et al. 2021:1078). However, this study expands on current literature by indicating that meetings and humanitarian actor relationship management can promote information sharing.

Theme 4: Information quality assurance

Theme 4 explores the information quality assurance methods and tools used by HOs during disaster response. These methods and tools aim to ensure accurate and reliable information to assist HO in making more informed decisions and responding to disasters successfully.

Information quality assurance methods

Five participants mentioned that they use information quality teams to validate the quality of the information. Information quality teams relate to teams who validate the accuracy, correctness and trustworthiness of information to ensure the HO responds to disasters at the correct time, place and in the correct manner. Participants indicated that information quality teams assist them in verifying the quality of information to make more informed decisions, as stated in the following extract:

> 'We are having a team which work on that of course, where, when we collected data, utilising such soft software and applications like Cobot, to collect data quickly and get it quickly. Then we are having a team that will analyse our MNE team monitoring and evaluation team specialists. They will also take the lead in ensuring that, the data is analysed and classified in a way that informs the people in decision-making better.' (P04, female, disaster manager)

Five participants indicated that they manually vet beneficiaries. Manually vetting beneficiaries is when organisations verify that the beneficiary's information corresponds to the information they have. Participants mentioned that by manually vetting people, they receive more accurate and trustworthy information, as stated in the following quotation:

> 'You need to vet people with some sort of document that proves that that is Barder, you know, and it's not some sort of fool or some sort of person made up person. So it's a very really tactile process.' (P10, male, director – senior partnerships, corporate and government)

Seven participants indicated that they cross-checked information. Cross-checking information is to ensure that the information you receive correlates with your information to confirm the quality of the information. Participants mentioned that they cross-checked information from their humanitarian actors to ensure that they make decisions based on quality information, as illustrated in the following quotation:

> '… we ourselves first verify, we have had some fake information coming through, put a lot of emotion into things and it really, you know, blew up in our faces. So what we do now is there's a whole system that we have to follow to make sure, verify and make sure our facts are right before we commit to something.' (P01, female, project manager)

Nine participants mentioned that they make use of historical data to make decisions for current and future decisions. Historical data represent past information such as population

demographics, annual weather patterns, types of disasters, magnitude of disaster, regions where disasters occur and the strategies used to respond to disasters. Participants indicated that they use historical data to make decisions as they cannot always predict the time, place and outcome of disasters, as illustrated in the following extracts:

> 'Of course, we relate to the information, because, you know, past experiences inform us also on future actions.' (P04, female, disaster manager)

> 'So generally, that's what we do. Historical data is very key in a lot of what I do personally because I do, I'm strategy, I can't, and because of the nature of the organisation I work with, we can't generally predict what's going to happen next year, but we need to be able to plan and budget in all of that. So we take historical information and plot that and see and then continuously monitor that going forward.' (P08, female, regional procurement manager – Southern Africa)

Information quality tools

Three participants indicated that they use spreadsheets to ensure the quality of their information. Spreadsheets involve the use of any spreadsheet, for example Microsoft and Google spreadsheets, to ensure the quality of the information. Participants indicated that they use spreadsheets to capture, process and alter the information to ensure the quality of information, as stated in the following quotation:

> 'I will then be processing this information onto an Excel spreadsheet where we will then populate it and work out the percentages of how many females of the age of those we are helping or assisting.' (P07, female, NPO liaison)

Three participants confirmed using paper-based documents to keep records and ensure quality information. Paper-based documents includes any document that is not online or on a hard drive, but that is physically written or printed on paper. Participants indicated that by using paper-based documents, they are ensuring accurate information, as illustrated in the following quotation:

> '… the best monitor for accurate information is for you to actually do it yourself with a pen and paper.' (P10, male, director – senior partnerships, corporate and government)

Five participants confirmed that they use databases to ensure the quality of their information. Databases comprise internal (i.e., within the organisation) or external (i.e., between humanitarian actors) databases used to ensure the quality of information. Participants indicated that they use databases to generate accurate information that assists them in their disaster response, as stated in the following quotation:

> 'And then we have an online accounting software system that we use to feed information in, and it works out a meal count for us.' (P07, female, NPO liaison)

This study corroborates with current literature by finding that historical data are an information quality method in HSC disaster response (Jeble et al. 2019:615). Furthermore, this study aligns with the current literature in that databases are an information quality tool (Kirac & Milburn 2018:486). However, this study expands on current literature by adding that information quality teams, manually vetting beneficiaries and cross-checking data are used as information quality assurance methods. In addition, this study adds to the current literature by finding that spreadsheets and paper-based documents are also used as information quality tools to ensure the accuracy of information.

Theme 5: Information sharing and information quality challenges

The last theme examines the challenges that HOs face when responding to a disaster. These challenges hinder HOs from responding to disasters optimally.

Information sharing challenges

Five participants indicated that the duplication of information is a challenge if the information is not shared between humanitarian actors. The duplication of information occurs when information is shared between humanitarian actors in similar or different ways. Some participants indicated that the duplication of information is challenging when sharing information and suggested the need for an information-sharing system as a possible solution as indicated in the following extract:

> '… I think collecting data as well, because I think that we sometimes duplicate things. So it looks like something is worse than what it really is. And that's why I think it's important to have a good system in place that when you collect the data, it doesn't get duplicated ….' (P01, female, project manager)

Other participants indicated that the duplication of information is not a challenge as they can easily verify the information from other humanitarian actors, as illustrated in the following quotation:

> 'Actually not when it comes to disasters, cause disasters are usually broadcasted, and you can verify the information with either your fire department or your police station within the area. So no we don't have a lot of duplication ….' (P07, female, NPO liaison)

Five participants indicated the lack of information sharing among humanitarian actors during disaster response. The lack of information sharing between humanitarian actors occurs when humanitarian actors are reluctant or negligent to share information. Participants mentioned that information sharing between humanitarian actors is a challenge because they all have different processes and methods or a lack of processes and methods that do not always integrate with one another, as indicated in the following extract:

> 'Yeah. I think the reluctance of certain organisations to share information, like I said, sometimes it's a competitive sector, even though it's humanitarian, it becomes about donor relations and who can raise the most money and who's the most visible. So a lot of yeah, it becomes very competitive. I think that's the biggest challenge I've faced.' (P08, female, regional procurement manager – Southern Africa)

Three participants indicated not having enough and/or adequate information sharing tools create a challenge for

humanitarian actors. It usually occurs when humanitarian actors do not have access to devices and systems to share information. Participants mentioned there is a lack of information sharing tools to promote coordination, as illustrated in the following quotation:

> 'You know you might have somebody like a farmer. That's not familiar with a zoom meeting or a zoom, you know technology. And so to get the message to them to say, we will be sending truckloads of feed for your, your animals or, you know, we've set up an account for you at the local suppliers, please go and, and fetch what you need. The message doesn't always get there. So I think in South Africa, we still a bit behind in certain areas.' (P01, female, project manager)

Four participants indicated that they experience the challenge of misinterpreted information. Information is misinterpreted when not understood correctly. Participants indicated that communicating the correct message is a challenge for humanitarian actors, as stated in the following quotations:

> 'Communication can be misinterpreted even amongst people of the same language.' (P02, female, senior social worker and head project lead)

> 'So I think getting the information across the way you wanted to get it across [is a challenge].' (P07, female, NPO liaison)

Information quality challenges

Seven participants indicated that information ethics is a challenge for information quality. Information ethics refers to information being honest and true. Participants mentioned that information ethics is a challenge as some beneficiaries learn to use the system to their advantage, and some humanitarian actors are dishonest about their output to receive more funding, as illustrated in the following extracts:

> 'That's our main concern. Because people have been requesting aid from us for three years in a row and their numbers are always exactly the same, their numbers don't change. And you're like, these hundred people were all affected exactly the same way over three years. Which is strange … Just being able to trust the people that are applying for aid.' (P06, female, general manager)

> 'But it's really very important that the accuracy of information and the ethics there too are maintained. Because if you are going to give exaggerated outputs, it's going to take that figure and say, look, if you are claiming that you are dropping 30 tons of food a day, hypothetically, it means in our calculation means 30 tons takes care of that geographical location. But in reality, you are only giving out 9 tons. So it means 21 tons of aid is not going out to people, which other NGOs that assume is going out, number one or alternatively they making up the shortfall and the organisation that's saying that 30 tons, they getting the credit ….' (P10, male, director – senior partnerships, corporate and government)

Ten participants mentioned their HO experience data collection challenges. These data collection challenges include large amounts of information to process, beneficiaries that are reluctant to share information and information inaccuracies. Participants indicated these challenges complicate the data collection and processing abilities of humanitarian actors, as stated in the following quotations:

> '… there's so much data. You can imagine the amount of data that is available. And how do you package that in a neat little thing, it's, that's the biggest challenge ….' (P05, female, logistics manager)

> 'So we are finding that criminal gangs are now using that as some sort of advantage, in terms of hiding from law enforcement. So we are finding that that's become a significant challenge towards gathering the index data that you actually want, you know.' (P10, male, director – senior partnerships, corporate and government)

> 'And so as fast as you think you've got the information, even the beneficiary list isn't even accurate, depending on the time that I've got completed and by who was managing that hall, because often those halls are absolute chaos. So there's a lot of stuff and it's so hard to stay on top of the accuracies of the beneficiary list, especially when you're trying to report back to donors and do the best that you can … But you know, that is probably one of the bigger challenges is its, yeah, I mean, there's loads of challenges, but that's a huge, huge challenges, accurate information for both sides.' (P09, female, nutrition and disaster response)

Four participants indicated that their HOs required sufficient information quality processes and methods. A lack of information quality processes and methods involves the absence of processes and methods used to ensure the quality of information. Participants indicated that in a disaster, the humanitarian actors are more focussed on responding to the disaster rather than verifying documenting information, as illustrated in the following quotation:

> 'So we are very poor at documenting things that we do, especially supply chain. We doers and then we think about things later. So it's very up when yeah. Generally, it's very hands-on. And then you think about things afterward, how to fix it and then retroactively maybe report and yeah.' (P08, female, regional procurement manager – Southern Africa)

Two participants indicated that their HOs or related humanitarian actors require information quality tools. Information quality tools are systems used to ensure the quality of information. Ensuring information quality becomes challenging when there are not enough information quality tools available. Participants mentioned there is a need for tools to ensure improved information accuracy to respond to disasters, as illustrated in the following extract:

> 'So it … is really key that we as a humanitarian organisation, we integrate also indigenous knowledge systems in our early warning systems and ensure that we integrate them with the technologically advanced kind of systems, which we are using. Because if you look at the KZN floods in as much as South Africa where service predicted, but it exceeded their prediction. So that one is one it then tells us, we need to do more to … also support the advanced technology in ensuring that we maximise on integration.' (P04, female, disaster manager)

This study is aligned with current research as the duplication of information, lack of information sharing between humanitarian actors, data collection challenges, information quality processes and methods and information quality tools prove challenging (Altay & Labonte 2014:60; John et al. 2019:1228; Kirac & Milburn 2018:486). However, this study

expands on current literature by indicating a shortage of information sharing tools. This study also identified that the misinterpretation of information leads to an unsuccessful HSC disaster response, which expands on current literature.

Conclusion

Summary of findings and theoretical implications

This generic qualitative study explored the role of information sharing and information quality in Southern African HSCs during disaster relief. This study investigated how information is shared in Southern African HSCs during disaster relief. Furthermore, this study examined how the quality of information is ensured during Southern African HSC disaster relief. The first research question addressed the role that information sharing plays in HSC disaster response. Four roles of information sharing during HSC disaster response were discovered, namely: coordination and collaboration, transparency, preparedness and contingency plans and efficient disaster response. This study is coherent with current literature in finding that coordination, collaboration, transparency and preparing contingency plans for future disasters are enhanced through sharing information during HSC disaster response (Dubey et al. 2019a:163, 2020:14; Khan et al. 2019:2081; Negi & Negi 2021:45; Van Wassenhove 2006:481).

The second research question explored the role of information quality in HSC disaster response. The study identified three roles of information quality in HSC disaster response: information accuracy, information clarity and trustworthiness. This study is aligned with current literature regarding information accuracy, information clarity and trustworthiness of information and confirms that the quality of information promotes these information quality roles (Dubey et al. 2019a:163; Khan et al. 2019:4; Shayganmehr et al.2021:2).

The third research question investigated how information is shared during HSC disaster response. Three information sharing methods, namely meetings, cluster-based approaches and humanitarian actors' relationship management, were discovered, and two information sharing tools, namely virtual communications and data and web-based platforms. This study confirms the findings of current literature by validating that humanitarian actors can use cluster-based approaches to share information efficiently and effectively during HSC disaster response (Altay & Pal 2014:1015; Damoah 2022:134). In addition, this study is aligned with current literature as it confirms that virtual communications, such as Google Drive, WhatsApp, phone calls, emails, newspapers, radio stations and social media and databases and web-based platforms are used as information sharing tools during HSC disaster response (Dubey et al. 2019a:162; Kabra & Ramesh 2016:83; Murayama et al. 2021:1078). Furthermore, this study expanded on current literature by discovering that humanitarian actors' relationship management promote sharing of information during HSC disaster response.

The fourth research question addresses how information quality was ensured during HSC disaster management. Four information quality processes and methods, namely information quality teams, manually vetting beneficiaries, cross-checking data and using historical data, were identified and three information quality tools, namely spreadsheets, paper-based documents and databases. This study corroborates with current literature by validating that historical data are used in HSC disaster response as an information quality method (Jeble et al. 2019:615). In addition, this study aligns with current literature by identifying that HOs use databases as an information quality tool during HSC disaster response (Kirac & Milburn 2018:486). Furthermore, this study augments the current literature by discovering that HOs manually vet beneficiaries and cross-check data as information quality methods to ensure the accuracy and trustworthiness of the information.

The fifth and last research question explores the information sharing and information quality challenges that HOs face during HSC disaster response. Four information sharing challenges, namely duplication of information, a lack of information sharing between humanitarian actors, a lack of information sharing tools and misinterpretation of the information. There are also four information quality challenges, namely information ethics, data collection challenges, a lack of information quality processes and methods and a lack of information quality tools. This study confirms current literature by identifying the duplication of information and the lack of information sharing between humanitarian actors poses a challenge for HOs during disaster response. Moreover, this study aligns with current literature by validating that a lack of information quality processes and methods, and a lack of information quality tools are challenges that HOs face when responding to an HSC disaster (Altay & Labonte 2014:60; John et al. 2019:1228; Kirac & Milburn 2018:486). Furthermore, this study contributes to the current literature by discovering that a lack of information sharing tools and the misinterpretation of information creates information sharing and information quality challenges that ultimately lead to an unsuccessful HSC disaster response.

Therefore, five main theoretical implications were discovered in this study. Firstly, this study expanded on current literature by identifying that information sharing can assist HOs in proactively preparing for future disasters by creating disaster preparedness and contingency plans. Secondly, this study confirmed current literature by finding that information accuracy, information clarity and trustworthiness of information promote information quality in HSC disaster response. Thirdly, this study augments current literature by establishing that the relationship between humanitarian actors promotes optimal information sharing among them. Fourthly, this study contributed to the current literature by discovering additional information quality methods that assist HOs in ensuring information accuracy and trustworthiness of the information. Fifthly, this study expanded on current literature by identifying additional information sharing and information quality challenges HOs face during HSC disaster response.

Managerial recommendations

Firstly, this study creates awareness of the importance of information sharing and information quality in HSC disaster response. Practitioners should prioritise and invest in sharing quality information between humanitarian actors. As a result, practitioners will achieve a more efficient and effective HSC disaster response, which will result in a successful disaster relief effort and ultimately alleviate the suffering of vulnerable people. This study also provides practitioners with various information sharing and information quality methods and tools to increase the level of information shared between humanitarian actors during disaster response. Methods and tools, such as managing relationships with humanitarian actors can increase efficiency in sharing quality information. Secondly, the challenges outlined in this study enable practitioners to understand the challenges that Southern African HOs face during HSC disaster management. Practitioners should be proactive and create strategies to mitigate these identified challenges when a disaster occurs.

Limitations and directions for future research

This study identified four main limitations and directions for future research. Firstly, this study explored the role of information sharing and information quality in Southern Africa, limiting this study's findings to only the perspectives of developing country HO participants. Therefore, future studies can expand on this study by investigating the role of information sharing and information quality during disaster response in other African countries or in developed countries. Secondly, this study only focussed on the perspectives of individual HO participants. Future studies can use a case-study approach or data triangulation between different humanitarian actors to explore more thoroughly how the relationship between humanitarian actors influences the quality of the information shared and how different information systems are integrated to respond effectively to disasters. Thirdly, this study focussed on the disaster response phase, which is only one phase of the disaster relief cycle. Future studies can investigate the nature of information sharing and information quality in other phases of the disaster relief cycle. Fourthly, this study followed a generic qualitative approach; future studies can test and determine the nature of information sharing and information quality with a quantitative study.

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Authors' contributions

M.d.W. was the main researcher. W.N. and C.S. acted as the supervisors and contribute to conceptualisation, literature review, research instrument and development of this article.

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Data availability

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