





RESEARCH ARTICLE

Entropy in the 'entrepot': Examining the challenges of relief supply chains during COVID-19 pandemic relief item distribution operation-2020 in Uganda [version 1; peer review: 1 approved with reservations]

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Abstract

Background: Distribution and management of relief supplies during hard times is seen as one of the key roles among governments in developing economies. Management of relief supply chains during a pandemic could be an uphill task that calls for an investigation. The present study focuses on the relief aid distribution of food items and face-masks during the first COVID-19 lockdown in Uganda. It specifically examines the challenges faced by the relief supply chain.

Methods: It was a case study of stakeholders involved in relief distribution and conducted through electronic and physical interviews. 20 electronic interviews were conducted through zoom and telephone calls while 20 physical interviews were conducted at the interviewees' respective workplaces. Data were collected from January 2021 to March 2021. The method of data collection and analysis was qualitative. Data were thematically analyzed using Atlas ti. v7.57.

Results: It was found that many challenges ranging from needs identification, procurement, warehousing, transportation, handling, beneficiary verification, and distribution inhibited the proper functioning of the relief items distribution supply chain. Other obstacles were the media and its increasing influence on supply activities. Also, politics coupled with the emergence of new actors and governance issues were identified as part of the study findings.

Conclusions: The present study identified a number of challenges in relief aid distribution. Some of the challenges were internal to the relief supply chain, others were beyond the chain. The findings could

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inform leverage of a number of factors during relief item distribution in the next cycles.

Keywords

Relief supply chains, relief distribution, humanitarian operations, epidemic, lockdown, relief storage facility, relief aid.



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Introduction

Relief supply during hard times like the COVID-19 pandemic is one of the key elements among governments in developing economies. One of the obstacles such relief encounters is the management of the supply chain the relief has to navigate before reaching the final beneficiaries. To that end, supply chain management plays an important role in ensuring the success of any relief operation, as it coordinates the planning, procurement, and distribution of the relief items from the source to the final consumer (de Moura *et al.*, 2020). So, efficient supply chains require robust humanitarian logistics systems (Thomas, 2003). This study sought to explore the challenges encountered in the chain of supplying relief items during the COVID-19 response operation in 2020 in Uganda.

Humanitarian logistics refers to the “process of planning, managing, implementing and controlling the efficiency, flow and storage of relief items. It is as well related to information and funds, from the point of origin (suppliers and donors) to the point of consumption, to meet the end beneficiary’s requirements” (Maghsoudi & Moshtari, 2021). Accordingly, logistics and relief supply chains, in general, account for up to 80% of the total humanitarian budget (Van Wassenhove, 2006), covering activities like needs assessment, resource mobilization, procurement, transportation, warehousing, and distribution to the final consumer (Van Wassenhove, 2006). Previous literature on relief supply chain operations has documented a wide range of practical challenges that inhibit the efficiency of relief operations. These challenges are not only aggravated by deficiencies in personnel logistic competencies such as training and experience, but also other bottlenecks such as inadequate funding, poor infrastructure, and the complexity of the disasters for which the relief is meant (Balcik *et al.*, 2008; Balcik *et al.*, 2010; Isabirye & Musasizi, 2020; Kovacs & Tatham, 2009; Sandwell, 2011). Additionally, the environment in which the humanitarian supply chain operates is characterized by increased media scrutiny and high levels of uncertainty. Hence, the difficulty of demand forecasting, and multiple stakeholders with varying needs (Kovacs & Tatham, 2009; Maghsoudi & Moshtari, 2021; Sandwell, 2011; Van Wassenhove, 2006).

Whereas previous studies have examined the challenges of relief supply chains, there are persistent natural and manmade disasters the world over whose humanitarian responses has always registered challenges (Maghsoudi & Moshtari, 2021; Mwangangi, 2016). So, response to the COVID-19 pandemic is not an exemption, when it comes to the challenges that characterize relief supply to vulnerable people. Moreover, relief operations are unique as they vary depending on location, intensity, timing, and context, as is the case in the current study considering a pandemic of great magnitude (Kovacs & Moshtari, 2019). The current study adds to existing literature and furthers the understanding of the challenges along the supply chain that arise during operations conducted during a pandemic. This study is inspired by the advent of events in March 2020, following the outbreak of the COVID-19 pandemic. Following the outbreak, the Ugandan government ordered a

nationwide lockdown (Ahimbisibwe, 2020). Meanwhile, the government set up a ministerial team headed by the prime minister to champion COVID-19 response efforts with the support of both national and international relief aid organizations (Isabirye & Musasizi, 2020).

After its institution, the relief supply team constituted measures concerning the distribution of food supplies mainly to the vulnerable groups in the metropolitan Kampala area (Shi, 2020). The relief program was designed to distribute mainly maize flour and beans to specific vulnerable groups. Further, sugar and powdered milk were in a special way to be distributed to breastfeeding mothers. Given the need to maintain standard operating procedures associated with the pandemic, the food distribution operations were conducted in a house to house and door to door technique (Isabirye & Musasizi, 2020). Moreover, another program was put in place regarding the distribution of 30 million face masks to adult citizens, especially the vulnerable groups (Kajoba, 2020). However, despite the efforts by the stakeholders to supply relief items, the operation registered multiple challenges as the items were not reaching the intended destination at the right time, quality, quantity, cost, and most importantly to the right beneficiaries (Isabirye & Musasizi, 2020). There were reported delays and worst of all some items were reported to be unfit for human consumption and use respectively, an indication of supply chain inefficiency (Isabirye & Musasizi, 2020), yet timely delivery of the items required an efficient supply chain.

Literature and theoretical review

The purpose of any relief supply initiative points to the alleviation of the suffering persons of a country may experience, ensuring supply network delivers the right relief items, at the right time, right quantities, delivered at the right place in the right condition at the right cost (Bölsche *et al.*, 2013; Maghsoudi & Moshtari, 2021). The supply chain, like in the business sector, aims at meeting the needs of the final consumer who is at the tail end of the downstream of the network (Mwangangi, 2016). So, before the commencement of any relief operation, actors should forecast the demand, procure the items, transport them, store the items, and distribute them over the last mile to the intended beneficiaries (Tatham *et al.*, 2017).

When forecasting is overlooked, the supply chain becomes liable to challenges at all its stages. The challenges at the needs assessment include needs complexity, rapid needs assessment that is prone to errors, volatility of demand, and limited or no coordination among the various stakeholders (Balcik *et al.*, 2008; Tatham *et al.*, 2017). Further, assessing the needs is made more difficult by other parameters like the location, since some disaster-struck areas are at times inaccessible due to improper infrastructure. Moreover, unregulated movements by refugees are synonymous with disaster situations, hence a challenge to the proper functioning of the relief supply chain (L’Hermitte *et al.*, 2015). Unlike in the business sector where logisticians easily capture consumer needs, relief

operations encounter diversity in terms of beneficiaries, especially in terms of origin, culture, and language. That makes the distribution process more difficult to accurately capture the needs of the intended beneficiaries (Kovacs & Spens, 2011; Tatham *et al.*, 2017).

The challenges at procurement not only cover acquisition but also transportation and storage. Some of the problems at this stage include unethical behavior, limited product availability, shortened lead times, limited financial resources, limited supply chain expertise, little storage space, limited information on cost of acquisition, restrictions ranging from legal, tariffs, and trade (Baporikar & Shangheta, 2018; L'Hermitte *et al.*, 2015; Makali, 2015; Tatham *et al.*, 2017). More complexity arises due to limited access to credible supplies that can meet the tight timelines (Balcik *et al.*, 2008). Additionally, transporting and storing the procured goods has been a nightmare, as the poor infrastructure makes the operations more challenging (Baporikar & Shangheta, 2018). Procurement and storage of items become further challenging, as donor fatigue increases (Balcik *et al.*, 2008; Sandwell, 2011).

Of late, there has been a growing challenge of unethical behavior, where operational actors falsified the cost of items during procurement, transportation, storage, and, worse still, inflating beneficiary numbers, which further poses a challenge to relief supply chains (Makali, 2015; Maria *et al.*, 2018). Coupled with the above challenges is the diversity of the various stakeholders from government agencies to non-government agencies all of which have got different structures, objectives, policies, and sources of funding. All of these complicate procurement and storage activities and pose a challenge to relief supply chains (Balcik *et al.*, 2010; Makepeace *et al.*, 2017). Relatedly, the different agencies have different standards, guidelines, and staffing capabilities. That makes coordination, communication, and organization of relief supply chain activities difficult (Makepeace *et al.*, 2017; Moshtari & Gonçalves, 2017).

The supply chain during distribution could be affected by difficulty in accessing the relief recipients, lack of security for last-mile deliveries, cross-border travel restrictions, strict delivery timelines, and difficulty in the verification of beneficiaries (Balcik *et al.*, 2008; Isabirye & Musasizi, 2020; Maghfiroh & Hanaoka, 2017). Thus, distribution is a very complex phase as it epitomizes all relief supply chain efforts. For instance, the supply faces disruptions, ranging from difficulty in accessing the right beneficiaries, security concerns, and the capacity of the actors (Maghsoudi & Moshtari, 2021). There could also be concerns regarding nonexistent road infrastructure, changes in supply routes caused by movements by the beneficiaries, and, most importantly, the border restrictions against supplies from different locations, countries, and donors who at times make donations in kind (Maghfiroh & Hanaoka, 2017).

Besides the challenges above, other external issues affect relief operations. Mainly, the issues are non-logistical, although they also influence relief operations. They include the increasing

influence of social media, politics, delays in legislation, and the emergence of new actors in relief operations such as philanthropists and celebrities (Kunz & Gold, 2017; Kunz & Reiner, 2016). Regarding the increased influence of social media, relief operations are scrutinized now more than before, since it is not only able to bring to light disasters in real-time but also challenges or failures during operations (Houston *et al.*, 2015; Isabirye & Musasizi, 2020; Wamba *et al.*, 2019). While relief aid organizations have lately embraced social media to reach potential donors, share information with their peers, collect data and disseminate key information to the wider community, it has come at a huge cost (Barnawal, 2014; Leonardi *et al.*, 2013).

The increased connectivity has reduced the productivity of staff as they spend most of the work hours on social media, caused loss of important data, loss of intellectual property, and compromised information security as systems hacks are now routine (Barnawal, 2014; Houston *et al.*, 2015; Leonardi *et al.*, 2013; Wamba *et al.*, 2019). Moreover, social media has proved to propagate misinformation in the 'form of fake news'. That has hurt the majority of the relief aid organizations (Barnawal, 2014). For instance, there was spread false information regarding the quality of supplies, speed of the supply chain, and many other forms of falsehoods during the operation. Such negativity affected the image, speed, and success of the relief operation (Isabirye & Musasizi, 2020). While organizations continue to use social media, there is an inconclusive debate as to whether social media should be embraced as an official tool of communication in relief supply chains.

The increased presence of other actors, such as celebrities and stand-alone philanthropists has largely been amplified by social media (Kapucu, 2016; Wamba *et al.*, 2019). For instance, during the Haiti 2010 earthquake and the 2004 Indian Ocean Tsunami, the world witnessed many actors coming on board alongside the traditional humanitarian agencies (Besiou *et al.*, 2013). Although scholars like Maghsoudi & Moshtari (2021) and Alexander (2015) have documented the role of these actors, there is limited literature on how these new players coordinate with the mainstream relief aid organizations to manage relief supply chains during a pandemic.

More among the non-logistical challenges is the role of politics, laws, and governance during relief operations in a pandemic. Whereas relief operations have been in existence for years, few governments the world over have not enacted laws to address the various legal grey areas during relief operations (Maghsoudi & Moshtari, 2021). Moreover, challenging rules and regulations are to relief operations in some countries (Kunz & Gold, 2017; Kunz & Reiner (2016). Considering that laws impact relief operations as they regulate the operation of national and international aid agencies, how they become a challenge during operating relief supply chains during a pandemic could be further inspected.

The sources considered point to the way relief supply dynamics change, as new disasters dictate. So, this study was irradiated

by the change theory. The theory of change (ToC) draws its origins from the principle of management by objectives as a management philosophy advanced by Peter Drucker in the mid-1990s and popularized by T. Chen, P. Rossi, M.Q. Patton, H. Clark, and C. Weiss (Funnell & Rogers, 2011). The theory of change is often used as a support tool for decision-making when carrying out interventions by designing and implementing programs aimed at creating social change (Browne, 2013). The theory has been used widely by organizations carrying out relief operations as it provides a framework for analyzing how planned activities, interventions will yield the desired outcomes (Biggs *et al.*, 2017).

Various relief aid organizations use the theory of change to carry out monitoring and evaluation and hence involve the intended beneficiaries to map out the required inputs to get the desired outcomes (Browne, 2013; Piggot-Irvine *et al.*, 2015). Currently, it has become desirable for most donors to insist on the use of the theory of change as its application at the planning phase increases the chances of success of the intended intervention (James, 2011).

One of the main assumptions of this theory is that there should be a participatory approach in program design especially in capturing beneficiary needs from the start, based on evidence, consultation, and continuous learning (Biggs *et al.*, 2017; Valters, 2014). On the other hand, the theory has limitations arising from the complexity that is synonymous with relief operations. For instance, it is challenging to manage and satisfy the ever-changing needs of all the multi-dimensional stakeholders more especially during a pandemic (Yates *et al.*, 2020). That limits the application of the theory in some operations as was the case during the COVID-19 relief operations in 2020 in Uganda. The theory of change has in the recent past risen to prominence as many scholars are advocating for its use in designing and implementing relief operations interventions (Yates *et al.*, 2020). Despite its apparent growth in usage, its proponents have registered varied results. From the COVID-19 response 2020 in Uganda, the challenges witnessed can partly explain to some extent the lack of stakeholder participation from the design of the program, from the phase of needs identification. That anomaly followed the entire operation, hence makes the theory applicable to the current study.

Methods

Ethical statement

Ethical approval was sought and granted by appropriate institutions before conducting the study.

In the first instance, Mbarara University Institutional Research Ethics Committee (IREC) approved the study under reference number MUST-2021-110. Further approval was obtained by the National Council for Science and Technology (UNCST) under approval reference number SS1037ES. Before data collection, all the study participants were informed that the study was for academic purposes only. Written informed consent was subsequently sought and obtained from the

participants, in accordance with the protocol approved by Mbarara University Institutional Research Ethics Committee. Every participant signed the official IREC consent form before partaking in the study.

Design

The study adopted a case study, to enable the collection of detailed and rich data (Rashid *et al.*, 2019) in natural settings (Yin, 2009; Yin, 2017).

Population and sampling

It was a case study of stakeholders involved in relief item distribution. Face-to-face and electronic interviews were conducted with the actors that participated in the COVID-19 pandemic response operation in 2020 in Uganda. These included a multi-sectorial team that had been constituted to manage the 2020 COVID-19 relief operations. The team involved government officials from different ministries, celebrities, social media influencers, representatives from mainstream media houses, representatives from religious organizations, and academicians with professional expertise in relief operations. The relief supply team consisted of about 500 personnel working in different sections of the operation. That number is not inclusive of casual laborers that were from time to time hired to do last-mile deliveries. The study purposively involved 40 key actors that directly participated in supply chain activities during the response operation. They included five sector heads of beneficiary verification, five from procurement, five from storage, five from the transportation unit, and 20 from the distribution section. The interviewees were purposely identified through working document of team members registered and approved by the office of the Prime Minister (OPM), this was the lead government department in charge of the COVID-19 relief operation 2020. After identifying the respondents who were involved in supply chain activities, they were contacted by phone and email using the information obtained from the OPM. Appointments were made for either physical or electronic interviews, based on the preference of the participant. The majority were got from the distribution section as the distributors directly interfaced with intended beneficiaries, thus more familiar with operational challenges than the rest of the groups. Members of the relief team that were involved in issues other than relief operations were excluded. Those involved in social work such as counseling and oversight were not considered for participation in the study. These were considered as not having firsthand information about the operational challenges.

Data collection

Data were collected using a semi-structured interview guide in English, as all interviewees could communicate in English. The interview guide was constructed by the research team of this study, borrowing ideas from Maghsoudi & Moshtari (2021). The instrument was piloted on a group of five participants from the OPM that had participated in the “Bududa mudslide” operation in 2019. The instrument has been published accordingly (Rukundo & Aryatwijuka, 2022). These individuals were chosen because they had participated in the distribution

of relief items in a similar operation in response to a mudslide that had occurred in Eastern Uganda. Participants in the pilot study were as well recruited using information from the OPM and contacted by telephone for interviews. Three were interviewed physically and two electronically. Following the responses from the pilot, some of the initial items in the interview guide were revised accordingly. For instance, an item that initially read: 'Describe the role of your organization in delivering relief supplies to intended beneficiaries' was modified to 'What is the role of your organization in delivering relief supplies to intended beneficiaries' to make the item precise and easier to interpret by the participant. After piloting the instrument was deemed suitable for the study as it met the conditions of validity and reliability as guided by Creswell (2014). The guide captured information related to supply chain activities, logistic and non-logistic challenges, and the overall performance of the operation. An example of a typical interview question is: 'Describe whether your organization faced challenges in its operations'. In observance of the COVID 19- pandemic restrictions, interviews were conducted in a variety of ways. First, we did 20 face-to-face interviews with participants who offered to be interviewed from their workplace spaces, since they were essential workers and were allowed to access offices during the COVID-19 lockdown. So, they were physically accessible in their offices. They were interviewed in their respective offices upon appointment. Second, we used Zoom and telephone with 20 participants that were not physically accessible. Of the 20 electronic interviews, 15 were telephone and five were on Zoom. Interviews were conducted until saturation was reached at the 40th interview. All interviews were conducted in English, as all participants were conversant and comfortable with it. Interviews took place from January 2021 to March 2021. The average duration of the interviews was 60 minutes. Interviews were captured manually and electronically, using a notebook and voice recorder respectively. The personal information of the participants is anonymized. However, other non-identifiable details such as gender, level of education, experience, category of the interviewee, and type of the interview were captured (see Table 1). Interview interviews were transcribed by reading through the texts and listening to the recordings several times. Transcription was done using Microsoft Word and then fed into Atlas ti. v7.57 software for analysis.

Data processing and analysis

Data were coded and analyzed using a computer program, Atlas ti. v7.57 (<https://atlasti.com/>). A similar software, Nvivo version 20.2.0.426 freely accessible at <https://download.freownload-manager.org/Windows-PC/QSR-NVivo/FREE.html> could be used to analyze the data. Data were categorized to identify challenges, using an open coding procedure (Miles & Huberman, 1984; Miles & Huberman, 1994). Further, data were reduced into categories through coding of sections that ranged from a few to many words. Reduction of the data to manageable parts was done through grouping of similar ideas together and removing redundant statements. Care was taken to code only the challenges along the supply chain that affected the relief operation, avoiding and eliminating the personal feelings of the

respondents. An iterative process was undertaken during the coding process, to link the present study findings with literature. Tables were generated in Microsoft Word. Transcripts were generated and read through several times while taking notes with codes relating to particular themes. The codes were connected to conceptual themes that were formed after identifying the patterns within the dataset during the process of data analysis. Data were grouped through identification of similar themes and texts. Thereafter, the themes generated were connected to the supply chain challenges in line with the literature. To reduce bias, three researchers separately analyzed the data. Each of the researchers used a consistent coding frame to realize intercoder reliability (O'Connor & Joffe, 2020). To reach a consensus, the researchers compared their coding and discussed the divergences and overlaps. The final codes were later connected to the categorical and conceptual links. The researchers shared the preliminary findings with 15 of the study participants and other stakeholders in a Zoom conference organized in May 2021. Participants for the conference were selected in consideration of the representation of the categories of needs identification, procurement, storage, transportation, and distribution. Although each of the above categories was represented, participation in the conference of each of the categories was not proportionate due to logistical and the COVID-19 lockdown challenges. Conferencing with some of the participants was for obtaining their feedback and verification of the results. Further, sharing the findings was to ensure trustworthiness, authenticity, and reliability and as a means of disseminating the study findings to the concerned stakeholders. To that end, the feedback from the conference was used to fine-tune the findings by identifying any omissions or misunderstandings. Corrections were made only in the bio-data section, such as correction of the participants' sex and category of the participants' job designation. There was no need for corrections in the results of the themes identified during analysis.

Results

This study examined challenges encountered during the distribution of relief supply items, focusing on relief food and face mask operations during the pandemic. There was a total of 40 interviews conducted (30 male and 10 female participants), with 20 face-to-face, 15 over the telephone, and five over Zoom (Table 1). Participants in this study were anonymized by numbering. For instance, the first participant to be interviewed was labeled 'interviewee 1', until 'interviewee 40'. Dates when the interviews were conducted are included in reporting of quotes, for clarity purposes. As seen in Table 2, the challenges experienced during the response operation were located in the entire relief supply chain from needs assessment, procurement, warehousing, and distribution to the final consumer (last mile).

Challenges at the needs assessment level

The challenges at this stage stemmed from a lack of up-to-date records regarding the number of persons per village, parish, sub-county, district, or country. The previous national housing and population census results were expired, as they were

Table 1. Presentation of respondents' demographic characteristics.

Item	Type	Frequency	Percentage
Gender	Male	30	75
	Female	10	25
Level of education	Certificate	3	7.5
	Diploma	5	12.5
	Degree	25	62.5
	Postgraduate	7	17.5
Years of service	0-1 year	5	12.5
	2-5 years	10	25
	Above 5 years	25	62.5
Respondent category	Government agencies	8	20
	International humanitarian organizations	15	37.5
	National humanitarian organizations	5	12.5
	Academia	3	7.5
	Religious groups	3	7.5
	Social media influencers	2	5
	Celebrities	2	5
	Mainstream media houses	2	5
Interview type	Face-to-face	20	50
	Telephone	15	37.5
	Zoom	5	12.5

Source: Primary data.

Table 2. Presentation of data according to the themes and subthemes identified in the study.

Theme	Sub theme	Subtheme pervasiveness	Compelling quotes
Challenges at needs identification	Wrong beneficiary numbers, corruption, lack of coordination	High number of responses/ Majority reflect this theme	01
Challenges in procurement, transportation, and ware housing.	Violation of procurement guidelines, inaccessibility of beneficiaries, lack of storage facilities.	High number of responses / All reflect this theme.	02
Challenges at distribution to the beneficiary	Wrong beneficiary numbers, duplication of effort, poorly planned homesteads, hostile weather, varying beneficiary expectations	High number of responses/ Majority reflect this theme	03
Challenges with the growing influence and use of social media	Spreading false information	High number of responses/ Majority reflect this theme	02
Challenges with the laws, politics and governance.	Weak laws, unregulated actors, political interference	High number of responses/ Majority reflect this theme	01
Challenges with emergence of new actors	Lack of structures to manage supply, duplication of effort, political interference	Small number of responses/ all reflect this theme	None

Source: Primary data.

conducted in 2014. Consequently, the relief operation was working with outdated records. Moreover, the uniqueness of the 2020 relief operation posed a challenge in assessing the needs since it targeted the urban poor, sick, breastfeeding mothers, elderly, and small business operators in the metropolitan area. So, determining the rightful beneficiaries was complex, since the middle class demanded support as well.

As respondent 3 on 5th January 2021, observed that, the former working-class also became the “urban poor” as the lockdown continued and hence required relief items. Other participants observed that corruption tendencies were experienced at this level, as enumerators had reported ghost residents. That resulted in a mismatch -delivery of redundant relief items in places with less demand and fewer items in areas with high demand.

Another challenge at this level was the failure to match the lifestyle, culture, demographic, ethnic grouping, and geographical locations of the intended beneficiaries with the planned supplies. According to one of the interviewees, “whereas the plan was to give 3kg of posho and 2 kg of beans per individual, there was no plan for the elderly or the young who are not breastfeeding and are unable to consume posho and beans”. (Respondent 6, 10th January 2021)

Another respondent underscored the lack of coordination between the actors involved in the operation as each group was targeting its beneficiaries. The respondent said “the church is only targeting its members leaving out others in need but not part of the church establishment.” (Respondent 29, 1st March, 2021). Moreover, whereas government agencies were targeting all groups identified by the national task force, other actors had their beneficiaries of interest. That made the process of needs assessment more complex. Respondents further noted lack of trust among the actors as a challenge to proper needs assessment as actors appeared to be competing amongst themselves out of pressure from the media.

Since the relief response was to a pandemic whose lockdown lasted longer than anticipated, beneficiary needs kept changing as the categories of the vulnerable persons kept increasing. One of the respondents noted that as the lockdown stretched to months, more people lost their jobs, and qualified for food relief. Also, as the COVID-19 infected cases increased, the pressure and demand for masks increased. That further complicating the needs assessment exercise.

Procurement, transportation, and warehousing challenges

Whereas humanitarian agencies have the infrastructure in place to conduct procurement during normal relief operations, storage and distribution were a big problem during the pandemic. The epicenter of the relief operations in Kampala city lacked basic storage facilities for supplies. So, agencies were largely adapting just-in-time as items would be procured in an *ad-hoc* manner for delivery with little storage. During the relief operation, the national task force commissioned a donation drive for food, masks, and money. The majority of the supplies were

procured under the emergency category thereby not following the well-established procurement guidelines. Failure to follow procurement guidelines resulted in inflated prices, procurement of food that was not fit for human consumption, delayed delivery of food and face masks as some of the companies contracted could not supply the required quantities at the right time. For instance, one of the respondents said: “Some of the beans supplied had stones while the posho was adulterated”. Another participant said. “We have been waiting for food for the last two months, and as for masks I do not have hope that they will ever be delivered”. (Respondent 7, 25th January 2021)

Transportation of supplies was also identified as a problem. It was difficult to deliver relief items to some areas as they were inaccessible due to poorly organized housing. That further reduced the speed of distribution of relief items. In the city suburbs, the transportation challenge was exacerbated by the poor or at times nonexistent roads especially during the distribution of the items. One respondent said: “Our teams are forced to carry food items on their heads and this is labor-intensive as some places are inaccessible”. (Respondent 8, 27th January 2021)

There was a challenge of diversion or theft of supplies. As the procurement exercise was conducted as an emergency with little regard to well-established procurement procedures, there were many cases of ‘air supply’ where suppliers falsified the quantities supplied to be paid for what they never supplied. In other cases, some actors connived amongst themselves and diverted or stole the supplies and put them back to the market for resale. That was largely attributed to a lack of adequate storage facilities. One of the respondents said: “Part of the food is issued and then it disappears along the way without reaching the intended beneficiaries and goes back to the market”. (Respondent 10, 30th January 2021)

Challenges with distribution to the final consumer

This stage of the relief supply chain requires efficient infrastructure and robust information systems. According to the study participants, several challenges were witnessed at this stage. First of all, as earlier seen at the level of needs assessment, there was a lack of clarity on how many beneficiaries were out there to be served. Other challenges caused by the pandemic were the maintenance of social distancing, avoiding crowding, and maintenance of all the protocols as per the guidance by the ministry of health. In observance of the COVID-19 standard operating procedures, the mode of delivery was house-to-house, and this caused the last-mile delivery complex. This is very different from other operations where the beneficiaries gather in one distribution center and receive all the supplies.

Among the many challenges was the duplication of effort. For instance, some beneficiaries received relief items from government agencies, humanitarian agencies, religious organizations, philanthropists, and politicians, while in some areas no supplies were received at all. Another scenario was where the political influence came into relief operations as one respondent observed that: “Some areas which are represented by politicians who subscribe to the ruling government’s ideology

were served first while those areas which are pro-opposition were left out". (Respondent 30, 15th March 2021)

There was also difficulty reaching the target beneficiaries. This was caused by the unplanned housing units were another challenge with a house-to-house form of relief operation. Whereas it was presumed that all people stay in houses, some urban dwellers have no permanent places of residence. One respondent said: "We thought we would find people in their homes; however, some stay in pipes, under the trees, and others has no permanent address and this is challenging to reach out to them". (Respondent 9, 30th January 2021)

There was an element of "harsh weather conditions". During the relief operation, the months of March up to June registered heavy rains and this made last-mile distribution more cumbersome. For instance, in central Uganda, the months of March to June received rain almost daily. This was a big challenge, especially where the mode of distribution was house-to-house.

Another challenge was managing contrasting stakeholder expectations. It should be noted that there were many actors involved in the operation, whereas the standard by government agencies was 3kg of posho and 2kg of beans and homemade cloth masks. While non-governmental agencies distributed as many as 10kg of posho and 5 kg of beans per individual. Other actors were distributing high-quality products like rice, cooking oil, powdered milk, and medical grade masks. One respondent said: "Imagine carrying 3kg of posho and 2 kg of beans when other groups are distributing rice in the same neighborhood?" (Respondent 39, 28th March 2021)

Non-logistical challenges during the relief operation

There are challenges that one cannot directly attribute to the proper functioning of a relief supply chain but can influence its functioning. For instance, there are challenges like the growing influence of social media, the emergence of new actors in relief operations, and the power of politics manifested in existing national laws and regulations. It should be noted that operations during a pandemic are very unique and complex and so the academic world needs to put a keen interest in such operations.

The growing influence and use of social media

During the distribution of relief items, social media platforms like WhatsApp, Twitter, Instagram, and Facebook played a major role in spreading not only key operational information but also falsehoods. Social media helped in mobilizing local donations, alerting nationals on the progress of the relief operations, and disseminating vital and timely information about the pandemic. Actors were able to reach out to those in need and at times this would save a life. As said by one of the respondents, "social media was able to bring out the challenges of the relief operation". Another respondent said: "Had it not been social media we would not be able to know how food and face masks intended for citizens were being diverted by those in charge for personal gain". (Respondent 18, 6th February 2021). Information on the progress of the operation would

come in real-time and this was a good platform to get beneficiary feedback.

Social media was at the forefront of bringing to light inefficiencies like delays, distribution of food unfit for human consumption, and inflated commodity prices. This would in most cases prompt immediate government response aimed at improving the relief operation. This was witnessed when after reports of inflated prices of food, officials from the office of the prime minister were within 24 hours of social media reports interdicted to pave way for an investigation.

However social media also had its negative side. For instance, persistent false news spread on social media where photos of expired food on the internet would be spread to alarm the country that that is what was being distributed during the relief operation. Additionally, persistent false reports that government agencies were giving relief supplies to only its supporters. These were some of the excesses of social media that affected the relief supply chain during the relief operation. One of the respondents said that: "because of social media, some donors have failed to honor their pledged items with a perception that it will all be misused". (Respondent 19, 7th February 2021)

Influence of laws, politics, and governance during the operation

In the study, it was observed that no specific laws were in place to regulate the relief operations more so during a pandemic. The operation was mainly guided by political proclamations. Moreover, the pandemic struck towards the political season as the country was preparing for general elections. Hence, enacting supportive laws to facilitate relief operations during and after the pandemic was lacking. This hindered the smooth coordination among actors, roles were ambiguous in the operation, and there was duplication of effort with several actors responding to the same groups of beneficiaries while others were left out. Additionally, actors like religious groups were mainly focusing on beneficiaries that subscribe to them while celebrities and philanthropists focused on reaching beneficiaries whose plight will be publicized by media.

Furthermore, while there was a national task force championing the donation drives whose activities were regulated, other stakeholders like philanthropists, celebrities, and religious groups had their campaigns with no guidelines regulating their fundraising programs. This posed a threat to transparency and accountability in the absence of a legal framework to streamline such a campaign. One of the respondents noted that: "When donations are given to government agencies, there are known procedures on how they are accounted for, however, there are no guidelines on donations to philanthropists, religious bodies or individuals". (Respondent 24, 11th February 2021)

Relatedly, the difference in the governance structure of the stakeholders was a challenge in coordination as each agency had its ownership, goals, targets, objectives, and methods of work. Hence, critical information on needs, locations, and

feedback from the target beneficiaries was not shared across the board to have a coordinated and robust response. Also considering that there was a lockdown, with movements restricted, posed a challenge to relief operations especially for non-government agencies. The requirement to seek permission to move from one point to another was restrictive to the proper functioning of the supply chain. Hence, lockdown restrictions hindered resource mobilization, relief data collection, and distribution of relief supplies.

Generally, respondents reported failure by the government to regulate key functions of the operation like information on needs of the beneficiaries, quality of the supplies, coverage of the operations by different actors, resource mobilization, and accountability mechanisms. Instead, the government regulated and restricted movement and watched on as politics interfered with the relief operations at the expense of beneficiaries who needed relief support.

The emergence of new actors

During the COVID-19 pandemic relief operation in 2020, there were many activists, politicians, athletes, and celebrities who ran parallel relief supply chains. These were limited and at times there was no coordination with the national task force. These actors were mainly driven by the media as all their efforts were always accompanied by a big media coverage. As earlier observed, given that the country was in a political season, it was a turn for potential candidates in the upcoming elections to show that they care about their people. According to respondents, there were a lot of resources mobilized by these actors from the business community, their supporters, political party sympathizers, and other individuals.

Additionally, given that these actors had no structures to run efficient supply chains, most of their relief supplies in form of food and masks were not delivered to the intended beneficiaries. Some of the items were stolen by intermediaries and self-appointed leaders of beneficiary groups, since such actors lacked coordination with the national task force, relief aid organizations, and religious groups which had staff and structures to operate relief supply chains. Some of the politicians in opposition to the ruling government and celebrities who the state categorized as sympathizers to the opposition had their accounts frozen and relief activities suspended under the disguise that they are likely to spread COVID-19 as they distribute relief supplies. This meant that while this was a genuine cause, it was frustrating as a lot of relief items were collected by politicians and celebrities but were never allowed by security forces to be distributed to the intended beneficiaries.

While new actors came on board to support efforts of government and actor stakeholders to ensure that the vulnerable communities got food and face masks, their success was based on which political side they belonged to or were sympathetic to, and this contributed to more challenges that affected the relief operation.

Discussion

From the data analyzed in the current paper, the following conclusions are drawn. To begin with, the challenges in the COVID-19 pandemic relief operation in Uganda in 2020 are in agreement with studies (Isabirye & Musasizi, 2020; Kovacs & Spens, 2009; Kovacs & Tatham, 2009; Leiras *et al.*, 2014; Maghsoudi & Moshtari, 2021; Sandwell, 2011) and broadens the body of knowledge in relief supply chain literature. The current study identified several issues at the preliminary phase of needs assessment and confirmed that it is at the needs assessment stage that an operation can succeed or fail, in line with existing literature (Balcik *et al.*, 2008; Isabirye & Musasizi, 2020; L'Hermitte *et al.*, 2015; Maghsoudi & Moshtari, 2021; Tatham *et al.*, 2017). For instance, it was discovered that unlike other relief operations and even in the business sector where their less complexity, during a pandemic it is difficult to ascertain the level of demand (Tatham *et al.*, 2017).

With inaccurate forecasts, actors in a relief supply chain during a pandemic are unable to deliver relief supplies at the right cost, speed, quantity, and quality. The absence of up-to-date data of the number of citizens, coupled with the lockdown measures and restrictions during a pandemic which kept changing the economic status of the population from employed to unemployed, middle class to poor, healthy to unhealthy, made the operation more complex. This is in contrast to the change theory which advocates for a participatory approach in needs identification by involving the beneficiaries in need identification.

Furthermore, limited coordination along the relief supply chain especially between government agencies and other stakeholders, infrastructure bottlenecks, and a lockdown restriction due to the pandemic creates challenges for procurement, storage, transportation up to distribution to the intended beneficiaries. These findings are in agreement with reports in previous studies of Maghsoudi & Moshtari (2021), Baporikar & Shangheta (2018), Makepeace *et al.* (2017), Tatham *et al.* (2017), and Balcik *et al.* (2010). Indeed, emergency procurements during a lockdown are a recipe for corruption, selection, and contracting of incompetent supplies which in turn increases lead times, procurement of poor quality of goods, and worse still at unreasonably high prices.

The prolonged lockdown created more complexity and escalated demand for relief supplies. As organizations shut down operations, more people became jobless and joined the category of the urban poor who required relief food. While many stakeholders joined the humanitarian campaign, they could not meet the varied needs of the intended beneficiaries. Amidst the uncertainty of demand and failure to meet beneficiary needs, there was also a lack of supply chain visibility as various actors along the relief chain were unable to have accurate information on who needs supplies and who does not, largely due to limited coordination among actors.

In addition to the challenges already documented above, our study discovered another category of challenges that affected the COVID-19 pandemic response operation in Uganda. These were non-logistical but affected the relief operation. These challenges include the increased influence and use of social media, the influence of laws, politics, and governance, and the emergence of new actors. While there is limited literature on the aforementioned factors and how they impact relief operations as observed by [Maghsoudi & Moshtari \(2021\)](#), [Besiou & Van Wassenhove \(2020\)](#), [Kirac & Milburn \(2018\)](#), [Kunz & Reiner \(2016\)](#), and [Kovacs & Spens \(2009\)](#). Other scholars may re-examine their implications and come up with practical solutions to mitigate their effects during relief operations more so during a pandemic.

Besides, the current study findings reveal that most actors especially celebrities, athletes, and politicians used social media to reach target beneficiaries, solicit donations, and publicize their operations as a form of accountability. There was a lot of data shared online most of which contained falsehoods especially exaggerating operation challenges in terms of the quality of supplies, speed of the operation, and theft of resources donated. In terms of disruption to the supply chain the falsehoods spread on social media increased pressure on the actors by presenting justifiable operational complexities as glaring failures, and hence discouraged more stakeholders from participating in the operations, and at times declining to honor their pledged support to the operations. This left operational actors with capacity gaps especially in terms of resources to fund the relief operation.

Strict or selective implementation of lockdown regulations created more operational challenges to the COVID-19 pandemic 2020 relief operation in Uganda. The additional absence of specific laws to regulate the activities of various actors during a relief operation was another challenge. This is in agreement with literature from other studies ([Baporikar & Shangheta, 2018](#); [Kovacs & Spens, 2009](#)). The current study findings reveal that political pronouncements replaced regulations and affiliation to the ruling government softened the operational environment while the association with the opposition made operations complex and at times led to radical sanctions like arrests with onward prosecution in courts of law with charges of conducting relief operations in a manner likely to spreading an infectious disease.

Furthermore, the upcoming political season was a challenge to relief supply chains, political players engaged in selective distribution of food and masks. Besides, there were shortages of relief supplies as political actors would compete for the existing food and masks with government agencies and other humanitarian agencies. This was a challenge to the relief supply chain as it created a shortage of relief items due to the sharp rise in the prices of most of the items amidst inelastic financial resources.

The coming on board of many actors ranging from government agencies, humanitarian organizations, religious groups, celebrities, athletes, and politicians was an opportunity but at the same time a challenge. It was an opportunity to the extent of

supporting the government which was duty-bound to provide relief support in form of food and masks for the safety of the citizens against COVID-9. On the other hand, it was a challenge since unlike government and experienced humanitarian agencies that had structures, existing staff, storage facilities, and experience in relief operations all of which the new actors lacked. Hence, the presence of such new actors in relief activities needs to be further explored especially during operations carried out during a pandemic.

Contribution and implications

The study sought to further the understanding of challenges along with relief supply. From the study findings, it was revealed that relief supply chains face a multitude of challenges in delivering relief supplies to the intended beneficiaries. Some of the challenges stem from needs assessment, procurement, transportation, warehousing, and last-mile distribution, all of which have been examined broadly by various scholars. However, the study has also identified other challenges like the growing influence and usage of social media, the emergence of new actors, and the influence of politics, rules, and governance on relief operations. Despite their influence on relief operations, there is limited literature on how they influence relief supply chains; hence scholars need to give them more attention. The aforementioned challenges disrupted operations during the COVID-19 pandemic response in 2020 in Uganda. They mostly increased the lead times, transportation delays, duplication of effort, and unequal distribution of relief supplies to the intended beneficiaries.

In line with the change theory, the study emphasizes the need for a participatory approach in needs identification. Such an approach ensures the right supplies reach the right beneficiaries in the right quality, condition, time, and cost.

Limitations and areas for further study

Like all studies, the current study could not run without limitations. In the first instance, this was a single case study on an operation during a pandemic. Its findings and conclusions may not be generalizable to other operations which differ in context. Nevertheless, they may apply to similar situations in the present context. Whereas a single case study limits the transferability of findings, it provides answers to questions that arise when a need for a case arises ([Cresswell, 2014](#)).

Additionally, the study was explorative – data were collected using semi-structured interviews that do not provide room for measurements as respondents are unable to assess to what extent they agreed with certain statements or were in disagreement. Other studies could be undertaken using surveys to get comparative views on actors involved in relief supply chains. By and large, other studies could be undertaken to examine how humanitarian agencies can better prepare for the influence of social media and better coordinate with the powerful influencers who have a high social media presence.

Conclusions

The present study identified several challenges in relief aid distribution. Some of the challenges were internal to the relief supply chain, others were beyond the chain. We identified

challenges at the primary level of the needs assessment. Other challenges were the procurement, transportation, and storage of relief items. There were problems with distribution to the beneficiaries, as well as non-logistical challenges. Also, the media and its increasing influence on supply activities were featured during the discussions. The emergence of new actors coupled with the impact of politics and governance issues formed part of the study findings. The findings could inform leverage of several factors during relief item distribution in the next cycles.

Data availability

Underlying data

The data used and described in this paper comes from interviews about a sensitive Government programme on relief supply. The data were collected from government agencies and relief aid organizations and some of the respondents could easily be identified, given their positions. For that reason, the dataset could not be deposited in an open repository. All raw data, including field notes, recordings, and transcripts are restricted from inclusion as part of the article. The restriction is in consideration of the requirements and guarantees provided to the Uganda National Council for Science and Technology that data pertaining to confidentiality of sensitive government programs, such as the COVID-19 relief operation 2020, may not be openly available. However, the data could be made available to an interested party upon

reasonable request and under careful observance of the law. The dataset can be shared after the authors have sought for and been granted permission to share the dataset by the Uganda National Council for Science and Technology. Interested parties could contact rukundoaloy@yahoo.com or wilbroadiez@gmail.com.

Extended data

Figshare: Interview Guide on a study: Entropy in the “Entrepot”: Examining the Challenges of Relief Supply chains during COVID-19 Pandemic Relief Item Distribution Operation-2020 in Uganda. <https://doi.org/10.6084/m9.figshare.20942644.v1>. (Rukundo & Aryatwijuka, 2022).

This project contains the following extended data:

- Relief Supply Interview Guide.pdf. (The interview guide used for collecting the data for this study).

Data are available under the terms of the Creative Commons Zero “No rights reserved” data waiver (CC0 1.0 Public domain dedication).

Author contributions

All authors participated in the ideation of the study and in coding and analysis of the data. WA applied for ethical review. AR and WA compiled the draft manuscript, while RN, AK, and FNK reviewed the manuscript. AR formatted the manuscript for submission.

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? **Arvind Upadhyay** 

Business School, University of Stavanger, Stavanger, Norway

The article is an interesting one. The article covers a wide set of disciplines. The following comments will help improve the manuscript.

1. The introduction section is reasonable, written well, but very narrowly focused; therefore, the authors must check to make it more relevant to the journal.
2. The research question(s) are not clear; if the authors can add research objectives following research contributions, then it will increase readability.
3. Research assumptions need a more theoretical base. The author(s) should link the assumptions to existing literature.
4. It would be nice to see some kind of conceptual framework for this research.
5. I would suggest refining your research methodology. At the moment, rather limited discussion on research philosophy.
6. Critically analyse different theoretical approaches to the research problem
7. Justify the solution method selected in terms of the research objectives
8. Strengthen the motivation and discussion parts substantially.
9. Demonstrate adequately that your solution findings have been logically derived and that conclusions, solutions/recommendations are fully supported by evidence
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Literature reviews are a bit different. Here, you also want a stand-alone document, but focus on comparing and contrasting what researchers.

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Is the work clearly and accurately presented and does it cite the current literature?

No

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

No

If applicable, is the statistical analysis and its interpretation appropriate?

No

Are all the source data underlying the results available to ensure full reproducibility?

No

Are the conclusions drawn adequately supported by the results?

Yes

Is the argument information presented in such a way that it can be understood by a non-academic audience?

Yes

Does the piece present solutions to actual real world challenges?

No

Is real-world evidence provided to support any conclusions made?

No

Could any solutions being offered be effectively implemented in practice?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Sustainable supply chain

I confirm that I have read this submission and believe that I have an appropriate level of

expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.
