LWATI: A Journal of Contemporary Research 2024, 21 (4): 18-38
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LWATI: A Jour. of Contemp. Res.
ISSN: 1813-222 © Dec. 2024
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THE ROLE PLAYED BY LOGISTICS SERVICE PROVIDERS TO EFFECTIVE DISASTER RELIEF OPERATIONS IN ADDRESSING PANDEMICS IN TANZANIA

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Abstract

The study examines key areas within humanitarian organizations to enhance the effectiveness of disaster relief operations. Utilizing a sequential explanatory research design, it combines quantitative and qualitative data from a sample of 150 respondents from humanitarian organizations in Tanzania. Data collection was carried out through questionnaires and key informant interviews. The nature and strength of the associations between independent and dependent variables were analyzed using multiple regression techniques. The findings indicate that Logistics Service Providers (LSPs) significantly contribute to effective pandemic response by ensuring reliability, possessing adequate capacity, demonstrating readiness for disaster relief participation, accommodating intermodal transport, providing dependable transportation options, and maintaining well-equipped warehouse facilities for disaster supplies. Consequently, it is essential for LSPs to actively engage in disaster relief operations led by humanitarian organizations. To facilitate this, LSPs must enhance their operational capabilities and foster collaboration with humanitarian organizations and government agencies during relief efforts. The study recommends that governments implement supportive laws and regulations to encourage LSP participation in emergency response. For example, reducing taxes and duties for organizations that provide essential emergency transport services, such as land and air ambulance providers, could incentivize greater involvement in relief operations.

Key Words: humanitarian logistics, disaster relief operations, pandemics, logistics service providers and humanitarian organizations

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1.0 Introduction

The emergence of both manmade and natural disasters has significantly impacted logistics operations worldwide, necessitating robust humanitarian logistics to facilitate the movement of goods and people. This support is essential for delivering food, medical equipment, and medicines to affected areas (United Nations Coordinated Appeal, 2020). In China, major business hubs experienced substantial disruptions in logistics activities, prompting government intervention. However, a lack of preparedness and strategic response hindered effective logistics management during these crises (Wuhan Statistics Bureau, 2019). The spread of COVID-19 across the United States, Asia, and Europe has affected nearly 70% of global supply chains, particularly disrupting the movement of people, raw materials, and finished goods (Seric et al., 2020). This situation has also led to shortages in pandemic control items and consumer goods, highlighting the urgent need for improved supply chain resilience (MOFCOM, 2020).

The Disaster Response Financial Report of Russia (2015) indicates similar challenges, with the country struggling to create an effective logistical environment for disaster operations. Key issues identified include transportation difficulties for relief items and poor stakeholder coordination, which undermines humanitarian logistics performance and the involvement of logistics service providers.

In Kenya, Karanja, Muirura, and Ombui (2015) highlighted that effective humanitarian logistics is critical during disasters like pandemics. They noted persistent issues with coordination among humanitarian organizations and stakeholders, which impede disaster relief efforts (Mweiga, 2013). The Kenya National Disaster Response Plan (2009) similarly identified a lack of coordination in natural disaster response as a significant barrier to effective operations.

African governments often face inadequate resources to cope with disasters, as noted by Kassema (2020). In the Democratic Republic of Congo (DRC), efforts to establish committees for COVID-19 and Ebola response were hampered by poor resource coordination (Nachega et al., 2020). Tanzania experiences similar challenges in disaster management and response systems (Stephano, 2018). To enhance preparedness, it is

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essential to recognize the critical role of humanitarian logistics in managing pandemic-related disasters (Saleh & Noorliza, 2020).

With the frequency of disasters increasing, humanitarian aid organizations are striving to save lives globally (Fritz Institute, 2005; EM-DAT, 2008). Humanitarian logistics is vital for efficient distribution among field officers, local institutions, and affected populations (Usman & Wismadi, n.d). Logistics activities constitute nearly 80% of disaster relief operations (Overstreet et al., 2011), underscoring their importance. Collaboration among companies is crucial for enhancing humanitarian logistics (European Union, 2019). Addressing logistical challenges requires recognizing the significance of coordination to ensure proper material flows during disasters (Moeiny & Mokhlesi, 2011). Companies have coordinated efforts with healthcare organizations, trading partners, and governments to navigate these challenges (Besiou et al., 2011). However, boundary restrictions and lockdowns present additional obstacles. Implementing effective strategies for humanitarian logistics can improve epidemic control and facilitate the flow and storage of supplies (Dasaklis et al., 2012).

Research by Vega and Roussat (2014) points out that the role of Logistics Service Providers (LSPs) in humanitarian logistics is often overlooked. Their involvement is crucial for effective disaster relief operations (Cozzolino, 2012). The recent COVID-19 pandemic highlights that resource constraints are not limited to developing countries; collaboration among key players is essential (Babatunde et al., 2020). Understanding import and export procedures is critical for enhancing humanitarian logistics performance (Heaslip et al., 2018).

National and international organizations interested in crisis response often face coordination challenges that hinder effective disaster and pandemic response (Buatsi & Mbohwa, 2014). Inadequate logistics infrastructure and poor coordination exacerbate these issues (Schulz & Blecken, 2010), necessitating improved mechanisms for sourcing, procurement, delivery, storage, and distribution of essential items such as medical supplies and food (Heaslip et al., 2018).

Koka et al. (2018) emphasize the importance of disaster preparedness in organizing resources and enhancing stakeholder awareness of

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humanitarian logistics' contributions. Effective cooperation between humanitarian organizations and government agencies is crucial for successful disaster relief operations (World Vision, 2018). Stakeholders must address performance issues in humanitarian logistics and recognize the pivotal role of LSPs in managing pandemics (Stephano, 2018; Mpanju, 2015).

Practitioners need to understand how humanitarian logistics contributes to disaster relief operations in Tanzania and the importance of collaborating with logistics service providers. Improved logistics can facilitate the movement of goods, practitioners, and information, ultimately mitigating the impact of crises and ensuring effective medical supply chains to control further spread of diseases.

1.2 Statement of the Problem

The COVID-19 pandemic has prompted countries worldwide to impose strict entry and exit restrictions, leading to widespread lockdowns and stringent movement controls. These measures have severely disrupted logistics and supply chains, as noted by various studies (UNCTAD, 2020; Kassema, 2020; Saleh & Noorliza, 2020; Kessa et al., 2021). The inadequacy of logistics and supply chain management networks has highlighted their inability to effectively respond to pandemics (Save the Children, 2015; Wolicki et al., 2016). When logistics systems fail to mitigate the shocks and ensure a continuous supply of essential goods, the role of humanitarian logistics becomes critical (Eriksson & Karlsson, 2017).

In many developing countries, including Tanzania, humanitarian logistics suffers from a lack of effective management practices, which undermines performance and fails to recognize the importance of collaboration with logistics service providers in disaster relief operations (Schiffling et al., 2020). Although efforts have been made to improve humanitarian logistics practices, significant gaps remain in ensuring their effectiveness during disaster response. While there are numerous studies on humanitarian logistics models for medical and healthcare items in emergencies across Africa, most literature focuses on general disaster relief operations, with few specifically addressing pandemics. For instance, Vaillancourt (2015) emphasized the importance of material

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consolidation and internal integration for both development and emergency situations, but did not specifically target pandemic-related logistics.

Research highlights the various challenges facing humanitarian logistics, which require urgent attention from stakeholders. These challenges can serve as key performance indicators for improvement (Kovacs & Spens, 2009; Kassema, 2020; Saleh & Noorliza, 2020; Kessa et al., 2021). Kovacs and Spens (2009) identified major constraints such as inadequate transport infrastructure, funding limitations, and a lack of vehicles as significant barriers to effective humanitarian logistics performance. Additionally, Kunz and Reiner (2012) outlined four external factors affecting humanitarian logistics: socio-economic conditions, environmental factors, government policies, and infrastructure challenges.

The lack of preparedness, weak engagement of logistics service providers, and insufficient inter-organizational cooperation pose substantial gaps in current humanitarian logistics practices. This study aims to bridge these gaps by exploring the relationship between humanitarian logistics and disaster relief operations during pandemics. Understanding the determinants of humanitarian logistics performance and the role of logistics service providers will provide insights into enhancing the effectiveness of humanitarian response efforts.

2.0 Literature Review

2.1 Definitions of Terms

2.1.1 Humanitarian Logistics

Humanitarian logistics refers to the specific logistical processes involved in the organization, delivery, and warehousing of essential items during natural or man-made disasters in affected geographical areas (Maghsoudi et al., 2018). In this study, humanitarian logistics encompasses a broad range of logistical activities related to relief operations, including transportation, procurement, warehousing, order processing, healthcare logistics, order delivery, and reverse logistics.

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2.1.2 Disaster Relief Operations

Disaster relief operations consist of various functions and activities performed before and after a disaster to mitigate its impact on human lives (Galindo & Batta, 2013). These operations typically involve multiple stakeholders, including host governments, local and international non-governmental organizations, donors, armed forces, and supply firms (Maghsoudi et al., 2018). In this context, disaster relief operations refer specifically to the actions taken before and after a pandemic to minimize its effects on the population and to assist those affected.

2.1.3 Pandemics

A pandemic is defined as an epidemic that spreads globally, affecting a large segment of the population and often crossing international borders. It is characterized by factors such as immunity, disease severity, and virology (Maghsoudi et al., 2018). This study considers both man-made and natural pandemics that significantly impact human life.

2.1.4 Humanitarian Organizations

Humanitarian organizations are entities—whether governmental, non-governmental, or private—that provide swift and effective humanitarian assistance in response to natural or man-made disasters (Galindo & Batta, 2013). Humanitarian relief organizations (HROs) coordinate substantial financial resources and relief efforts annually for victims of natural disasters, civil conflicts, and wars. Their primary responsibility is the timely mobilization of funds and goods from international donors and the distribution of relief to vulnerable populations at disaster sites worldwide. In this study, humanitarian organizations encompass a variety of entities involved in disaster relief, including private organizations, international organizations, government agencies, and non-governmental organizations (NGOs).

2.2 Review of the Related Theories

2.2.1 Stakeholder Theory

Stakeholders are defined as individuals or groups that have a vested interest in the operations of an organization, whether it be a business or a charity. These stakeholders can influence or be influenced by the organization’s activities (Ademola, 2014). Stakeholder Theory posits

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that disasters affect the operations and daily activities of all stakeholders, impacting the supply of goods and potentially causing price fluctuations (Freeman, 2010; Gunasekaran et al., 2018). The availability of supplies is contingent upon companies operating in affected areas and their positions within the global supply chain. Disaster victims rely on the resources provided by relief organizations and agencies (Carter, 2015; Pfeffer & Salancik, 1978, 2003). Thus, effective coordination among stakeholders is crucial for successful disaster relief operations.

This theory underscores the need for collaboration among stakeholders involved in humanitarian logistics and disaster relief. Building partnerships can enhance resource sharing and improve coordination during rescue operations. For instance, both private and public sector stakeholders can contribute to disaster and humanitarian efforts by fostering effective communication and developing joint plans.
Corporate stakeholders must recognize the implications of their operations and supply chains in the context of supporting disaster relief efforts. Through contractual agreements, companies can indirectly support humanitarian initiatives in various ways. By employing local populations affected by disasters, organizations can contribute to economic development in post-disaster areas, often in partnership with international aid networks and local governments (Bray & Crockett, 2012). Additionally, by making their products and services accessible, companies can facilitate long-term disaster response and recovery efforts (Nkamnebe & Idemobi, 2011; Yates & Paquette, 2011).

2.3 Empirical Literature Review

Logistics service providers (LSPs) play a crucial role in enhancing the operations of humanitarian organizations (HOs) by leveraging their expertise from the commercial sector. HOs can greatly benefit from the services offered by LSPs, particularly in areas where they may lack capacity or resources (Bealt, Barrera, & Mansouri, 2016; Cozzolino, Wankowicz, & Massaroni, 2017; Baharmand, Comes, & Lauras, 2017; Nurmala, De Leeuw, & Dullaert, 2017). LSPs add value by meeting humanitarian needs through their technical knowledge, financial resources, access to diverse information, and rapid response capabilities (Scholten et al., 2010).

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In the context of humanitarian logistics, LSPs are vital for ensuring smooth disaster management processes. Significant disasters, particularly in Asia, have drawn increased attention to humanitarian logistics as an essential research area and policy focus (Kovács et al., 2011). LSPs are instrumental in managing natural disasters efficiently, often collaborating with governmental agencies. However, the effectiveness of civilian involvement in disaster response is not solely dependent on LSPs; rather, it requires coordinated efforts among various stakeholders, including local non-governmental organizations (NGOs) (Sandra Carrasco, 2018). Governments, both at the international and national levels, recognize that effective humanitarian logistics necessitates collaboration with other entities to enhance disaster relief capabilities (Fathalikhani et al., 2019; Schulz et al., 2010).

Charter (2008) outlines three stages of natural disaster management: preparedness, response, and recovery. The role of LSPs varies across these stages, influenced by their level of engagement in humanitarian logistics operations. Cozzolino, Wankowicz, and Massaroni (2017) emphasize the need for LSPs to be flexible and reliable in disaster relief operations, as their engagement significantly impacts operational effectiveness. This view is further supported by Arputham and Subramanian (2019), who highlight the importance of recognizing LSPs as essential partners in disaster relief efforts.

Masudin et al. (2020) underscore the critical importance of involving LSPs in disaster relief operations, advocating for compatibility between their systems and those of humanitarian organizations to facilitate collaboration and communication. This highlights the necessity of considering LSPs as integral members in the planning and execution of relief operations, given their pivotal role in the movement of people and materials during crises.

3.0 Methodology

This study employed a sequential explanatory research design to develop concepts from the collected data, providing insights into the role of humanitarian logistics cooperation in enhancing disaster relief operations during pandemics in Tanzania. The target population comprised humanitarian organizations and other stakeholders involved

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in successful humanitarian logistics and disaster relief efforts. The unit of observation included five organizations, with a sample of 150 respondents selected using Cochran's Sample Size Formula. Stratified random sampling was implemented to ensure a representative distribution by dividing the population into strata with homogeneous characteristics, from which random samples were drawn.

To gather data, the study utilized survey questionnaires and guided interviews, facilitating the collection of both quantitative and qualitative information for triangulation. The questionnaire was administered to all respondents, while interviews were conducted with select experts in humanitarian logistics and disaster relief. This mixed-methods approach aimed to enrich the understanding of the contributions of humanitarian logistics to effective disaster response.

Ensuring validity and reliability was a critical aspect of the research. Validity was assessed through consultations with research experts who provided feedback on the data collection instruments, enhancing their accuracy and relevance. A pilot test involving ten randomly selected respondents was conducted to further refine the questionnaire and interview guide. Reliability was measured using Cronbach's alpha, a widely accepted coefficient that assesses internal consistency. All variables achieved a Cronbach’s alpha above 0.7, indicating good reliability. For example, the logistics service provider construct had an alpha of 0.964, demonstrating strong internal coherence.

Data analysis was conducted using multiple linear regression analysis and descriptive statistics with the Statistical Package for the Social Sciences (SPSS). Descriptive analyses included mean and standard deviation calculations, while regression analyses involved R and R^2 coefficients, t-tests, and coefficients. The study also tested model assumptions, including multicollinearity, heteroscedasticity, and normality. Variance Inflation Factor (VIF) values confirmed the absence of multicollinearity, while Levene’s Test indicated homoscedasticity, with a p-value of 0.767. Normality was assessed using the Kolmogorov-Smirnov and Shapiro-Wilk tests, revealing that the data were normally distributed, as evidenced by p-values greater than 0.05.

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4.0 Findings and Discussion

4.0 Working experience of the Respondents

The study aimed to understand the working experience of respondents to provide context for their insights into humanitarian logistics and disaster relief operations. Establishing this background was crucial for determining the respondents' familiarity with relief procedures and the functioning of humanitarian organizations. Working experience was categorized into three groups: less than one year, 6 to 10 years, and over 10 years. As illustrated in Table 6, the majority of respondents (42.7%) had more than 10 years of experience, indicating a strong foundation of knowledge regarding their operations.

The findings suggest that respondents possess substantial expertise in humanitarian operations and supply chain management, enhancing their understanding of disaster relief procedures. Most respondents are well-acquainted with standard operations in relief efforts and have a clear grasp of the systems involved. This aligns with Abebe (2012), who reported that approximately 73% of respondents had over 10 years of working experience, underscoring their capability to provide accurate and reliable information related to humanitarian logistics.

4.1 The Role Played by Logistics Service Providers to effective disaster relief operations in Addressing Pandemics in Tanzania

Respondents were presented with various statements on a Likert scale, where they indicated their level of agreement or disagreement from 1 to 5. A rating of ‘1’ indicated strong disagreement, ‘2’ disagreement, ‘3’ neutrality, ‘4’ agreement, and ‘5’ strong agreement. The categories were defined as follows: "strongly disagree" and "disagree" were assigned a mean score of 1.0 to 2.5, indicating disagreement; "neutral" was assigned a mean of 2.6 to 3.4, reflecting neutrality; and "agree" and "strongly agree" received a mean score of 3.5 to 5.0, representing agreement..

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Table 7: The Role played by Logistics Services providers to effective disaster relief operations in Addressing Pandemics in Tanzania

Statement	Mean	Standard deviation
Availability of reliable logistics service providers may contribute to the effectiveness of disaster relief operations	4.28	0.740
capacity of logistics service providers may contribute to the effectiveness of disaster relief operations	4.30	0.780
readiness of logistics service provide to participate in disaster relief operations may contribute to the effectiveness of disaster relief operations	3.58	0.688
Logistics service providers being able to accommodate intermodal transport may contribute to the effectiveness of disaster relief operations	3.54	0.401
Logistics service provider having reliable means of transport may contribute to the effectiveness of disaster relief operations	4.30	0.812
Logistics service provider having good warehouse facilities for disaster relief supplies may contribute to the effectiveness of disaster relief operations	4.26	0.901
Average	4.04	0.720

From Table 15, the descriptive statistics indicate that the mean scores for the statements are above 3.00, suggesting a general agreement among respondents regarding the role of logistics service providers (LSP) in effective disaster relief operations, particularly in addressing pandemics. The standard deviations are below one, indicating a minimal average distance between the values in the dataset and the mean. This tight clustering around the mean signifies that the data points are closely related, and the mean values exceeding 3.00 reflect a positive consensus on the statements, moving well beyond neutrality.

The mean scores, ranging from 4.26 to 4.30, underscore the significance of various factors that contribute to the effectiveness of disaster relief operations. Specifically, having adequate warehouse facilities, reliable transportation, and the capacity to respond effectively during disasters are viewed as critical elements. While these factors scored below four

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indicate their importance, they are not as critical as those rated 4.0 and above. These findings highlight the essential role that logistics service providers play in humanitarian logistics and disaster relief efforts during pandemics. The results suggest that reliable LSP can significantly enhance disaster relief operations by ensuring preparedness and effective resource management. This aligns with the findings of Masudin et al. (2020), which emphasize the necessity for LSPs to be ready to engage in relief operations and to maintain systems compatible with humanitarian organizations for effective collaboration.

Moreover, the involvement of LSP in humanitarian logistics is crucial for providing essential services such as transportation and warehousing, as well as engaging in corporate social responsibility initiatives. LSPs often serve as fourth-party logistics providers (4PL), facilitating procurement, inventory management, and transportation coordination between local NGOs and logistics service providers during disaster responses. These roles are further supported by studies from Fathalikhani et al. (2019) and Vega et al. (2015), which highlight the importance of LSPs in delivering quick and efficient transportation services during relief operations. Empowering LSPs and enhancing their performance through better infrastructure can lead to significant improvements in the efficiency of disaster relief operations, thereby optimizing the delivery systems during pandemic situations.

Recent studies highlight the crucial role of logistics service providers (LSPs) in humanitarian logistics and disaster relief operations, particularly during pandemics. LSPs contribute significantly by providing essential services such as transportation, warehousing, and inventory management (Rutaba, 2022; Rutaba, 2023). Their involvement enhances the effectiveness of relief operations through improved preparedness and resource management (Rutaba, 2022). LSPs often serve as fourth-party logistics providers, facilitating coordination between NGOs and other stakeholders (Cozzolino et al., 2017). Research indicates that factors such as adequate warehouse facilities, reliable transportation, and response capacity are critical for effective disaster relief (Rutaba, 2022). Studies also emphasize the importance of collaboration, cooperation, and coordination between LSPs and humanitarian organizations (Cozzolino et al., 2017; Vega & Roussat,

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2015). While academic literature may underrepresent LSPs' roles in humanitarian logistics, major LSPs actively communicate their involvement in relief efforts through their websites (Vega & Roussat, 2015).

Table 8 : Model analysis for the role played by logistics service provider to the effectiveness of disaster relief operations (n=150)

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Variables	Unstd. Coefficients		Stand. Coefficients		
	B	S.E	B	T	Sig.
(Constants)	0.492	0.106		4.643	0.000
Readiness of LSP	0.101	0.018	0. 188	5.611	0. 000
Availability of Reliable LSP	0.159	0.027	0.155	5.889	0.000
Flexibility of LSP	0.151	0.023	0.195	6.565	0. 000

R^2=0.935, R= 0.967, F= 2720.236 at p= 0.000

To assess the impact of logistics service providers (LSP) on the effectiveness of disaster relief operations, a multiple linear regression model was employed, yielding a coefficient of determination (R^2) of 0.935. This indicates that the three predictor variables included in this study explain approximately 93.5% of the variance in disaster relief effectiveness, with the remaining 6.5% attributable to other factors not examined in this research. The analysis emphasizes the critical need for LSPs to be prepared for disaster relief operations, which necessitates possessing the necessary equipment, machinery, and operational capacity. Additionally, the reliability and flexibility of LSPs are essential factors, as their ability to adapt and respond effectively contributes positively to the success of disaster relief initiatives.

The readiness of LSPs significantly influences the effectiveness of disaster relief operations, with results showing a t-value of 5.736, a p-value of 0.000, and a β-value of 0.101, indicating a statistically significant relationship ($p < 0.05$). This means that as LSP readiness increases, the effectiveness of disaster relief operations improves by

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0.101 for each unit increase in readiness. Availability of reliable LSPs also emerged as a strong predictor, yielding a β-value of 0.159, a t-value of 5.993, and a p-value of 0.000, further confirming the significance of this relationship. Flexibility of LSPs exhibited a similar trend, with a β-value of 0.151 and a t-value of 6.542, indicating that an increase in flexibility contributes to greater effectiveness in disaster relief operations. One respondent highlighted this importance, stating that a willing and flexible transport service provider is crucial for ensuring smooth operations and enhancing effectiveness in relief activities (Field data interview, Kigoma, 07 August 2021).

These findings align with the work of Cozzolino, Wankowicz, and Massaroni (2017), who noted that engaging logistics service providers and ensuring their flexibility are vital for smooth disaster relief operations. Reliability and willingness to participate are also crucial for enhancing operational effectiveness, as supported by Arputham and Subramanian (2019). The implications of these results underscore the importance of fostering collaboration between logistics service providers and other stakeholders in disaster relief efforts. The analysis reveals that effective disaster relief operations can be facilitated by reliable LSPs, adequate logistical capacity, readiness to engage, and the ability to accommodate various transportation modes. Furthermore, LSPs may also play a role in corporate social responsibility (CSR) initiatives and self-regulate humanitarian logistics, encompassing procurement, inventory management, and transportation coordination with local non-governmental organizations.

Overall, these findings affirm that logistics service providers are essential contributors to effective disaster relief operations, particularly in pandemic scenarios. Their readiness, reliability, and flexibility are critical in ensuring that logistics operations meet the demands of humanitarian relief, highlighting the necessity of integrating LSPs as key players in the broader humanitarian logistics framework.

Recent research highlights the significant impact of logistics service providers (LSPs) on disaster relief operations. A study in Tanzania found that LSP readiness, reliability, and flexibility are crucial factors in enhancing relief effectiveness, with a multiple linear regression model explaining 93.5% of the variance (Rutaba, 2023). LSPs' engagement in

humanitarian logistics has become increasingly important, with their initiatives contributing to improved disaster relief operations (Cozzolino et al., 2017). Key determinants of humanitarian logistics performance include trained experts, supportive policies, financial resources, and dedicated LSPs (Rutaba, 2022). Despite their growing importance, academic literature has not extensively explored LSPs' roles in humanitarian relief supply chains (Vega & Roussat, 2015). However, major LSPs actively communicate their involvement in relief efforts through their websites. These findings underscore the need for greater collaboration between LSPs and other stakeholders in disaster relief, emphasizing the integration of LSPs as key players in the humanitarian logistics framework.

5.0 Conclusion and Recommendations

The findings indicate that Logistics Service Providers (LSPs) play a crucial role in effectively addressing pandemics through several key factors: reliability, appropriate capacity, readiness to engage in disaster relief operations, the ability to accommodate intermodal transport, dependable transportation means, and well-equipped warehouse facilities for disaster relief supplies. This underscores the necessity for LSPs to be actively involved in disaster relief efforts led by humanitarian organizations.

To enhance their effectiveness, LSPs must focus on improving their operational capacities and fostering collaboration with humanitarian organizations and government entities during relief operations. The study recommends that governments support logistics service providers by implementing favorable laws and regulations that encourage their participation in emergency response efforts during pandemics. For instance, reducing taxes and duties for organizations providing emergency transport services, such as land and air ambulance services, can incentivize their involvement. Additionally, governments should prioritize digital connectivity by establishing a centralized database of logistics service providers, recognizing their specializations to facilitate effective communication and coordination when emergencies arise.

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