

HUMANITARIAN SUPPLY CHAIN FRAMEWORK FOR ZAKAT HUMANITARIAN AID

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ABSTRACT

This research devises a Humanitarian Supply Chain Management (HSCM) framework designed to enhance the efficacy of Zakat distribution within the context of disaster management in Indonesia. The study delineates critical indicators as principal components in the management of humanitarian-based Zakat supply chains. Employing an exploratory methodology with a conceptual model development approach, the analysis involves a comprehensive synthesis of diverse humanitarian supply chain models, incorporating the Disaster Management Cycle, Humanitarian Logistics Flow, and the SCOR model. The findings reveal a marked congruence between Zakat distribution in disaster scenarios and conventional humanitarian supply chains. The proposed framework posits the flow of goods, information, and inter-organizational coordination as cardinal components in assuring precision targeting and expedited responsiveness. Subsequent research may focus on field testing and SCOR-based performance measurement to empirically validate the framework's effectiveness. The results furnish an operational roadmap for BAZNAS and LAZ to formulate a Zakat distribution system that is responsive, standardized, and adaptive to the dynamic exigencies of disaster scenarios. Furthermore, this framework facilitates the formulation of Standard Operating Procedures (SOPs), the needs assessment of beneficiaries (mustahik), and the integration of digitally-enabled data streams.

Keywords: Zakat, Humanitarian Supply Chain, Framework

I. INTRODUCTION

Zakat, as a pivotal instrument within the Islamic economic system, serves a dual mandate: the redistribution of wealth and the augmentation of social welfare. Exhibiting potential in the alleviation of poverty and the fortification of social solidarity, zakat has emerged as a crucial mechanism in fostering inclusive and sustainable development within Muslim-majority societies (Wahab & Abdul Rahman, 2011). Beyond its social functionalities, extant research indicates that zakat plays a significant role in crisis management and humanitarian aid, particularly in the context of natural disasters and exigent circumstances. The study by Hulwati et al. (2024) elucidates zakat's tangible contributions to disaster mitigation, emergency response, and socio-economic recovery in the aftermath of the 2018 Lombok earthquake, encompassing the provision of shelter, medical services, and essential aid. However, this latent potential remains sub-optimally developed due to logistical governance deficits and the unavailability of distribution systems responsive to the dynamism of crises.

Pamuncak et al (2025) through research Noor Atihief & Rachman In the Indonesian context, the utility of zakat encounters structural impediments. In comparison to select Middle Eastern nations, the national zakat system is perceived as fragmented and lacks efficacy. This is influenced by institutional

duality between BAZNAS and LAZ, coupled with low public literacy concerning zakat and a pronounced preference for traditional distribution modalities. Data from LAZ Muhammadiyah reveal that merely 27.5% of muzakki channel their zakat through formal institutions (Mukhtar & Widiastuti, 2022). The incongruity of operational frameworks and resources efficiently. Within this context, the Humanitarian Supply Chain (HSC) framework offers a novel an engenders data redundancy, aid duplication, attenuated synchronization with governmental entities, and unpreparedness amongst zakat institutions to manage large-scaled distribution during emergencies (Firmansyah & Sukmana, 2014).

Concurrently, Indonesia has experienced an elevated intensity of disasters in the preceding five years. BNPB records 14,930 disaster occurrences, resulting in 12,988,781 affected individuals and 1,273 fatalities. As of June 2024, 751 disasters have transpired, with landslides representing the most frequent type (249 occurrences) and volcanic eruptions the least (1 occurrence) (Datagoodstat, 2024). The elevated frequency and geographic distribution of disasters underscore the urgency for accelerated and reinforced emergency response systems, inclusive of optimizing zakat's role as a strategic humanitarian resource.

To address these inefficiencies, the digital system SIMBA (Zakat Management Information System) was introduced by BAZNAS, serving as a centralized platform for the collection, distribution, and reporting of ZIS funds nationwide (Riyanto & Fakkana, 2024). It is operated by amil of productive age with bachelor's degrees, enabling them to technically operate the system. As a national data center, SIMBA encompasses muzakki profiles, collected funds, ashnaf, and distribution programs. However, at the operational distribution level, SIMBA is limited to recording the amount of funds disbursed, their destination, and recipients. The system lacks the capacity to manage the dynamics of zakat distribution in crisis situations, which demand procedures more multifaceted than mere financial input-output tracking. SIMBA, at this stage, does not fully support key processes within humanitarian aid management, such as rapid mustahiq needs mapping, cross-regional coordination, and field logistics management. These limitations do not render SIMBA inadequate but indicate opportunities for bolstering its operational concept through a more comprehensive framework.

Zakat entities presently confront increasingly complex distribution challenges, concomitant with expanded beneficiary coverage, aid modalities, geographic scales, and disaster frequencies. Mokoginta (2020) and Utami et al. (2020) posit that the absence of a systematic roadmap constitutes a fundamental impediment in zakat governance. Zakat logistics requirements, encompassing mustahik needs identification, resource allocation, aid delivery, and receipt verification, inherently emulate the workflows within Supply Chain Management (SCM), managing flows of goods, information, and pertinent perspective. HSC is designed for humanitarian operations characterized by uncertainty, resource constraints, and time-sensitive response requirements (Kovács & Spens, 2007). Zakat distribution in disaster scenarios exhibits strikingly similar characteristics: rapidly evolving needs, access constraints, and reliance on multi-actor coordination. Consequently, the integration of HSC into zakat management is not merely logical but also scientifically grounded and strategically advantageous. HSC enables the conceptualization of zakat as a humanitarian logistics system, harmonizing the flow of funds, goods, volunteers, and information among stakeholders to ensure precise and timely distribution.

Conversely, BAZNAS's recent innovation in crisis management has pioneered the Quintuple Helix (QH) model, encompassing government, academia, industry, community, and the environment. While the QH model employed by BAZNAS in its disaster relief program (BTB) has indeed fostered multi-sectoral collaboration, it exhibits vulnerabilities in data integration and logistical orchestration. By incorporating a Humanitarian Supply Chain (HSC) approach, the QH model can evolve beyond mere conceptual collaboration towards a structured supply chain coordination framework. In this context, the

Humanitarian Supply Chain Management (HSCM) approach offers a managerial foundation that can complement the QH model. By integrating HSCM principles, multi-sectoral collaborations can be translated into systematic supply chain coordination mechanisms, ranging from needs assessment and resource management to distribution, monitoring, and evaluation in emergency scenarios. Based on these identified lacunae, this research is directed towards addressing two primary inquiries: (1) how can the Humanitarian Supply Chain Management (HSCM) framework be strategically implemented to augment the performance of zakat distribution in emergency disaster response within Indonesia; and (2) what specific indicators constitute the key components within HSCM.

II. LITERATURE REVIEW

Management Zakat for Disaster Mitigation

Zakat, an Islamic social finance instrument, serves to redistribute wealth, provide social protection, and enhance community resilience. Within the context of disaster management, extant research posits zakat as a form of Islamic humanitarian finance, integral to the disaster management cycle, encompassing mitigation, preparedness, response, and recovery phases (Ali & Haseeb, 2019; Abid et al., 2020). Firstly, in the mitigation and preparedness stages, zakat funds can bolster community resilience through the development of basic infrastructure, preparedness training programs, and strengthening early warning systems. The economic empowerment of mustahik (zakat recipients) also mitigates the vulnerability of communities most susceptible to disasters, thereby enabling zakat to interrupt cycles of poverty and augment overall resilience (Dusuki, 2008).

Secondly, zakat's emphasis on poverty alleviation targets vulnerable populations, who are often disproportionately affected by disasters. During the response phase, zakat functions as a rapid mobilization fund. A case study of the 2018 Lombok disaster illustrates zakat's capacity to support humanitarian services, such as emergency shelters, communal kitchens, healthcare provisions, temporary schools, and rescue operations (Hulwati et al., 2024). This underscores zakat's potential critical role within faith-based humanitarian supply chains through the provision of logistics, food aid, and psychosocial support. Thirdly, in the recovery and reconstruction phase, Zakat facilitates the economic rehabilitation of beneficiaries (mustahik) through empowerment programs, public facility development, and housing reconstruction. Nevertheless, the utilization of Zakat in disaster management encounters limitations due to Sharia regulations mandating distribution to the eight specified categories (asnaf). Consequently, the integration of Zakat with other social funds, such as infaq, sadaqah, CSR, and humanitarian funds, becomes crucial to broaden program scope.

BAZNAS, as the national Zakat management institution, has developed four primary strategies to strengthen governance, namely: (1) institutional reinforcement; (2) human resource development; (3) infrastructure and facilities enhancement; and (4) network expansion and collaboration. Concerning disaster management, BAZNAS implements the BAZNAS Disaster Response (BTB) program, encompassing emergency response, disaster risk management, and volunteer development. As of 2024, the BTB program has reached 26 locations with 169,993 beneficiaries and involved 1,478 volunteers across 345 regencies/cities. However, evaluations indicate that volunteer capacity, logistical preparedness, and inter-unit coordination remain uneven, necessitating more integrated standard operating procedures and information systems.

In 2024, BAZNAS has innovated a distribution model concerning humanitarian programs for 2025 by developing a Quintuple Helix Model of BAZNAS Disaster Response Programme, positioning the

government, academia, industry, society, and the environmental sector as collaborative pillars in disaster risk reduction. While this model is pertinent as a governance framework, BAZNAS lacks a roadmap governing the operational flow of logistics, information, and distribution. This gap underscores the importance of developing a digital-based Humanitarian Supply Chain Management (HSCM) framework to ensure rapid, accountable, and coordinated disaster response.

Supply Chain Management

A Supply Chain (SC) encompasses a network of facilities, suppliers, customers, products, and methodologies governing inventory control, procurement, and distribution. It serves to connect suppliers and customers across all processes intrinsic to the conversion of raw materials into finished goods. Operationally, a Supply Chain constitutes an assemblage of three or more entities (organizations or individuals) directly engaged in the upstream and downstream flow of products, services, finances, and/or information from origin to the end consumer (Toit & P.J. Vlok, 2014).

Supply Chain Management (SCM) is delineated as a strategic paradigm for integrating core functional domains such as procurement, production, warehousing, and distribution, thereby enabling the production and delivery of goods or services in optimal quantities, at precise junctures, and with minimized costs (Simchi-Levi et al., 2000). Contemporary SCM emphasizes inter-organizational process integration, collaborative frameworks, and information synchronization to augment supply chain performance (Mentzer et al., 2001). In operational praxis, the SCM process comprises several key activities, including: (1) procurement, involving acquisition of required materials or goods; (2) warehousing, encompassing physical stock storage and management; (3) inventory management, ensuring the availability of goods contingent upon demand; (4) order picking and dispatch, entailing assortment, packaging, and shipment preparation; and (5) transport and delivery, determining the efficacious distribution of goods to end-users (Mecalux, 2023). These activities possess relevance not only within commercial contexts but also in the management of social welfare and humanitarian logistics, such as zakat.

One of the most prominent SCM reference models is the Supply Chain Operations Reference (SCOR) model. This model, developed by the Supply Chain Council (a recognized global non-profit organization), assists SCM functions by providing a suite of practical guidelines for analyzing SCM practices (Prakash, 2013). The SCOR model categorizes supply chain processes into six principal elements: Plan, Source, Make, Deliver, Return, and Enable. This model furnishes standardized performance measurements, best practice methodologies, and a structured process framework that organizations can utilize to evaluate and enhance supply chain efficiency. Within the context of humanitarian aid and zakat management, the SCOR model can facilitate the mapping of commodity flows, from planning the needs of beneficiaries and procuring or collecting funds to preparing assistance, distributing resources, and monitoring and evaluating disbursement.

Humanitarian Supply Chain Management (HSCM)

Humanitarian Supply Chain Management (HSCM) has garnered significant scholarly attention within global logistics studies following the 2004 Indian Ocean Tsunami, which exposed deficiencies in coordination, information dissemination, and distribution networks during humanitarian operations (Dubey, 2022). Van Wassenhove (2006) conceptualizes the humanitarian supply chain as a process encompassing the planning, procurement, transportation, storage, and distribution of aid to effectively alleviate the suffering of affected populations. In contrast to commercial supply chains, humanitarian supply chains operate under conditions of heightened uncertainty, necessitate rapid response times, and

involve a multiplicity of stakeholders, including governmental bodies, Non-Governmental Organizations (NGOs), military entities, and international institutions (Kovács & Spens, 2007).

Humanitarian organizations are thus compelled to deliver swift responses during crises, providing essential aid such as shelter, sustenance, and other necessities to mitigate the adversity faced by victims. Scholarly literature delineates commercial and humanitarian supply chains through several key differentiators: objectives (profit maximization versus life preservation), demand patterns (stable versus volatile), network structures (static versus dynamic), lead times (predetermined versus near-zero), and the extent of technological integration (advanced versus constrained) (Balcik & Beamon, 2008). Principal challenges in HSCM include deficient inter-organizational coordination, erratic demand and supply dynamics, limited digital infrastructure, and high rates of human resource turnover within humanitarian agencies (Heaslip, 2014; Tatham & Pettit, 2010). The subsequent analysis presents comparative components elucidating the distinctions between commercial and humanitarian supply chain in Table 1.

Table 1. Commercial Vs Humanitarian Supply Chains

Topic	Commercial SC	Humanitarian SC
Main Objective	Maximize profit	To mitigate mortality and provide succor to designated beneficiaries.
Demand pattern	Characterized by relative stability, rendering it amenable to prediction via established forecasting methodologies.	Exhibiting irregularities in terms of magnitude, temporal dimension, and spatial distribution; demand assessment is conducted within the initial response phase.
Supply pattern	Mostly predictable	Cash is donated for procurement, Unsolicited donations and in-kind donations need sorting, prioritizing to decrease bottlenecks
Flow type	Commercial products	Resources, encompassing evacuation conveyances, personnel, temporary domiciles, sustenance, and sanitation provisions, inter alia.
Lead time	Mostly predetermined	Approximately zero lead time, demand is needed immediately
Delivery network structure	Established methodologies for ascertaining the quantity and geographical positioning of warehousing and distribution facilities.	Facilities demand nodes, dynamic network structure
Inventory control	Safety stocks for certain service levels can be found easily when demand and supply pattern is given	Unpredictable demand patterns makes inventory control challenging. Prepositioned inventories are usually insufficient
Technology and information systems	Highly developed technology is used with commercial software packages	The implementation of technology is limited, with a paucity of software applications available for the purposes of logging and monitoring logistical data. Furthermore, a data network infrastructure is nonexistent.

Performance measurement method	Based on standard supply chain metrics	Time to respond the disaster, fill rate, percentage of demand supplied fully meeting donor expectation
Equipments and vehicles	Ordinary trucks, vehicles and forklifts	Robust equipment are needed to be mounted and demounted easily
Human resources	Commercial SCM is now a respected career path (Thomas, 2023)	High employed-turnover, based on voluntary staff, harsh physical and psychological environment
Stakeholders	Shareholders, customers, and suppliers	Donors, governments, military, NGOs, beneficiaries, United Nations, etc.

Source:(Ertem and Buyurgan, 2010)

According to Mecalux (2024), the stages in Humanitarian Logistics encompass: 1) Demand Management, to ensure the availability of sufficient resources for all potential scenarios, maintaining said resources in optimal condition. 2) Aid Distribution, establishing networks to communicate the requisite goods in a disaster facilitates a more efficient collection of these items. 3) Development of Support Plans, pre-emptive planning of evacuation routes and humanitarian aid access points before emergencies is advisable. Disaster management structures, generally adapted from Howden (2009) and Haddow and Bullock (2004), consist of preparedness, response, recovery, and mitigation. However, extant literature emphasizes the criticality of a transition phase, denoting the shift from response to recovery due to evolving aid requirements, resource allocation, and coordination modalities. During the preparedness phase, humanitarian organizations develop knowledge bases, Standard Operating Procedures (SOPs), and capabilities to enable rapid action upon disaster occurrence. Each phase exhibits distinct logistical characteristics regarding urgency, personnel qualifications, supply needs, and reliance on public and private institutions. Initial disaster response prioritizes saving lives, but subsequent activities, such as socio-economic recovery and rehabilitation, remain crucial for restoring community conditions.

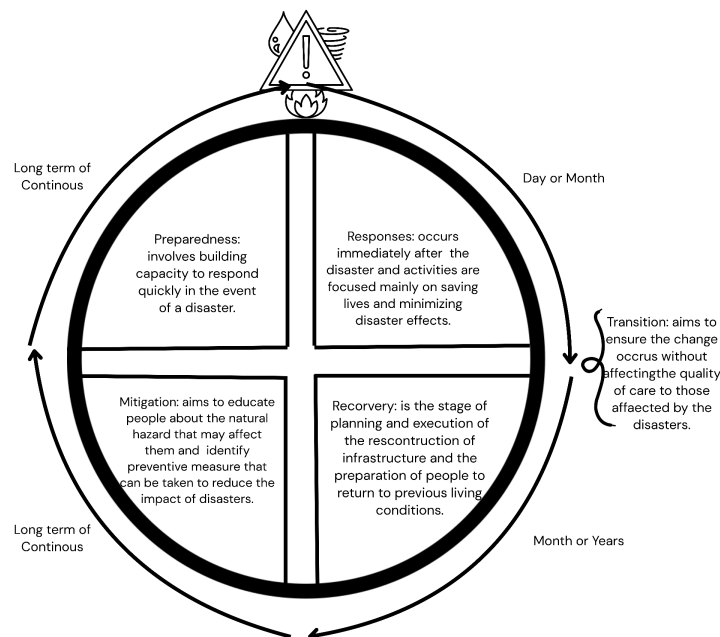


Figure 1. The Disaster Management Cycle
 Source: (Howden (2009) and Haddow and Bullock (2004))

The framework of Zakat, institutions such as BAZNAS and LAZ possess functions pertinent to Humanitarian Supply Chain Management (HSCM), given their involvement in the provision of social assistance, disaster relief, and social protection for vulnerable populations. However, academic literature concerning the roadmap for Zakat distribution in disaster management and its integration with HSCM remains nascent. Consequently, this research endeavors to develop a conceptual framework that synthesizes the Humanitarian Logistics and Disaster Management Cycle model (Howden, 2009), the Disaster Management Cycle (Haddow & Bullock, 2004), the Humanitarian Supply Chain Flow, and the established SCOR model to elucidate the integration of the flow of goods, information, and digital capabilities within Zakat distribution operations in Indonesia.

III. METHODOLOGY

This research employs an exploratory research methodology to rigorously investigate the implementation of digital transformation within Humanitarian Supply Chain Management (HSCM) in the context of zakat distribution in Indonesia. The exploratory approach is warranted due to the nascent state of literature addressing the intersection of digitization, supply chain dynamics, and zakat management, thereby necessitating the elicitation of novel concepts, patterns, and structures (Mudjiyanto, 2018).

This study constitutes a conceptual model development endeavor, advancing a digital-centric HSCM framework through exhaustive literature analysis and the synthesis of extant models, including the Humanitarian Logistics and Disaster Management Cycle (Howden, 2009), the Disaster Management Cycle (Haddow & Bullock, 2004), the Humanitarian Supply Chain Flow (Howden, 2009), and the SCOR model. The synthesis process is executed via comparative conceptual mapping and the integration of salient constructs such as the flow of goods, information dissemination, and digital capacity.

The developed framework is designed to provide a comprehensive understanding of supply chain architecture, the role of digital technologies, and the augmentation of human resource capabilities within the operational context of Baznas and national zakat institutions. This model facilitates the identification of performance gaps in humanitarian logistics, particularly across the preparedness, response, recovery, and distribution phases, ultimately enhancing the efficacy of zakat disbursement and aid provision during disaster scenarios.

IV. RESULTS AND DISCUSSION

Proposed Framework

This research culminates in an integrated humanitarian supply chain framework specifically tailored for zakat management in disaster response. The framework synthesizes the Disaster Management Cycle (Howden, 2009; Haddow & Bullock, 2004), the SCOR Model, resilience capabilities, and digital systems (ERP, SIMBA, ArcGIS) into a cohesive end-to-end operational flow. As depicted in Figure 2, the framework elucidates that the flow of zakat in a disaster context encompasses material flow (aid commodities), information flow, and inter-staff coordination flow. With the mustahiq positioned as the focal point, the entirety of the Supply Chain Management (SCM) processes is strategically oriented to ensure the accurate, expeditious, and efficient delivery of aid.

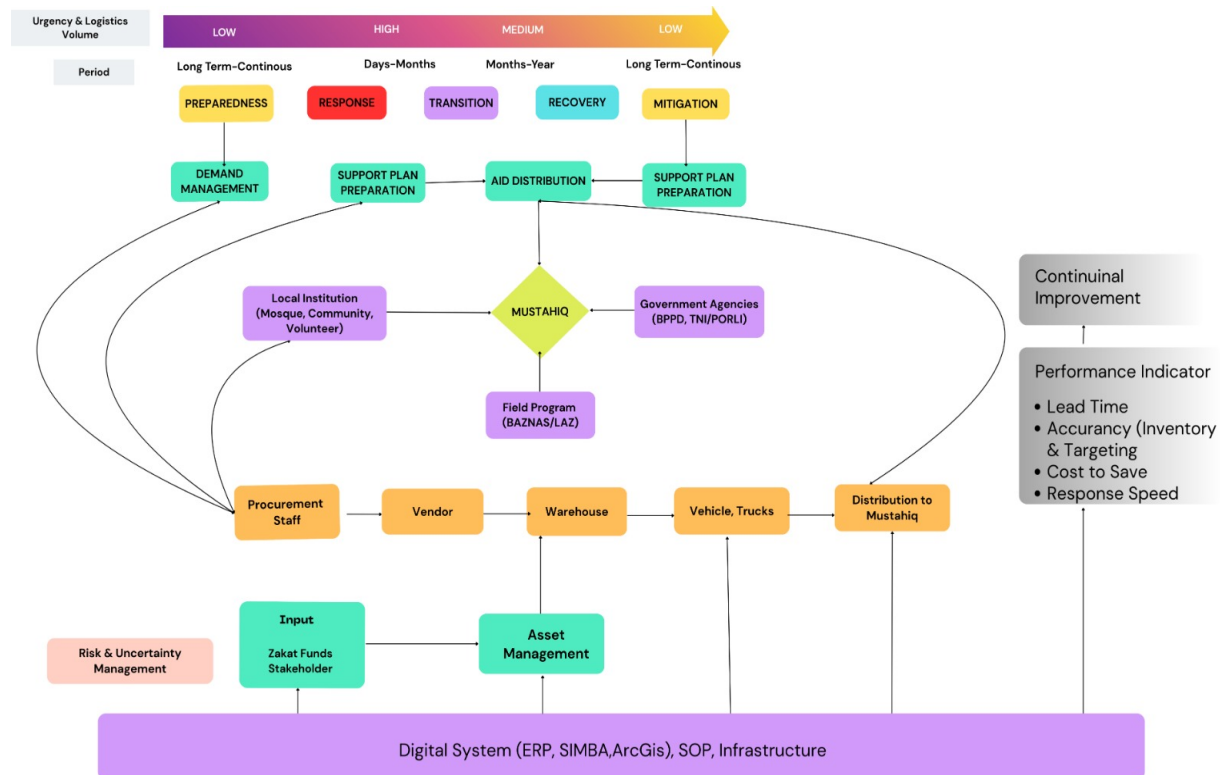


Figure 2. Proposed Framework HSCM for Zakat Humanitarian Aid

Key Participants

Within the Zakat-based humanitarian supply chain, several key participants exert influence over the effectiveness of aid distribution, coordination mechanisms, and the agility of disaster response. Firstly, the National Zakat Board (BAZNAS), as the authoritative national institution, assumes the role of lead agency, orchestrating the collection and distribution of Zakat funds, as well as formulating strategic policies pertaining to the utilization of these funds for disaster mitigation. The institutional augmentation, human resource development, infrastructural enhancements, and collaborative network consolidation undertaken by BAZNAS constitute a critical foundation for ensuring responsive and standardized Zakat governance across all regions.

Secondly, Zakat Collection Agencies (LAZ) and regional BAZNAS units function as operational actors, executing implementation at the grassroots level. They bridge central policy directives with localized exigencies through disaster-prone area mapping, impacted beneficiaries' identification, and the implementation of assistance programs encompassing shelter provision, logistical support, healthcare services, psychosocial interventions, and other rehabilitative endeavors. LAZ and regional BAZNAS units also serve as coordination hubs with local government bodies and volunteer networks. Thirdly, the BAZNAS Disaster Response Volunteers (BTB) constitute a vital component during the rapid response phase. Comprising a cadre of 1,478 personnel distributed across 345 regencies/cities, these volunteers are responsible for initial rescue operations, evacuation procedures, mobile healthcare provision, emergency logistics, and the management of shelters and communal kitchens. Their presence extends the reach of BAZNAS services, although challenges persist concerning capacity standardization, technical disaster management training, and inter-regional coordination consistency.

Fourthly, governmental entities (BNPB, BPBD, and related agencies) act as regulators, disaster data providers, and inter-agency coordinators. Government collaboration with BAZNAS is paramount in ensuring that disaster management adheres to national standards, averts aid duplication, and optimizes distribution to impacted beneficiaries. The government also furnishes the legal frameworks and logistical support facilitating expedited aid mobilization. Fifthly, communities and local populations participate in beneficiary data validation, information dissemination, and engagement in mitigation programs and disaster education initiatives. Community involvement fortifies the accuracy of aid distribution while ensuring the continued relevance of disaster-based Zakat programs to proximate needs. Sixthly, adopting a Quintuple Helix model, auxiliary actors such as academics, industries, and the environmental sector engage in disaster research, technological support, logistical innovation, and ecosystem-based mitigation programs. Academics contribute to a scientific basis, industries assist on logistical and technological fronts, while the environmental sector provides a sustainability-oriented approach to long-term disaster risk reduction.

Disaster Management Phases and Their Logistical Characteristics

The humanitarian supply chain life cycle encompasses activities from preparedness to recovery, structured into four key stages: preparedness, response, recovery, and mitigation. However, analysis of the framework reveals the transition phase, the shift from response to recovery as a critical juncture within the Zakat-based humanitarian supply chain. This phase involves significant alterations in logistical requirements, aid characteristics, resource prioritization, and inter-agency coordination. This transition necessitates heightened flexibility from Zakat institutions, particularly in adapting to the evolving needs of mustahik, shifting from immediate relief to medium-term recovery support.

Operationally, the preparedness stage, as delineated in the framework, must precede any disaster. During this phase, Zakat institutions develop a knowledge base, standard operating procedures (SOPs), digital systems (ERP, SIMBA, ArcGIS), risk mapping, and collaborative partnerships with local communities and governmental bodies. These proactive measures, informed by prior disaster experiences, facilitate rapid response capabilities when a disaster strikes.

Consequently, the disaster management cycle employed in this study adheres to the sequence: preparedness – response – transition – recovery – mitigation. Each phase exhibits distinct logistical characteristics concerning response velocity, human resource competencies, aid typology, and reliance on public and private entities. In the immediate post-disaster phase, the primary focus centers on rescue operations and the basic needs of mustahik, garnering substantial attention from government authorities, media outlets, and humanitarian organizations. Nevertheless, a series of equally vital activities, including socio-economic rehabilitation, infrastructure restoration, and long-term risk reduction, must be accorded commensurate importance.

Supply Chain Performance and Resilience Capabilities

Within the framework of commercial enterprises, supply chain management is implemented with the objective of minimizing losses and maximizing profitability. Conversely, in humanitarian organizations such as BAZNAS and LAZ, the adoption of the supply chain concept places greater emphasis on the efficient administration of scarce resources, the accurate distribution of aid, and the effective rehabilitation of beneficiaries in the aftermath of disasters. This approach enables zakat institutions to enhance their professionalism, transparency, and accountability across all phases of the disaster cycle.

The findings within this framework are consistent with the mapping conducted by Howden

(2009), which elucidates the correlation between the disaster management cycle and logistical activities, predicated on temporal considerations, the nature of requirements, urgency, and procurement mechanisms. Across each phase, logistical activities are observed to persist albeit varying in type, volume, and intensity. These range from stockpiling during preparedness, rapid mobilization during response, consolidation during transition, rehabilitation during recovery, to education and mitigation in the concluding stages. Zakat institutions necessitate a structured performance measurement system. By adapting the SCOR model (Plan, Source, Make, Deliver, Return, Enable), performance can be assessed across planning, logistical mobilization, aid package preparation, delivery, and post-disaster evaluation. Operational key performance indicators (KPIs) encompass lead time, accuracy (inventory and targeting), cost to serve, and response speed. The application of SCOR within the context of zakat reveals that continuous improvement can be attained through the fortification of digital systems (ERP, SIMBA, ArcGIS), enhancement of standard operating procedures (SOPs), integration of beneficiary data, and collaboration with local institutions and governmental bodies. Post-disaster evaluation is a pivotal component in ensuring capacity enhancement in subsequent phases.

An analysis of the framework developed in this research, coupled with conceptual enrichment from Ali et al. (2017), indicates that the resilience of the zakat supply chain is contingent upon five core capabilities. The prevention capability reflects the ability of zakat institutions to identify potential risks prior to the onset of disasters and to undertake mitigating measures, such as mapping vulnerable beneficiaries, providing buffer stocks, and training volunteers. Subsequently, the resistance capability serves as a buttress when disruptions occur, requiring the institution to sustain operational continuity through human resource flexibility, the availability of reserve resources, and the support of a multi-actor logistical network. During the emergency phase, the response capability becomes crucial, determining the speed and accuracy with which aid can reach survivors, primarily through the optimization of BTB volunteers, logistical vehicles, and warehouse management.

Entering the recovery phase, the recovery and continuity capability ensures that institutional activities can return to normalcy while concurrently adapting to the evolving needs of post-disaster beneficiaries. Concurrently, the learning and continuous improvement capability encourages zakat institutions to conduct systematic reflections on each disaster event examining root causes, evaluating procedures, and updating policies and SOPs to improve future handling. Despite the literature employing diverse terminology such as enablers, capabilities, or enhancers to describe these resilience elements, this study adopts the resilience principles formulated by Christopher & Peck (2004) and Ali et al. (2017) as the foundational basis for understanding how the zakat supply chain can endure, respond, and evolve in the face of disaster dynamics.

End-to-End Humanitarian Chain: Risk Management and Continuous Improvement

Within the operational framework of Zakat institutions, the complete management process, encompassing fund collection and management, aid distribution, and recovery phases, constitutes an integrated end-to-end humanitarian chain. This chain transcends a mere physical logistics flow, incorporating information dissemination, policy coordination, volunteer mobilization, and sustained community engagement from inception to conclusion. This end-to-end process ensures that Zakat is not confined solely to emergency response but operates methodically, spanning mitigation, preparedness, response, and reconstruction, thus ensuring assistance remains relevant, targeted, and sustainable for affected beneficiaries.

Risk and Uncertainty Management occupies a strategic position at the forefront of this

humanitarian chain. This phase serves as a foundational element for comprehending threats, charting vulnerabilities, and evaluating local capacities prior to disaster events. Positioning risk management functions upstream enables Zakat institutions to formulate robust mitigation plans, determine buffer stock locations, identify alternative logistical pathways, and establish inter-agency coordination networks. Consequently, subsequent processes of preparedness, response, and recovery can proceed with diminished uncertainty and enhanced decision-making quality.

Furthermore, Continual Improvement functions as a transversal element across all phases of the disaster management cycle. Rather than being executed solely at the conclusion of operations, continuous enhancements are integrated into each stage from risk analysis and disaster scenario planning to distribution process monitoring, aid effectiveness assessment, and post-reconstruction evaluation. Through this approach, Zakat institutions are capable of extracting lessons from each event, refining Standard Operating Procedures (SOPs), updating logistical standards, and consistently enhancing volunteer capabilities and information systems. The presence of continual improvement throughout the disaster cycle renders the Zakat supply chain increasingly adaptive, responsive, and resilient to future disaster dynamics.

V. CONCLUSION

The management of Zakat in disaster contexts necessitates a more systematic approach through the implementation of Humanitarian Supply Chain Management (HSCM). The complexity of Zakat distribution during disasters—characterized by rapidly evolving needs, resource constraints, and multi-actor coordination indicates that traditional distribution models are inadequate for addressing existing operational challenges. Consequently, the integration of humanitarian supply chain principles becomes a strategic imperative to enhance the precision, speed, and efficiency of Zakat aid delivery to affected mustahik (beneficiaries). This study generates an integrated humanitarian supply chain framework that amalgamates the Disaster Management Cycle, the SCOR model, humanitarian logistics flows, and support from digital systems such as SIMBA, ERP, and mapping technologies. The framework positions mustahik as the central focus of the distribution flow, demonstrating that the flow of goods, information, and coordination are essential components in ensuring an effective disaster response. Thus, the developed framework not only offers a theoretical contribution but also provides practical guidance for BAZNAS and LAZ (Zakat institutions) to construct a more responsive, standardized, and adaptable Zakat distribution system in the face of dynamic disaster conditions. Overall, this research affirms that digital transformation and a supply chain approach are critical foundations for the modernization of Zakat governance in Indonesia, especially in the context of increasingly frequent and intense disasters. These findings provide a basis for further research and empirical implementation in Zakat institutions to enhance the effectiveness of disaster management sustainably.

This study is limited by its conceptual nature and the absence of empirical testing within Zakat institutions, precluding definitive confirmation of the framework's effectiveness in practical applications. Furthermore, the research does not thoroughly assess the digital readiness of Zakat institutions, nor does it incorporate the direct perspectives of volunteers, local governments, or mustahik, all of whom are critical actors in Zakat distribution during disasters. Therefore, future research should conduct empirical testing through case studies or field surveys, measure supply chain performance using SCOR indicators, and comprehensively evaluate technological readiness and information system integration. Further expectations include the direct involvement of stakeholders to strengthen the validity of the model and ensure that the developed framework is genuinely applicable within the operational context of Zakat in

Indonesia.

VI. REFERENCES

- Baznas, P. (N.D.). Design Of Zakat Collection, Distribution, And Utilization Target In 2025. Retrieved From <https://puskasbaznas.com/publications/books/1991-Design-Of-Zakat-Collection-Distribution-And-Utilization-Target-In-2025>
- Dubey, R., Bryde, D. J., Foropon, C., Graham, G., Giannakis, M., & Mishra, D. B. (2022). Agility In Humanitarian Supply Chain: An Organizational Information Processing Perspective And Relational View. *Annals Of Operations Research*, 319(1), 559-579.
- Dusuki, A. W. (2008). What Does Islam Say About Corporate Social Responsibility. *Review Of Islamic Economics*, 12(1), 5-28.
- Ertem, M. A., Buyurgan, N., & Rossetti, M. D. (2010). Multiple-buyer procurement auctions framework for humanitarian supply chain management. *International Journal of Physical Distribution & Logistics Management*, 40(3), 202-227.
- Ferreira Viagi, A., Panizzolo, R., & De Crescenzo, A. L. B. E. R. T. O. (2016). Humanitarian Supply Chain Risk Management (Hscrm). In *Program And Book Of Abstracts. Departament Of Industrial Engineering, Universidad Tecnologica De La Habana "Jose Antonio Echeverria" & Departament Of Industrial Engineering, Universidad Central "Marta Abreu" De Las Villas.*
- Firmansyah, I., & Sukmana, W. (2014). Analisis Problematika Zakat Pada Baznas Kota Tasikmalaya: Pendekatan Metode Analytic Network Process (Anp). *Jurnal Riset Akuntansi Dan Keuangan*, 2(2).
- Goodstats Data. (N.D.). Terkini! Perbandingan Jumlah Bencana Alam Di Indonesia 2020-2024. Retrieved From <https://data.goodstats.id/statistic/terkini-perbandingan-jumlah-bencana-alam-di-indonesia-2020-2024-lwikm>
- Howden, M. (2009, May). How Humanitarian Logistics Information Systems Can Improve Humanitarian Supply Chains: A View From The Field. In *Proceedings Of The 6th International Iscream Conference, Gothenburg, Sweden.*
- Hulwati, H., Andespa, R., Mujiono, S., & Syofyan, A. (2024). Zakat For Humanity In Disaster Mitigation. *Planning*, 19(5), 1929-1939.
- Levi, David Simchi, Philip Kaminsky, Dan Edith Simchi Levi, 2000, *Designing And Managing The Supply Chain: Concepts, Strategies And Case Studies*, Singapore, Mac Grawhill.
- Mecalux. (n.d.). Supply chain flow: key for optimised logistics systems. Retrieved from <https://www.mecalux.co.uk/blog/supply-chain-flow>
- Mokoginta, S. (2020). Efektivitas Pengelolaan Zakat, Infaq, Dan Sedekah Melalui Penerapan Aplikasi Sistem Informasi Manajemen Baznas (Simba) Pada Baznas Kota Kotamobagu (Doctoral Dissertation, Iain Manado).
- Muchtar, F. T. Z., & Widiastuti, T. (2022). Analisis Faktor-Faktor Yang Mempengaruhi Penghimpunan Zakat: Studi Di Empat Negara Asean. *Jurnal Ekonomi Syariah Teori Dan Terapan*, 9(5).
- Mudjiyanto, B. (2018). Metode Penelitian Komunikasi: Pendekatan Kuantitatif Dan Kualitatif. *Jurnal Studi Komunikasi Dan Media*, 22(1), 65–80.
- Negi, S., & Negi, G. (2021). Framework To Manage Humanitarian Logistics In Disaster Relief Supply Chain Management In India. *International Journal Of Emergency Services*, 10(1), 40-76.
- Pamuncak, M. B., Wahid, H., Ismail, A. G., & Sarmidi, T. (2025). Exploring The Macroeconomic Drivers On Zakat Collection In Indonesia: Evidence From 1994-2024. *International Journal Of Sustainable Development & Planning*, 20(8).
- Pedraza-Martinez, A. J., & Yan, L. (2025). A Research Framework On Digital Platforms And Humanitarian Supply Chain Management. In *Nonprofit Operations And Supply Chain Management: Theory And Practice* (Pp. 209-235). Cham: Springer Nature Switzerland.

- Prakash, S., Sandeep Gunjan, S., & Rathore, A. (2013, October). Supply Chain Operations Reference (Scor) Model: An Overview And A Structured Literature Review Of Its Application. In International Conference On Smart Technologies For Mechanical Engineering (Pp. 1-20).
- Riyanto, D., & Fakkanna, M. (2024). Enhancing Zakat Governance: Implementation Of The Simba System Across Baznas Levels. *International Journal Of Zakat*, 9(2), 92-99.
- Sugiyono. (2018). *Metode Penelitian Kualitatif, Kuantitatif, Dan R&D*. Bandung: Alfabeta.
- Utami, P., Suryanto, T., Nasor, M., & Ghofur, R. A. (2020). The Effect Digitalization Zakat Payment Against Potential Of Zakat Acceptance In National Amil Zakat Agency. *Iqtishadia*, 13(2), 216.
- Wahab, N. A., & Rahim Abdul Rahman, A. (2011). A Framework To Analyse The Efficiency And Governance Of Zakat Institutions. *Journal Of Islamic Accounting And Business Research*, 2(1), 43-62.