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Humanitarian Logistics and Supply Chain Management Performance, Development of A Theoretical Framework

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Abstract

This study investigate and construct a performance measurement framework for Humanitarian Logistics and Supply Chain Management (HLSCM). By utilizing the secondary data a qualitative methodology has been applied and has identified the critical factors which counted most in the HLSCM performance e.g. block chain technology, transparency, public trust, coordination and traceability. A qualitative research design was employed, and 12 articles on supply chain management and humanitarian logistics were analyzed using relevant resources such as "Google Scholar", "JSTOR", and "Scopus" for literature search. The findings of this study will be useful for the HLSCM scholars, humanitarian organizations, and public and private organizations and service providers. Additionally, the rapidly shifting settings and situations demand that all stakeholders shall collaborate effectively either the situation is disasters' or normal. This research contributes significantly and effectively to the body of knowledge on humanitarian logistics and supply chain supply and it is a strong contender to spread the word about swift, equitable, and secure humanitarian logistics to identify knowledge gaps and to open doors for future studies. The theoretical framework developed in this study provides a useful guide for future research on this topic, highlighting the importance of transparency, public trust, coordination, and traceability in enhancing the effectiveness of humanitarian logistics.

Keywords: Supply Chain Transparency, Public Trust, Public Coordination, Traceability on Humanitarian Logistics Performance, Block Chain Technology

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1. INTRODUCTION

Due to the recent rise in both the intensity and frequency of catastrophes, which is anticipated to continue in the future associated with climate change, unnecessary suffering has grown. Natural disaster severely impair a region's ability to perform and the efficiency of a community while causing losses in the humanistic, financial, technical, and environmental spheres that are beyond the capacity of the people to recover from using its own resources (Dubey et al., 2020). The processes of planning, managing supply chain, and monitoring data are all strongly related to logistics. The goal of logistics is to efficiently organize items for transportation and deliver them to clients in the exact amount (Khan et al., 2021).

Pakistan is a developing market in South Asia with an unsteady infrastructure and a quickly growing population that frequently experiences both unexpected and delayed calamities (Dubey et al., 2019). Naturally and man-made hazards frequently occur, highlighting the importance of careful planning to mitigate their impacts. The main activity, or humanitarian logistics, is crucial during a disaster. But up to this point, neither this reality nor its explanation have been recognized by humanitarian organizations.

Traceability is one of the elements of data that businesses must obtain. Interaction especially in corporate services, are necessary to connect the suppliers. Presence of traceability is taken into account while evaluating the effectiveness of logistics (Garcia-Torres et al., 2021).

The most crucial factor for humanitarian performance is trust since it allows managers to guide and engage with many groups in a successful manner. Most often, trust is used to lessen interactions' sensitivity or ambiguity, especially when actors' knowledge or comprehension of the situation is restricted (Baharmand et al., 2021). Public trust is a crucial notion in supply chains and has been studied from a wide range of psychological, economical, and social angles. In both the humanitarian and financial situations, better supply chain partner trust improves chain coordination, efficacy, and performance (Dubey et al., 2019).

Transparency is another way to build public trust in organizations (Garcia-Torres et al., 2021). Additionally, public trust is where transparency in humanitarian logistics begins. Similarly to how openness increases public coordination and trust, it is insufficient without it. According to Mann et al. (2018), coordination prevents repetition, duplication, and division whereas collaboration entails the sharing of complementary skills across various individuals, groups, and/or organizations in order to jointly create a procedure, result, or activity. Coordination in logistics promotes organization performance, which improves assets for commercial companies and organizational survival. Additionally, cooperation among relief agencies in a tragedy area can result in advantages like access to additional resources that improve the performance of humanitarian logistics (Aranda et al., 2019).

The use of blockchain technology has gained significant attention in recent years due to its potential to improve the efficiency, transparency, and accountability of various industries. One area where blockchain technology has the potential to make a significant impact is in humanitarian logistics and supply chain management. Therefore, this study aims to investigate the role of blockchain technology in improving the performance of humanitarian logistics and supply chain management. The use of blockchain technology has the potential to improve the efficiency, transparency, and accountability of humanitarian logistics and supply chain management. Specifically, blockchain technology can help to reduce fraud, increase transparency, and enhance supply chain traceability.

Based on organizational information processing theory, (Dubey et al., 2020) made a model with independent variables like block chain technology and operational supply chain transparency on collaboration, public trust and supply chain resilience with mediating effect of trust. They recommended that operational supply chain transparency, trust and public coordination use as independent variables

effect on humanitarian logistics with mediating role of traceability of logistics and use moderator block chain to check the trust and coordination of NGOs with peoples. The intention of this study is to ascertain whether measurable humanitarian performance is impacted by traceability in logistics via transparency, trust and coordination.

2. LITERATURE REVIEW

2.1 Organizational information processing theory

Organizational information processing theory (OIPT) is a theoretical framework that explains how organizations acquire, process, and use information to make decisions and solve problems. Humanitarian Logistics and Supply Chain Management (HLSCM), Organizational Information Processing Theory (OIPT) can provide insights into the decision-making processes of humanitarian organizations during disaster relief efforts. In the context of HLSCM, organizations must acquire, process, and use information to make decisions that will impact the delivery of relief goods and services to those in need (Garcia-Torres et al., 2021; Mann et al., 2018). Organizational Information Processing Theory can help to explain how humanitarian organizations acquire information through internal and external channels, and how they process this information using various mechanisms. For example, humanitarian organizations may obtain internal information through feedback from relief workers and partners, while external information may come from government reports and social media. Based on the level of ambiguity in the information available to them, humanitarian organizations may use different decision-making processes to make decisions related to HLSCM. In the case of rational decision-making, humanitarian organizations may use complete information to make informed decisions related to procurement, transportation, and distribution of relief goods and services. However, in the case of administrative or political decision-making, organizations may rely on heuristics, routines, and negotiations to make decisions in situations where there is incomplete or ambiguous information (Garcia-Torres et al., 2021; Mann et al., 2018).

2.2 Operational supply chain transparency on traceability of humanitarian logistics and performance

A transparency in operational supply chain, according to Garcia-Torres et al. (2021), is strongly dependent on the movement of resources, money, and relevant material throughout the logistics line. Furthermore defining operational supply chain transparency, according to Mann et al. (2018), is a company's capacity to actually participate in stakeholder involvement in order to generate accountability and traceability into transmission and distribution supply chain processes. Consequently, we may claim that increased supply chain transparency reduces complexity of the system by enhancing the understanding of upstream and downstream supply chain activities (Garcia-Torres et al., 2021; Mann et al., 2018). Operational supply chain transparency refers to the visibility and accountability of the various activities and stakeholders involved in the supply chain. This includes the ability to track the movement of goods, materials, and information from the source to the final destination, as well as the ability to access relevant information about the products and their origins, including the suppliers, manufacturing processes, and distribution channels (Garcia-Torres et al., 2021; Mann et al., 2018).

The capacity to track items and will provide data about them (such as uniqueness, ingredients, and placements) during creation and distribution is provided by traceability (Gonzalez-Feliu et al., 2021). Investigators are paying more and more attention to areas relating to supply chain traceability and availability. The degree of informational accessibility for both trading partners and outside observers is referred to as transparency. Given the increasing safe facility connected with the technology, transparency is thus a vital factor in evaluating the performance of the supply chain. Products pass via a huge network of different actors (such as recyclers, manufacturers, dealers,

wholesalers, distributors, and warehouses) even before they reach the end customer (Masudin et al., 2021; Yacoub & Castillo, 2021).

2.3 Public Trust significantly on humanitarian logistics and performance

A business user in a managing disaster must be supplied by the technology, in accordance with humanitarian logistics standards. For the most recent client, the logistics industry develops the management system. Because of this, building the information system based on the logistical supply chain hierarchies from the prior client to the supplier is simple (Dubey et al., 2019). In humanitarian logistics, the number of inquiries is determined by the needs of the clients as well as by outside service and relief providers, including both government and private groups that assist in the handling of natural disasters.

According to Dubey et al. (2020), trust is described as "confidence in an exchange partner's dependability and honesty". Trust encourages parties to exchange information, experience, and other materials and discourages exploitative behavior as a result of the fierce competition between groups for limited resources in the humanitarian response (Dubey et al., 2019; Yacoub & Castillo, 2021).

2.4 Public coordination on traceability of humanitarian logistics and performance

According to Mann et al. (2018), cooperation is the exchange of ideas that results in the joint development of a technique, a production, or an activity complementing abilities amongst various individuals, groups, and/or organizations, whereas there won't be any without cooperation duplication, distance, and overlapping. Gaining trust is not easy the accomplishment on its own. Organizational coordination can be successful through mutual cooperation, according to theory of organizations. Spontaneous response view supports coordination as a possibility through experiential learning (Garcia-Torres et al., 2021). It is more crucial than ever and calls for extreme transparency, particularly in HL [80]. According to an old adage, coordination is difficult because "everyone wants coordination, but nobody wants to be coordinated" (Masudin et al., 2021). Coordination is important, according to several studies, and this is an issue that requires quick and serious thought (Dubey et al., 2019; Gonzalez-Feliu et al., 2021; Khan et al., 2021). Investigators have therefore focused a lot of attention to coordination in the area of humanitarian logistics and performance (Yacoub & Castillo, 2021).

Baharmand et al. (2021), it was mentioned that various coordinating strategies, there are numerous actors involved, goals varying from centrally planned to the market are possible. That is a as the primary strategy of humanitarian logistics, Dubey et al. (2020) claimed that the group method could be viewed as a grouping technique. A single lead institution is assigned. As the controller, (umbrella organization) will aid in coordination in the effectiveness of humanitarian logistics. For all humanitarian logistics, including shipment, storage, and other logistical activities, the data system is necessary. Technology is supporting this data system, which links all users of logistics, including the governments, sponsors, NGOs, providers of logistics services (Dubey et al., 2019; Dubey et al., 2015).

2.5 Traceability of humanitarian logistics and humanitarian logistics performance

The quantity of demands in humanitarian logistics is determined by the needs of the clients as well as by outside service and relief providers, including both government and private groups that help crisis management. Traceability and humanitarian logistics performance are closely related concepts in the context of humanitarian relief efforts. Traceability refers to the ability to monitor and track the movement of humanitarian aid and supplies from the source to the final destination, including tracking the flow of goods, materials, and information through the entire supply chain. To provide timely and reliable data about what is required, what goods are necessary, and where the site is, the organization of information in the crisis management procedure is essential (Centobelli et al., 2022; Garcia-Torres et al., 2021).

Aside from NGOs and govt. agencies, a broad range of agencies are involved in humanitarian efforts. Government, businesses, and donors join the various initiatives. Because of this uniqueness, all actions must be standardized, integrated, and under control. Researchers are combining traceability with more general goals and consumer requirements for more accountable, public, and equitable supply chain in the present globalization debate (Gonzalez-Feliu et al., 2021). It is "the capacity to identify and trace the history, distribution, location and application of products, parts and materials to ensure the reliability of sustainability claims in the areas of human rights, labor (including health and safety), the environment, and anti-corruption," according to the Global Compact (Centobelli et al., 2022). Traceability is therefore the capability that makes it possible to retrieve and make a specific piece of information available when necessary.

2.6 Traceability of humanitarian logistics

The capacity to track items or provide data about them (such as authenticity, ingredients, and placements) during manufacturing and distribution is provided by traceability. In humanitarian logistics, the quantity of requests is determined by the demands of the customers as well as by outside service and relief providers, including both government and private groups that help the management of natural disasters. They are the ones who priorities the criteria that logistics companies will support (Garcia-Torres et al., 2021). This is more difficult to forecast than a typical logistical system. To provide timely and reliable information about what is required, what goods are necessary, and where the location is, the organization of information in the crisis management process is essential (Gonzalez-Feliu et al., 2021; Mann et al., 2018).

On either side, the main disadvantages are related to the high expenses, both financially and in terms of difficulties and complexity involved with achieving full traceability in international sectors (Yacoub & Castillo, 2021).

2.7 Block chain technology

As a public blockchain that records and preserves all activities between various participants in a network, blockchain technology has the ability to solve these problems. By combining Blockchain technology with Connectivity, it will be possible to collect data from devices in a decentralised manner while saving money on the costs of operating huge data center's (Dubey et al., 2020). The "miracle" of blockchain technology has been touted as a solution to a wide range of problems in both the public and private sectors. There is no universal consensus on whether this technology will be important in the coming years or whether there have been unwarranted high expectations placed on Blockchain (Khan et al., 2021). In any event, the multiple data trust concept is changing thanks to blockchain technology.

Blockchain consists of two main components. The very first are all of the network users' activities, and the other are the blocks where transactions are captured in the proper order and verified as not having been modified (Baharmand et al., 2021). By making information available to all participants while maintaining data protection, blockchain technology can assist in removing obstacles that prevent data exchange. This could further aid in lowering expenses and improving the openness of humanitarian personal information (Yacoub & Castillo, 2021).

3. METHODOLOGY

A theoretical framework was developed based on the literature review. The framework was based on the key themes and concepts that emerged from the literature review. The framework was used to guide the data analysis and interpretation. Researcher employed a qualitative methodology with two steps for this investigation. In the first step, we found and examined 12 articles on supply chain management, humanitarian logistics, and pre-existing frameworks. Academic journals, reports, and conference proceedings should all be included in the search strategy's list of pertinent research studies.

Keywords such as “humanitarian logistics”, “supply chain management”, “performance”, and “disaster assistance” should be included in the search strategy. To guarantee that only pertinent research are incorporated into the review, inclusion criteria was created. Studies should, for instance, be focused on disaster relief efforts and published in peer-reviewed journals. Studies that are unrelated to the study issue should be excluded using exclusion criteria that have been developed. In second step, use relevant resources, such “Google Scholar”, “JSTOR”, and “Scopus”, to do the literature search. The inclusion and exclusion criteria should be applied to the search results before being reviewed.

The research design for this study was qualitative. Data was collected through a review of relevant literature. The data was analyzed using thematic analysis. Data for this study was collected through a review of relevant literature. The data was collected by conducting a literature review of 12 articles on supply chain management and humanitarian logistics. The data collected for this study was analyzed using thematic analysis. The themes that emerged from the data were used to develop the theoretical framework. The results of the study showed that there is a relationship between humanitarian logistics and supply chain management performance. The theoretical framework developed was used to guide the interpretation of the results. Based on the results of the study, it can be concluded that humanitarian logistics and supply chain management performance are closely related. The theoretical framework developed in this study can be used to guide future research on this topic. The government will be able to use the study's findings to build guidelines and policies for the logistics of the humanitarian supply chain. Through the use of this study, future demands regarding technology, education, and training can also be estimated. The findings of this study was be useful for the HLSCM scholars, humanitarian organizations, and public and private organizations and service providers.

Table 1 Search Strategy

1. Keywords	KW1- Humanitarian Logistics KW2- Supply Chain Management KW3- Performance KW4- Disaster Assistance
2. Search Engines	SE1- Google Scholar SE2- JSTOR SE3- Scopus
3. Exclusion Criteria	EC1- any of the chosen keywords that didn't occur in the entire text, title, abstract, or keywords EC2- Not in English
4. Inclusion Criteria	IC1- The title, abstract, keywords, and entire text all contained any of the chosen keywords. IC2- be in the English language

4. RESULTS AND DISCUSSION

The findings of this study will be beneficial to NGOs and public and private organizations and service providers. Researchers will find it interesting to evaluate block chain technology and learn about the benefits and problems of traceability in terms of the supply chain at the firm level for humanitarian logistics. With the help of this research, future demands regarding technology, academia, and instruction can also be anticipated.

Based on the literature review and discussion stated below a conceptual framework (Figure 1) has been formulated for the humanitarian logistics and supply chain management performance. This framework will be evaluated further through the empirical study in upcoming research and the purpose

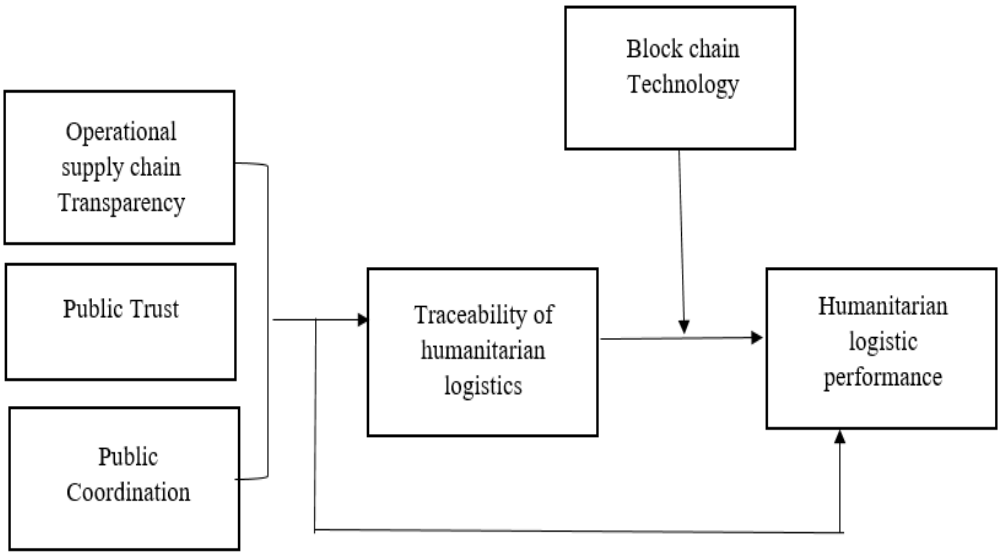

Figure 1 Conceptual Framework

is to find the interesting expects of block chain technology and learn about the benefits and problems of traceability in terms of the supply chain at the firm level for humanitarian logistics performance. The purpose of this study was to develop a theoretical framework for understanding the impact of blockchain technology and big data analytics on the transparency and traceability of humanitarian logistics, and the resulting effect on public trust and coordination, which ultimately affects the humanitarian logistics performance. The study employed a qualitative research design and analyzed relevant literature on humanitarian logistics and supply chain management performance, blockchain technology, big data analytics, and public trust.

5. CONCLUSION

The purpose of this study was to examine the relationship between humanitarian logistics and supply chain management performance and to develop a theoretical framework to guide future research on this topic. The study employed a qualitative research design and analyzed 12 articles on supply chain management and humanitarian logistics. The literature search was conducted using relevant academic databases such as “Google Scholar”, “JSTOR”, and “Scopus”.

The results of this study showed that there is a close relationship between humanitarian logistics and supply chain management performance. The theoretical framework developed in this study identified several key themes and concepts that are important in understanding this relationship. These themes include logistics planning and coordination, information management, stakeholder collaboration, and risk management. Logistics planning and coordination emerged as a key theme in this study. Effective planning and coordination are essential for ensuring that humanitarian aid is delivered to those in need in a timely and efficient manner. The literature review highlighted the importance of logistics planning and coordination in the success of humanitarian missions. Information management was also identified as a key theme in this study. Effective information management is critical for ensuring that all stakeholders are informed about the progress of the humanitarian mission. This can include information about the availability of resources, the status of supply chain operations, and the needs of the affected population.

The results of this study showed that blockchain technology and big data analytics have the potential to significantly enhance the transparency and traceability of humanitarian logistics, which can lead to increased public trust and better coordination among stakeholders, ultimately leading to improved humanitarian logistics performance. The theoretical framework developed in this study identified several key variables, including transparency, public trust, coordination, traceability, and the mediating role of coordination in the relationship between blockchain technology, big data analytics, and humanitarian logistics performance. This study has contributed to our understanding of the impact of blockchain technology and big data analytics on the transparency and traceability of humanitarian logistics, and the resulting effect on public trust and coordination, ultimately affecting humanitarian logistics performance. The theoretical framework developed in this study provides a useful guide for future research on this topic, highlighting the importance of transparency, public trust, coordination, and traceability in enhancing the effectiveness of humanitarian logistics.

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