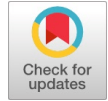


Behavioral Challenges of Humanitarian Supply Chain in the Context of Natural Calamities in India

Anoop C., Regi Kumar V.



Abstract: When natural occurrences affect populated areas and destroy local infrastructure and population, they are referred to as natural disasters and cause pain and deprivation. India is one of the world's regions that experiences disasters the most frequently because of its physiographic and meteorological circumstances. Natural disasters have been more frequent during the past ten years or more, notably in India. Increased population, urbanization, industrialization, development in high-risk areas, environmental degradation, and climate change may all contribute to increased vulnerability to catastrophe risks. Humanitarian operations are started as soon as a disaster occurs with the goal of assisting victims quickly in a variety of ways, such as rescuing those who are affected or stranded, gathering and disposing of corpses, allocating resources, providing food aid, shelter, and medical care, and reopening access to remote areas. Delays in delivery or relief during humanitarian efforts can result in lives lost. Therefore, as it guarantees the seamless flow of products and services in a convoluted supply chain, logistical efficiency is a crucial component of humanitarian success. Logistics is essential to the effectiveness and responsiveness of major humanitarian initiatives like health, food, shelter, water, and sanitation. It acts as a link between catastrophe preparedness and response as well as between procurement and distribution. Calamities, crises, plagues, and destructive actions can all be categorized as disasters depending on the logistical effort needed. Different sorts of disasters require different approaches to management: Running refugee camps is considerably different from giving the kind of aid needed after a sudden natural disaster or a nuclear accident. Aid offered to help a place develop is different from aid given to deal with famine and drought. The humanitarian supply chain (HSC) is an organization that specializes in planning the distribution and storage of supplies to impacted areas and individuals during emergencies and natural disasters. The complex environments involved in a disaster, quick design, new or unfamiliar intermediaries or participants, and thus, it faces many possible obstacles, make it highly unpredictable and tumultuous. The humanitarian supply chain is made up of many different players, each with a unique attitude, way of acting, and cultural background. In a situation involving India, the humanitarian supply chain involves foreign aid agencies, host governments, the military, local self-governments, regional aid agencies, etc., all of whom have competing interests, mandates, capacities, and logistics expertise.

Due to the complexity, it is imperative to analyze key variables in order to create a humanitarian supply chain that meets the needs of donors, beneficiaries, and service providers alike. The history of India demonstrates how a lack of professionalism, cooperation between many parties, and several other cultural variables have turned the field of humanitarian logistics into one with a lot of difficulties and important considerations. When building a supply chain, from sourcing to production, storage, distribution, and all transportation links in between, a sustainable supply chain (SSC) tries to take the environment, the economy, and social and human issues into consideration. The humanitarian supply chain should be integrated with sustainable practices while it is being designed or developed. In order to handle the most difficult situations in the context of natural calamities, a sustainable humanitarian supply chain that has been optimized is necessary. With the aid of cutting-edge technologies like artificial intelligence, blockchains, and machine learning, the domain of sustainable humanitarian supply chains in India is experiencing difficulties and obstacles with plenty of room for improvement. In the context of the natural disasters in India, the article's main focus is on the significance of an effective sustainable humanitarian supply chain. The goal of this article is to identify the obstacles and variables that affect the efficient development of a humanitarian supply chain in India that is flexible enough to fulfill the unique needs of an HSC that are completely different from those of a commercial supply chain.

Keywords: Disaster, Humanitarian Supply Chain, Sustainability, Natural Calamities.

I. INTRODUCTION

Each year, disasters strike all across the world. The United Nations Office for Disaster Risk Reduction (UNISDR) has statistics showing that between 2000 and 2012, 2.9 billion people were affected by various types of catastrophes, resulting in 1.2 million fatalities. In the same time frame, it was projected that the damages had an economic impact of almost US\$ 1.7 trillion. These figures demonstrate that the preparedness for and relief from disasters have significant economic and humanitarian ramifications. India is one of the world's regions that experiences disasters the most frequently because of its physiographic and meteorological circumstances. Additionally, there is a risk of being affected by CBRN (chemical, biological, radiological, and nuclear) disasters and emergencies. Nearly 5,700 km of the 7,516 km long coastline are vulnerable to cyclones and tsunamis, 68% of its cultivable area is vulnerable to droughts, and its hilly areas are at risk from landslides and avalanches. Additionally, more than 58.6% of the landmass is susceptible to earthquakes of moderate to very high intensity.

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Increased population, urbanization, and industrialization, growth in high-risk areas, environmental degradation, and climate change can all lead to increased susceptibility to disaster risks. For the purposes of defining the roles and responsibilities, the Disaster Management Act of 2005 and the DM Policy of 2009 classify disasters as either natural or human-induced. The methodology employed in the national plan includes the Sendai Framework's four goals for each hazard into the framework for planning disaster risk reduction under the five Thematic Areas for Action.

1. Recognizing Risk
2. Coordinating between agencies
3. Investing in Structural Measures to Reduce Disaster Risk
4. Non-structural Disaster Risk Reduction Measures Investment
5. Capacity Building

A disturbance that "physically impacts a system as a whole and undermines its priorities and goals" is referred to as a "disaster" (Van Wassenhove, 2006, [1]). It is feasible to distinguish between natural and man-made disasters based on their origin, as well as between sudden-onset and slow-onset disasters based on predictability and pace of occurrence (Van Wassenhove, 2006, [1]). Calamities, crises, plagues, and destructive actions can all be categorized as disasters depending on the logistical effort needed. Different types of disasters require different approaches to management. For example, aid given to promote regional development is different from aid given to address famine and drought, and managing refugee camps is very different from offering the kind of aid required following a sudden natural disaster or a nuclear accident. According to Kovacs and Spens (2007), [6] the organization of humanitarian activities follows two main axes. They are ongoing aid efforts and catastrophe relief. In any disaster relief attempt, logistics are the most crucial component and determine whether the operation is successful or not (Van Wassenhove, 2006, [1]). However, it is also the most costly component of any disaster relief effort. According to estimates, logistics expenditures make up about 80% of all expenses associated with disaster aid (Van Wassenhove 2006,[1]). Disaster relief operations must be effectively managed in order to address and execute better responses because they are characterized by a great deal of uncertainty and complexity. As a result, disaster management is a crucial component of successful relief effort implementation, and it starts with strategic process design (Tomasini and Van Wassenhove, 2009, [4]). The majority of the research in this field suggests that disaster management comprises six distinct phases, including mitigation, planning, response, and reconstruction. The preparation, reaction, and reconstruction phases of the process—collectively known as the humanitarian logistics stream—are what logisticians are mostly involved in, with a concentration on logistics and supply chain management. It's notable that in the case of the humanitarian logistics stream, the emphasis shifts from operational performance speed to cost reduction during the transition between the stages (Tomasini and Van Wassenhove, 2009, [4]). Two supply chain principles, agility, and leanness can be applied to each

stage of the process to achieve a specific goal (Cuzzolino et al. 2012, [5]).

II. DISASTER MANAGEMENT CYCLE



Figure 1: Disaster Management Cycle

Prevention: The best way to handle a disaster is to take preventative measures. Recognizing potential dangers and developing safety measures to limit their consequences are necessary for this. Even while this stage of the cycle involves putting long-term precautions in place that can help decrease catastrophe risk, it is important to understand that disasters can't always be prevented.

Mitigation: Reducing the number of lives lost as a result of a disaster is the aim of mitigation. Both structural and non-structural actions are feasible. A structural measure comprises changing the physical characteristics of the structure or surroundings to mitigate the effects of a disaster.

Preparedness: Planning and practicing what they would do in the event of a disaster is an ongoing practice that can be advantageous to individuals, communities, businesses, and organizations. The highest level of readiness is made possible by ongoing training, assessment, and corrective action. Fire drills, active shooter drills, and evacuation drills serve as the best examples of the preparation stage

Response: A response is what takes place in the wake of a calamity. There are both immediate and long-term reactions. In an ideal situation, the disaster management coordinator will coordinate the use of all available resources, including personnel, machinery, and supplies, to help restore public safety, protect the environment, and lessen the likelihood of more property damage. During the reaction phase, any ongoing threats are dealt with.

Recovery: The fifth stage of the disaster management process is recovery. It could take months, years, or even decades to complete. The ultimate purpose of this stage is to assist individuals, groups, communities, corporations, and organizations in returning to normal—or a new normal, depending on the impacts of the disaster.

Reconstruction: The process of renovating buildings and other structures. Many different activities, such as modifying schools to make them more earthquake-resistant, may also be seen as a kind of mitigation since this might frequently take years.

As soon as a disaster occurs, players in disaster management, particularly humanitarian organizations, get involved in the short-term response and long-term recovery stages. The four crisis management phases listed above don't necessarily, or even typically, occur one after the other or in this particular order. Parts of the cycle typically overlap, and the severity of the disaster has a substantial impact on how long each phase lasts. Response actions are those that are conducted right away after obtaining early warning of an imminent disaster, expecting it, or post-disaster in the event that an event occurs without notice. Saving lives, preserving property, safeguarding the environment, and providing for the basic needs of people and other living things after a disaster are the main objectives of disaster response. The search and rescue of those in need and the evacuation of those who are most likely to be impacted by the disaster or any potential subsequent disaster will take priority in the short term. Globally, improvement reconstruction has become the preferred method for post-disaster restoration and rehabilitation. Despite the significant disruption of daily life caused by disasters, the immense suffering, the loss of life, and the destruction of property, global efforts view the recovery, rehabilitation, and reconstruction phase as a chance to better integrate disaster risk reduction into development measures and build disaster-resilient communities. Strengthening institutions, systems, and capacities of all stakeholders at all levels is included in capacity development. The plan acknowledges the necessity of a strategic approach to capacity building as well as the necessity of passionate participation from a range of stakeholders in order for it to be successful. An essential component of federal fiscal relations has been the financing

of disaster relief. The State Governments are in charge of carrying out rescue, relief, and recovery efforts in the event of a disaster. Their efforts are supplemented by the Union Government's financial and logistical support. An essential component of federal fiscal relations has been the financing of disaster relief. The State Governments are in charge of carrying out rescue, relief, and recovery efforts in the event of a disaster. Their efforts are supplemented by the Union Government's financial and logistical support. An essential component of federal fiscal relations has been the financing of disaster relief. The State Governments are in charge of carrying out rescue, relief, and recovery efforts in the event of a disaster. Their efforts are supplemented by the Union Government's financial and logistical support. The disaster management cycle serves as an example of the ongoing procedure by which businesses in the public, private, and nonprofit sectors prepare for and respond to emergencies. The disaster management cycle highlights the continuous process by which organizations in the public, private, and non-profit sectors prepare for, mitigate, and recover from disasters. To effectively manage a disaster, the government must adopt policies and programs that either alter the causes of disasters or mitigate their effects on infrastructure, people, and property. As disaster management is reinforced before a catastrophic event, the phases of mitigation and readiness occur. Developmental issues are vital to disaster avoidance and a community's effective reaction to a tragedy. Utilized effectively, the disaster management cycle can mitigate the effects of a catastrophic event. It may also involve the emergency preparations and measures necessary for a speedy and comprehensive recovery.

Major Disasters in India

Table 1: List of Major Disasters and Fatalities

Sl No.	Name of Event	Year	State and Area	Fatalities
1	Floods	October 2014	Jammu Kashmir	
2	Cyclone Hud H	September 2014	Andhra Pradesh and Odisha	
3	Odisha Floods	October 2013	Odisha	21
4	Andhra Floods	October 2013	Andra Pradesh	53
5	Cyclone Phalin	October 2013	Andra Pradesh and Odisha	23
6	Floods/Landslides	June 2013	Uttarakhand and Himachal Pradesh	4,094
7	Cyclone Mahasen	May 2013	TamilNadu	08
8	Cyclone Nilam	October 2012	Tamil Nadu	65
9	Uttarakhand Floods	Aug-Sep 2012	Uttarkashi, Rudraprayag and Bageshwar	52
10	Assam Floods	July-Aug 2012	Assam	
11	Cyclone Thane	December 2011	TamilNadu, Puducherry	47
12	Sikkim Earthquake	September 2011	Sikkim, West Bengal, Bihar	60

III. HUMANITARIAN SUPPLY CHAIN

A supply chain is essentially a dynamic and complicated network of supply and demand. A supply chain is a network of organizations, individuals, activities, and resources involved in the distribution of a product or service. According to the American professional association's definition, supply chain management entails: "Supply chain management includes the planning and management of all sourcing and procurement, conversion, and logistics management activities. Importantly, it also entails coordination and collaboration with channel partners, who may include suppliers, intermediaries, third-party service providers, and customers ". Humanitarian supply chain

(HSC) specializes in coordinating the delivery and storage of supplies to affected persons during natural disasters and emergency circumstances. Specifically, "humanitarian logistics" refers to the activities of "planning, implementing, and controlling the efficient, cost-effective flow and storage of goods and materials as well as related information, from point of origin to point of consumption in order to alleviate the suffering of vulnerable people (Thomas and Kopczak, 2005, [3]). The function covers a variety of tasks, including preparation, planning, procurement, transit, warehousing, tracking and tracing,

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customs, and clearing. It is the most expensive component of any relief mission, and its success or failure determines the operation's success. HSC functions as a link between catastrophe preparation and response, procurement and distribution, and headquarters and the field.

In an Indian context, the humanitarian supply chain involves international relief groups, host governments, the military, local self-governments, and regional relief organizations, among others, with competing interests,

mandates, capacities, and logistical competence. The primary distinctions between commercial and humanitarian supply chains have an impact on three elements: supply chain flows, supply chain structures, and project life cycle management. The strategic objective of humanitarian supply chains to save lives and alleviate human suffering is perhaps the most fundamental and significant distinction.

Table 2: Commercial and Humanitarian Supply Chain

	Commercial Supply Chain	Humanitarian Supply Chain
Network Configuration	There exist methods for supply chain network design.	Challenging due to the nature of unknowns (locations, type and size of events, politics, culture) and "last mile" considerations.
Information Systems	Typically, well-defined, making use of advanced technology.	Information is often unreliable, incomplete, or non-existent.
Performance Measurement System	Historically, focused on resource performance measures, such as maximizing profit or minimizing costs.	Primary focus on output performance measures, such as the time required to respond to a disaster or ability to meet the needs of the disaster victims.
Strategic Goals	Usually, to produce high quality products at low cost in order to maximize profitability and achieve customer satisfaction.	Minimize the loss of life and alleviate suffering.

(B. M. Beamon, 2004, [7])

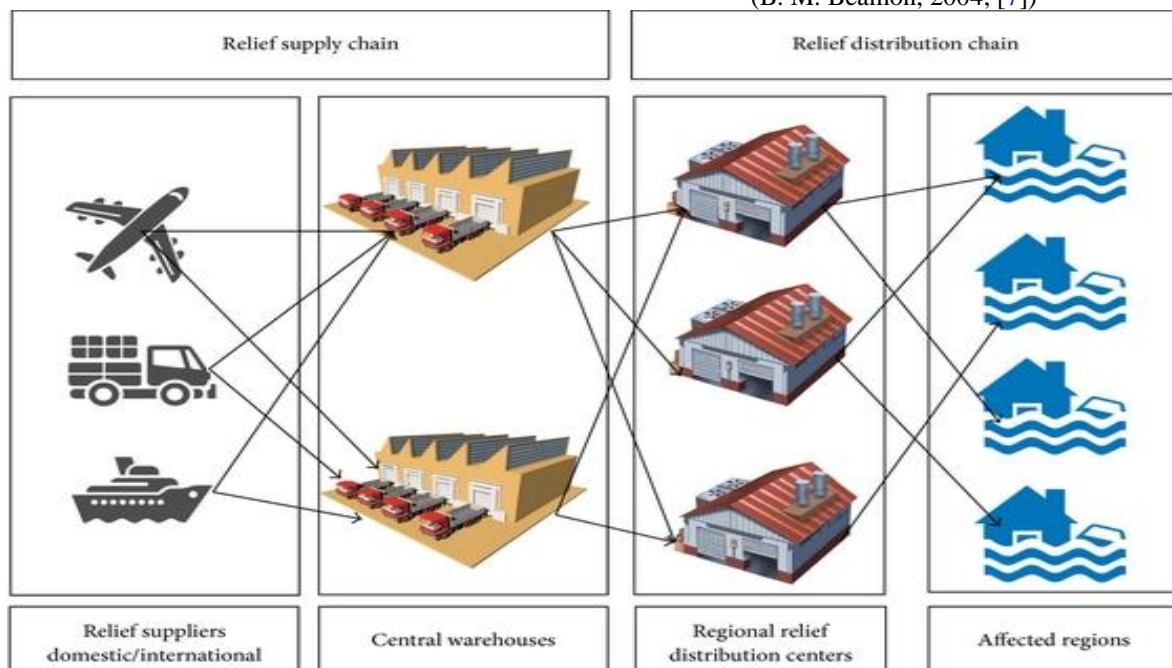


Figure 2: Relief Supply Chain Network



IV. CHALLENGES IN THE HUMANITARIAN SUPPLY CHAIN

The field of the humanitarian supply chain in India is fraught with issues and impediments, as well as areas that require quick attention. Humanitarian logistics was a neglected back-office function until very recently, and logistics expertise is still underdeveloped. Only after the 2004 tsunami tragedy did the Indian government and other stakeholders begin to address the long-standing need for a humanitarian supply chain and disaster management. The obstacles can be classified as behavioral obstacles and are briefly detailed below.

4.1 Deficit of Stability

Donors are constantly at the center of humanitarian help, which is funded, carried out, and administered in a variety of ways. There are various categories of contributors, including government donors, corporate donors, and individual donors, each with its own purposes, tactics, and ambitions. Donors typically pledge contributions, however, it is frequently observed that actual contributions may not materialize or, if they do, will be less than the amount promised. There is a problem with the lack of funding transparency in India. The funding may arrive in installments that do not coincide with the timeline established for restoration and reconstruction. The instability of the humanitarian supply chain involves finance for these modifications, donor priorities in their own backyards, and politicized government donations. In India, the stability of the humanitarian supply chain is typically compromised by a lack of logistics infrastructure and public official corruption

4.2 Absence of Collaboration Between Players

A humanitarian supply chain includes various actors, including funders, state, federal, and municipal governments, NGOs, the military, etc. Each participant in disaster response has the overarching objective of assisting people and alleviating their pain. However, the participants' missions, motivations, strategies, and operational restrictions may vary. Coordination, collaboration, and communication among the participants in a humanitarian supply chain are crucial. In India, the government, typically the state government of impacted areas, plays the role of coordinator. As the government's actions are governed by the existing rules and regulations, it will be challenging for the military and private agencies to engage with the government's established policies. It is frequently believed that the government lacks the expertise, resources, and experience to organize such a chaotic and emergency scenario.

4.3 Lack of Predictability

There are a variety of times of year for disaster management uncertainty. This is a significant obstacle in a humanitarian supply chain that can be overcome via good coordination amongst supply chain participants. The location, timing, and intensity of catastrophes, particularly sudden-onset disasters, cannot typically be predicted, making it difficult to construct a successful humanitarian supply chain. Population characteristics and current infrastructure may not be readily

available in disaster-prone locations. Therefore, the existing supply chain should have the flexibility and capacity to satisfy unforeseen needs in a catastrophic event.

4.4 Scarcity or Oversupply of Resources

Aligning supply with demand is a significant obstacle in the humanitarian supply chain. This is due to a number of factors, including the unpredictability of crisis situations, a lack of supporting resources and infrastructure, inadequate funding, the absence of coordination structures, etc. Even when finances are available, a lack of coordination and infrastructure can often result in vulnerable situations and panic. The aftermath of the tsunami is a prime illustration of such a scenario when the lack of potable water became a serious worry in the coastal regions of India. There was a great deal of indifference and incompetence in the provision of potable water to the afflicted coastal residents, whose water resources were contaminated with salt water. In 2009, when a boating tragedy occurred in the Thekkadi wildlife reserve, the immediate need was for searchlights. It was extremely difficult to locate and gain access to these high-capacity searchlights in nearby locations, so they had to be transported from other districts to meet the immediate need.

4.5 Knowing the Needs in Relief Operations

It is crucial to assess the ground realities, needs, and infrastructure facilities in a disaster-affected area in order to plan relief efforts accordingly. Typically, it is a lack of preparedness and an inability to comprehend the requirements of the suffering people that hinders the disaster management process, not a lack of cash. During the 2004 tsunami that affected hundreds of people in India, there was an image of airports piled high with humanitarian assistance flown in from worldwide donors and awaiting delivery to tsunami-stricken areas, months after the actual disaster. As a crucial success component, a humanitarian supply chain must take into account the needs of the people in relief camps, their emotional state, and their internal group dynamics, among other things. During times of tragedy, it is customary to collect clothing and medications and deliver them to those in need in relief camps. However, the actual demand will be for undergarments, which cannot be provided using the same technique as the rest of the resources.

4.6 Deficit of Leadership Quality

The establishment and coordination of a humanitarian supply chain depend a lot on the quality of the leadership offered. Especially in an Indian scenario this factor is not given due importance and is severely affecting the successful implementation of the supply chain. Even though there are a lot of rules and acts being passed in parliament and in other legislatures supporting disaster management activities, it needs great leadership qualities and initiative from the political leadership and the executive to implement this authority for establishing and coordinating an HSC. Usually in India, the district collector is the person who will be taking the lead in such activities and the revenue department under his immediate control will be taking the initiatives.

V. SUCCESS ELEMENTS FOR THE HUMANITARIAN SUPPLY CHAIN IN THE INDIAN CONTEXT

Critical Success Factor is a management phrase indicating a requirement for a project to accomplish its objective. It is a necessary activity for securing success. Critical success factors are the situations, characteristics, or variables that, when correctly fostered, sustained, maintained, or controlled, can have a substantial impact on an enterprise's success. Instead of analyzing the humanitarian supply chain on a microscopic level based on specific criteria, we have attempted to uncover the essential success elements in the humanitarian supply chain and crisis management in the Indian context.

5.1 Coordination and Collaboration Between Players

Humanitarian assistance situations involve multiple players, such as foreign relief groups, host governments, the military, local and regional relief organizations and private sector enterprises, each of which may have varying interests, cultures, capacities, and logistics expertise. In spite of current obstacles and past failures, coordination is receiving more attention due to the growing scarcity of global resources, accountability issues, and the potential benefits afforded by advancements in global information technologies. It is crucial that there is clear and effective communication among the stakeholders in a humanitarian supply chain without interfering with their own powers and sovereignty.

5.2 Training

Training is an effective tool for building the capacity of individuals, organizations, officials, and all others involved for tackling the complex situations arising as a result of the disaster. Capacity building includes pre-disaster activities like personnel training, the establishment of institutions, financial ensuring measures and prior planning of logistic centers and shelters, custom agreements with local governments, mock drills, household preparedness, handling community equipment, understanding warning messages, and First Aid preparedness. It is very important that the training reaches the individuals, organizations, and others concerned who will be really involved with the actual supply chain and disaster management activities. Care should be taken for building the capacity of local self-governments, people's representatives at the bottom level of democracy who will be playing an active role in the actual scenario. In India with the new disaster management policy in place, the importance of training has really gained importance.

5.3 MOU with Regional Bulk Vendors

A crisis situation necessitates the procurement of massive quantities of commodities such as clothing, medication, and even potable water. This requires an extensive and well-established database of resources, including rescue equipment. District-specific resource data might be useful in this circumstance. Kerala's comprehensive database of potential disaster-related needs serves as a model for other regions. This will not be a simple task due to the variable nature of the demand and the intricacy of the supply chain. It

will be difficult to find providers during an emergency, as there will be much confusion and uncertainty over payment, liability, etc. It would be preferable for the government or district authorities to identify possible suppliers and sign memorandums of understanding with them in order to partially meet the need.

5.4 Transport Infrastructure

In any form of the supply chain, whether humanitarian or commercial, a transportation facility is important. It is especially difficult in the Indian context, where transportation infrastructure is inadequate. Indian railways, which traverse the entire country in all directions, can play a crucial role in such a scenario. All participants in a humanitarian supply chain can be encouraged to use this network to meet their needs. Being a government-run organization, Indian Railway can quickly assist the supply chain, particularly during the restoration phase of disaster management.

5.5 Participation of Local Government and NGOs

In the relief and reconstruction phase of a humanitarian mission, group dynamics and the needs of the affected group must be understood. The afflicted individuals who will be housed in refugee camps will come from vastly different cultural and religious backgrounds, among other things. Their needs may vary in accordance with their cultural diversity, way of life, and even their caste and religion. Even a demand for a separate kitchen may arise, as it has in the past during numerous disasters in northern India. Inhabitants of a refugee camp may decline to accept the used clothing and other items provided as part of the contributions. Understanding the internal dynamics of a group is therefore essential for a response, refugee, and rehabilitation activities, as well as the construction of a sustainable humanitarian supply chain. This highlights the need for local government and NGOs to be involved in disaster and supply chain operations, as it assists in determining the requirements and dynamics of the impacted community. The operational efficacy realities on the ground may be comprehended

5.6 Lean Supply Chain

The concept of the agile supply chain is a continuing readiness to change, sometimes to alter radically to the fast response to changes in the market and consumer demand. Due to its speed, adaptability, enhanced diversity, and customizability, agility is an appropriate risk management method for supply chains. The humanitarian supply chain is specialized in the management of large-scale hazards, the management of the link between disaster relief components, the assessment of needs, the evaluation of the impact of dispersed supplies, and the monitoring of various ongoing relief operations. Humanitarian help often focuses on search and rescue, maintaining or saving a life, and restoring self-sufficiency to offset disaster-related losses. The essential element in any humanitarian Integrating lean and agile supply chain enhances coordination across humanitarian supply chain (HSC) participants.

The humanitarian supply chain (HSC) must be nimble, adaptable, and aligned; this is a key capability of many humanitarian organizations participating in disaster relief and an area from which the commercial sector might draw to enhance its competitive advantage. (Van Wossenove, 2006, [1]). Literature in this field indicates that the flexibility of the supply chain and its adaptability to ecological and environmental conditions is a crucial aspect in enhancing the supply chain (HSC) in order to ensure that victims of an emergency receive effective and efficient commodity delivery

5.7 Media

Information and the media play an important role in a humanitarian supply chain. The data is necessary for effective planning. The term information has to be subdivided into two categories, information about the situation e.g. mortality rate, impact on health, affected people, access to areas and logistics hubs, development of the disaster, population structure, availability of sources in the affected area, staff and their education, and Information about the security, reporting to local authorities and communication to the national security services, etc. The rehabilitation process is one of the areas where print and visual media must intervene. Usually, the practice is that the relief activities will be backed by NGOs and other groups including political parties. This phase typically receives extensive media coverage and accolades. But when it comes to the reconstruction phase the interest of the organizations goes down and the committed funds and support may not come as planned. Such a scenario can be prevented by clear communication, having clear terms of the agreement, the follow-up action of the respective departments, and ongoing intervention from the media.

5.8 Leadership

In every humanitarian supply chain, leadership is of paramount importance. Since every disaster management program involves a lot of participants with diverse cultures, tactics, and worldviews. The leader or organization that plays the function of coordinator between the HSC's players should be well-trained and have effective interpersonal interaction skills, communication skills, etc. Notably in India where disaster management is still an issue that is getting acknowledged slowly and is not given enough consideration especially by the government departments and by the general public the leadership component plays a critical role. Leadership plays a significant role in persuading the public and concerned parties of the gravity of the problem, as well as in risk and need assessment. Risk assessment aids in addressing the underlying causes of danger and concurrently decreases losses of life and property. After a catastrophic occurrence, a needs assessment must be conducted to determine what goods and services are necessary. The success of the humanitarian supply chain is also significantly influenced by the players' behaviors

5.9 Other Factors

Some of the characteristics cited as important success factors in a humanitarian supply chain in the relevant literature are omitted from this study since their applicability

was not evaluated. But some of the components such as the behavioral aspects of the participants participating in a humanitarian supply chain is an important factor to be considered. The sustainability of the supply chain is also a crucial aspect to be considered in the successful implementation of the humanitarian supply chain. According to the available literature in this field, the agility of the supply chain and its adaptability to external conditions is a crucial aspect for enhancing the responsiveness of the humanitarian supply chain. The main component in any humanitarian supply chain (HSC) is to ensure that the victims of the crisis should receive effective and efficient delivery of commodities

Many commercial approaches to the management of supply networks are applicable to humanitarian logistics. Utilizing the power of information management to assure the achievement of the '5 rights' has been a crucial element of an efficient and productive organization (the right goods are available, in the right place, at the right time, in the right quantity and quality, at the right cost). This is also true in the humanitarian context, despite the fact that the difficulties of identifying the demand side of the equation while simultaneously supplying across a damaged physical environment are typically far more complex.

VI. SUSTAINABLE SUPPLY CHAIN

Government and non-government organizations (NGOs) operate and maintain supply chains in many developing nations to assist vulnerable communities in satisfying their core needs. Controlled supply chains have been built to carry and distribute food, water, sanitation, and medications throughout diverse regions of the world (Shareef, 2019, [2]). Since supply chain structures are interrelated and constantly mutable, modifying one structure might have repercussions on the alterations of other interconnected structures. In emergencies where catastrophes such as hurricanes, flash floods, fire, and famine can have a substantial impact on the population and environment, national governments and non-governmental organizations (NGOs) run and manage emergency supply chains (ESCs). One of the primary goals of disaster management and one of its greatest linkages to development is the promotion of sustainable livelihoods, as well as their preservation and recovery during emergencies and disasters. When this purpose is achieved, people are more equipped to deal with crises, and their recovery is both immediate and long-lasting. The goals of a development-oriented approach to disaster management are to minimize risks, avert catastrophes, and get ready for emergencies. Consequently, the mitigation and preparedness phases of the disaster management cycle heavily consider developmental aspects. Inadequate development methods may lead to a lack of emergency readiness and an increase in disaster susceptibility. In addition, it acts as a significant focal point for key stakeholders, such as civil society and the commercial sector, who are highly motivated and essential participants in decreasing global, regional, national, and local disaster and climate risk.



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Integration of disaster risk reduction across global activities in support of the 2030 Agenda for Sustainable Development creates a real and concrete link between the humanitarian and development communities.

VII. RESULTS AND DISCUSSION

The paper discusses the behavioral challenges faced in the process of establishing an agile and sustainable humanitarian supply chain in an Indian scenario. India due to its huge population, variable geography, and vivid culture demands optimum and vigilant utilization of resources to ensure that the supply reaches everyone concerned. The paper tries to identify the critical factors that affect the implementation and success of a sustainable supply chain. The importance of these factors, their influence over logistics and distribution, and their correlation will be the key to establishing an agile and sustainable supply chain. Agility and sustainability should be ensured as the developing economy in India demands such practices in operations performed under the constraint of time. Future work on this area demands analysis of these factors confirmatory factor analysis and the development of a structural equation that will facilitate the development of a suitable model for establishing a sustainable supply network.

VIII. CONCLUSION

The methodology adopted for this particular study is a literature review and discussions with experts in humanitarian and disaster management supply chains. There were a lot of limitations due to the limited exposure to literature related to humanitarian supply chains in an Indian scenario. In emergencies accomplished brought on by a natural disaster, armed conflict, economic or political crisis, or, in more complicated emergencies, by a combination of several of these factors, humanitarian action or response entails providing material and logistical assistance to save lives, relieve suffering, and protect human dignity are achieved. Large-scale humanitarian activity has been sparked by several significant natural catastrophes in recent years, and this response has received critical attention. The natural disasters of 2020 had terrible effects on millions of people in several countries. The unique coronavirus pandemic will make 2020 stand out, but it also saw some of the worst and most expensive catastrophes. There are 412 natural disasters per year on average. Others list mass movements, landslides, plagues, invasions, and volcanic eruptions. More frequent and unpredictable climate-related catastrophic occurrences increase risk and vulnerability and have a detrimental effect on human rights, disrupt livelihoods, and endanger lives all over the world. In 2020, there were a total of 389 climate-related disasters that claimed 15,080 lives, had an impact on 98.4 million people, and caused \$171.3 billion in economic harm. No one group can address every continuing issue or concern during a humanitarian catastrophe. To successfully coordinate aid efforts and maximize efficiencies concerning costs and speed, it is always required to get many players to work together in a network. This necessitates the development of a humanitarian supply chain management strategy, a

multilateral approach that coordinates the movement of supplies through international organizations and relief aid organizations while obtaining funding from both national and international organizations to efficiently and decisively reach the victims of the disaster. The Humanitarian supply chain organization involved in relief supplies in disaster areas must be adaptable, aligned, and agile to improve its competitive edge. Optimizing the logistic performance requires that all the relationships among the actors involved are managed through an integrated approach to efficiently and effectively coordinate inter-organizational performance, eliminate redundancy, and maximize efficiency along the entire emergency supply chain.

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