



The Critical Role of Public Trust and Coordination in Supply Chain Performance: Empirical Evidence from National and International NGOs in Pakistan

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ARTICLE INFO

Article History:

Received: June 08, 2025

Revised: September 03, 2025

Accepted: September 04, 2025

Available Online: September 05, 2025

Keywords:

Humanitarian Supply Chain
Performance (HSCP)
Supply Chain Transparency (SCT)
Public Trust (PT)
Public Coordination (PC)
Resource-Based View (RBV)
Humanitarian Logistics

Funding:

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

ABSTRACT

The current study investigated the humanitarian supply chain performance effected by supply chain transparency, public trust and public coordination and drawing with resource-based theory. Methodology/Design- Employees of national and international NGOs in Pakistan including in data collection of 380 valid response and data were analysed by SmartPLS. The findings reveal that the direct and significant impact of supply chain transparency, public trust and public coordination on humanitarian supply chain performance. Additionally, the findings provide validation that each of these components has a significant positive association with HSCP, emphasizing the strategic benefit of non-physical resources in humanitarian operations. In practical terms, the discoveries are a significant point of reference to managers and policy-makers in terms of providing some level of resource allocation with technologies, like blockchain that can operationalize transparency and data securitization which the study will conclude, is a significant factor in building trust with the public and enhancing public stakeholder engagements with participations in the humanitarian network with greater effectiveness and resilience, and which can also enable the transition to physical asset allocation to more optimally leverage social and informational resources.

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1. Introduction

Over the past ten years in reaction to major disasters, humanitarian supply chain has expanded enormously (Waseem et al., 2025). In 2024, more than 85 million people were displaced because of conflict and violence worldwide (Tariq, Tufail, & Rehman, 2025). Humanitarian crises have emerged for significant parts of the world from the historical coronavirus epidemic of 2020 and the continuing impact on the global healthcare and economic systems. Therefore, humanitarian organisations (HOs) are under tremendous pressure to provide aid in an increasingly cost-effective manner (Inam & Gul, 2025). Many humanitarian effort and programs are interrupted, some state they are "operating at fifty percent" or in many cases a more complete standstill (Wu et al., 2024). In all likelihood, the addressing humanitarian emergencies will be unlikely in the future. The prevalence, increased frequency, and severity of natural and/or man-made disasters globally illustrates a need for a more effective and efficient humanitarian aid operating system. After a large catastrophic event, the ability to rapidly and equitably distribute necessary relief supplies, such as food, water, shelter, and medical assistance directly relates to saving lives and reducing human suffering (Wang et al., 2024). Humanitarian assistance around the world has never been more complicated, with cascading issues like the increase of natural disasters from climate change, the extension of conflicts that lead to mass displacement, and a crippling global economic situation disrupting funding for the humanitarian sector. This chaotic global context is most apparent in the disaster-prone nation of Pakistan, one of the most climate-vulnerable countries, recently subject to continuous devastating disasters,

including the floods in 2025 that impacted 33 million people, in conjunction with serious economic problems, political instability, and hosting millions of refugees for extended periods of time (Verna, Genta, & Galetto, 2025).

The act of assembling the resources and individuals necessary to save lives and support the affected population is termed the humanitarian supply chain (Anjomshoae et al., 2025). According to Tetteh, Owusu Kwateng and Tani (2024), humanitarian missions aim to save lives, reduce suffering, and satisfy the basic needs of the impacted community. First, the effort focuses on mobilizing the necessary logistics to the situation in the community; this involves moving materials, developing transportation plans, and increasing storage when necessary (Kashav & Garg, 2024). This effort of ensuring disasters are managed appropriately will include action planning for the humanitarian mission with mediation of the processes (Shrivastav & Bag, 2024). HSC serves to connect disaster victims to humanitarian help suppliers. The HSC forms after a natural disaster occurs. Each individual event varies in nature and scale, which usually translates to modifying through custom integration to include local geography, resources available, and local level of trouble (Dubey, Bryde, & Foropon, 2024). One of the major barriers to humanitarian supply chain (HSC) performance, especially in high-risk contexts like Pakistan, is the lack of transparency in the supply chain, public trust, and coordination. Crises in Pakistan, including the well-documented 2025 earthquake disaster, and ongoing flooding have exposed the infrastructure and systemic issues in the possible diversion of aid, corruption, and the irregular distribution system (Tariq, Tufail, & Rehman, 2025). Unlike commercial logistics, where precautions can be taken for a variety of assumed responses to deliveries, HSC exists in a real-time over-stressed environment based on unpredictability of demand, environmental exhaustion of assets, destroyed infrastructure, and needing fast evaluations and decision making often with life or death implications. Improving performance of this supply chain is not just a logistics question, but a moral and strategic question of the international humanitarian system (Inam & Gul, 2025). Supply chain transparency where there is clear and demonstrable visibility into all aspects of the supply chain from procurement to final delivery is necessary for accountability of the donors and the services delivered rely upon for access.

Research indicates that lack of transparency negatively impacts trust from donors and gives rise to inefficiencies or corrupt practices that directly harm aid recipients (Schäfer, 2023). Clearly then, the establishment of a transparent and traceable supply chain is essential for optimal humanitarian response (Morgan, Gabler, & Manhart, 2023). The challenges described above are particularly acute for staff members of national and international non-governmental organizations (NGOs) in Pakistan. NGO staff are frequently working in operational environments characterized by severe security risks, logistic challenges, and expectation of demonstrating accountability all in an environment that is constantly adapting to ongoing socio-political shifts (Tetteh, Owusu Kwateng, & Tani, 2024). The success experienced at the levels of getting outcomes on the ground, and more particularly the last-mile of getting relief are directly contingent upon the trust the public has in these organizations and the cooperation of partnerships within the local networks. Public trust is the confidence of affected communities and society more broadly - in the fairness and effectiveness and integrity of aid agencies is thin and fragile, but not unimportant (Wang et al., 2020). When public trust is damaged, affected communities may resist aid distribution or interfere, and potential local implementing partners may be less willing to partner with aid agencies, resulting in delay and ineffectiveness. In addition to issues of trust, public coordination the collective action of all stakeholders, including government entities Ramadass, Arunachalam and Sagayasree (2020), affected communities, and a vast network of national and international non-governmental organizations (NGOs) is also essential. In Pakistan, the long history of uncoordinated efforts, the duplication of resources, and at times little collaboration between the state and NGOs mark the need for improvement in incorporated mechanisms of coordination to ensure that the most vulnerable receive assistance in a timely manner without bias (Iwaya et al., 2020; Waseem et al., 2025).

In theoretical point of view, the Resource-Based View (RBV) (Lockett, Thompson, & Morgenstern, 2009), which the intangible resources of transparency, trust, and coordination have led to performance outcomes particularly in a humanitarian context. More specifically, this research will help provide insights on the mechanisms by which humanitarian organizations can leverage transparency, trust, and coordination to positively influence their humanitarian supply chain performance (Kashav & Garg, 2024). Practically, the results provide potential evidence for use by policymakers, humanitarian organizations, and supply chain managers interested in

enhancing performance and accountability in the delivery of aid. By establishing some evidence on the specific mediating potential of supply chain transparency, public trust, and public coordination in humanitarian performance with the use of technology, the results can assist humanitarian actors with the development of evidence-based, traceable, and legitimate systems that may enhance corruption, response times and achieve a more equitable allocation of resources (Anjomshoae et al., 2025). While considerable research has outlined the general landscape in terms of Humanitarian supply chain (HSC) challenges, performance measures and disaster relief operations, a perusal of the literature suggests that the vast majority of this work is not empirical research; most studies tend to be descriptive, often focusing on cases studies. Some studies do frame model development within HSCs (Kashav & Garg, 2024), however, there continues to be a significant lack of empirical research utilizing well-established organizational theories to examine the mechanisms behind performance. The Resource-Based View (RBV) argues that unique non-substitutable valuable organizational resources including relational and social capital distinguish organizations with sustained or high performance; this view is well-considered in the commercial supply chain management literature (Dubey, Bryde, & Foropon, 2024). This highlights one of the first gaps in our knowledge: an empirical and theory driven examination of how social capital dimensions specifically, public trust and public coordination may act as key strategic resources and how they impact HSC performance. Thus, the research questions was; *Does a significant effect of supply chain transparency on humanitarian supply chain performance? Does a significant effect of public Trust on humanitarian supply chain performance? And Does a significant effect of public coordination on humanitarian supply chain performance?*

2. Theoretical Review and Hypothesis Development

2.1. Resource Based View Theory

The Resource-Based View (RBV) is a key theory of strategic management that proposes that a firm realizes a sustainable competitive advantage from acquiring and using resources that are Valuable, Rare, Inimitable, and Non substitutable (VRIN) (Barney, Wright, & Ketchen Jr, 2001). Conceptualizing RBV in terms of an organization functioning in the humanitarian space opens [up] the definition of superior humanitarian supply chain performance (HSCP) to mean the highest possible level of efficiency and effectiveness in the systematic delivery of aid (Wernerfelt, 1984). Here, it is recognized that while agencies may use tangible resources like vehicles and warehouses, these physical resources are available to all organizations in the humanitarian space. The real advantage exists in the successful management of intangible and relational resources. Supply chain transparency (SCT) is an important informational resource in this context (Kraaijenbrink, Spender, & Groen, 2010). SCT creates a strong capability that translates into better operational performance and responsible stewardship of resources (Ko et al., 2023). The Resource-Based View (RBV) is primarily associated with for-profit organizations seeking sustainable competitive advantage and/or financial advantage; the concept still hinges upon the same principle that if an organization is outperforming others, it is most likely either due to unique resources that other competitors can't easily duplicate in the marketplace (Barney & Arian, 2005). In for-profit organizations, these resources tend to be RBV resources that are related to proprietary assets of things such as technology, or access to the market, which are utilized to maximize the wealth of the firm's shareholders. However, for non-profit organizations such as NGOs, the objective is to maximize the most effective performance of the mission and operational capacity of the NGO (Nagariya et al., 2023). Thus, in this humanitarian context, RBV is defined differently with sustained advantage signified through better aid impact, efficiency, and resilience of the overall system. In fact, the key resources are not tangible or technological, but rather they're relational and social capabilities; specifically, public trust and coordination allow NGOs access to the necessary external resources to help them work in complex environments, achieving a non-substitutable capacity for implementation that is critical to saving lives (Collins, 2022).

The RBV is further strengthened when we consider the socio-relational resources of public trust and public coordination (Saiah, Vega, & Kovács, 2023). The resource of public trust is sufficient to describe the social capital of the organization, a very important resource that enables NGOs to obtain continued donor funding, immediate access to communities, and lower transaction costs related to corruption or local dissent (Bui, 2024). This resource has inherent inimitability as it requires effort over a period of time as ethical behaviour and accountability are the differentiators in high-performing organizations. On the other hand, public coordination

serves as a unique resource in organizational process resource. It is valuable as it formalizes the integration of local knowledge and nontraditional assets (e.g., local volunteer networks, booths of temporary operational infrastructure) into the HSC (Kashav & Garg, 2024). The humanitarian actors can move from simple operational efficiency to a unique, inimitably difficult capability, which is the basis of superior HSCP in complex, unpredictable environments like Pakistan (Ahmed, Azhar, & Mohammad, 2024; Mohammad & Ahmed, 2017).

2.2. Humanitarian Supply Chain Performance

In recent years, many disasters have compelled HOs to improve their relief operations in order to cope with emergencies (Anjomshoae et al., 2025). Disasters can be classified as natural and man-made (Tetteh, Owusu Kwateng, & Tani, 2024). Natural disasters include earthquakes, volcanic eruptions, pandemics, and floods, while human-made disasters include terrorism, conflicts, and chemical spills (Alied et al., 2024; Kalbouneh et al., 2023). Disaster management researchers (Akhtar & Dhanani, 2024) have defined disaster management as domain characterized by high urgency, high uncertainty, and short duration typically. Disaster management can include issues and/or challenges around procurement, planning, rapid mobilization of the resources, distribution of supplies, and warehouse locations. The humanitarian supply chain (HSC) ensures that relief and recovery supplies are delivered to victims in the right quantity, at the right time, and in the right place (Inam & Gul, 2025). Unlike a commercial supply chain that is seeking profit, HSC performance is ultimately based on its effectiveness at saving lives and alleviating human suffering, a purpose that requires balancing the competing demands of speed, cost, and quality (Fatima et al., 2023; Tariq, Tufail, & Rehman, 2025). Key performance indicators focus on timeliness, (for example, to measure time from disaster notification to first aid delivered); effectiveness (for example, aid adherence accuracy and what percentage of the affected population was covered); and efficiency, which tracks cost to beneficiaries for accountability to donors. HSC performance operates in a high-stakes environment that necessitates focusing on agility the ability of a supply chain to adapt swiftly to changing needs and chaotic conditions and resilience; the ability of a supply chain to withstand and recover from disruption, like damage to infrastructure or experience of conflict (Shrivastav & Bag, 2024). Agility improves the cultural appropriateness of aid, reduces lead time to aid delivery, or avoid complex global shipping entirely; and it builds local capacity, so when international access is limited, the humanitarian supply chain can remain functionally sustainable (Nagariya et al., 2023; Tetteh, Owusu Kwateng, & Tani, 2024). Thus, modern humanitarian supply chain performance is not simply a performance measure and operational indicator, but a comprehensive reflection of the organization's dynamic capacities, ethical engagement, and ultimate impact on human dignity (Ragmoun, 2024; Ragmoun & Alfalih, 2024).

2.3. Hypothesis Development

Information and communication technology management is situated in the context of sustainable SCM as well as sustainability itself being deeply examined as a relevant issue for SCM (Anjomshoae et al., 2025; Ko et al., 2023). However, one challenge with supply chain transparency is in operationalizing supply chain openness due to the complexity, cost, and time associated with global supply chains. Accordingly, new technologies (such as blockchain technologies) and online extensions have investigated ways to assist organizations in assessing supply chain openness and transparency via sustainable SCM (Budler, Quiroga, & Trkman, 2024; Shrivastav & Bag, 2024). However, an expanded understanding of supply chain transparency is necessary to understand what information should be shared and by whom. Research findings indicate that transparency, clarity, and quality of information provision leads to significant improvements in humanitarian supply chain performance (Jia et al., 2024). An example of this relationship, demonstrated rigorously, is that any HSCP that turns on a transparent humanitarian supply chain system, based on rigorous disclosure and strong corporate governance, vastly reduces worries about corruption or fraud one of the enduring challenges to delivering aid (Kashav & Garg, 2024). The contemporary method for promoting HSC transparency is through the intentional use of digital technologies, which is also a key and emergent issue in contemporary humanitarian supply chain research. Digital technologies can, for example, track the aid from the time it is procured until it is decommissioned at the last mile, dissociating the flow of information with the physical movement of goods and minimizing concerns related to the integrity of the data (Khan, Alshahrani, & Jacquemod, 2023). This new level of visibility has been shown to lead to improved agility and responsiveness two primary ways of measuring HSC performance and outcomes by enhancing rapid decision making, which can be beneficial in high-uncertainty contexts. According to Bui (2024), supply chain transparency improves the

performance of the humanitarian supply chain. Organisational scholars have thoroughly examined this Morgan, Gabler and Manhart (2023), but there hasn't been much empirical research done on it. According to Ko et al. (2023), those organisations had better procedural justice and rule transparency, which also led to a higher level of humanitarian supply chain. Furthermore, according to Saïah, Vega and Kovács (2023), behavioural uncertainty frequently results from inadequate information exchange or transparency among supply chain stakeholders, which has a significant impact on governance.

H1: There is significant effect of supply chain transparency on humanitarian supply chain performance.

Because organisations must collaborate on strategic goals that require quick, real-time responses, trust is essential to decision-making throughout supply chains. For those who rely on transparent systems, these AI models raise questions (Robles & Mallinson, 2025). Due to their ignorance of the weight distribution of inputs and prediction building techniques, supply chain experts are reluctant to adopt AI recommendations (Baharun et al., 2022). For example, recent research confirms that public trust acts as a significant mediating variable between base organisational variables (e.g., disclosure, clarity, accuracy, and due diligence accountability processes) and the eventual effectiveness of HSC performance (Tetteh, Owusu Kwateng, & Tani, 2024). This critical role illustrates that public trust is a necessity merely demonstrating transparency, in support of Herdiansyah (2023), suggestion that transparency improves supply chain performance, without trust among stakeholders, specifically donors and beneficiaries, is not enough. This has been studied sufficiently by organisational psychologists Rachman, Verawati and Rusandi (2023), but there has been little empirical research in terms of operational advantages in volatile environments until prior. Not establishing swift trust and relational capital within a short time is a significant barrier to enhancing supply chain performance and coordination, particularly in temporary, post-disaster contexts (Sabrina et al., 2023). Also, Liu and Duarte (2025), behavioral uncertainty often emerges from inadequate information sharing or transparency among supply chain stakeholders, which is an important factor that supports governance. This uncertainty is important because humanitarian operations are complex and multi-stakeholder environments, which require substantial collaborative planning. When trust is low, actors are less likely to share critical information, share resources, or engage in strategic planning, which is noted as degree of "collaboration deficits" in sector-wide surveys (Morgan, Gabler, & Manhart, 2023). Conversely, when trust is high often managed by the digitalized information systems, that mitigate uncertainty and creates more logistical visibility and accountability Dubey, Bryde and Foropon (2024), humanitarian organizations are better able to access the supply chain agility and resiliency required to effectively respond to global crises.

H2: There is significant effect of public Trust on humanitarian supply chain performance.

Scholars of operations management have paid close attention to coordination in humanitarian settings (Liu et al., 2023). Nonetheless, classic supply chain RBV theory is a major component of humanitarian supply chain coordination theory. According to Herrera-Medina and Riera Font (2023), supply chain coordination has been divided into two groups in the literature on supply chain management: relationship-based and process-driven (Langbroek, 2023). Relationship-based cooperation is sometimes thought of as a long-term relationship where participants actively exchange strategic resources and knowledge in order to accomplish a shared objective. Coordination is defined as the process of sharing information and resources, centralized decision-making, and planning operations collaboratively (Langbroek, 2023). Improving coordination is associated with less "wasted spend" that occurs with competing disaster relief efforts in a lack of coordination (Eteng et al., 2023; Herrera-Medina & Riera Font, 2023). If coordination does not occur, then necessitated issues can stem from duplicated aid, delayed distribution, and misdirected resources, which are initially problematic in terms of saving lives. Prior studies show that improved inter-agency coordination, generally with the assistance of "tracking systems" or collectively defined systems with improved flow, facilitates improved logistical coordination and provides improved systems resiliency (Anjomshoe et al., 2025). While discussions about coordination theories pertains more to the prior event or entire course of disaster relief; studies have found the impact of coordination is usually greatest during the pre-disaster preparedness phase and the recovery phase, just not for the last year the areas of focus by across academic field consumption around response have been much more prevalent

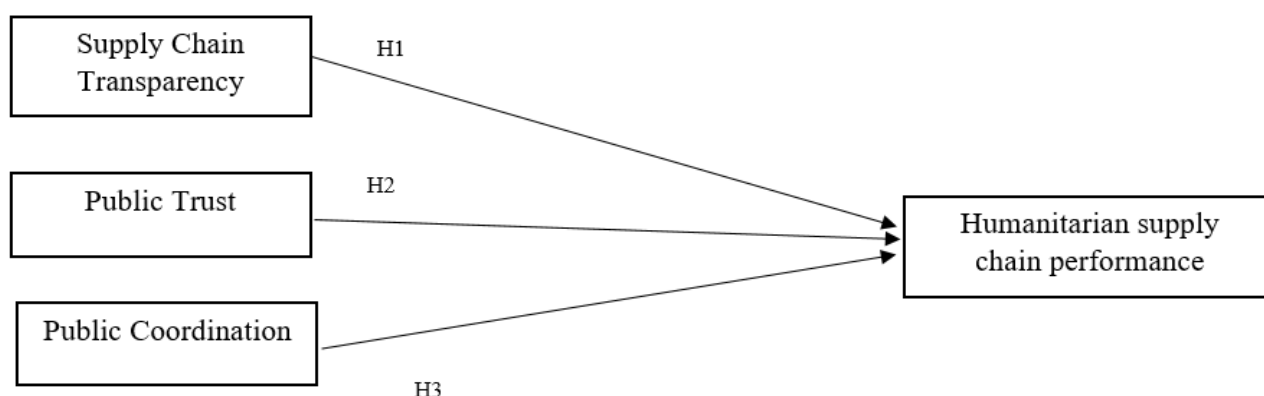
(Langbroek, 2023). Through joint planning and assessment (both aspects of public coordination), organizations often can preposition supplies, diversify their supply base, and develop more systems resiliency to any potential supply chain failure (Herrera-Medina & Riera Font, 2023). Studies on inter-organizational networks suggest that "formally" permissions like standardized reporting systems or coordination stores has resulted in making partners more trusting of each other through distributive justice and promoting fidelity to the level of information provided (Liu et al., 2023).

H3: There is significant effect of public coordination on humanitarian supply chain performance.

2.4. Conceptual Model

Figure 1, illustrates the suggested conceptual model, which is based on resource-based perspective theory and examines how public trust, supply chain transparency, and public coordination affect the performance of the humanitarian supply chain among national and international NGOs in Pakistan.

Figure 1: Conceptual Model



3. Methodology

3.1. Data Collection and Participants

In this study, a quantitative approach was used for testing the proposed conceptual model to see the effect of supply chain transparency, public trust and public coordination on humanitarian supply chain (HSC) performance. The study population were employees of national and international Non-Governmental Organizations (NGOs) in Pakistan who perform humanitarian and disaster relief work. Data was collected from 380 employees purposefully selected based on their involvement in, or oversight of, supply chain and logistics processes allowing them to possess the relevant knowledge to accurately respond to the survey. The respondents were typically managers or officers in their respective organizations, and each employee completed a structured self-administered questionnaire. Prior to formally distributing the instrument, the researcher introduced and explained the purpose of the questionnaire; while the respondents filled out the questionnaire, the researcher clarified any ambiguities raised by the respondents to ensure comprehension and high data fidelity. To facilitate respondent feedback and maximize response rate, participants were assured that their individual response, as well as their information would be limited to the study and confidentiality would be strictly maintained in terms of what they provided and the feedback was accessible only to the researcher for academic analysis. Furthermore, ethical approval was granted from a recognized institutional ethics committee prior to the research, and advanced informed consent was provided from each participant prior to their responses to the questionnaire, enhancing adherence to ethical research practices.

3.2. Measurements of Study

The study's constructs measurement scales were taken from existing literature to validate and ensure reliability within the humanitarian domain. Adapted items for supply chain transparency measured by Dubey et al. (2020). Public trust was measured by Khan et al. (2021). The construct of public coordination was developed by Khan et al. (2021). Lastly, the humanitarian supply chain performance scale was developed by Dubey, Singh and Gupta (2015). All constructs were measured using a five-point Likert scale of 1 (Strongly Disagree) to 5 (Strongly Agree).

3.3. Common Method Biasness

Conduct a cross-sectional study to rule out the common method biasness issue in the self-reported measures. The common method biasness was analyzed using Harmon's single-factor analysis by reviewing the construct of the study that not only a single variable explains the effect on the dependent construct, but other constructs are also playing their role. The study found that the value of total variance is less than 50%, representing that there is no common method biasness issue in the study.

3.4. Analysis

For analysis, the cleaned data was input into Smart PLS (Hair et al., 2024). The measurement model was validated using Smart PLS 3.0. Smart PLS-SEM was used to investigate both direct and indirect correlations between the constructs. Because of its resilience, the SEM is a suitable instrument for evaluating measurement errors and testing the complete model at once. The next section contains the analysis's findings.

4. Results

4.1. Measurement Model

Confirmatory factor analysis was conducted to determine the measurement model's validity and reliability using Smart PLS version 3. The method evaluated the validity and reliability of the constructs through the maximum likelihood estimation method. In order to conduct the structural model analysis, the model measurement assessment needed to take place first. The validity and reliability of the measurement model was evaluated through Cronbach alpha (CA), composite reliability (CR), and average variance extracted (AVE).

Table 1: Result of measurement model

Variables	Items	F. Loading	Alpha	CR	AVE
Supply Chain Transparency	SCT1	0.750	0.826	0.878	0.591
	SCT2	0.726			
	SCT3	0.829			
	SCT4	0.821			
	SCT5	0.709			
Public Trust	PT1	0.779	0.765	0.849	0.587
	PT2	0.832			
	PT3	0.739			
	PT4	0.799			
	PT5	0.746			
Public Coordination	PC1	0.758	0.760	0.837	0.515
	PC2	0.782			
	PC3	0.726			
	PC4	0.769			
	PC5	0.796			
Humanitarian Supply Chain Performance	HSCP1	0.743	0.703	0.833	0.625
	HSCP2	0.734			
	HSCP3	0.843			
	HSCP4	0.784			
	HSCP5	0.741			

Table 1 indicates that all constructs had adequate internal consistency and reliability based on the Construction of Alphas and Composite Reliability (CA and CR) values each exceeding 0.7, which shows acceptable reliability of a scale (Hair et al., 2024). Also, when construct convergent validity was looked at, using AVE for each construct, the AVE values were also above the threshold of 0.5. To examine the model discriminant validity, the Fornell Larcker criterion was also used. The analysis indicated that discriminant validity was not a concern in our model, and the square root of the AVEs was greater than the correlation among the model variables (Fornell & Larcker, 1981).

Table 2: Fornell-Larcker Criterion

Constructs	1	2	3	4
Humanitarian Supply Chain Performance	0.790			
Public Coordination	0.486	0.717		
Public Trust	0.423	0.399	0.766	
Supply Chain Transparency	0.454	0.341	0.355	0.769

The HTMT ratio was employed to gain further insight into the discriminant validity assessment. This approach resulted in an HTMT threshold (<0.90), confirming the discriminant validity of the research model (Table 2). Cross loading indicates the relationship between one item and other model constructs. . The variance inflation factor (VIF) is used to assess multi-collinearity.

Table 3: VIF and Cross-loading values

	VIF	HSCP	PC	PT	SCT
HSCP1	2.265	0.757	0.542	0.389	0.447
HSCP2	2.343	0.784	0.436	0.352	0.545
HSCP3	2.458	0.831	0.421	0.462	0.550
HSCP4	2.661	0.766	0.579	0.455	0.402
HSCP5	2.688	0.822	0.485	0.358	0.371
HSCP6	2.449	0.884	0.596	0.435	0.563
HSCP7	1.398	0.679	0.422	0.455	0.470
PC1	2.226	0.449	0.762	0.780	0.460
PC2	2.434	0.384	0.692	0.555	0.423
PC3	2.749	0.411	0.774	0.573	0.591
PC4	1.548	0.543	0.696	0.335	0.489
PC5	1.733	0.575	0.785	0.398	0.470
PT1	2.552	0.442	0.434	0.765	0.667
PT2	2.947	0.442	0.457	0.881	0.656
PT3	2.451	0.359	0.438	0.873	0.549
PT4	2.964	0.481	0.647	0.854	0.529
PT5	3.362	0.464	0.532	0.893	0.590
SCT1	2.861	0.570	0.543	0.567	0.878
SCT2	2.256	0.595	0.536	0.539	0.896
SCT3	3.253	0.594	0.577	0.591	0.876
SCT4	2.251	0.467	0.456	0.534	0.869
SCT5	1.555	0.350	0.546	0.795	0.754

Their results indicate that an item's outer loading on the related construct should be higher than the item's loading on all other constructs. Their results show, in the following table, that all indicators now have higher loadings on the related construct. This provides evidence that the constructs have discriminant validity. Multi-collinearity occurs when a set of items, or predictors, are highly correlated with one another and may lead to inflated standard errors, decreasing the reliability of results. As a rule of thumb, values of VIF less than 5 are acceptable, indicating that there is not serious multi-collinearity, and VIF values are closer to 1 indicating very low correlation among predictors (Table 3).

4.2. Testing Hypothesis: Structural Model

Following the assessment of the measurement model that met the reliability and validity criteria, the stage of structural model assessment and hypothesis testing occurs. (Hair et al., 2024)

Table 4: Assessment of R-Square and SRMR values

Constructs	R Square	SRMR
Humanitarian Supply Chain Performance	0.298	0.702

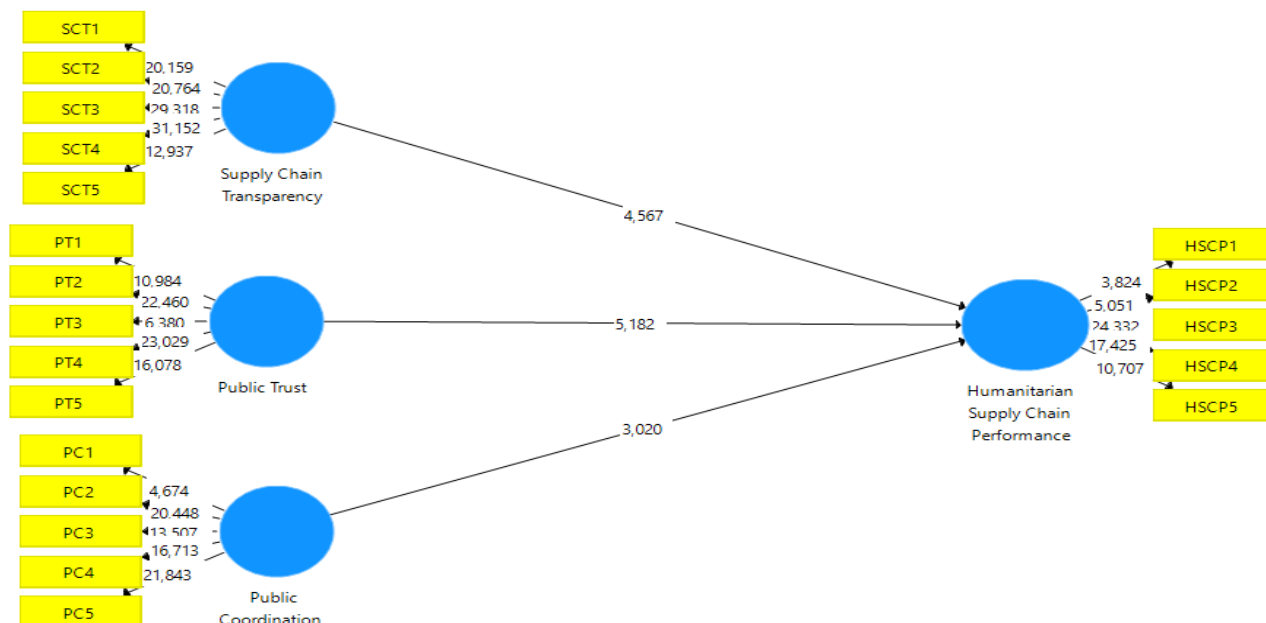
The HSCP coefficients of determination (R^2) were low (0.298), respectively. The SRMR values further demonstrate an acceptable level of model fit, indicating strong explanatory power and predictive accuracy for the proposed framework. The results of the analysis of the structural paths are displayed in Table 5. Each conceptual relationship was statistically significant at the 0.05 level, supporting acceptance of all three hypotheses.

Table 5: Hypothesis testing

Paths	β	Mean	SD	T Values	P Values
H1: Supply Chain Transparency -> Humanitarian Supply Chain Performance	0.268	0.274	0.059	4.567	0.000
H2: Public Trust -> Humanitarian Supply Chain Performance	0.288	0.293	0.056	5.182	0.000
H3: Public Coordination -> Humanitarian Supply Chain Performance	0.205	0.206	0.068	3.020	0.003

It was determined that supply chain transparency had a significant positive influence on humanitarian supply chain performance ($\beta = 0.268$, $p = 0.000$); also, public trust ($\beta = 0.288$, $p = 0.000$) and public coordination ($\beta = 0.249$, $p = 0.003$) presented statistically significant positive influence as well.

Figure 2: Structural Model: Hypothesis Results



5. Discussion

The present study explores that supply chain transparency, public trust and public coordination has impact on humanitarian supply chain performance among national and international NGOs employees in Pakistan. The findings reveal that supply chain transparency had a significant positive influence on humanitarian supply chain performance. From an RBV perspective, transparency is considered a unique resource that can result in visibility across the logistics network and provides accurate and timely data. This resource represents reliable information that offers several RBV-based advantages: first, improved operational efficiencies through better resource allocation and streamlining of logistics processes, as an essential part of HSCP (Garcia-Torres et al., 2021). Second, enhanced response decision-making since access to clear and transparent information enables quicker and more informed decisions during the time-critical phase of disaster relief, providing a source of non-substitutable advantage (Jia et al., 2024; Udeh et al., 2024). Additionally, transparency has operational advantages, but it also offers effects on a strategic source of value and legitimacy for Non-Governmental Organizations (NGOs) in complex environments like Pakistan. By providing visibility into goals and/or money and resources spent, transparency is a source of organizational legitimacy (RBV), creates accountability and is source of public trust a valuable, social resource cannot be imitated. This finding also supports accountability in the non-profit sector. The NGO legitimacy literature, where again, disclosure of activities and resource allocation through transparency is one way to create accountability and build trust towards funding and support of the organization's operations and functions which are a product of societal effectiveness and corruption prevention. Liu et al. (2023), adapted measures confirms a strategic source of value cannot be debated by making information reliable and transparent for the overall organizational performance of NGOs in a complex setting like Pakistan.

The results shows that public trust had a significant positive influence on humanitarian supply chain performance. Additionally, in insecure conflict or corruption prone situations, trust will enable an organization to preserve access and security of its operations. This finding furthers the strategic need for NGOs to not only be transparent, but also consider it's a strategic necessity to deliberately build trustworthiness as a separate organizational capability that it can deploy and evaluate directly with improvements in actual results of their overall HSC performance. Public trust, which is a trust invested by stakeholders, like the donor, beneficiary, and local community, provides a relational resource that serves to bring down uncertainty, along with transaction costs.

This is an important relational resource since trust prior to engaging the community helps lower resistance and facilitate people working together, effectively advancing an equitable and ethical process for distributing resources, all of which reflects high HSC effectiveness (Rijal & Saranani, 2023). Trust also helps financial backers (donors) provide ongoing and flexible funding, a unique relational resource that is essential for developing NGOs' pre-disaster preparedness, pre-disaster responsiveness capabilities, and post-disaster responsiveness capabilities (Papadopoulos, Von Wyl, & Gille, 2024). The results reveal that public coordination had a significant positive influence on humanitarian supply chain performance. This positive relationship is consistent with existing literature identifying inter-organizational coordination as a critical ingredient for HSC effectiveness (Langbroek, 2023). An effective public coordination mechanism between local governments, community leaders, and networks of volunteers will lead to more rapid alignment of external public resources (e.g., knowledge of the locality, food access points, and temporary food storage) with the operational needs of the HSC. This coordination facilitates an almost immediate alignment of external public resources for example local knowledge, access points, and temporary storage with the needs of the HSC's sometimes rare and specialized operational, which are often inaccessible to external actors. The effective structuring of this cooperation reduces logistical bottlenecks and duplicate efforts, which result in direct, observable improvement to the efficiency and effectiveness of last-mile distribution. This relational resource is, by its nature, inimitable because it relies upon the unique, contextual social capital and trust that have developed over (Davoudi & Johnson, 2024; Xie et al., 2023). For this reason, coordinated public engagement is a non-substitutable capability, crucial throughout both the pre-disaster preparedness and disaster response. It reduces resistance to disbursement and highly utilizes a needs-based distribution mechanism. As a result, the evidence indicates a state of strategy for NGOs to intentionally develop and maintain formal and informal public engagement structures as a unique deployable component of organizational capacity that yields observable enhancement of overall HSC performance.

5.1. Implications

The theoretical contributions in moving the framework of the Humanitarian Supply Chain (HSC) from a purely operational space to a more sociological network will first be substantial to the Resource-Based View (RBV) in providing empirical evidence that intangible, relationship-based assets (transparency and trust) are just as important to HSC success as physical assets. The significant positive relationship that exists between public trust and performance supports the relational view in a non-profit context by emphasizing that legitimacy and stakeholder trust are important resources to fund and coordinate non-profit actions (Barney & Arikan, 2005). Second, the contribution to humanitarian network theory is grounded in the explicit realization of the public/community level as an essential, non-traditional coordination node. By demonstrating that effective public coordination is a unique motivator of performance, this work provides a context-specific, inclusive paradigm for explaining last-mile delivery efficacy that is particularly salient in complex, developing contexts, like Pakistan. Regarding practicality, these above implications suggest that HOs need to take further steps to develop proactive transparency platforms that serve a purpose other than being a mere reporting tool. HOs may invest in digital (or analogue) transparency tools like open-source tracking systems that will offer real-time visibility and tracking on the distribute of resources, and usage of resources in order, reducing trust of the public, and therefore ensuring future donor funding. Our findings have further implications for policy makers/managers involved in disaster relief operations. We understand logistics efforts may amount to 80% of disaster relief operations. Consequently, visibility, accountability and traceability visibility will (continue) to be real concerns in disaster relief supply chains. HOs are increasingly processing volumes of sensitive information about their donors. In addition, there is the issue of to what extent will these new technologies be able to protect this information. HSCP could allow humanitarian actors to have more control over the disbursement of assistance, and ensure the funds reach the right victim, in the right time through decreasing transaction costs and providing public oversight of the flow of disaster relief materials, information, and funds, it can improve the resilience of humanitarian supply chains. Finally, managers need to address the related policy implications regarding information sensitivity. As HOs continue to adopt new technologies to manage an increasing amount of sensitive donor and beneficiary data, stakeholders should work proactively with policymakers to establish strong policy frameworks and data protection approaches to tackle the issue of technology adoption and competing values, and transparency efforts should not deteriorate trust through data insecurity.

5.2. Limitations and Future Research

This study cautiously interpreted with full consideration of their limitations, many of which open avenues for future research. First, organizational limitations, particularly related to the legal structure and confidentiality requirements of the NGOs in our sample, limited our capacity to aggregate sufficient objective data, particularly related to sensitive partner and donor information for actual HSCP performance (HSCP) metrics. This limitation could extend our theory even further: future research should consider the interaction effect on the paths between SCT, PT, and PC with HSCP. This would extend the theorizing by exploring these synergistic relationships - perhaps allowing a deeper theoretical understand of how the collective impact of these factors improves performance in the humanitarian network. Specifically the use of perceptual measures provided by a single individual respondent. Previous studies have found a strong relationship between perceptual and actual performance measures but future work utilizing objective measures may have greater utility. Additionally, subjective measures are often impacted by common method bias (CMB). Despite our efforts to mitigate CMB effects, we believe data from multiple respondents would also be beneficial. Another limitation is the absence of qualitative triangulation, a significant methodological limitation. For instance, the cross-sectional and one-point-in-time nature of the study may not uncover the dynamic insights, subtleties, and causal mechanisms underlying the correlations observed in the quantitative data. Researchers are therefore encouraged to further investigate the links between SCT, PT, and PC with HSCP among NGOs using a mixed-methods approach (e.g., longitudinal research, structured case studies, or field studies) so that findings can yield actionable recommendations.

6. Conclusion

Our study provides better understanding about supply chain transparency, public trust and public coordination has impact on humanitarian supply chain performance among national and international NGOs employees in Pakistan. Using data collected from 380 respondents from domestic and foreign non-governmental organisations (NGOs) involved in disaster relief efforts, a conceptual model based on resource-based view theory was developed in order to achieve the study's goal. The findings offered clear about humanitarian agencies should prioritize proactive transparency platforms and police public coordination mechanisms to mitigate logistical friction and facilitate last-mile provision. The compelling relationship found between these factors also necessitates investment in trusted, tamper-evident technologies, such as Blockchain, to continuously improve visibility and accountability standards. In the end, through the achievement of these socio-relational elements, NGOs will be able to transition service users from passive beneficiaries to active, coordinated participants in the coordination of aid, while ensuring aid is delivered efficiently and the overall resiliency of the humanitarian supply chain is improved.

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