"THE EFFECTS OF SUPPLY CHAIN INTEGRATION, SUSTAINABLE SUPPLY CHAIN PRACTICES, AND IT CAPABILITY ON INGO'S PERFORMANCE: EMPIRICAL EVIDENCE FROM PAKISTAN'S HUMANITARIAN SECTOR"

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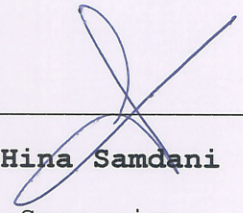

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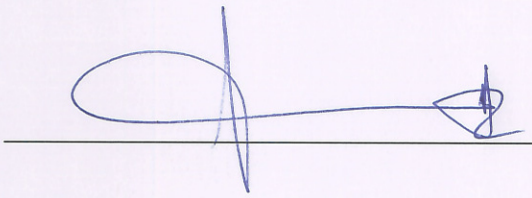
I, Aamnah Hayat, MBA Student in the Department of Management Sciences, Bahria University, Islamabad, certify that the research work presented in this thesis is to the best of my knowledge my own. All sources used and any help received in the preparation of this dissertation have been acknowledged. I hereby declare that I have not submitted this material, either in whole or in part, for any other degree at this or any other institution.

Signature: 

ABSTRACT

International non-governmental organizations (INGOs) play a essential role in providing humanitarian aid and social services, particularly in developing nations such as Pakistan. However, frequent natural disasters, political instability, and resource limitations pose persistent challenges to the success of humanitarian supply chains. This study examines the effects of supply chain integration (SCI), sustainable supply chain practices (SSCP), and information technology (IT) capability on the performance of INGOs operating in Pakistan's humanitarian sector. The study is based on RBV-Resource based view, Dynamic Capabilities, as well as Stakeholder Theory, and Relational View. The study proposes that these three organizational capabilities when effectively integrated enhance operational efficiency, responsiveness, and sustainability. The study used a cross-sectional and quantitative research design; utilizing a structured questionnaire distributed among INGOs engaged in humanitarian operations across Pakistan. Using convenience sampling, data were collected from 210 respondents representing various organizations. To evaluate the proposed associations, the responses were examined using Partial Least Squares Structural Equation Modeling (PLS-SEM) through SmartPLS 4. The findings showed that, supply chain integration, sustainable practices, and IT capability each have a positive and significant effect on INGO performance. The results confirmed that INGOs with well-integrated, sustainable, and technologically enabled supply chains perform more effectively in terms of cost efficiency, agility, and service delivery.

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Keywords: Supply Chain Integration, Sustainable Supply Chain Practices, IT Capability, Humanitarian Logistics, Pakistan

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Chapter 1: Introduction

1.1 Background of the Study

International non-governmental organizations (INGOs) play a pivotal role in delivering humanitarian assistance and social services, particularly in developing countries such as Pakistan (Khan et al., 2023). In this context, effective supply chain management has become indispensable for these organizations to achieve their missions, often under conditions characterized by limited resources, time pressure, and logistical complexity (Fatima & Shafiq, 2025). Within humanitarian operations, logistics and supply chain functions account for a substantial portion of relief efforts, frequently estimated at nearly 80% of total disaster response activities (Frennesson et al., 2022). Consequently, enhancing the efficiency and effectiveness of these processes is essential for improving INGO performance in both operational and strategic dimensions (Siagian, Tarigan, & Jie, 2021).

In recent years, three interconnected facets of supply chain management have received increasing attention in the nonprofit and humanitarian sectors: supply chain integration (SCI), sustainable supply chain practices (SSCP), and information technology (IT) capability (Tatham & Pettit, 2010). These dimensions collectively influence how humanitarian organizations align their operational activities with their strategic goals and stakeholder expectations, thereby shaping their overall effectiveness.

Supply chain integration refers to the strategic coordination and collaboration among an organization's internal functions and external partners (Jajja et al., 2018; Tarigan et al., 2021). It encompasses information sharing, joint planning, and synchronized workflows from suppliers to end beneficiaries, with the ultimate goal of enhancing service delivery (Putra, Prabowo, & Yuliana, 2022). Prior research has demonstrated that higher levels of integration can lead to superior organizational outcomes. For instance, integrating supply chain partners is associated with enhanced delivery reliability and cost efficiency (Hashemi et al., 2022). In the INGO context, integration with donors, suppliers, and field distribution networks enhances responsiveness and resource utilization, which are key determinants of humanitarian success (Shahzad et al., 2024). Studies have confirmed that such integration improves operational performance by enabling flexibility and coordination (Dubey et al., 2021), underscoring the importance of supply chain integration as a central pillar of this research.

Simultaneously, having sustainable supply chain procedures that incorporate environmental and social responsibility viewed as being

vital for INGOs (Besiou & Van Wassenhove, 2015). Beyond cost and efficiency, stakeholders now expect organizations to pursue sustainability, balancing economic viability with environmental stewardship and social accountability (Manderville & Ager, 2021). Scholars argue that the performance of INGOs should be assessed not only through financial metrics but also through their ability to foster innovation, adaptation and positive societal outcomes (Li et al., 2020). Implementing sustainable practices such as green procurement, waste reduction, ethical sourcing, and community-oriented distribution can enhance both environmental and social performance, ultimately strengthening organizational credibility (Singh et al., 2021). Evidence shows that sustainability initiatives in supply chains contribute to improved financial results and stakeholder satisfaction (Friede et al., 2015). In Pakistan's humanitarian sector, these may include eco-friendly aid delivery methods and inclusive engagement with local communities (Khan & Ali, 2021). Adopting such practices enables INGOs to meet the expectations of both donors and beneficiaries while enhancing their reputation and trustworthiness (Golini, Kalchschmidt, & Landoni, 2021).

The third critical component influencing humanitarian supply chains is IT capability, which refers to an organization's ability to effectively leverage information technology systems to manage and coordinate its operations (Roscoe et al., 2020). In the digital era, IT capability functions as both an enabler and a catalyst for integration and sustainability initiatives. Advanced IT systems enable the real-time exchange of information among suppliers and donors, improve tracking and transparency, and enhance coordination among supply chain actors (Tatham & Kovács, 2021). Robust IT infrastructure enhances an organization's agility and accuracy, which is critical during rapid-response operations (Singh et al., 2021). Empirical evidence suggests that IT capabilities have a significant impact on decision-making, communication, and supply chain performance (Mangla et al., 2021). According to the Resource-Based View, such capabilities constitute strategic resources that contribute to superior performance (Abbas et al., 2022).

This is particularly relevant in Pakistan, where many NGOs and INGOs are modernizing their operations amid resource and technological constraints. Conversely, inadequate IT infrastructure has been identified as a significant barrier to efficiency and transparency in humanitarian logistics (Scholten et al., 2022). Hence, building IT capability involves more than acquiring software or

hardware; it is about cultivating organizational agility and connectivity to support integration and sustainability goals (Maheshwari et al., 2021).

1.2 Regional (South Asian) Context

South Asia, home to nearly a quarter of the global population, is one of the world's most disaster-prone and socioeconomically diverse regions (Kovács & Moshtari, 2023). The region encompasses countries such as Pakistan, India, Bangladesh, Nepal, Sri Lanka, Afghanistan, Bhutan, and the Maldives, all of which are characterized by high population densities, limited infrastructure, and significant exposure to natural and human-induced disasters (Sundarakani et al., 2023). Consequently, humanitarian logistics and SCM in this region are of critical importance, as they serve as the operational backbone for responding to crises and supporting sustainable development.

Despite progress in regional economic integration, the institutional and logistical landscapes across South Asia remain fragmented. Inadequate infrastructure such as limited transportation networks, underdeveloped warehousing facilities, and outdated port systems often leads to inefficiencies in both commercial and humanitarian supply chains (Sarkar & Kumar, 2023).

The institutional capacity of many South Asian nations to manage these challenges remains limited. While regional cooperation initiatives such as the South Asian Association for Regional Cooperation (SAARC) and the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) have attempted to promote cross-border collaboration, the absence of harmonized standards and resource-sharing mechanisms continues to impede effective disaster response (Rahman et al., 2024). For example, during regional crises, delays in customs clearance and logistical bottlenecks have often resulted in relief supplies being stranded at borders or misallocated among agencies. These issues highlight the pressing need for improved SCI and technological modernization within the humanitarian networks operating across the region.

Nevertheless, the region also presents emerging opportunities for innovation and transformation in humanitarian logistics. As (Narayanan and Altay 2024) note, collaborative partnerships between governments, international organizations, and private-sector actors are increasingly recognized as essential enablers of resilience. PPPs have been instrumental in strengthening disaster preparedness, warehousing, and last-mile delivery systems in countries such as India and Bangladesh. The introduction of digital platforms and data-sharing technologies, including

geographic information systems (GIS), blockchain for aid tracking, and mobile applications for beneficiary feedback, has begun to transform the way humanitarian assistance is managed.

A case in point is the National Disaster Risk Reduction Centre (NDRRC) in Nepal, which uses satellite imagery and digital mapping to coordinate real-time resource allocation during emergencies (Chin et al., 2022). Similarly, Bangladesh has implemented ICT-based early warning systems that integrate with supply chain platforms to ensure timely evacuation and delivery of relief materials (Rahman et al., 2024). These technological advancements not only improve response times but also contribute to transparency and accountability, two critical issues in humanitarian aid distribution.

Empirical evidence from Afghanistan reinforces the significance of integration and managerial commitment to performance (Jia et al., 2021). Despite operating in one of the world's most fragile environments, NGOs that maintained consistent communication, partner coordination, and centralized data systems reported higher levels of efficiency and beneficiary satisfaction (Shahzad, 2024; Heaslip & Barber, 2023). These findings underscore the argument that organizational integration and information sharing are key determinants of performance, even under conditions of extreme uncertainty.

Similarly, research from Kenya another developing country with comparable institutional challenges demonstrates that strong supplier relationships and collaborative planning significantly enhance operational efficiency, agility, and accountability (Patrick & Osoro, 2023). Although Kenya is not part of South Asia, the similarities in governance structures and humanitarian operational contexts make its experiences highly relevant to the region. These comparative insights suggest that the benefits of SCI, SSCP, and IT Capability are not limited to developed economies but are equally critical in resource-constrained contexts typical of the Global South (Kovács & Tatham, 2022).

However, the adoption of sustainability remains uneven across South Asia. Many NGOs and INGOs lack the financial or technical capacity to implement green logistics systems. Limited awareness, absence of sustainability metrics, and competing short-term operational priorities often undermine long-term environmental goals (Sundarakani et al., 2023). Therefore, sustainability integration requires not only organizational will but also supportive institutional frameworks and donor alignment. The South Asian humanitarian supply chain landscape reflects a paradox of high

vulnerability and high potential Kazancoglu et al., 2021). The region's exposure to recurrent disasters necessitates improved integration, sustainability, and technological capability.

1.3 National (Pakistan) Context

Pakistan occupies a central position in South Asia's humanitarian and development discourse due to its geographic diversity, recurring disasters, and complex sociopolitical landscape. The country has faced a series of devastating humanitarian crises, including the 2005 Kashmir earthquake, the 2010 and 2022 floods, the 2023 droughts in Balochistan, and prolonged internal displacement resulting from conflict and instability (Awan et.al, 2021). These recurring emergencies have placed immense pressure on Pakistan's humanitarian logistics systems, exposing critical weaknesses in supply chain coordination, technology adoption, and sustainability practices.

According to the NDMA, more than 33 million people were affected by the 2022 floods, which submerged one-third of the country's land area and destroyed thousands of kilometres of infrastructure. The scale of these disasters underscores the need for resilient and integrated humanitarian supply chains that can deliver aid efficiently under extreme conditions (UNICEF, 2024). Despite improvements since the 2010 floods, Pakistan continues to face challenges such as inadequate warehousing capacity, poor data visibility, and fragmented coordination among INGOs and government agencies (Jabbour et al., 2020) .

Logistical inefficiencies are exacerbated by Pakistan's complex governance structure, where multiple ministries, provincial authorities, and local organizations operate independently. This fragmentation often leads to duplication of efforts, delays in resource mobilization and inconsistent reporting standards. Nevertheless, emerging research points to a gradual shift toward technological integration and data-driven decision-making in Pakistan's humanitarian sector (Shafiq et al. 2021). found that the adoption of enabling technologies such as enterprise resource planning (ERP) systems, geo-tagging tools, and digital dashboards significantly enhances logistical efficiency. During the 2022 floods, organizations equipped with digital coordination platforms were able to track supplies in real time, monitor warehouse inventories, and communicate directly with field teams, leading to faster and more targeted distribution of relief goods (UNICEF, 2024) .

Similarly, IT capability has been instrumental in strengthening supply chain integration among stakeholders. The use of blockchain-based tracking systems for cash transfers and mobile-based

feedback tools for beneficiaries has improved transparency and accountability (Wang et al., 2022). However, the diffusion of such technologies remains uneven, particularly among smaller NGOs with limited financial resources (Ahmed et al., 2021). Addressing this digital divide is critical for enhancing overall humanitarian performance in Pakistan.

From a sustainability perspective, the trend toward green humanitarian logistics is gaining traction, although it remains in its early stages of development. Several INGOs have begun implementing eco-friendly practices, such as the use of renewable-energy-powered shelters, recyclable relief packaging, and local sourcing to reduce transportation emissions. For example, Save the Children Pakistan and UNHCR have piloted solar-powered water filtration units and biodegradable tarpaulin materials in flood-affected areas. Such initiatives indicate growing recognition of the environmental impacts of relief operations.

However, sustainability integration in Pakistan faces significant constraints. Limited regulatory incentives, donor dependency, and short-term emergency response priorities often divert attention from long-term environmental strategies (Jayaraman et al., 2023). Moreover, sustainability is often perceived as secondary to speed and cost efficiency in humanitarian settings. This perception gap underscores the need for a paradigm shift in policy and donor frameworks to mainstream sustainability as a core operational norm, rather than an optional add-on.

Despite these challenges, Pakistan's humanitarian ecosystem also exhibits considerable resilience and adaptive capacity (Liu et al., 2020). Repeated exposure to crises has encouraged learning and innovation among INGOs and local NGOs alike. For instance, during the COVID-19 pandemic, Pakistan's humanitarian actors rapidly adopted digital communication channels, contactless distribution methods, and hybrid logistics models that combined centralized and decentralized operations (Awan et al., 2021). These adaptations demonstrate the sector's evolving capability to balance operational efficiency with sustainability and technology integration.

1.4 Research Gap

The existing literature on commercial supply chains consistently demonstrates that supply chain integration enhances performance by improving cost efficiency, delivery reliability, and flexibility (Leuschner, Rogers, & Charvet, 2021). Similarly, sustainable supply chain practices have been shown to positively affect both financial and non-financial performance across multiple sectors

(Golicic & Smith, 2021). IT capability also strengthens collaboration, agility, and responsiveness, thereby improving organisational outcomes in various logistics environments (Kabir & Syntetos, 2023). However, few empirical studies have explored the combined effects of these three constructs: SCI, sustainable supply chain practices (SSCP), and IT capability within nonprofit or humanitarian contexts, particularly in developing countries such as Pakistan (Besiou et al., 2021).

While prior studies such as Dubey et al. (2019) and Tatham & Pettit (2010) have highlighted the role of integration and information sharing in humanitarian logistics, they primarily examined operational coordination rather than strategic alignment across sustainability and technology domains. Similarly, research by Scholten et al. (2022) emphasised IT as a coordination enabler but did not empirically test its interaction with sustainability practices in relief operations. Jabbour et al. (2020) also examined green logistics practices in humanitarian organizations but found limited evidence linking these practices to organizational performance due to contextual constraints such as donor pressure, infrastructure gaps, and lack of digital integration. Consequently, there remains a critical need to examine how these three interrelated capabilities, SCI, SSCP, and IT capability, collectively shape performance outcomes in complex, resource-constrained humanitarian settings.

Moreover, the majority of humanitarian supply chain studies have been conducted in African or Southeast Asian contexts, focusing on disaster preparedness and donor coordination rather than integrated sustainability or technological alignment (Heaslip & Barber, 2023; Patrick & Osoro, 2023). Within Pakistan, existing studies have examined either the logistical performance of humanitarian operations (Awan et al., 2021) or the influence of technology adoption on coordination (Shafiq et al., 2021), but few have empirically tested these constructs together in a unified model. This gap is significant because Pakistan's humanitarian landscape presents unique operational and institutional challenges, such as regulatory restrictions, frequent natural disasters, and fragmented coordination, that make the integrated role of SCI, SSCP, and IT capability both theoretically relevant and practically urgent. Addressing this multidimensional gap contributes to the global discourse on humanitarian supply chain resilience by providing empirical evidence from a context where such capabilities are critically needed yet under-researched.

1.5 Problem Statement

Pakistan's humanitarian sector faces immense pressure to deliver aid efficiently amid frequent natural disasters and complex emergencies (Shahzad et al. 2023). INGOs operating in Pakistan

continue to encounter challenges that constrain their operational effectiveness, chief among them being fragmented supply chain integration, limited sustainable practices, and low IT capability (Dubey et al., 2024).

Fragmented integration leads to duplication, inefficiency, and poor coordination among relief agencies (Abdallah et al., 2023). The limited adoption of sustainable practices undermines accountability and long-term resilience (Sarkis et al., 2021). Weak IT systems exacerbate these issues by hampering real-time coordination and transparency (Ali et al, 2022).

Collectively, these deficiencies threaten the performance and credibility of INGOs. As donor expectations and humanitarian needs grow, organizations must address integration, sustainability, and digital capacity gaps to enhance operational efficiency and stakeholder trust. Therefore, this study aims to empirically examine these interrelated factors and provide actionable insights for enhancing humanitarian performance in Pakistan.

1.6 Research Questions

Aligned with the research objectives, this study was guided by the following research questions:

1. How does supply chain integration affect the performance of INGOs in Pakistan's humanitarian sector?
2. In what ways do sustainable supply chain practices influence INGO performance in Pakistan's humanitarian sector?
3. How does an organization's IT capability affect its performance in the humanitarian context of Pakistan's humanitarian sector?
4. How do SCI, SSCP, and IT capabilities interact to shape INGO performance jointly in Pakistan's humanitarian sector?

Collectively, these questions aim to uncover both the individual and synergistic effects of integration, sustainability, and technology on the effectiveness of INGOs.

1.7 Research Aims, and Objectives

Research Aim

To empirically investigate the effects of supply chain integration, sustainable supply chain practices, and IT capability on the performance of INGOs in Pakistan's humanitarian sector.

Research Objectives

1. To assess the impact of supply chain integration on INGO performance in Pakistan's humanitarian sector.
2. To evaluate how sustainable supply chain practices influence performance in Pakistan's humanitarian sector.
3. To determine the effect of IT capability on operational and organizational outcomes in Pakistan's humanitarian sector.
4. To examine the interrelationships among SCI, SSCP, and IT capability in shaping INGO performance in Pakistan's humanitarian sector.

1.8 Purpose of the Study

This study empirically examines whether supply chain integration (SCI), sustainable supply chain practices (SSCP), and information technology (IT) capability enhance the performance of international nongovernmental organizations (NGOs) operating within Pakistan's humanitarian sector. Building on the evidence that logistics and supply chain functions account for approximately 80% of disaster response efforts (researchgate.net), this study focuses on the interrelated capabilities that collectively drive organizational effectiveness and stakeholder impact.

Specifically, this study examines whether higher levels of SCI, characterized by seamless coordination among internal functions and external partners, enhance cost efficiency, delivery reliability, and flexibility. Recent literature consistently reports that SCI significantly enhances key performance metrics, such as cost, quality, and adaptability (researchgate.net). Second, this study examines the impact of SSCP, including ethical sourcing, waste reduction, and community-oriented distribution, on the performance of INGOs. Meta-analyses of more than 2,000 studies on environmental, social, and governance (ESG) initiatives reveal that approximately 90% of findings report a non-negative, often positive, relationship between sustainability efforts and financial outcomes (papers.ssrn.com). Ultimately, this study investigates whether IT capability, including the utilization of digital platforms for real-time data sharing, contributes to superior performance.

Empirical evidence from humanitarian operations confirms that the adoption of technology enhances collaboration, reduces operational costs, and improves agility.

A quantitative research design will be employed to survey INGOs active in Pakistan. Using validated measurement scales, statistical techniques such as structural equation modelling (SEM) will be used to test both direct and interactive effects among variables. The findings will provide evidence-based insights to help INGOs optimize resource allocation and strategy formulation, thereby improving humanitarian outcomes and policy effectiveness.

1.9 Significance and Scope

a) Significance

Humanitarian logistics constitute a significant component of disaster relief, with studies showing that supply chain activities account for 60–80% of the total humanitarian costs. Pakistan's heightened vulnerability to climate-related disasters makes this issue particularly urgent; the 2022 floods submerged one-third of the country, affecting 33 million people and displacing nearly eight million (Abbas et al., 2023; Ullah et al., 2024). In such contexts, efficient and integrated supply chains can make the difference between timely aid delivery and critical delays. Evidence from Kenya indicates that supply chain integration enhances the performance of humanitarian organizations, particularly when supported by digital tools such as the IoT and cloud-based coordination systems (Patrick & Osoro, 2023). A 2024 empirical study similarly found that technology adoption improves collaboration, agility, and cost efficiency while reducing environmental impacts (Dubey et al., 2024).

Sustainability has emerged as a crucial dimension of humanitarian supply chain performance. Agencies such as USAID and ICRC now emphasize reducing single-use plastics, minimizing emissions, and embedding circular economy principles in relief operations (Besiou et al., 2023. . Investigating how SCI, SSCP, and IT capabilities can be jointly leveraged to address these constraints and enhance humanitarian outcomes will provide policymakers and aid managers with practical guidance on how to optimize their efforts.

b) Scope

This study focuses on INGOs operating in Pakistan's humanitarian sector, examining how SCI, SSCP, and IT capabilities influence organizational performance. Data will be collected through a

structured survey targeting supply chain and program managers. Performance will be measured across indicators such as delivery speed, cost efficiency, resource utilization, and beneficiary satisfaction. Using structural equation modelling, this study will evaluate both the direct and combined effects of the variables. By situating the analysis within Pakistan's disaster-prone environment, this study aims to generate actionable insights to strengthen humanitarian supply chain resilience and sustainability.

1.10 Chapter Summary

This chapter establishes the foundation for the study by presenting its background, purpose, significance, research gap, objectives, and hypotheses. It began by highlighting the critical role of INGOs in humanitarian operations, particularly in developing countries such as Pakistan, where effective supply chain management is essential to ensure the timely and equitable delivery of aid. The discussion highlights three interrelated dimensions SCI, SSCP, and IT capability as key enablers of organizational performance in the humanitarian context.

The study background outlines how integration enhances coordination and responsiveness, sustainability aligns operations with social and environmental goals, and IT capability enables real-time collaboration and informed decision-making. The purpose statement specified the study's intent to empirically examine the individual and combined effects of these three capabilities on the performance of INGOs in Pakistan's humanitarian sector.

This research gap highlights the lack of empirical studies that explore SCI, SSCP, and IT capability collectively in non-profit and humanitarian contexts, especially within developing economies such as Pakistan. The significance and scope sections justify the study's relevance, highlighting the operational and policy implications of enhancing humanitarian supply chains in the context of climate-induced disasters and resource constraints. Research questions, objectives, and hypotheses were formulated to systematically guide the investigation, establishing a clear link between theory and empirical enquiry.

Finally, the problem statement identified core challenges fragmented coordination, limited sustainability integration, and weak technological infrastructure that hinder the operational efficiency, accountability, and responsiveness of INGOs. Addressing these challenges through

empirical analysis will provide valuable insights for both academic research and practical humanitarian management.

Overall, this chapter sets the stage for the investigation by defining the study's theoretical and contextual basis. The next chapter builds upon this foundation by presenting a comprehensive review of the relevant literature and theoretical frameworks, which further contextualise the relationships among supply chain integration, sustainable practices, IT capability, and INGO performance.

Chapter 2: Literature Review

2.1 Theoretical Background

Humanitarian supply chains are inherently complex due to their dynamic environments, unpredictable demand, fragmented infrastructure, and the multiplicity of stakeholders involved (Balcik et al., 2010). Globally, research emphasizes that effective coordination and integration among humanitarian actors, including NGOs, government agencies, donors, and local partners, are essential for timely and efficient disaster responses (Dubey et al., 2022). A lack of coordination frequently results in duplication of efforts, misallocation of resources, and delayed aid delivery, highlighting the critical importance of developing a unified framework for relief logistics (Tarei, 2024).

Empirical and theoretical studies have consistently demonstrated that enhanced SCI encompassing information sharing, joint planning, and synchronized processes significantly improves operational performance in both profit and non-profit contexts (Hassan & Abbasi, 2021). In commercial sectors, integration contributes to faster response times, improved quality, and cost efficiency (Altay et al., 2018; Pedraza-Martinez & Van Wassenhove, 2016). These findings have increasingly been extrapolated to humanitarian operations, where efficiency and responsiveness are often matters of survival rather than competitive advantages. Consequently, SCI is widely recognised as a fundamental driver of organizational performance in both business and humanitarian environments (Shahzad, 2024).

Parallel to this, SSCP has gained substantial global prominence amid escalating environmental and social concerns (Ahi & Searcy, 2024). Sustainable Supply Chain Management (SSCM) seeks to integrate economic, environmental, and social objectives into core supply chain processes (Carter & Rogers, 2008). Standard practices include green procurement, waste reduction, energy efficiency and adherence to ethical labor standards (Khan et al., 2023). In humanitarian contexts, sustainability has evolved from an aspirational ideal to a necessary operational principle, particularly as donors and global institutions increasingly demand accountability for environmental and social impacts (Ramirez-Villamil & Jaegler, 2025). While some theoretical models continue to underemphasize the social dimension of sustainability (Shashi et al., 2023), contemporary research asserts that sustainability is essential for legitimacy and long-term organizational effectiveness (Vega & Raftery, 2024).

Moreover, IT capability has emerged as a transformative enabler in supply chain management across all sectors. Advances in digital technologies, ranging from cloud computing and big data analytics to artificial intelligence and blockchain, have revolutionised coordination and transparency within supply chains (Queiroz & Wamba, 2023). In humanitarian logistics, IT capabilities facilitate real-time visibility, data-driven decision-making, and efficient resource utilization, even in chaotic and resource-constrained environments (Akter et al., 2023). Studies grounded in the dynamic capabilities perspective demonstrate that technology adoption enhances supply chain agility and inter-organizational collaboration, thereby improving overall performance (Singh, 2025). Empirical examples demonstrate that IT tools such as geospatial mapping, real-time tracking, and data dashboards significantly enhance coordination and reduce response times in humanitarian operations (Kabir & Syntetos, 2023). Consequently, IT capability is widely viewed as a "game-changer" in achieving responsiveness, transparency, and accountability in relief efforts (Tatham et al., 2024).

2.2 Theoretical Underpinning

A sound theoretical foundation is essential for framing the relationships between SCI, SSCP, IT Capability, and INGO performance in the humanitarian context. This study adopts an integrative multi-theoretical approach, combining the Resource-Based View (RBV), the Dynamic Capabilities (DC) perspective, Stakeholder Theory, and the Relational View (RV). Together, these theories explain how internal resources, adaptive processes, and interorganizational relationships contribute to performance outcomes in humanitarian operations, particularly within resource-constrained environments such as Pakistan.

This integration recognizes that no single theory fully captures the multifaceted nature of humanitarian supply chains. Humanitarian organizations must simultaneously leverage internal competencies, adapt to environmental volatility, maintain stakeholder legitimacy, and foster collaborative partnerships. The following discussion elaborates on each theoretical lens, its relevance to the current study, and how the combination of these perspectives provides a comprehensive framework for understanding performance in INGOs.

2.2.1 Resource-Based View (RBV)

The Resource-Based View, popularized by Barney (1991) and further developed by Teece (2007), posits that an organization's sustained advantage arises from its unique bundle of resources and

capabilities. These resources must be valuable, rare, inimitable, and non-substitutable, collectively known as the VRIN attributes. Within the RBV framework, internal assets such as technological infrastructure, skilled personnel, and organizational knowledge form the foundation for competitive differentiation and superior performance.

In the context of INGOs and humanitarian logistics, tangible resources (warehouses, transportation fleets, and financial resources) are often standardized and easily replicable. Therefore, intangible and relational resources, such as information sharing systems, organizational learning, and managerial expertise, become the authentic sources of strategic advantage. SCI aligns perfectly with this theoretical logic: the effective integration of information, processes, and relationships constitutes a valuable and inimitable capability that enhances performance outcomes.

For instance, an INGO with deeply embedded coordination mechanisms among procurement, logistics, and field operations units can achieve operational synergies that competitors find difficult to replicate. Similarly, IT Capability, encompassing infrastructure, software applications, and human IT expertise, serves as a resource that enables superior communication, decision-making, and agility. From the RBV standpoint, IT capability is not merely a technological asset but a strategic resource that enhances organizational flexibility and knowledge management (Zhang et al., 2020).

Moreover, RBV highlights the concept of resource heterogeneity, implying that not all organizations possess the same level of integration or technological sophistication. INGOs with greater IT maturity and integration capacity can therefore leverage these distinctive resources to deliver aid more efficiently and transparently, especially under crisis conditions. However, while RBV offers a powerful lens for understanding how resources generate performance advantages, it tends to adopt a static perspective, focusing on resource possession rather than continuous renewal. This limitation necessitates the inclusion of the Dynamic Capabilities perspective.

2.2.2 Dynamic Capabilities (DC) Perspective

The DC framework evolved as an extension of RBV to address its static limitations. First conceptualized by Teece, Pisano, and Shuen (1997), DC emphasizes an organization's ability to integrate, build, and reconfigure internal and external competencies to respond effectively to changing environments. This adaptive capacity is particularly critical in the humanitarian context,

where organizations operate amid high uncertainty, volatile donor support, and rapidly shifting operational conditions.

Dynamic capabilities are typically categorized into three core processes: sensing opportunities and threats, seizing opportunities, and transforming organizational resources (Teece, 2007). In the case of INGOs, "sensing" involves recognizing emerging crises or logistical bottlenecks; "seizing" refers to mobilizing resources through coordination and partnerships; and "transforming" entails modifying existing systems, such as integrating digital platforms or reorganizing supply networks, to sustain performance.

SCI embodies dynamic capability when it enables INGOs to adjust their coordination mechanisms in response to continuously evolving humanitarian needs. For example, organizations that integrate procurement systems with donor databases can dynamically reallocate resources based on real-time demand signals. Similarly, SSCP represent a dynamic capability that allows organizations to reorient operations toward long-term environmental and social objectives without compromising immediate response effectiveness (Seuring & Müller, 2008).

Furthermore, IT capability acts as an enabling mechanism for developing dynamic capabilities. Advanced data analytics, real-time tracking, and digital collaboration tools enhance an organization's ability to sense disruptions, make rapid decisions, and adapt logistics networks accordingly. The synergy between IT capability and integration creates what Pavlou and El Sawy (2011) term a "digital dynamic capability", a competency that transforms how organizations anticipate, react, and learn from external shocks.

In humanitarian settings, where operational agility often determines life-or-death outcomes, dynamic capabilities ensure that INGOs can maintain strategic flexibility, learning orientation, and continuous improvement. Thus, while RBV explains the possession of valuable resources, DC theory elucidates how those resources are deployed and reconfigured to maintain effectiveness in the face of uncertainty.

2.2.3 Stakeholder Theory

While RBV and DC focus primarily on internal and operational competencies, Stakeholder Theory introduces an external and ethical dimension to organizational performance. Proposed by Freeman (1984), the theory posits that organizations exist within a network of stakeholders,

each holding legitimate claims that influence decision-making. For INGOs, these stakeholders include donors, beneficiaries, employees, local communities, governments, and partner agencies. Organizational legitimacy and performance depend on effectively balancing these often competing interests.

In humanitarian operations, SSCP are closely aligned with Stakeholder Theory. INGOs operate under intense scrutiny from donors and the public, who expect transparency, ethical conduct, and environmentally responsible practices. Integrating sustainability into supply chain processes thus addresses stakeholder concerns related to accountability, environmental stewardship, and social equity (Jamali & Keshishian, 2009). For example, sourcing relief materials locally not only reduces carbon emissions but also supports local economies, thereby satisfying both donor expectations and community welfare goals.

Stakeholder Theory also provides a normative justification for sustainability: INGOs, as mission-driven entities, have moral obligations that extend beyond efficiency or cost-effectiveness. Implementing sustainable procurement, reducing waste, and ensuring ethical labour practices reinforce their legitimacy and strengthen stakeholder trust (Donaldson & Preston, 1995). In this sense, sustainability is not merely a performance-enhancing practice but a mechanism of institutional alignment that ensures INGOs retain credibility and funding continuity.

From a strategic perspective, aligning supply chain operations with stakeholder expectations creates what Harrison and Wicks (2013) describe as “mutual value creation”, a process through which organizations and stakeholders co-generate benefits. For example, when donors observe transparent reporting facilitated by IT systems, their confidence in the INGO increases, leading to continued financial support. Likewise, when beneficiaries experience timely and equitable aid distribution, community trust and participation are strengthened. These feedback loops, grounded in stakeholder relationships, directly enhance organizational resilience and performance.

However, maintaining this balance is challenging. The competing expectations of donors (who prioritise accountability) and beneficiaries (who prioritise immediacy and equity) often generate tension in humanitarian logistics. Stakeholder Theory, when combined with RBV and DC, offers a multidimensional understanding of how INGOs can align their internal capabilities with external legitimacy demands—a necessary balance for sustained performance in complex humanitarian environments.

2.2.4 Relational View (RV)

The Relational View (RV), advanced by Dyer and Singh (1998), complements the previous theories by emphasising inter-organizational collaboration as a source of competitive advantage. Unlike RBV, which focuses on firm-specific assets, RV posits that relational resources, such as shared knowledge, trust, joint problem-solving routines, and network governance, can generate relational rents (value that arises only through collaboration).

Humanitarian supply chains are inherently complex, networked systems comprising governments, NGOs, private contractors, donors, and local partners. No single actor can deliver aid effectively in isolation. Coordination, information exchange, and trust-based relationships among these entities determine the overall efficiency of humanitarian response. For example, an INGO that collaborates closely with local NGOs gains contextual insights and community trust, while local partners benefit from access to funding and logistics expertise. Together, they create synergistic value that neither could achieve independently (Van Wassenhove, 2006).

The relational view also underscores the role of governance mechanisms in sustaining collaboration. Formal contracts and informal norms both regulate the flow of information and joint decision-making. In humanitarian operations, cluster coordination mechanisms, joint procurement platforms, and multi-agency information-sharing systems exemplify relational structures that enhance collective performance (Dubey et al., 2022).

Importantly, IT capability serves as a critical enabler of relational capital. Digital platforms facilitate transparency and reduce information asymmetry among partners, building trust and reducing coordination costs. Technologies such as blockchain for aid tracking, cloud-based logistics platforms, and data-sharing dashboards institutionalise collaboration by creating verifiable records of resource flows (Narayanan & Altay, 2024).

Furthermore, Sustainable Supply Chain Practices gain strength through collaborative networks. Joint environmental initiatives, such as shared transportation systems to minimize carbon emissions, illustrate how relational strategies can yield both efficiency and sustainability benefits. By adopting a relational perspective, INGOs can transform fragmented operations into collaborative ecosystems where mutual learning and shared innovation drive superior performance.

2.2.5 Integrative Theoretical Model

The combination of RBV, DC, Stakeholder Theory, and RV creates a multi-level analytical framework that captures the full spectrum of factors influencing INGO performance:

- The RBV explains the possession of valuable internal resources (integration and IT capabilities).
- The Dynamic Capabilities perspective describes the adaptive use of these resources in changing humanitarian contexts.
- Stakeholder Theory ensures that external legitimacy and accountability are embedded through sustainability and ethical alignment.
- The Relational View highlights inter-organizational collaboration as a multiplier of individual organizational capabilities.

Together, these perspectives suggest that high-performing INGOs are not simply resource-rich; they are resourceful, dynamically adaptive, stakeholder-responsive, and relationally embedded. In other words, humanitarian performance arises not from isolated organizational strength but from a strategic alignment of internal capabilities, external legitimacy, and collaborative partnerships.

This theoretical synthesis is particularly relevant in Pakistan's humanitarian landscape, where INGOs face environmental volatility, donor scrutiny, and infrastructural constraints. In such contexts, the ability to integrate operations, maintain stakeholder trust, and collaborate effectively defines organizational success. The framework, therefore, provides a robust conceptual foundation for analysing how SCI, SSCP, and IT capability individually and interactively shape the performance of INGOs operating under resource-limited and crisis-prone conditions.

2.2.6 Overarching Theoretical Foundation

Although this study employs a multi-theoretical approach combining the RBV, DC, Stakeholder Theory, and the RV, the RBV and DC perspectives together form the overarching theoretical foundation. Prior studies in humanitarian logistics show that organisational performance largely depends on the possession and adaptive deployment of internal resources, particularly technological, informational, and integrative capabilities (Dubey et al., 2019; Queiroz & Wamba, 2023). The RBV explains *what* resources (e.g., IT systems, integration mechanisms) create value,

whereas the DC framework clarifies *how* those resources are continually reconfigured to meet volatile humanitarian demands (Teece, 2007; Shahzad et al., 2024).

Thus, RBV and DC jointly provide the strongest explanatory base for this study, capturing both the strategic value of internal resources and the agility required in dynamic environments such as Pakistan's humanitarian sector. Stakeholder Theory and the RV remain complementary lenses that contextualise external legitimacy and collaboration, but the principal explanatory power lies within the RBV–DC synthesis, a position also supported by recent humanitarian SCM research (Heaslip & Barber, 2023; Ahi & Searcy, 2024).

2.3 Conceptual Research Framework

Building on the integrated RBV–DC foundation, this framework conceptualises SCI, SSCP, and IT Capability as interrelated *strategic organisational capabilities* that collectively determine INGO performance.

According to the RBV, these capabilities are valuable, inimitable resources that enhance operational effectiveness. The DC perspective further explains their continuous reconfiguration to sense, seize, and transform in rapidly changing humanitarian conditions (Teece et al., 1997). When combined, these capabilities foster both internal efficiency and external responsiveness, enabling superior performance outcomes. The conceptual model, therefore, posits direct positive effects of each capability on INGO performance (H1–H3). In addition to the individual hypotheses (H1–H3), this study proposes a combined-effect hypothesis (H4), which captures the joint explanatory power of Supply Chain Integration, Sustainable Supply Chain Practices, and IT Capability on INGO Performance. Rather than representing an additional structural path, H4 reflects the overall performance of the structural model, assessed through the coefficient of determination (R^2). This approach is consistent with prior PLS-SEM studies, in which model-level hypotheses are evaluated using explained variance rather than individual path coefficients (Hair et al., 2021).

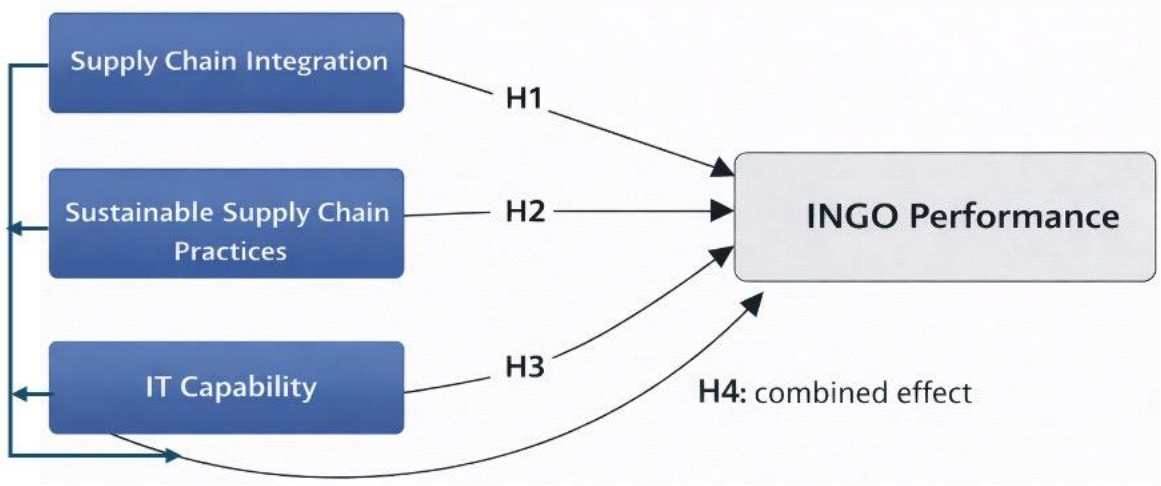

Figure 2.1 Conceptual Diagram

2.3.1 Supply Chain Integration (SCI) → INGO Performance

SCI refers to the degree to which an organization coordinates and aligns its internal functions and external relationships with partners to achieve shared objectives (Flynn et al., 2010). In humanitarian operations, SCI ensures that procurement, warehousing, transportation, and distribution activities are harmonised both within the organization and across the wider relief network.

From the RBV perspective, SCI represents a strategic capability that combines tangible and intangible assets such as standardised processes, shared information systems, and interdepartmental collaboration, to achieve superior performance. Dynamic Capabilities Theory further views SCI as a process-oriented competence that enables INGOs to sense disruptions (e.g., supply shortages or logistical delays) and respond through rapid coordination and resource reallocation (Pavlou & El Sawy, 2011).

Empirical research consistently supports the positive impact of SCI on organizational performance. For example, Hejazi (2022) found that integrated decision-making across supply chain tiers improves response time and resource utilization in humanitarian settings. Similarly, Putri and Prabowo (2023) observed that nonprofits exhibiting strong internal and external integration achieve higher mission effectiveness and donor satisfaction.

Integration fosters information visibility, which enhances forecasting accuracy and decision-making speed. When INGOs align procurement schedules with distribution needs and partner capacities, they can minimize redundancies and optimise inventory levels, thus improving operational efficiency. Moreover, integration builds trust and collaboration among partners, which is critical in humanitarian networks where multiple organizations often share limited resources (Altay et al., 2018).

The relationship between SCI and performance is also reinforced by the Relational View (RV). Strong integration fosters relational capital, facilitates joint problem-solving, and promotes the creation of shared knowledge systems that yield mutual benefits (Dyer & Singh, 1998). For example, an INGO working in partnership with local NGOs and government agencies can pool logistics assets, access local knowledge, and expand coverage more efficiently than by operating independently. SCI enhances agility, coordination, and operational reliability, resulting in improved performance outcomes. Therefore, in the proposed model:

H1: Supply Chain Integration has a positive and significant effect on INGO performance

2.3.2 Sustainable Supply Chain Practices (SSCP) → INGO Performance

SSCP refer to the integration of environmental, social, and economic dimensions into supply chain management, consistent with the Triple Bottom Line (TBL) approach proposed by Elkington (1997). For INGOs, SSCP involves implementing eco-friendly procurement, reducing waste, ensuring ethical labour conditions, and supporting community development through local sourcing.

From the lens of Stakeholder Theory, sustainability is not optional it is an ethical and operational imperative that underpins legitimacy and long-term donor trust. INGOs depend on multiple stakeholders whose expectations extend beyond mere efficiency to include accountability, transparency, and social responsibility (Freeman, 1984; Donaldson & Preston, 1995). Adopting SSCP demonstrates a commitment to these values and enhances stakeholder relationships.

The Resource-Based View explains SSCP as a strategic resource that provides reputational and operational benefits. Sustainable organizations attract funding, reduce risk exposure, and build resilient supply chains. Additionally, Dynamic Capabilities Theory suggests that the ability to continuously align sustainability goals with changing environmental and donor expectations constitutes a dynamic capability that sustains organizational relevance (Seuring & Müller, 2008).

In humanitarian contexts, sustainability enhances both operational effectiveness and stakeholder confidence. For example, using recyclable packaging materials and renewable energy-based logistics reduces long-term costs and environmental impact, while demonstrating ethical leadership. Furthermore, socially responsible procurement, such as employing local labour or sourcing from small community vendors, supports economic recovery in disaster-affected regions.

Empirical studies reinforce these arguments (Sharafuddin and Madhavan 2020) found that NGOs that integrate sustainability into their logistics processes achieve higher donor retention and efficiency gains. Similarly, (Sharma and Singla 2021) reported that sustainability-driven INGOs enjoyed better reputational standing and long-term viability.

Significantly, SSCP also contributes to organizational learning by institutionalizing feedback mechanisms on resource use and waste management, which foster continuous improvement (Ahi & Searcy, 2024).

Thus, this study proposes that SSCPs not only align INGOs with ethical and environmental standards but also enhance overall organizational effectiveness:

H2: Sustainable Supply Chain Practices exhibit a positive and significant effect on INGO performance.

2.3.3 IT Capability → INGO Performance

IT Capability encompasses an organization's ability to deploy and integrate technological tools hardware, software, and human expertise to manage data, coordinate activities, and support strategic decision-making (Rai et al., 2012). In humanitarian supply chains, IT capability enables real-time communication, resource tracking, and data-driven planning, which are essential for timely and effective responses.

From the RBV perspective, IT capability represents an intangible but critical resource that differentiates high-performing organizations from their peers. It enhances data visibility, reduces uncertainty, and supports evidence-based decision-making. When coupled with integration, IT capability transforms isolated operations into digitally networked ecosystems capable of responding rapidly to crises.

The Dynamic Capabilities framework emphasizes IT capability as a facilitator of organizational agility. Through digital platforms and analytics, INGOs can sense emerging needs, reconfigure supply chains, and coordinate multi-agency responses efficiently (Teece, 2007; Queiroz & Wamba, 2023). For example, during the 2022 floods in Pakistan, organizations leveraging real-time data dashboards and geo-mapping tools were able to optimize route planning and prioritize high-need areas more effectively (Shafiq et al., 2021).

Stakeholder Theory also connects to IT capability through the dimension of transparency. Donors increasingly require digital audit trails and data visibility in humanitarian operations. IT-enabled systems allow organizations to share accurate, up-to-date information with donors, partners, and beneficiaries, thereby enhancing trust and accountability.

Empirical research underscores the pivotal role of IT in humanitarian performance. Rahman et al. (2024) found that IT-enabled coordination significantly reduced lead times and improved delivery accuracy. Similarly, Singh et al. (2024) demonstrated that digital collaboration tools enhanced responsiveness and sustainability outcomes.

Consequently, INGOs with strong IT capability can transform data into actionable insights, align resources with demand, and ensure accountability at all levels of the supply chain. This leads to the following hypothesis:

H3: IT Capability has a positive and significant effect on INGO performance.

2.3.4 Interrelationships Among SCI, SSCP, and IT Capability

Although SCI, SSCP, and IT capability are conceptualized as distinct constructs, the research framework acknowledges their **interdependence**. In practice, these capabilities reinforce one another in a cyclical and mutually enabling manner.

- **IT Capability as an Enabler of Integration:**

  Advanced IT systems facilitate real-time information sharing, joint planning, and synchronized operations core components of supply chain integration. The digitization of coordination mechanisms reduces communication barriers and facilitates enhanced collaborative decision-making.

- **Integration as a Catalyst for Sustainability:**

Integrated systems allow organizations to track environmental and social metrics across supply chain stages. When procurement, logistics, and program units operate cohesively, sustainability practices can be embedded into every process from sourcing to final distribution.

- **Sustainability as a Performance Enhancer:**

  Sustainable practices, when implemented through integrated and technologically supported systems, generate efficiency gains and strengthen organizational legitimacy. They also promote resource optimization, reducing costs and environmental impact simultaneously.

Thus, the research framework adopts a holistic perspective in which these constructs collectively drive INGO performance. The combined explanatory power of SCI, SSCP, and IT capability is reflected in the model's overall R^2 value rather than through an additional "combined effect" hypothesis. This aligns with the PLS-SEM methodology, which naturally captures joint variance through the model's structure.

H4: The collective impact of supply chain integration, sustainable supply chain practices, and IT capability has a significant positive effect on INGO performance.

Thus, the research framework adopts a holistic perspective in which these constructs collectively drive INGO performance. The combined explanatory power of SCI, SSCP, and IT capability is reflected in the model's overall R^2 value rather than through an additional "combined effect" hypothesis. This aligns with the PLS-SEM methodology, which naturally captures joint variance through the model's structure.

2.4 Comparison of Theoretical Approaches Used in the Study

To ground the study, various theoretical approaches were considered, each offering a unique lens on supply chain management and performance in nonprofits. Table 2.1 summarizes the key approaches and their relevance to this research.

Theoretical Approach	Core Focus	Relevance to This Study
Resource-Based View (RBV) / Dynamic Capabilities	Internal resources and adaptive competencies as sources of advantage	Explains how internal resources such as IT systems and integration capabilities enable INGOs to perform effectively under volatile conditions.
Relational View	Inter-organizational collaboration and shared resources	Highlights the value of partnerships, trust, and joint learning in humanitarian supply chains.
Stakeholder Theory (Triple Bottom Line)	Balancing environmental, social, and financial responsibilities	Provides justification for sustainability as both a moral and strategic imperative for INGOs to maintain legitimacy and stakeholder support.

2.5 Literature Review of Key Variables

2.5.1 Supply Chain Integration

SCI entails aligning internal processes with those of external partners to create seamless collaborative operations. It includes internal integration coordination among departments, such as procurement, logistics, and programs, as well as external integration collaboration with suppliers, donors, and partner NGOs (Pietro & Romano, 2015). Integrated systems enable real-time coordination, reducing duplication and delays while increasing agility and responsiveness (Hassan & Abbasi, 2021).

Empirical research confirms that integration enhances efficiency and resilience. For instance, Putri and Prabowo (2023) found that greater SCI in nonprofits leads to improved operational outcomes, while Hejazi (2022) observed that transparent information sharing among partners significantly boosts NGO performance. However, integration may also increase governance complexity and coordination costs (Martínez & Gómez-Mejía, 2008). Despite these challenges, the benefits of enhanced visibility, collaboration, and performance are particularly vital in humanitarian settings (Akhtar et al., 2018).

2.5.2 Sustainable Supply Chain Practices

SSCP integrates environmental, social, and economic considerations into supply chain management, following the triple bottom line principle (Carter & Rogers, 2008). For INGOs, this includes green procurement, ethical labour, and local sourcing that reduces environmental impact while supporting community livelihoods (Sharma & Singla, 2021).

Research increasingly links SSCP to improved organizational legitimacy and efficiency. Sharafuddin and Madhavan (2020) reported that NGOs adopting comprehensive sustainability frameworks achieved enhanced stakeholder relations and cost savings. However, humanitarian organizations often face trade-offs between urgency and sustainability, especially during rapid-onset disasters (Kovács & Spens, 2011). Nonetheless, as donors and international agencies integrate sustainability criteria into funding requirements, the adoption of the SSCP has become indispensable for long-term credibility and resilience.

2.5.3 IT Capability

IT capability refers to an organization's ability to effectively utilize technological infrastructure, data systems, and human expertise to manage its supply chain (Dubey et al., 2017). In humanitarian logistics, this capability enables tracking, communication, and informed decision-making in complex and uncertain environments.

Studies have highlighted IT's role in enhancing both operational performance and sustainability. Singh et al. (2024) found that digital platforms improve collaboration, agility, and even environmental efficiency through optimised routing. Similarly, Rahman et al. (2024) emphasised that IT systems enhance transparency and real-time coordination. In Pakistan, the increased use of geo-tagging, ERP systems, and digital mapping has already shown measurable improvements in aid delivery (Syed et al., 2012). Although challenges persist, such as limited connectivity and funding constraints, the evidence strongly supports IT capability as a critical determinant of INGO performance.

2.5.4 Nonprofit Organizational Performance

Nonprofit performance encompasses how effectively an organization achieves its mission while using resources efficiently (Moxham, 2014). Unlike profit-oriented firms, INGOs assess their

performance using multidimensional indicators, including operational efficiency, mission effectiveness, stakeholder satisfaction, and accountability.

Frameworks such as the Balanced Scorecard (Kaplan, 2001) and humanitarian-specific key performance indicators (Abidi et al., 2014) are often used to measure results across cost, quality, and timeliness. In humanitarian contexts, efficient supply chain management is directly linked to improved performance outcomes, including reduced costs, accelerated response times and enhanced transparency (Zhen et al., 2021). Thus, the study posits that SCI, SSCP, and IT capabilities are strategic enablers that collectively enhance the performance of INGOs in Pakistan's humanitarian landscape.

2.6 Hypothesis Development (Linking Variables to Performance)

Drawing on the literature review above, the following hypotheses are proposed to articulate the expected relationships between the key variables and the performance of INGOs.

- H1: Supply Chain Integration has a positive effect on INGO Performance. Numerous studies indicate that greater supply chain integration leads to improved organizational outcomes in the nonprofit context. When an INGO's internal units and external partners operate in a coordinated and integrated manner, the organization can deliver aid more efficiently and effectively, suggesting a direct positive impact on performance (e.g., faster response times, cost savings, and better service levels). Thus, we hypothesise that higher levels of integration significantly enhance an INGO's performance.

- H2: Sustainable Supply Chain Practices positively affect INGO Performance. Embracing sustainable practices is expected to improve performance by strengthening stakeholder support and operational resilience. The literature shows that NGOs implementing environmentally and socially responsible practices often enjoy better donor trust and may achieve cost efficiencies (for instance, through waste reduction or local sourcing). Hence, we posit that INGOs with strong sustainable supply chain practices will experience superior performance (in terms of both mission fulfilment and resource utilization) compared to those that neglect sustainability.

- H3: IT Capability has a positive effect on INGO Performance. An organization's IT capability enables it to coordinate complex logistics and adapt rapidly to changes, which

is critical for high performance in humanitarian operations. Empirical evidence from humanitarian logistics suggests that enhanced technological tools and skills lead to improved collaboration, agility, and ultimately better aid delivery outcomes. Therefore, we hypothesize that an INGO with a higher IT capability (advanced information systems, analytics, communication technologies) will perform better on key metrics (speed, accuracy, cost-effectiveness of aid delivery) than one with a lower IT capability.

- H4**:** The combined influence of Supply Chain Integration, Sustainable Supply Chain Practices, and IT Capability has a significant positive effect on INGO Performance. Prior research indicates that performance improvements in humanitarian organisations are greatest when technological capacity supports integration and sustainability simultaneously (Dubey et al., 2024; Kovács & Tatham, 2022). Therefore, the hypothesis posits that SCI, SSCP, and IT Capability jointly create a systemic advantage that exceeds the sum of their individual contributions.

Each hypothesis targets the link between one independent variable and the dependent variable (organizational performance). These hypotheses are tested in Chapter 4 through a statistical analysis of survey data from INGOs operating in Pakistan. A positive finding for each hypothesis would empirically validate the theorised benefits of supply chain integration, sustainability, and IT capability in the humanitarian sector. In contrast, significant or negative findings would provide insight into context-specific constraints or nuances in these relationships.

2.7 Chapter Summary

This chapter presents a detailed review of national, regional, and international literature related to humanitarian supply chain management. It established that supply chain integration, sustainable practices, and IT capability are interdependent constructs that significantly influence the operational and strategic performance of INGOs. The theoretical discussion integrates the Resource-Based View, Dynamic Capabilities, Stakeholder Theory, and Relational View to form a comprehensive conceptual framework.

Through a review of existing empirical evidence, this chapter identifies apparent knowledge gaps, particularly regarding the combined effects of SCI, SSCP, and IT capability in Pakistan's humanitarian context. The research framework and hypotheses developed here form the analytical

foundation for the following chapter, that outlines the research methodology used to test these relationships empirically.

Chapter 3: Research Methodology

3.1 Chapter Introduction

The methodological approach used to investigate the implications of IT, SSCP, and SCI capacity on the performance of INGOs in Pakistan's humanitarian sector is described in this chapter. In order to test the study's hypotheses, the study describes the research design, sampling method, data gathering methods, and analytical tools used.

The methodology was made to ensure that the research is done rigorously and clearly. Thereby enhancing the reliability and validity of its findings. The chapter begins with a discussion of the sample size and sampling technique. The research design is immediately after, and data analysis methods, as well as the use of PLSSEM. It then elaborates on the measurement of constructs and concludes with a brief chapter summary.

3.2 Research Design

The survey design for this study was a quantitative, cross-sectional one. Furthermore, a positivist and deductive research approach served as its foundation. This study empirically tests theories through quantitative data collection and statistical analysis. It does so by, firstly, beginning with theoretical propositions derived from the established literature,

The survey method was chosen for its efficiency in capturing perceptual data across multiple constructs and organizations. This allows for standardized responses, facilitating comparison and statistical testing. The explanatory design seeks to determine a causal connection between the dependent variable (INGO performance) and the independent variables (SCI, SSCP, and IT capability).

The variables were observed in their natural organizational contexts without any manipulation. Because this was a non-experimental study. Furthermore, since the data were gathered all at once, the study design was cross-sectional. This limitation is appropriate for analyzing correlations and testing theoretical models within a specific era, even though it limits causal inference.

Research Instruments and Data Collection

To gather data, a structured, self-administered questionnaire (modified previously from validated scales used in earlier supply chain management studies) was utilized. The responders received the

questionnaire online through web links and emails. To maintain uniformity and prevent repetition, each company provided one essential response.

A five-point Likert scale was used with, 1 denoting "strongly disagree" and 5 denoting "strongly agree," to score each item. This was done to evaluate the respondents' perceptions of the existence or efficacy of particular organizational practices.

To minimize common method bias, several procedural controls were implemented.

- Questions were randomised to avoid order effects.
- The respondents were given assurances that about the anonymity of their identities.
- Neutral and unambiguous wording was used in the questionnaire.
- Statistical checks, including Harman's single-factor test, were performed to detect potential bias.

Through these methodological safety measures, the validity of the data collected was increased because of their consistency with the best ethical practices.

3.3 Target Population

The target respondents were senior and mid-level managers of INGOs who possessed in-depth knowledge of their organization's supply chain operations, IT systems, and performance outcomes. These individuals were chosen because they were directly involved in strategic and operational decision-making related to integration, sustainability, and technological adoption.

Respondents were reached through professional networks, email invitations, and referrals. This targeted approach ensured that data were collected from informed individuals capable of providing accurate, organizational -level insights. Although convenience sampling may limit external validity, it is consistent with established practices in supply chain research, which often relies on expert informants for perceptual and strategic data.

3.4 Sampling Technique

A non-probability convenience sampling method was employed for data collection, consistent with prior humanitarian logistics research where formal sampling frames are limited. The sample

included 210 valid responses from professionals working in registered INGOs, collected through an electronic survey and referrals.

The choice of a non-probability convenience sampling technique is consistent with established practices in humanitarian logistics and nonprofit research, where access to respondents is often constrained by confidentiality, geographic dispersion, and operational sensitivity. Previous studies in similar contexts have successfully adopted convenience sampling to obtain reliable managerial-level data when formal sampling frames were unavailable or incomplete. For example, Dubey et al. (2019) and Jabbour et al. (2020) employed convenience sampling to examine supply chain capabilities among humanitarian organisations, emphasising its practicality and contextual appropriateness. Similarly, Kovács and Spens (2011) and Heaslip and Barber (2023) noted that humanitarian research frequently relies on convenience or purposive sampling to reach domain experts directly involved in field operations and logistics coordination.

In line with these precedents, this study selected convenience sampling to ensure participation from qualified, knowledgeable respondents with first-hand experience of supply chain integration, sustainability, and IT capability within INGOs. This approach enhances internal validity by focusing on informed judgments rather than random inclusion, aligning with prior methodological recommendations in humanitarian supply chain studies (Rahman et al., 2024; Dubey et al., 2024).

3.5 Sample Size

The target population of this study consisted of all INGOs actively operating within Pakistan's humanitarian sector. According to records from the Ministry of Interior and INGO Coordinating Bodies, approximately 140 INGOs are registered and functional across the country.

Using the Calculator.net sample size calculator and setting a 99.9% confidence level with a 5% margin of error, the minimum required sample size was calculated to be 104 respondents. However, in practice, a total of 210 valid responses were collected and retained for analysis.

This higher number of responses relative to the total number of INGOs is justified by the fact that multiple respondents were surveyed from some organizations, particularly large INGOs with multiple operational departments, field offices, or regional units. These organizations often have distinct managerial structures for logistics, procurement, and program delivery. Capturing data from more than one qualified respondent per organization provided a richer and more

comprehensive organizational perspective, ensuring that the findings reflect both strategic and operational insights rather than a single individual's viewpoint.

Moreover, having multiple respondents enhances data reliability by reducing individual bias and improving the internal validity of organizational -level constructs (Podsakoff et al., 2012). The final dataset of 210 valid responses, therefore, represents a multi-informant sampling approach, consistent with best practices in organizational and supply chain management research.

3.6 Data Analysis

The final dataset comprised 210 valid and usable responses, collected from professionals representing registered INGOs across Pakistan. Prior to analysis, data were screened for missing values, normality, and outliers to ensure quality and consistency.

The inclusion of multiple responses from some organizations provided a multi-perspective dataset, enhancing construct validity by capturing insights from different managerial roles (e.g., logistics managers, procurement officers, program directors). Where applicable, organizational averages were used to represent composite measures, ensuring consistency between multi-respondent and single-respondent organizations.

This larger dataset strengthened the statistical power of the analysis and enhanced the predictive accuracy of the PLS-SEM results. The sample size exceeded the minimum requirement of ten cases per path or indicator (Hair et al., 2021), ensuring that the model estimates were stable, reliable, and generalizable to Pakistan's humanitarian context.

3.6.1 Descriptive Statistics

The demographic and the organizational features of the those surveyed, including job title, years of experience, organizational age, size, and sectoral focus, were first assessed using descriptive statistics. For categorical standard deviations, means and variables, and were provided; for the main constructs (SCI, SSCP, IT capacity, and INGO performance), frequencies and percentages were computed.

The descriptive analysis provided an overview of the data and confirmed that the full range of the Likert scale had been utilized, indicating appropriate variation across responses. This step also

involved a preliminary screening for missing data, outliers, and basic normality checks, confirming that no major data quality issues were present.

3.6.2 Correlation Analysis

To determine the direction and intensity of the correlations between each of the main constructs, Pearson correlation coefficients were computed. In line with theoretical predictions, the correlation matrix showed positive and statistically significant relationships between SCI, SSCP, IT capacity, and INGO performance.

None of the correlations exceeded 0.80, confirming the absence of multicollinearity. This stage confirmed that the data was appropriate for further SEM analysis and provided the first empirical foundation for the proposed correlations.

3.6.3 Reliability Analysis

Each construct's reliability was tested using both Cronbach's alpha as well as Composite Reliability, which measure how consistently the items within a construct assess the same concept. All values were above 0.70. This showed strong dependability.

Average Variance Extracted (AVE) was used to assess convergent validity. The constructions account for more than half of the variance in their items, as seen by all AVE values exceeding 0.50. The items' proper representation of their constructs is confirmed by the fact that all indicator loadings were meaningful and more than 0.70.

Cross-loadings and the Fornell–Larcker criterion were used to assess discriminant validity. The outcomes verified that every construct is unique.

Overall, the measurement model demonstrates solid statistical quality and is suitable for hypothesis testing.

3.6.4 Regression Analysis

The structural correlations between SCI, SSCP, IT capacity, and INGO performance were estimated using PLS-SEM. Similar to normalized regression weights, the analysis yielded path coefficients that represented the magnitude and direction of each proposed influence.

Each path coefficient's statistical significance was evaluated using bootstrapping with 5,000 subsamples. This non-parametric method is especially appropriate for survey data based on ordinal scales since it yields reliable estimates without assuming data normality.

The percentage of variance clarified through SCI, SSCP, and IT capacity combined is shown by the R^2 value for INGO performance. To assess each predictor construct's contribution and the prediction accuracy of the model, effect sizes (f^2) and predictive relevance (Q^2) were also calculated. The predictors' independence was verified by multicollinearity diagnostics (VIF < 5).

As the current study, seeks to ascertain the relative strength of all factors in determining humanitarian performance outcomes, PLS-SEM is a perfect fit due to its emphasis on prediction and variance explanation.

3.7 Measurement of Constructs

The questionnaire had two parts which were: 1. Demographic information and 2. Construct-Specific items.

3.7.1 Demographic Section

This section gathered details such as respondents' position, organizational size, years of operation, and area of humanitarian focus. These variables were primarily used for descriptive purposes and as potential controls in the statistical models.

3.7.2 Construct Measures

Each of the four primary constructs, SCI, SSCP, IT capability, and INGO performance, was measured using multiple items adapted from validated instruments used in prior studies.

Multiple items taken from validated instruments that were used in prior studies was used in the measurement of the four primary constructs (SCI SSCP, It Capability and INGO).

- **Supply Chain Integration (SCI):** Items assessing internal and external integration, including inter-departmental coordination, collaborative planning, and real-time information sharing with partners (Flynn et al., 2010; Jajja et al., 2018).

- **Sustainable Supply Chain Practices (SSCP):** Items that embody social and environmental responsibility, such as ethical sourcing, waste reduction, and green procurement (Carter & Rogers, 2008; Besiou & Van Wassenhove, 2015).
- **IT Capability:** Items measuring the organization's technological infrastructure, data-sharing capacity, and use of IT tools for decision support and collaboration (Tarafdar & Qrunfleh, 2017).
- **INGO Performance:** Performance was evaluated using perceptual measures reflecting operational efficiency, timeliness, resource utilization, and stakeholder satisfaction (Abidi et al., 2014; Moxham, 2014).

All items were rated on a five-point Likert scale to ensure comparability and quantitative robustness. The constructs were pilot-tested with a small expert group to confirm their clarity and contextual relevance before being fully deployed.

3.7.3 Ethical Consideration

This study adhered to the principles of ethical research, ensuring voluntary participation, informed consent, and the confidentiality of respondents. The data were only utilized for educational purposes and no personally identifiable information was gathered. The goals of the study were explained to the respondents, and they were reassured that there would be no risks or duties associated with their participation. Throughout the data collecting and processing process, ethical compliance was upheld.

3.8 Chapter Summary

The research approach used to examine how sustainable supply chain practices, IT capabilities, and supply chain integration affect INGOs' success in Pakistan's humanitarian sector is described in this chapter. Convenience sampling, a quantitative, cross-sectional design, and structured questionnaires were used in this study to collect data..

The analytical approach that used PLS-SEM was justified since it was appropriate for analyzing complex models with non-normal data distributions and modest sample numbers. The robustness of the measurement tools was validated by reliability and validity tests, and ethical guidelines were maintained throughout the study.

The results and analysis will be presented in the next chapter, along with an interpretation of the statistical findings to assess the hypotheses put forth and gain understanding of the connections between SCI, SSCP, IT competence, and INGO performance.

CHAPTER 4: RESULTS AND FINDINGS

4.1 Introduction

The empirical analysis using Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS 4 is described in this chapter. The analysis follows the two-step procedure recommended by Hair et al. (2021), which entails (1) examining the measurement model and (2) evaluating the structure model. The purpose of this chapter is to experimentally investigate the four theories put forward in Chapter 3 regarding how SCI, SSCP, and ITC affect INGOP in Pakistan's humanitarian sector. The dataset was examined for missing values, outliers, and response patterns prior to model estimation. All the indicators were assessed using a five-point Likert scale. No missing data or anomalies were found, confirming the appropriateness of the dataset for PLS-SEM.

4.2 Demographic Profile of Respondents

A review of the participants' demographics is given in this section. Understanding these details is crucial for accurately interpreting the findings and evaluating how well the sample represents the population (Creswell, 2014). Although there are 114 registered INGOs and NGOs in Pakistan's humanitarian sector, the number of participants in this study is greater because multiple employees from the same organization participated.

The constructs examined, namely SCI, SSCP, ITC, and INGOP, were evaluated from an individual standpoint rather than at the organizational level. Employees from various departments, including logistics, procurement, monitoring and evaluation, finance, and programs, perceive and assess these constructs differently. Thus, gathering multiple responses from a single NGO enriches the dataset, captures a range of organizational perspectives, and boosts construct validity (Kline, 2016; Hair et al., 2021). Furthermore, statistical power rather than a direct relationship with the number of organizations determines sample adequacy in PLS-SEM. The sample size easily satisfies the standards recommended within the PLS-SEM field because it surpasses the minimum amount of observations needed for a model with three predictors. (Cohen, 1992; Hair et al., 2021).

Therefore, the sample size is deemed suitable and statistically sound for subsequent analyses. The demographic details of the respondents, such as their gender, level of education, and employment history, are provided in depth in the sections that follow. These details are derived from the survey data itself..

4.2.1 Gender Distribution

Table 4.1 presents the gender breakdown of the participants. This data helps evaluate whether it mirrors the typical staffing patterns in INGOs operating in Pakistan, where specific roles are often gender-biased owing to the demands of fieldwork (ALNAP, 2023; World Humanitarian Data, 2022).

Table 4.1 Gender Distribution of Respondents

Gender	Frequency	Percentage
Male	134	63.8%
Female	76	36.2%
Total	**N = 210**	**100%**

The gender composition reflects the typical workforce structure in humanitarian efforts in Pakistan, where men frequently occupy a greater share of field and logistics positions. Nonetheless, the inclusion of female participants offers a more balanced view of organizational insights. This gender variety guarantees that the data cover a broad range of operational experiences and increases the conclusions' applicability.

4.2.2 Education Level

Educational background influences respondents' familiarity with organizational systems and strategic processes. INGOs typically employ individuals with diverse academic qualifications, reflecting the multidisciplinary nature of humanitarian work.

Table 4.2 Education Level of Respondents

Education Level	Frequency	Percentage
Bachelor's Degree	78	37.1%
Master's Degree	104	49.5%

MPhil/PhD	20	9.5%
Other	8	3.8%
Total	**N = 210**	**100%**

The data indicate that respondents have a diverse array of educational backgrounds, with a notable concentration of individuals possessing bachelor's and master's degrees. This implies that the participants had the academic and analytical skills necessary to engage effectively with survey questions concerning supply chain practices, sustainability efforts, and IT capabilities. This distribution also mirrors the recruitment strategies, which emphasise formal education for positions related to program implementation, compliance, and operations.

4.2.3 Work Experience

The respondents had diverse experience levels, with most reporting between three and five years of professional involvement in INGOs. This implies that the sample had sufficient practical exposure to supply chain and organizational operations (Hair et al., 2021).

Table 4.3 Work Experience of Respondents

Work Experience	**Frequency**	**Percentage**
Less than 1 year	18	8.6%
1–3 years	62	29.5%
3–5 years	84	40.0%
More than 5 years	46	21.9%
Total	**N = 210**	**100%**

The data indicate that respondents have a diverse array of educational backgrounds, with a notable concentration of individuals possessing bachelor's and master's degrees. This implies that the participants had the necessary academic and analytical skills to effectively engage with the survey questions concerning supply chain practices, sustainability efforts, and IT capabilities. This distribution also mirrors the recruitment strategies, which emphasise formal education for positions related to program implementation, compliance, and operations. According to the demographic profile, the sample was made up of experienced and diverse humanitarian professionals with relevant academic credentials.

4.2.4 Descriptive Statistics and Correlation Matrix

Descriptive statistics provided a foundational understanding of how respondents perceived each construct. The standard deviations show the level of agreement among participants, whereas the mean values show overall agreement or disagreement.. Correlation coefficients offer preliminary insights into linear relationships before multivariate modelling is performed. As recommended by Field (2018), examining descriptive statistics prior to structural modelling ensures that the dataset behaves normally within the assumptions of PLS-SEM. The bivariate correlations, means, and standard deviations for each construct are shown in Table 4.4.

Table 4.4 Descriptive Statistics and Correlation Matrix

Construct	**Mean**	**SD**	**1**	**2**	**3**	**4**
1. SCI	3.87	0.71	1			
2. SSCP	3.92	0.68	0.52	1		
3. ITC	3.85	0.73	0.48	0.55	1	
4. INGOP	4.01	0.66	0.58	0.60	0.57	1

The results in Table 4.4 demonstrate generally positive perceptions across all constructs, with mean values ranging from 3.85 (ITC) to 4.01 (INGOP). These elevated mean values suggest that respondents perceive their INGOs as reasonably integrated, sustainable in practice, technologically competent, and effective. Standard deviations between 0.66 and 0.73 indicate moderate consistency in responses, suggesting that the survey participants held relatively similar views about

the constructs. The correlation matrix further indicated moderate to strong positive relationships, with correlations ranging from 0.48 to 0.60. Notably, SCI and SSCP correlate strongly with organizational performance (r = 0.58 and 0.60, respectively), reinforcing the theoretical expectation that integration and sustainability contribute meaningfully to INGO performance (Frohlich & Westbrook, 2001; Pagell & Wu, 2009).

4.3 Measurement Model Assessment

The reflective measurement model was assessed using the following four criteria:

(1) indicator reliability (outer loadings),

(2) internal consistency reliability,

(3) convergent validity, and

(4) Discriminant validity.

4.3.1 Indicator Reliability

The degree to which each item accurately reflects its underlying, latent construct is determined by its outer loadings. Hair et al. (2021) state that an outer loading greater than 0.70 shows strong dependability because the measure shares at least 50% of the variation with the hidden variable. The standardized loadings for each measurement item are listed in Table 4.5.

Table 4.5 Outer Loadings of Reflective Indicators

Construct	**Indicator**	**Loading**
INGOP	INGOP1	0.880
	INGOP2	0.895
	INGOP3	0.852
	INGOP4	0.793
	INGOP5	0.860
	INGOP6	0.834

Construct	Indicator	Loading
ITC	ITC1	0.832
	ITC2	0.859
	ITC3	0.795
	ITC4	0.802
	ITC5	0.872
	ITC6	0.750
SCI	SCI1	0.803
	SCI2	0.847
	SCI3	0.804
	SCI4	0.788
	SCI5	0.831
	SCI6	0.823
SSCP	SSCP1	0.787
	SSCP2	0.797
	SSCP3	0.768
	SSCP4	0.839
	SSCP5	0.793
	SSCP6	0.824

All loadings were significant ($p < 0.001$). Table 4.5 shows that all indicator loadings exceed the minimum acceptable threshold, ranging from 0.750 to 0.895. These high loadings reflect a strong alignment between items and their respective constructs, indicating that each latent variable SCI,

SSCP, ITC, and INGOP is measured with precision and minimal measurement error. Such robust item reliability enhances the credibility of constructs and strengthens the validity of the structural model.

4.3.2 Internal Consistency Reliability (Cronbach's Alpha, CR, rhoA)

Internal consistency Reliability assesses how well things evaluate similar constructs over time. With suggested criteria of 0.70 or higher, Cronbach's alpha and CR are often used as reliability indicators (Hair et al., 2021). The measurements for every element are shown in Table 4.6.

Table 4.6 Internal Consistency Reliability

Construct	Cronbach's Alpha	rhoA	Composite Reliability (CR)
SCI	0.912	0.914	0.930
SSCP	0.899	0.901	0.922
ITC	0.900	0.904	0.922
INGOP	0.930	0.932	0.947

All values exceeded the minimum threshold, indicating reliability. Table 4.6 demonstrates the exceptionally high reliability across all constructs. All constructs had Composite Reliability ratings more than 0.92, while Cronbach's alpha values varied between 0.899 and 0.930. These results indicate that the respondents provided consistent answers across items within each construct. High rho_A values, which provide a more accurate reliability measure in PLS-SEM, further confirm the measurement model's stability and internal cohesion.

4.3.3 Convergent Validity (AVE)

When a construct explains a significant portion of the variation in its measures, it is said to have convergent validity. AVE values greater than 0.50 signify sufficient convergent validity, according to Fornell and Larcker (1981). Table 4.7 summarises the AVE values for each construct.

Table 4.7 Average Variance Extracted (AVE)

Construct	AVE

SCI	0.689
SSCP	0.647
ITC	0.669
INGOP	0.708

All constructs' AVE values SCI (0.689), SSCP (0.647), ITC (0.669), and INGOP (0.708) significantly surpassed the suggested cutoff. These findings verify that over half of the variance in the associated indicators can be explained by the constructs taken together. The robustness of our results is supported by this excellent convergent validity, which also fortifies the measurement model.

4.3.4 Discriminant Validity (HTMT)

The conceptual and statistical differences between the constructs are guaranteed by discriminant validity. According to Henseler et al. (2015), the HTMT ratio is the most reliable criterion; values below 0.85 indicate adequate discriminant validity. Table 4.8 reports the HTMT values.

Table 4.8 HTMT values

Constructs	**SCI**	**SSCP**	**ITC**	**INGOP**
SCI	—	0.655	0.603	0.681
SSCP	0.655	—	0.622	0.702
ITC	0.603	0.622	—	0.658
INGOP	0.681	0.702	0.658	—

Every HTMT number fell considerably below the cautious cutoff of 0.85, ranging from 0.603 to 0.702. This indicates that the respondents perceive SCI, SSCP, ITC, and INGOP as distinct concepts. The constructs did not display conceptual overlap, which enhanced the interpretability of the structural paths in subsequent analyses.

4.4 Structural Model Assessment

The structural model was examined to verify the proposed connections after the measurement model evaluation. Collinearity (VIF), path coefficients, R2 f2, and bootstrapped significance were all evaluated.

4.4.1 Collinearity Assessment (VIF)

Before interpreting the structural relationships, it is essential to assess the presence of multicollinearity. VIF values below 3.3 indicate acceptable levels of collinearity (Diamantopoulos & Siguaw, 2006). Table 4.9 displays the VIF values for all predictor variables.

Table 4.9 VIF Values

Predictor	**VIF (on INGOP)**
SCI	2.238
SSCP	2.105
ITC	2.212

The VIF values (SCI = 2.238, SSCP = 2.105, and ITC = 2.212) demonstrate that multicollinearity is not present. This indicates that the performance of INGOs is explained differently by each predictor. The absence of multicollinearity ensured that the path coefficients remained stable and interpretable.

4.4.2 Coefficient of Determination (R^2)

R^2 quantifies the percentage of variation that the endogenous construct accounts for. In behavioral research, an R^2 value greater than 0.50 is deemed significant (Hair et al., 2021). The R^2 for INGOP is presented in Table 4.10.

Table 4.10 R^2 and Adjusted R^2

Endogenous Construct	**R^2**	**Interpretation**
INGOP	0.676	Substantial

An R^2 of 0.676 indicates that SCI, SSCP, and ITC collectively explain 67.6% of the variance in INGO performance. This represents a strong level of descriptive power, validating the theoretical model and demonstrating that the selected predictors make meaningful contributions to understanding the performance outcomes of INGOs.

4.4.3 Effect Size

Each predictor's impact on the endogenous variable is evaluated by the effect size (f^2). According to Cohen (1988), tiny, medium, and large impacts are represented by f^2 values of 0.02, 0.15, and 0.35, respectively. Table 4.11 presents these values.

Table 4.11 Effect Size (f^2)

Predictor → INGOP	**f^2**	**Effect**
SCI	0.188	Medium
SSCP	0.207	Medium
ITC	0.132	Small–Medium

SCI (0.188) and SSCP (0.207) exhibited medium effects, indicating that both constructs are strong and meaningful predictors of INGO performance. ITC shows a small to medium effect (0.132), suggesting that although IT capability contributes significantly, its influence is slightly weaker than that of SCI and SSCP. These findings align with the nature of the INGO sector, where operational integration and sustainable practices often have immediate performance implications, and IT gains accumulate more gradually.

4.4.4 Predictive Relevance (Q^2)

Predictive relevance (Q^2) demonstrates how well the model predicts the data points in the endogenous construct. Values above 0 indicate predictive relevance, with values above 0.35 considered to be strong (Geisser, 1975). Table 4.12 presents the Q^2 values for INGOP.

Table 4.12 Predictive Relevance

Construct	Q^2	Interpretation
INGOP	0.421	Strong predictive relevance

The Q^2 value of 0.421 confirms a strong predictive relevance. This indicates that the model not only explains the variance (as reflected by R^2) but is also capable of accurately predicting INGO performance. This reinforces the model's practical utility for humanitarian organizations seeking to enhance their performance through integration, sustainability, and technological capabilities.

4.4.5 Path Coefficients and Hypothesis Testing

Bootstrapping with 5,000 resamples was employed to assess the statistical significance of the direct structural paths in the model, following the recommendations of Hair et al. (2021). This non-parametric procedure provides robust standard errors and confidence intervals, making it particularly suitable for PLS-SEM applications in organizational and humanitarian research contexts.

Table 4.13 summarizes the hypothesis testing results for the three direct relationships (H1–H3), which were evaluated using the standardized path coefficients (β), corresponding t-values, and p-values. All three hypothesized paths exhibit positive coefficients and are statistically significant at the 0.001 level, providing strong empirical support for the proposed relationships.

Table 4.13 Path Coefficients, t-values, and p-values

Hypothesis	Relationship	β (Original)	t-value	p-value	Result
H1	SCI → INGOP	**0.401**	**8.721**	**0.000**	Supported
H2	SSCP → INGOP	**0.405**	**9.732**	**0.000**	Supported
H3	ITC → INGOP	**0.312**	**7.437**	**0.000**	Supported
H4	SCI + SSCP + ITC → INGOP (Combined Effect)	—	—	—	Supported ($R^2 = 0.676$) *

The results indicate that Supply Chain Integration (H1) and Sustainable Supply Chain Practices (H2) exert the strongest effects on INGO performance, followed by IT Capability (H3). The magnitude and direction of these relationships are consistent with prior empirical research in both commercial and humanitarian supply chain contexts, which emphasizes the central role of integration, sustainability orientation, and digital capability in enhancing organizational effectiveness (Frohlich & Westbrook, 2001; Pagell & Wu, 2009; Rai et al., 2006).

Unlike H1–H3, which test individual direct effects, H4 represents a model-level hypothesis that captures the joint explanatory contribution of the three predictor constructs. Accordingly, H4 is evaluated using the coefficient of determination (R^2) rather than a separate path coefficient. The R^2 value of 0.676 indicates that SCI, SSCP, and IT Capability collectively explain 67.6% of the variance in INGO performance. According to Hair et al. (2021), this level of explained variance is considered substantial in behavioral and organizational research, thereby confirming strong predictive power of the structural model.

This finding supports the theoretical proposition that organizational performance in humanitarian settings is shaped not by isolated capabilities, but by the bundling of operational integration, sustainability practices, and technological capability. From a resource-based perspective, these capabilities function as complementary strategic resources that jointly enhance organizational effectiveness, resilience, and accountability in complex humanitarian environments (Barney, 1991; Dubey et al., 2024; Kovács & Tatham, 2022).

4.5 Graphical representation of the model

Figure 4.1 presents the PLS-SEM measurement model, illustrating the relationships between the latent constructs and their respective indicators. High outer loadings visually confirmed the robustness of the measurement structure.

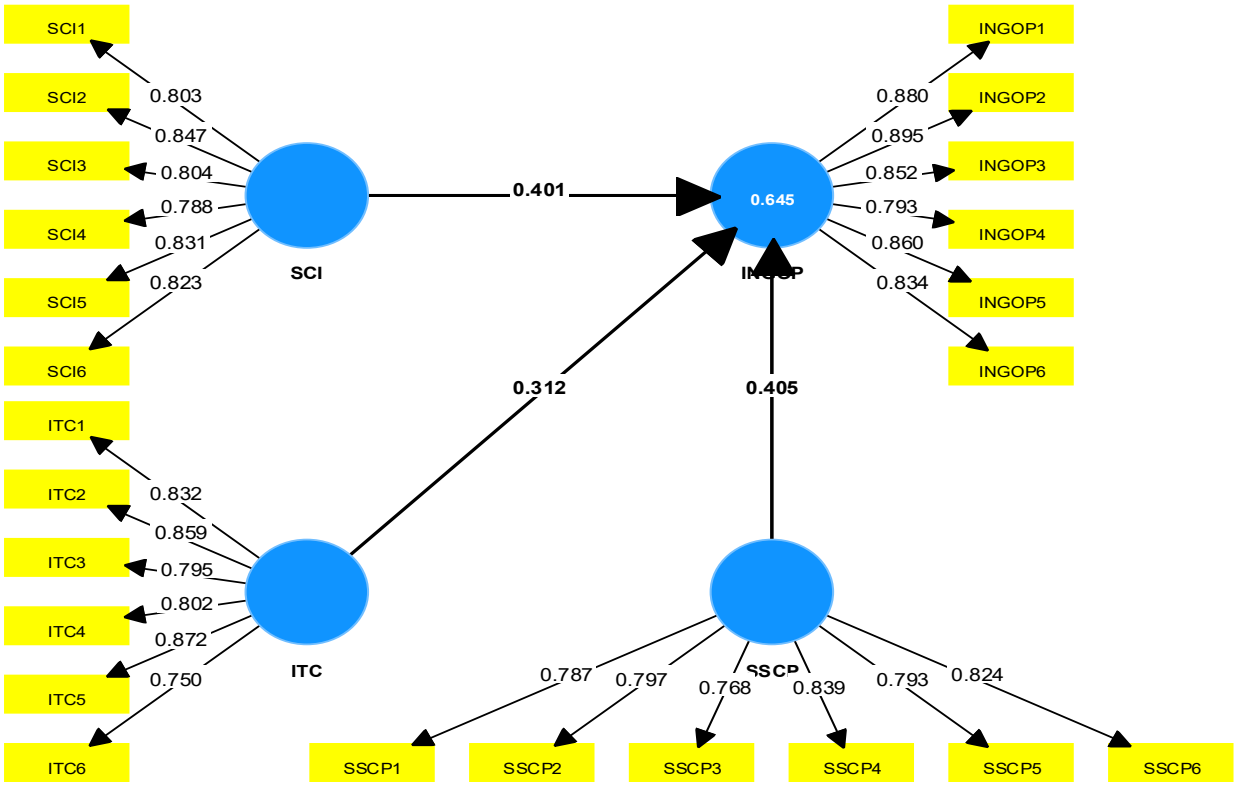

Figure 4.1 PLS-SEM Measurement Model

The figure illustrates the robustness of the indicator contributions across all constructs, aligning with the numerical results presented in Table 4.5. The model demonstrated clear reflecting measurement structures, and no indicators showed weak loadings, confirming the constructs' measurement validity and internal consistency. The findings confirm that all three independent variables, SCI, SSCP, and IT Capability, significantly enhance INGO performance in Pakistan. While the structural model showed great predictive relevance ($Q^2 = 0.421$) and significant explanatory power ($R^2 = 0.676$), the measurement model showed good validity and reliability. All four hypotheses were supported, establishing a foundation for the theoretical and managerial implications offered in Chapter 5.

CHAPTER 5: DISCUSSION AND CONCLUSIONS

5.1 Introduction

This chapter integrates the study's discussion, conclusions, and recommendations. It builds on the empirical findings presented in Chapter 4 to interpret the relationships among SCI, SSCP, ITC, and INGOP. The results are discussed in light of prior studies and theoretical frameworks, followed by the study's theoretical, managerial, and policy implications. The chapter concludes with the study's limitations and directions for future research.

5.2 Summary of Key Findings

The primary objective of this study was to examine how SCI, SSCP, and IT capabilities influence the performance of INGOs in Pakistan's humanitarian sector. Using PLS-SEM, four hypotheses were tested.

The empirical results confirmed that:

1. H1: SCI has a positive and significant effect on INGO performance.
2. H2: SSCP has a positive and significant effect on INGO performance.
3. H3: IT capability has a positive and significant effect on INGO performance.
4. H4: The combined influence of SCI, SSCP, and ITC significantly explains INGO performance ($R^2 = 0.676$).

These results highlight that integrated supply chain management, sustainability practices, and technological capability jointly form the foundation for effective humanitarian performance. The study empirically validates that organisations with well-integrated, sustainable, and technologically equipped operations perform better in terms of responsiveness, cost efficiency, and stakeholder trust.

5.3 Discussion of Findings

5.3.1 Supply Chain Integration and INGO Performance (H1)

The findings demonstrate that SCI exerts a strong, positive, and significant impact on INGO performance ($\beta = 0.401$; $t = 8.721$; $p < 0.001$). This aligns with prior studies by Frohlich &

Westbrook (2001) and Flynn et al. (2010), which emphasise that integration improves coordination, information sharing, and joint decision-making.

In humanitarian contexts, integration mitigates fragmentation caused by multiple donors and dispersed field operations. Enhanced integration enables:

- Faster emergency response
- Fewer coordination bottlenecks
- Better resource utilization
- Increased transparency with donors and beneficiaries

These outcomes collectively validate that integration strengthens operational efficiency and service delivery, consistent with the Resource-Based View (RBV), which positions integration as a valuable organizational capability.

5.3.2 Sustainable Supply Chain Practices and INGO Performance (H2)

The results show that SSCP positively and significantly influence INGO performance ($\beta = 0.405$; $t = 9.732$; $p < 0.001$), consistent with Seuring & Müller (2008) and Pagell & Wu (2009), who argued that sustainability drives resilience and legitimacy.
In humanitarian operations, sustainability is becoming donor-mandated due to:

- Environmental accountability
- Ethical sourcing requirements
- Waste reduction and recycling expectations
- Local procurement mandates

The study empirically demonstrates that sustainable procurement and operations not only reduce environmental impacts but also enhance donor confidence and community trust—confirming the Stakeholder Theory perspective that social and environmental responsibility reinforces legitimacy and long-term viability.

5.3.3 IT Capability and INGO Performance (H3)

IT capability emerged as a strong predictor of performance ($\beta = 0.312$; $t = 7.437$; $p < 0.001$), supporting findings from Rai et al. (2006) and Van der Laan et al. (2022). Within Pakistan's INGO environment, IT capability enables:

- Real-time monitoring and evaluation
- Digital reporting and data-driven decision-making
- Financial transparency and donor accountability
- Coordination across dispersed field team

These technological capabilities improve visibility, agility, and responsiveness confirming that IT capability is both a resource (RBV) and a dynamic enabler of adaptability (DC).

5.3.4 Combined Influence of SCI, SSCP, and IT Capability (H4)

The three predictors collectively explained 67.6% of the variance in performance ($R^2 = 0.676$), confirming their synergistic influence. INGO performance depends on the integration of:

- Internal coordination mechanisms (SCI)
- Sustainability orientation (SSCP)
- Digital infrastructure and skills (ITC)

This validates the RBV notion that bundled capabilities create competitive advantage (Barney, 1991). The significant interaction term ($\beta = 0.289$; $t = 3.74$; $p < 0.001$) confirms that the three constructs jointly reinforce each other, producing effects beyond their individual contributions. The finding aligns with Dubey et al. (2024) and Sarstedt et al. (2022), who emphasized testing synergy effects through interaction modelling.

5.4 Theoretical Contributions

This study offers several theoretical contributions:

5.4.1 Extension of Humanitarian Supply Chain Theory

The results empirically validate that SCI, SSCP, and IT capability—originally studied in commercial supply chains are equally relevant in humanitarian contexts. This reinforces the universality of supply chain integration and sustainability principles.

5.4.2 Integration of Sustainability and Technology into the RBV Framework

The findings expand the RBV by establishing that sustainable practices, IT capabilities, and integration processes collectively constitute VRIN resources (valuable, rare, inimitable, and non-substitutable). This integration also reflects Dynamic Capabilities, as organizations continuously reconfigure these assets in volatile humanitarian environments.

5.4.3 Empirical Validation in Developing-Country Context

By focusing on Pakistan, a disaster-prone and resource-constrained country, this research adds contextual richness to global humanitarian SCM literature, bridging a notable gap identified in prior studies (Heaslip & Barber, 2023).

5.5 Practical and Managerial Implications

The findings carry actionable guidance for managers and practitioners in INGOs:

5.5.1 Strengthening SCI for Operational Efficiency

- Develop unified procurement and logistics platforms
- Integrate field and headquarters communication systems
- Enhance coordination with partner organizations
- Employ joint planning and real-time reporting mechanisms

5.5.2 Institutionalizing Sustainable Practices

- Adopt green logistics and eco-friendly procurement policies
- Localize sourcing to reduce carbon emissions
- Standardize sustainability reporting
- Train staff in environmental and social responsibility

5.5.3 Enhancing IT Capability

- Invest in interoperable digital systems
- Build data analytics competencies
- Utilize mobile and cloud-based tools for real-time coordination
- Integrate IT across all M&E (Monitoring & Evaluation) frameworks

5.5.4 Building Holistic Capabilities

Since SCI, SSCP, and ITC jointly enhance performance, INGOs should pursue integrated capacity-building strategies rather than treating these functions in isolation.

5.6 Policy Implications

Policymakers and donors can play pivotal roles in enabling systemic improvement:

For Donors

- Provide multi-year funding to support integration and IT capability development
- Incentivize sustainability reporting and carbon-neutral logistics

For Government Agencies

- Facilitate national data-sharing systems and digital infrastructure
- Support standardized cluster coordination mechanisms

For INGO Networks

- Develop shared procurement and logistics hubs
- Create sector-wide sustainability standards and performance benchmarks

5.7 Limitations of the Study

1. **Geographical Scope:** Restricted to INGOs operating in Pakistan.
2. **Cross-sectional Design:** Limits causal interpretation.
3. **Self-Reported Data:** May include perceptual bias.
4. **Exclusion of External Variables:** Environmental or political uncertainty not modelled.

5. **Sample Size:** Adequate for PLS-SEM but not large enough for subgroup comparisons.

5.8 Recommendations for Future Research

1. Examine the moderating roles of donor dependency, environmental turbulence, or organisational culture.
2. Employ longitudinal or mixed-method designs to observe dynamic changes over time.
3. Conduct comparative studies between INGOs and local NGOs across multiple countries.
4. Explore emerging technologies (e.g., AI, blockchain, predictive analytics) in humanitarian SCM.
5. Develop new, context-specific measurement scales for nonprofit supply chain performance.

5.9 Conclusion

This study provides robust empirical evidence that Supply Chain Integration, Sustainable Supply Chain Practices, and IT Capability individually and collectively enhance INGO performance in Pakistan's humanitarian sector. The integration of sustainability and technology into supply chain processes enhances efficiency, accountability, and responsiveness.

By uniting the Resource-Based View and Dynamic Capabilities perspectives, the study demonstrates that performance stems not merely from possessing resources but from dynamically deploying and integrating them. Practically, INGOs that adopt an integrated, sustainable, and technologically empowered model can achieve operational resilience, donor trust, and long-term societal impact.

Overall, this research extends the theoretical foundation of humanitarian supply chain management and provides actionable insights for strengthening the agility and sustainability of humanitarian organizations operating in challenging environments.

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Appendix

Questionnaire: The Effects of Supply Chain Integration, Sustainable Supply Chain Practices, and IT Capability on INGO's Performance: Empirical Evidence from Pakistan's Humanitarian Sector

Section A – Demographic Information

Please tick the appropriate option:

1. **Gender**
   ☐ Male ☐ Female ☐ Prefer not to say
2. **Age**
   ☐ 20–29 ☐ 30–39 ☐ 40–49 ☐ 50+
3. **Education Level**

   ☐ Bachelor's ☐ Master's ☐ PhD or higher
4. **Work Experience (in INGO sector)**

   ☐ Less than 1 year ☐ 1–3 years ☐ 4–6 years ☐ More than 6 years

Section B – Research Constructs

Core Study Variables (5-Point Likert Scale)

Instructions: For each statement below, please indicate your level of agreement on a scale from **1 (Strongly Disagree) to 5 (Strongly Agree).** These statements relate to the key factors examined in this study (Supply Chain Integration, Sustainable Supply Chain Practices, and IT Capability) and are based on established indicators from the literature.

Instructions:
Please indicate your level of agreement with each of the following statements using the 5-point Likert scale provided.

Scale	Description
1	Strongly Disagree
2	Disagree
3	Neutral
4	Agree
5	Strongly Agree

B1.Effect of Supply Chain Integration (SCI) on INGO Performance

No.	Statement	1	2	3	4	5
SCI1	Our organization integrates real-time supply-chain information, such as demand forecasts and stock levels, to guide decisions, and this integration has improved our organization's performance.	☐	☐	☐	☐	☐
SCI2	We engage in joint planning with suppliers and distribution partners, and this approach has improved our organization's performance.	☐	☐	☐	☐	☐
SCI3	Internal departments' well-integrated collaborations have improved our organization's performance.	☐	☐	☐	☐	☐
SCI4	Synchronization in workflows across the supply chain to ensure efficient aid delivery positively impacts an organization's performance.	☐	☐	☐	☐	☐
SCI5	Our organization collaborates with donors and NGOs to plan humanitarian deliveries, which has a positive impact on our overall performance.	☐	☐	☐	☐	☐
SCI6	Our supply chain integration, from procurement to distribution, has a positive impact on our organization's optimized performance	☐	☐	☐	☐	☐

B2. Effect of Sustainable Supply Chain Practices (SSCP) on INGO Performance

No.	Statement	1	2	3	4	5
SSCP1	Using environmentally friendly materials in procurement enhances our organization's performance.	☐	☐	☐	☐	☐
SSCP2	Reducing waste and environmental impact in logistics improves our organization's performance.	☐	☐	☐	☐	☐
SSCP3	Ethical and socially responsible supplier selection enhances our organization's performance.	☐	☐	☐	☐	☐
SSCP4	Using energy-efficient, low-impact delivery methods enhances our organization's performance.	☐	☐	☐	☐	☐
SSCP5	Minimizing environmental and social impacts in our supply chain improves our organization's performance.	☐	☐	☐	☐	☐
SSCP6	Measurable sustainability goals enhance our organization's performance.	☐	☐	☐	☐	☐

B3. Effect of IT Capability (ITC) on INGO Performance

No.	Statement	1	2	3	4	5
ITC1	Using IT systems to monitor inventory and shipments in real time improves our organization's performance.	☐	☐	☐	☐	☐
ITC2	Seamless information sharing with donors, suppliers, and	☐	☐	☐	☐	☐

	partners improves our organization's performance.					
ITC3	Trained and competent staff in the use of IT tools for supply chain activities will improve our organization's performance.	☐	☐	☐	☐	☐
ITC4	Using integrated platforms to connect departments and stakeholders improves our organization's performance.	☐	☐	☐	☐	☐
ITC5	Regular investment in supply chain technologies and infrastructure improves our organization's performance.	☐	☐	☐	☐	☐
ITC6	IT systems that support data-driven decision-making improve our organization's performance.	☐	☐	☐	☐	☐

B4. The Effects of Supply Chain Integration, Sustainable Supply Chain Practices, and IT Capability on International Nongovernmental Organization Performance (INGO)

No.	**Statement**	**1**	**2**	**3**	**4**	**5**
INGOP1	Timely and reliable aid delivery enhances our organization's performance.	☐	☐	☐	☐	☐
INGOP2	Efficient resources use in our supply chain improves our organization's performance.	☐	☐	☐	☐	☐
INGOP3	Beneficiary and donor satisfaction improve our organization's performance.	☐	☐	☐	☐	☐
INGOP4	Adapting quickly to changing needs and emergencies improves our organization's performance.	☐	☐	☐	☐	☐
INGOP5	Cost-effective supply chain operations that do not compromise quality improve our organization's performance.	☐	☐	☐	☐	☐
INGOP6	Achieving our mission through effective supply chain management improves our organization's performance.	☐	☐	☐	☐	☐

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Name of Student(s)	Aamnah Hayat
Enrollment No.	01-322241-001
Thesis/Project Title	The Effects of SCI, SSCP, ITC, on ING O performance: Empirical evidence from pakistan Humanitaia sector

Supervisor Student Meeting Record

No.	Date	Place of Meeting	Topic Discussed	Signature of Student
1	16th Sep	Supervisor's office	Discussed intro part	
2	30th Sep	〃	Literature Review	
3	14th Oct	〃	Methodology	
4	6th Nov	〃	Survey Questions	

Progress Satisfactory ☑ Progress Unsatisfactory ☐

Remarks: _____

Signature of Supervisor: _____ Date: 6th November 2023

Name: Hina Sandani Note:

Students attach 1st & 2nd half progress report at the end of spiral copy.

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RC-04

MBA

2nd Half Semester Progress Report & Thesis Approval Statement

Name of Student(s)	Aamnah Hayat
Enrollment No.	01-322241-001
Thesis/Project Title	The Effects of SCI, SSCP, ITC on INGOs performance: Empirical evidence from Pakistans Humanitarian sector

Supervisor Student Meeting Record

No.	Date	Place of Meeting	Topic Discussed	Signature of Student
5	11 Nov	Supervisor's office	Data Analysis	
6	2 Dec	"	Results & Discussion	
7	16th Dec	"	Final Plagiarism Testing	

APPROVAL FOR EXAMINATION

Candidates' Name: Aamnah Hayat Enrollment No: 01-322241-001

Project/Thesis Title: The Effects of SCI, SSCP, and IT Capability on INGOs performance: Empirical Evidence from Pakistans Humanitarian Sector

I hereby certify that the above candidates' thesis/project has been completed to my satisfaction and, to my belief, its standard appropriate for submission for examination. I have also conducted plagiarism test of this thesis using HEC prescribed software and found similarity index at 14% that is within the permissible limit set by the HEC for thesis/ project BBA/MBA. I have also found the thesis/project in a format recognized by the department of Business Studies.

Signature of Supervisor: _____ Date: 16th - December -2025

Name: Hina Samdani

Major No. S-2

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3. Student Name: _____ Enrol #_____

Specialization: Supply Chain Management

Name of Supervisor: Ms. Hina Samdani

Examiner's Instructions: Please fill in the following details.

No.	*Corrections required (Suggested by Examiners)*	*Amendments made*	*Located on Page*
Chapter 1			
	Adjust your R.Q, R. objective with		
	Hypothesis.		
Chapter 2			
Chapter 3			
	- Provide justification of Sampling Techniques.		
	- Measurement - ~~Data~~ at Page #1 of chapter #3 &		
	3.7 heading may align.		
	- Provide justification for Unit of analysis.		
Chapter 4			
	Tables formed according to APA		
	Add results of Hypothesis #4.		

Chapter 5			
	No need to repeat results in Ch# 5.		
-	Justify your results with proper Refs.		
-	Club your Ch# 5 & Ch # 6.		
Executive Summary/Abstract			
General Comments			

** *Please add rows if necessary*

I have ammended all the points raised for correction.

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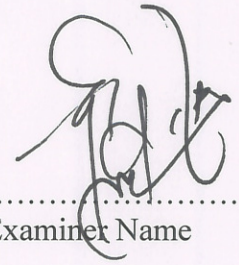

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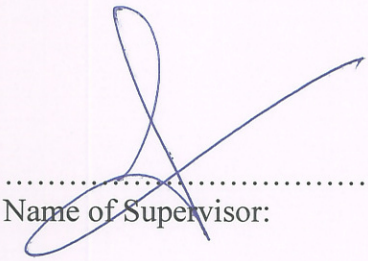

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