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PHD PROGRAM IN CONTEMPORARY MANAGEMENT STUDIES

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THE IMPACT OF SUPPLY CHAIN INTEGRATION ON PERFORMANCE IN HUMANITARIAN ORGANIZATIONS

SUPERVISOR

Assist. Prof. Dr. Gamze KARAYAZ

ISTANBUL, January 2026

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ÖZET

İNSANI YARDIM KURULUŞLARINDA TEDARIK ZINCIRI ENTEGRASYONUNUN PERFORMANS ÜZERINDEKI ETKISI

İnsani yardım tedarik zincirleri, aşırı belirsizlik koşulları, daraltılmış zaman dilimleri ve çok paydaşlı karmaşık koordinasyon gereksinimleri altında faaliyet göstermekte olup, hızlı ve uyarlanabilir teslimatın sağlanamaması yaşamla ölüm arasındaki farkı belirleyebilmektedir. Buna karşın, tedarik zinciri entegrasyonu (TZE) kuramlarının büyük bölümü ticari ve piyasa odaklı bağlamlara dayalıdır ve insani yardım operasyonlarını açıklamada sınırlı kalmaktadır. Bu çalışma, kriz müdahalesinin kendine özgü yapısal, etik ve zamansal gerçekliklerini yansıtan, insani yardıma özgü bir TZE çerçevesi geliştirerek ve bunu ampirik olarak doğrulayarak bu konuyu ele almaktadır.

Bu çalışmada, paydaş kuramı, dinamik yetkinlikler ve durumsallık kuramından hareketle, yararlanıcı entegrasyonu, içsel entegrasyon, tedarikçi entegrasyonu, kamu (hükümet) paydaşlarının entegrasyonu ve STK ortaklarının entegrasyonunu kapsayan, yeni bir entegrasyon modeli önerilmektedir. Çalışmayı ayırt edici kılan unsur, etkilenen nüfusun pasif yardım alıcıları yerine tedarik zincirinin merkezi paydaşları olarak açık biçimde yeniden kavramsallaştırılması ve yararlanıcı entegrasyonunun yalnızca normatif bir ilke değil, operasyonel performansın birincil belirleyicisi olduğunu ampirik olarak göstermesidir. Karma yöntemli bir araştırma tasarımı benimsenmiş; Birleşmiş Milletler Yakın Doğu'daki Filistin Mültecileri için Yardım ve Çalışma Ajansı (UNRWA) personelinden, krizden etkilenen beş ülkede (Gazze, Batı Şeria, Lübnan, Suriye ve Ürdün) toplanan anket verileri, nicel bulguları doğrulamak ve zenginleştirmek amacıyla uzman görüşmeleriyle birleştirilmiştir.

Bulgular, entegrasyon–performans ilişkisinin farklılaşmış ve analiz edilen bağlamda duyarlı olduğunu göstermektedir. Önerilen beş entegrasyon boyutunun tamamı teslim süresi (lead time) üzerinde olumlu etki yaratmakla

birlikte, yararlanıcı entegrasyonu hem teslim süresinin azaltılmasında hem de esnekliğin artırılmasında en güçlü belirleyici olarak öne çıkmaktadır. İçsel entegrasyon, özellikle esneklik üzerinde güçlü bir etki sergileyerek, değişken ortamlarda fonksiyonlar arası koordinasyonun ve örgütsel çevikliğin önemini vurgulamaktadır. Buna karşılık, tedarikçi entegrasyonu verimliliği artırmakla birlikte uyum sağlama konusunda sınırlı katkı sağlamaktadır; bu durum, insani yardım tedarik sistemlerinde yapısal bir paradoksu açığa çıkarmaktadır. Kamu ve STK ortaklarının entegrasyonu ise doğrudan performans artışı yerine meşruiyet ve erişim sağlayan kolaylaştırıcı koşullar olarak işlev görmektedir.

Bu çalışma dört özgün katkı sunmaktadır. Birincisi, TZE kuramını ticari bağlamların ötesine taşıyarak yüksek belirsizlik içeren insani yardım ortamlarına genişletmektedir. İkincisi, yararlanıcı entegrasyonunu ayrı, doğrulanmış ve performans açısından kritik bir yapı olarak tesis etmektedir. Üçüncüsü, insani yardım operasyonlarına uyarlanmış, yalın ancak güçlü bir teslim süresi–esneklik performans çerçevesi sunmaktadır. Dördüncüsü ise, entegrasyon değerinin afet evreleri ve operasyonel bağlamlara göre nasıl değiştiğini açıklayan Entegrasyon–Performans Durumsallık Çerçevesi'ni geliştirmektedir. Bu katkılar ,insani yardım kuruluşları, politika yapıcılar ve bağışçılar için giderek karmaşıklaşan kriz müdahale operasyonlarında hız, uyarlanabilirlik ve etkililiği artırmaya yönelik hem yeni bir kuramsal bakış açısı hem de uygulanabilir tavsiyeler sağlamaktadır.

Anahtar Kelimeler: İnsani Yardım Tedarik Zinciri Entegrasyonu, Dinamik Yetkinlikler, Entegrasyon–Performans İlişkisi, Teslim Süresi–Esneklik Çerçevesi, İnsani Yardım Operasyonları

ABSTRACT

THE IMPACT OF SUPPLY CHAIN INTEGRATION ON PERFORMANCE IN HUMANITARIAN ORGANIZATIONS

Humanitarian supply chains operate under conditions of extreme uncertainty, compressed timeframes, and complex multi-stakeholder coordination, where failure to deliver rapidly and adaptively can have life-or-death consequences. Despite this, most supply chain integration (SCI) theories remain rooted in commercial, market-driven contexts and offer limited explanatory power for humanitarian operations. This study addresses this gap by developing and empirically validating a humanitarian-specific SCI framework that captures the distinctive structural, ethical, and temporal realities of crisis response.

Drawing on stakeholder theory, dynamic capabilities, and contingency theory, the research proposes a novel five-construct integration model encompassing beneficiary, internal, supplier, government, and partner integration. What distinguishes this study is its explicit reconceptualization of affected populations as central supply chain stakeholders rather than passive aid recipients, and its empirical demonstration that beneficiary integration is not merely a normative principle but a primary driver of operational performance. Using a mixed-methods design, the study combines a survey data from United Nations Relief and Works Agency (UNRWA) staff across five crisis-affected contexts (Gaza, West Bank, Lebanon, Syria, and Jordan) with expert interviews to validate and enrich the quantitative findings.

The results reveal a differentiated and context-sensitive integration–performance relationship. While all five integration dimensions positively influence lead time, beneficiary integration emerges as the strongest determinant of both lead time reduction and flexibility enhancement. Internal integration exerts a particularly powerful effect on flexibility, underscoring the role of cross-

functional coordination and organizational agility in volatile environments. In contrast, supplier integration improves efficiency but contributes minimally to adaptability, exposing a structural paradox in humanitarian procurement systems. Government and partner integration function primarily as enabling conditions, providing legitimacy and access rather than direct performance gains.

The study makes four original contributions. First, it extends SCI theory beyond commercial settings into high-uncertainty humanitarian environments. Second, it establishes beneficiary integration as a distinct, validated, and performance-critical construct. Third, it introduces a parsimonious yet powerful lead time–flexibility performance framework tailored to humanitarian operations. Fourth, it advances an Integration Performance Contingency Framework that explains how integration value varies across disaster phases and operational contexts. Together, these contributions offer both a new theoretical lens and actionable guidance from a practical perspective for humanitarian practitioners, policy makers, and donors seeking to enhance speed, adaptability, and effectiveness in increasingly complex crisis response operations.

Keywords: Humanitarian Supply Chain Integration, Dynamic Capabilities, Integration-Performance Relationship, Lead Time-Flexibility Framework, Humanitarian Operations

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ABBREVIATIONS LIST

BOM: Bill of Materials

CDF: Collaborative Development Framework

CS: Case Study

GSCF: Global Supply Chain Forum

ERP: Enterprise Resource Planning

HSCM: Humanitarian Supply Chain Management

HSCI: Humanitarian Supply Chain Integration

KPI: Key Performance Indicator

IoT: Internet of Things

LT /T: Lead Time

LTA: Long terms Agreement

OS: Organization Structure

PO: Purchase Order

RFP: Request for Proposal

SC: Supply Chain

SCO: Supply Chain Operations

SCI: Supply Chain Integration

SCM: Supply Chain Management

UN: The United Nations

UNRWA: The United Nations Relief and Works Agency

CHAPTER 1

1. INTRODUCTION

1.1.BACKGROUND

In today's highly competitive global economy, businesses are constantly seeking ways to gain a sustainable competitive advantage over their rivals (Alharthi, 2012). The term competitive advantage refers to an organization's ability to outperform its competitors in the same industry by generating higher revenues, achieving lower costs, or providing more value to customers (Coyne, 1986). Meanwhile sustainability, as defined by Brundtland, refers to development that fulfills the needs of the present without compromising the ability of future generations to meet their own needs (Nassos & Avlonas, 2020).

Some organizations narrow their strategic focus to a single aspect of sustainable competitive advantage, often fixating on factors like pricing or responsiveness to customer needs (Adner & Zemsky, 2006). However, overlooking the broader spectrum of competitive advantage can prove detrimental in the long run (Porter , 2008). For instance, a retail chain might aggressively slash prices to attract customers in the short term, but without attention to quality or brand reputation, they risk devaluing their products and damaging profitability over time. Similarly, a tech firm might prioritize immediate responsiveness to customer inquiries but neglect investments in innovation and product development, eventually losing relevance in a fast-evolving market. In both cases, these companies fail to recognize the holistic nature of sustainable competitive advantage, leading to their premature exit from the competitive arena.

Therefore, it's imperative for businesses to embrace a comprehensive strategy that encompasses various elements such as quality, innovation,

customer experience, and operational efficiency to secure their longevity in the marketplace (Jaynie & William, 2006).

The efficacy of methods for achieving sustainable competitive advantage depends on the capacity of the organization to adapt environmental changes and sustain its competitive advantage over time (Fahy, 2002). To achieve this goal, researchers suggest that organizations should undertake a complete reformulation of their business practices and operational structures to enable effective engagement with the environment. Such approaches include the development of an internal structure that integrates human resource management practices (Ulrich & Lake, 1991), or the enhancement of financial and technological capabilities (Libecap & Thursby, 2008).

Ultimately, the success of these methods rests on their ability to help organizations maintain a sustainable competitive advantage over the long term (Kak, 2002). However, it is crucial to recognize that attaining sustainable competitive advantage requires a multifaceted approach that accounts for both internal and external factors (Jaynie & William, 2006). A customized strategy tailored to the unique context of the organization is crucial to fostering the emergence of sustainable competitive advantage (Porter , 2008). Supply Chain Management (SCM) could serve as a valuable tool in integrating all elements and processes, enabling the implementation of a tailored strategy (Markley & Davis, 2007). Thus, effective supply chain management is considered one of the primary means for achieving sustainable competitive advantage. Supply chain management involves the coordination and management of all activities involved in the production and delivery of goods and services, from raw material sourcing to the delivery of finished products to customers (Oliver & Webber, 1982). The effective management of the supply chain can lead to cost savings, improved customer service, and increased profitability which are key elements to achieve sustainable competitive advantage (Markley & Davis, 2007).

Thus, numerous scholars have emphasized the importance of supply chain management in improving organizational performance. For example, Schliephake, Stevens, and Clay (2009) argued that supply chain management

plays a crucial role in repositioning organizations, while Craig, Hult, and Ketchen (2009) suggested that an innovative supply chain can contribute to superior organizational performance. Additionally, studies by Todd and McGrath (PRTM), on integrated supply chain benchmarking and supply chain operations reference model, shows that the gap in performance between organizations becomes more wide and this gap cannot be bridged with no efficient supply chain where organizations pay less for a well-structured supply chain which enables the organization to outperform its competitors (Stewart, Supply-chain operations reference model, 1997).

Therefore, researchers have been studying over the years how to involve the strategic alignment of functions and processes of supply chain to have better performance through a true design of supply chain that can achieve cost reduction and reduced lead time. And that is mainly a focus on which part of supply chain plays the most important role in leverage the performance (Markley & Davis, 2007). An example is the one that considers the role of information technology (IT) as the most important aspect in supply chain management. IT has become increasingly important in facilitating the integration of various supply chain processes and functions. Research has shown that the effective implementation of IT can lead to significant improvements in supply chain performance, such as cost reduction and reduced lead time. IT can also improve communication and collaboration between supply chain partners, leading to more efficient and effective supply chain management (Kim, Cavusgil, & Cavusgil, 2013).

Moreover, the integration of IT infrastructure into the supply chain can help maintain the performance gains achieved through the implementation of IT. This is because IT infrastructure provides a foundation for the continued implementation and management of IT systems and processes (Rai, Patnayakuni, & Seth, 2006). However, it is important to note that the integration of IT into the supply chain must be done in a way that is aligned with the overall business strategy and goals.

In addition to the role of IT, there is growing interest in green supply chain management as a way to improve supply chain performance while also addressing environmental concerns. Green supply chain management refers to the design, implementation, and management of environmentally friendly supply chain practices (Hervani, Helms, & Sarkis , 2005). A research has shown that implementing green supply chain practices can lead to significant improvements in supply chain performance, such as cost reduction, improved quality, and increased customer satisfaction (Diabat & Govindan, 2011). To implement green supply chain practices, organizations need to identify the drivers that affect the adoption of these practices. Drivers can include factors such as regulatory pressures, customer demand, and corporate social responsibility initiatives (Diabat & Govindan, 2011). By identifying and addressing these drivers, organizations can successfully implement green supply chain practices and reap the benefits.

Resilience is another important aspect of supply chain management that has gained increased attention in recent years (Abe & Ye, 2013). Resilience refers to the ability of the supply chain to respond effectively to disruptions, such as natural or human disasters (Linnenluecke, 2017). To build a resilient and robust supply chain, organizations need to consider both internal and external parameters. Internal parameters can include factors such as supply chain design, risk management practices, and supplier selection processes. External parameters can include factors such as government policies, environmental factors, and economic conditions (Abe & Ye, 2013).

Finally, the integration of supply chain processes and functions has been identified as a critical factor in achieving supply chain performance (Trkman, Indihar , & Jaklic, 2007). Integration can be achieved through vertical and horizontal integration or by both directions (Caputo & Valeria , 1996).

Vertical integration involves integrating processes and functions within the same organization by expanding its operations into different stages of the supply chain, from raw material acquisition to distribution and retail. For example, a coffee company might acquire coffee plantations, processing

facilities, and retail outlets to gain control over the entire coffee production and distribution process. By vertically integrating, the company can ensure quality control at every stage, optimize costs, and minimize dependence on external suppliers (Kesidou & Sorell, 2018)

On the other hand, horizontal integration involves integrating processes and functions across different organizations by merging with or acquiring other organizations at the same stage of the supply chain (Cai & Ichiro , 2009). For instance, an automotive manufacturer may horizontally integrate by acquiring other car manufacturers or parts suppliers. This consolidation allows for economies of scale, shared resources, and enhanced collaboration in research and development, leading to greater innovation and cost efficiencies (Wilhelm, 2011). Moreover, horizontal integration can also foster collaboration and coordination among supply chain partners. For instance, a clothing brand might horizontally integrate by partnering with textile manufacturers and logistics companies. By working closely together, these partners can streamline production processes, reduce lead times, and respond more effectively to market demands (Maloni & Benton, 1997).

In essence, while vertical integration offers greater control and efficiency within the supply chain, horizontal integration promotes collaboration and synergy among partners, ultimately leading to enhanced competitiveness and sustainability in the marketplace (Trkman, Indihar, &Jaklic, 2007).

The present study adopts an integration approach to investigate the link of integration between supply chain elements and its performance, specifically focusing on the humanitarian sector and through both dimensions: vertical and horizontal. By examining various aspects of supply chain integration, the aim is to enhance the current understanding of supply chain management in humanitarian business and offer practical insights to humanitarian organizations seeking to improve their performance. Through a thorough analysis of the literature and an evaluation of the impact of supply chain integration on performance, this thesis highlights the critical role that supply chain management plays in promoting organizational competitiveness and improving

performance. Thus, this study provides valuable insights into how organizations, in specific humanitarian ones, can attain sustainable competitive advantage in today's challenging business environment through effective supply chain integration.

In conclusion, effective supply chain management is critical to achieving sustainable competitive advantage in today's challenging business environment. To achieve this, organizations including humanitarian entities need to consider a multifaceted approach that incorporates integration of supply chain processes and functions. By adopting such an approach, organizations can improve their supply chain performance and ultimately achieve long-term success.

1.2.STATEMENT OF PROBLEM

The humanitarian organizations are responsible for delivering critical supplies, including food, medicines, and other humanitarian aid, to vulnerable communities during natural and man-made disasters around the world (Queiroz, Renato, & Silvia , 2020). Supply chain cannot be considered only as the center of any humanitarian response to increasing conflict around the world; but it is also the most expensive part. Sixty to eighty per cent of the cost of humanitarian aid is a cost related to supply chain (OCHA, 2015). Therefore, the supply chain of humanitarian organizations should act at a high performance in order to be responsive and cost effectiveness and at the same extent should avoid as much as possible any disruption or break in supplies or commodities.

In recent decades, the effectiveness of humanitarian supply chains has been hindered by a multitude of challenges, leading to suboptimal performance in delivering essential supplies to those in need. According to WFP (2013), there are several examples of shortcomings in the supply chain of humanitarian organizations. Procurement delays are a pervasive issue, often arising from complex bureaucratic processes and cumbersome procurement procedures. Such delays can generate shortages of critical supplies and significantly constrain an organization’s ability to respond rapidly during emergencies. Transportation and

logistics pose additional challenges, particularly in remote or conflict-affected areas where poor infrastructure, political instability, and heightened security risks impede the movement of supplies and contribute to further delays and shortages. Limited and unpredictable funding compounds these problems, as humanitarian organizations depend heavily on donor support; funding shortfalls frequently delay procurement processes and restrict the overall response capacity. Quality control concerns also undermine supply chain performance, as the procurement of supplies from diverse and sometimes unreliable sources can result in products that fail to meet established standards, necessitating rejections or causing further delays. Moreover, inadequate information management systems exacerbate these challenges, as weak data management practices and outdated systems impair the tracking and coordination of supplies, leading to errors and inefficiencies in delivery.

At present, numerous instances illustrate how humanitarian organizations have been unable to respond promptly to crises, experiencing supply shortages or resorting to the provision of assistance at substantially higher costs.

One of common examples is the earthquake disaster occurred in Pakistan on October 8th, 2005. the earthquake was a massive with a magnitude of 7.6 on Richter scale hit 95 kilometers northeast of the capital Islamabad, affecting all region of South Asia including Afghanistan and India. Ripple of following earthquakes continued for next few months. The earthquake had a sever impact on the people, 73,000 persons were killed, and 3.5 million individuals were internally displaced. Despite all efforts exerted by humanitarian organizations and the local government, however supply chain of humanitarian relief needs failed to respond specially in remote villages (Gattorna, 2016).

A similar incident of the Turkey-Syria earthquake unfolded on February 6th, 2023, causing widespread devastation to critical logistics infrastructure. According to the Turkish authorities, key ports and near airports had a severe damage. Unusable highways rendering truck transportation virtually impossible due to impassable roads. Concurrently, power outages disrupted industrial output, leading to substantial delivery delays and bringing the whole supply

chain to a bottleneck (Turkishmaritime, 2024). These impressive challenges have triggered significant delays in the delivery of essential goods, resulting in severe bottlenecks within the humanitarian supply chain. Regrettably, this impacts the timely delivery of life-saving materials to the affected people in dire need (Kowalczyk, 2023).

Also, one of recent examples, in 2020, the World Health Organization (WHO) faced significant challenges in its supply chain for personal protective equipment (PPE) during the COVID-19 pandemic. The global demand for PPE surged, leading to shortages and delays in the procurement and delivery of supplies. The WHO called for urgent action to address these challenges and improve the availability of PPE for health workers around the world (WHO, 2020).

Another example in 2018, the United Nations Children's Fund (UNICEF) faced challenges in its supply chain for vaccines in several countries. In Nigeria, one of the clear examples, delays in the procurement and distribution of vaccines led to shortages, and some children were not vaccinated on schedule. The agency worked with the government and other partners to address these challenges and ensure that children received the vaccines they needed (unicef, 2022).

And last but not least, another example of World Food Programme (WFP), in 2017, when faced transportation and logistics challenges in delivering food assistance to vulnerable communities in Yemen. The ongoing conflict and poor coordination with the two local governments in the country made it difficult to access some areas, and the agency had to rely on airdrops to deliver supplies. However, airdrops are expensive and can be challenging to coordinate, resulting in delays and shortages (WFP, 2022).

Based on the previously mentioned review, it is apparent that the efficiency and responsiveness of the humanitarian supply chain can be hindered by numerous challenges. In a study conducted on 40 humanitarian organizations operating in Kenya, five factors were identified as contributing to these challenges: unclear definition of the role of supply chain management in humanitarian operations, interruptions in the operation caused by domestic

barriers, uncertainty in demand due to unforeseen emergencies, difficulty in accessing targeted beneficiaries, and fluctuation in material prices due to increased demand (Nyamu, 2012).

The research problem derives from the context described above. Challenges in supply chain management of humanitarian organizations are increasing by high level of uncertainty in the environment while there is a global limitation in performance of the humanitarian supply chain. This condition can be interpreted by the lack of efforts in humanitarian supply chain design, which reflects negatively on the operation and results in poor services provision.

This study addresses a critical gap in the existing literature by proposing a structured and contextualized framework for designing high-performing supply chains tailored specifically for humanitarian organizations. Unlike current literature, which primarily focuses on supply chain models for public or private entities, this research introduces a comprehensive model integrating five key constructs: beneficiary integration, supplier integration, government and political stakeholder integration, partner organization integration, and internal integration. Further elaboration on these constructs will be provided in Chapter Two.

1.3.MOTIVATION FOR RESEARCH

The main motivation for conducting this research was initiated from the challenges that the researcher encountered while working for more than twenty years in supply chain management for the United Nations organizations, trying to identify gaps and shortfalls, and propose solutions to improve performance of humanitarian supply chain management structure.

Till the time of doing this research, there have been minimum focus on empirical studies investigating a model for integration of humanitarian supply chain. Furthermore, the field of humanitarian supply chain integration is still an immature level of research which generates a motivation for the researcher's

genuine desire to contribute to the best practices of humanitarian organizations operation in scope of supply chain.

1.4.RATIONALE OF STUDY

Despite the literature is rich with many studies highlight the importance of supply chain integration, but still, most of researches give a focus on public and industrial sectors. Moreover, some scholars judge that the theory of supply chain integration is still under developing and there is a lack of agreement on supply chain integration constructs which result in inconsistent findings and recommendations (Fallahpour, Yew Wong, & Rajoo, 2021) (Danese, Romano, & Marco, 2013). This research suggests that literature findings have been affected by several factors including thematic qualities of integration, constructs of integration and the notion of organization and its scope.

There is a need to contribute to elimination of a gap in the literature to approach the positive effect of integration on supply chain elements of humanitarian or nonprofit organizations which are fairly different either in its scope or work scheme from private or public sectors (The United Nations Global Compact, 2008).

The importance of this study is derived from the knowledge value it can be provided to practitioners including decision makers of nonprofit organizations to improve the performance of humanitarian supply chain and though, these organizations can act in more responsive and effective flexible manners. This can impact on the level of services and assistance provided to beneficiaries. It can also achieve efficiency by getting the best value of scarcity resources which returns in value to the whole society.

The model proposed by this research, can be used as a framework to identify problems and challenges associated with construction of supply chains in humanitarian context and involving right practices to lead improvements in construction supply chain.

The study also draws the attention of researchers to give more focus on how to improve almost all areas of humanitarian business which is not less importance than the private and public sectors.

In addition, this research provides some directions for future research in the field of humanitarian supply chain development.

1.5.RESEARCH OBJECTIVES

The study aims to test if supply chain performance can be attained by applying integration on the proposed five constructs of the supply chain of humanitarian organizations. To fulfil the research aim, there are the following two objectives:

- To develop a theoretical framework for integrating supply chain of the humanitarian organization's internal departments with its external supply chain tires including suppliers, customers, government and partnering organizations.
- To empirically validate that the model of humanitarian supply chain integration constructs is interrelated with performance of humanitarian supply chain.

1.6.RESEARCH CONTRIBUTION

This research is expected to make several substantive contributions to the field of humanitarian supply chain management and, more broadly, to supply chain theory and practice. First, it seeks to advance theoretical understanding of humanitarian supply chain integration by providing a multidimensional examination of the relationships among internal operations, suppliers, beneficiaries, governments, and partnering organizations. By conceptualizing supply chain integration as a dynamic and systemic process rather than a set of isolated activities, the study offers a more comprehensive framework for understanding how integration unfolds in complex humanitarian environments.

Second, the research addresses the operational differences between supply chain concepts in the public and private sectors and those applied by humanitarian organizations. While commercial supply chains typically prioritize efficiency, cost reduction, and profit maximization, humanitarian supply chains are often driven by principles of equity, urgency, and the alleviation of human suffering. By systematically comparing these approaches, the study provides insights into how established supply chain practices can be adapted or transformed to suit the unique objectives and constraints of humanitarian contexts.

Third, the study contributes to bridging a critical gap in the understanding of supply chain performance in humanitarian operations. Existing metrics of supply chain effectiveness, largely derived from commercial or public-sector models, do not adequately capture the priorities of humanitarian organizations such as timeliness, flexibility, beneficiary satisfaction, and equity of resource distribution. By developing and testing context-specific performance indicators, this research provides a set of metrics tailored to the realities of humanitarian supply chains, enabling more precise performance measurement and management.

Fourth, the study adopts a novel methodological approach by analyzing data derived from a concurrently functioning humanitarian supply chain. This real-time and context-sensitive analysis moves beyond retrospective or hypothetical case studies, offering a richer and more empirically grounded understanding of how integration operates under actual field conditions. Such an approach allows for the identification of causal mechanisms, interdependencies, and bottlenecks that may not be apparent in more traditional research designs.

Fifth, the research develops an empirically based model of humanitarian supply chain integration aimed at improving operational performance. By drawing on both theoretical insights and real-world data, the model provides a practical and evidence-based tool for decision-makers and practitioners seeking to enhance coordination, responsiveness, and resource utilization in humanitarian operations.

Finally, the study provides actionable recommendations for maximizing the use of scarce resources through more effective integration practices. By clarifying the processes, structures, and relationships that facilitate successful integration, it offers humanitarian organizations a roadmap for optimizing their supply chains under conditions of chronic resource scarcity and operational uncertainty. Together, these contributions are intended to advance both scholarly understanding and practical implementation of humanitarian supply chain integration, ultimately supporting more timely, efficient, and equitable responses to crises.

1.7.RESEARCH QUESTIONS

The main question is "*How supply chain integration should be shaped to enhance the SC performance in humanitarian organizations?"*

And there are five sub questions as follows:

- Is there a relation between Beneficiary integration and humanitarian supply chain performance?
- Is there a relation between Supplier integration and humanitarian supply chain performance?
- Is there a relation between government and political stakeholder's integration and humanitarian supply chain performance?
- Is there a relation between partner organizations integration and humanitarian supply chain performance?
- Is there a relation between internal integration and humanitarian supply chain performance?

1.8.THESIS STRUCTURE

This thesis is organized into six chapters, each systematically designed to address the research objectives and ensure a logical progression of analysis and findings. The structure of the thesis is outlined as follows:

Chapter 1: Introduction

This chapter establishes the foundation of the study by presenting its background and research context. It explains the motivation behind the research, identifies gaps in the existing literature, and clearly defines the research aim and objectives. The chapter also emphasizes the academic and practical significance of the study, highlighting its expected contributions.

Chapter 2: Literature Review

This chapter provides a comprehensive review of relevant scholarly literature. It begins with an overview of organizational structures and functions, followed by a focused discussion on humanitarian organizations. The chapter then introduces the theoretical foundations of supply chain management, with particular emphasis on its application in humanitarian contexts. Special attention is given to the five key constructs that underpin the proposed research model.

Chapter 3: Research Model and Methodology

This chapter presents and justifies the proposed research model. It details the development of research hypotheses derived from the literature review and describes the data collection procedures and analytical techniques employed. The chapter also explains the methodological approach used to validate the model and analyze the empirical data.

Chapter 4: Results and Discussion

This chapter reports the results obtained from the data analysis and interprets them in relation to the research questions and objectives. The findings are compared with existing studies, and their theoretical and practical implications are critically discussed. This chapter highlights how the results contribute to advancing knowledge in the field.

Chapter 5: Qualitative Analysis of Expert Interviews

This chapter presents the qualitative analysis of expert interviews conducted as part of the study. It explores key themes and insights derived from practitioners' perspectives, providing deeper contextual understanding and complementing the quantitative findings. The chapter enhances the robustness of the research through triangulation of data sources.

Chapter 6: Conclusion and Recommendations

The final chapter summarizes the main findings of the study in relation to each research objective. It outlines the contributions of the research, acknowledges its limitations, and offers practical recommendations for humanitarian organizations. The chapter concludes by suggesting directions for future research and reflecting on the overall significance of the study.

CHAPTER 2

2. LITERATURE REVIEW

In this chapter, a comprehensive literature review related to the research is presented. The chapter is structured in a logical and coherent manner, consisting of two parts: Organization and Supply chain management. As outlined in Figure 2.1, the first section starts with a background on the definition of an organization and its structure. The concept of uncertainty and contingency theory is then introduced, providing a solid theoretical foundation for the subsequent discussion on the definition of humanitarian or nonprofit organizations. The focus then shifts towards United Nations organizations, including UNRWA, which serves as the context for the empirical analysis conducted in this research.

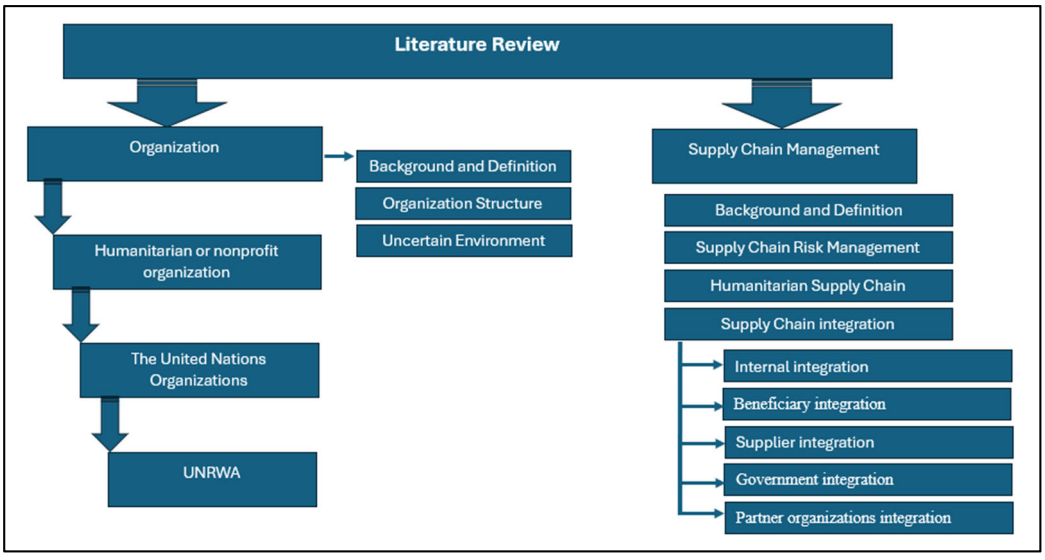

Figure 2.1 Literature Review

The second part of the literature review delves deeper into the concept of supply chain management and integration. The discussion highlights related concepts such as performance and risk management, providing an understanding

of how these concepts relate to supply chain management. Throughout, relevant case studies and examples will be presented to provide a real-world context for the theoretical concepts being discussed.

The five constructs of supply chain integration, namely internal integration, supplier integration, beneficiary integration, internal integration, government integration and finally integration with partnering organization are then thoroughly reviewed. The review provides insights into how these constructs are interrelated and how they can contribute to the effectiveness and efficiency of humanitarian supply chain management. Figure 1 provides an illustration for structure of the second part.

Overall, this chapter provides a solid foundation for the subsequent empirical analysis conducted in the research. The literature review helps to contextualize the research by providing a comprehensive understanding of the relevant concepts and theories related to humanitarian supply chain management and integration, as well as the context in which the empirical analysis takes place.

2.1.ORGANIZATION

2.1.1. Background and Definition

Organizational theory contributes to elaborate on the dynamics of how organization operates and interact with the environment. It also gives an explanation and better understanding of the organization phenomena (Jones, 2013). The organization in a simple definition is “A consciously coordinated social unit, made up of a group of people, that functions on a relatively continuous basis to achieve common goals” (Robbins & Judge , 2005). However, an organization is not merely a physical space where people come together to work. It is also an entity that shapes the identities of individuals within it and instills common values, goals, and culture. In fact, an organization can be thought of as a microcosm of society, with its own unique culture and customs that reflect its purpose, goals, and values (Clegg, Kornberger, & Pitsis, 2016).

One crucial aspect of any organization is its objectives. Every organization exists to create value, whether it be in the form of goods, services, or ideas. The objectives of an organization are the driving force behind its operations, and they determine its overall direction. They also help to define the scope of the organization's activities and the resources it needs to achieve its goals (Jones, 2013).

Ultimately, an organization is a complex social unit that must balance the needs and goals of diverse stakeholders, including employees, customers, shareholders, and society at large. To achieve success, it must also adapt to changing circumstances, embrace innovation, and continuously improve its operations. (Manning, 2017).

Jones (2013) provides a model explains the way that how the organization creates as a result of internal social interaction between its individuals from one side and with its external environment from the other side. The organizational environment can be defined as "the set of forces and conditions that operate beyond an organization's boundaries but affect its ability to acquire and use resources to create value" (Lamotta, 2017). More information may refer to Figure2.2 below.

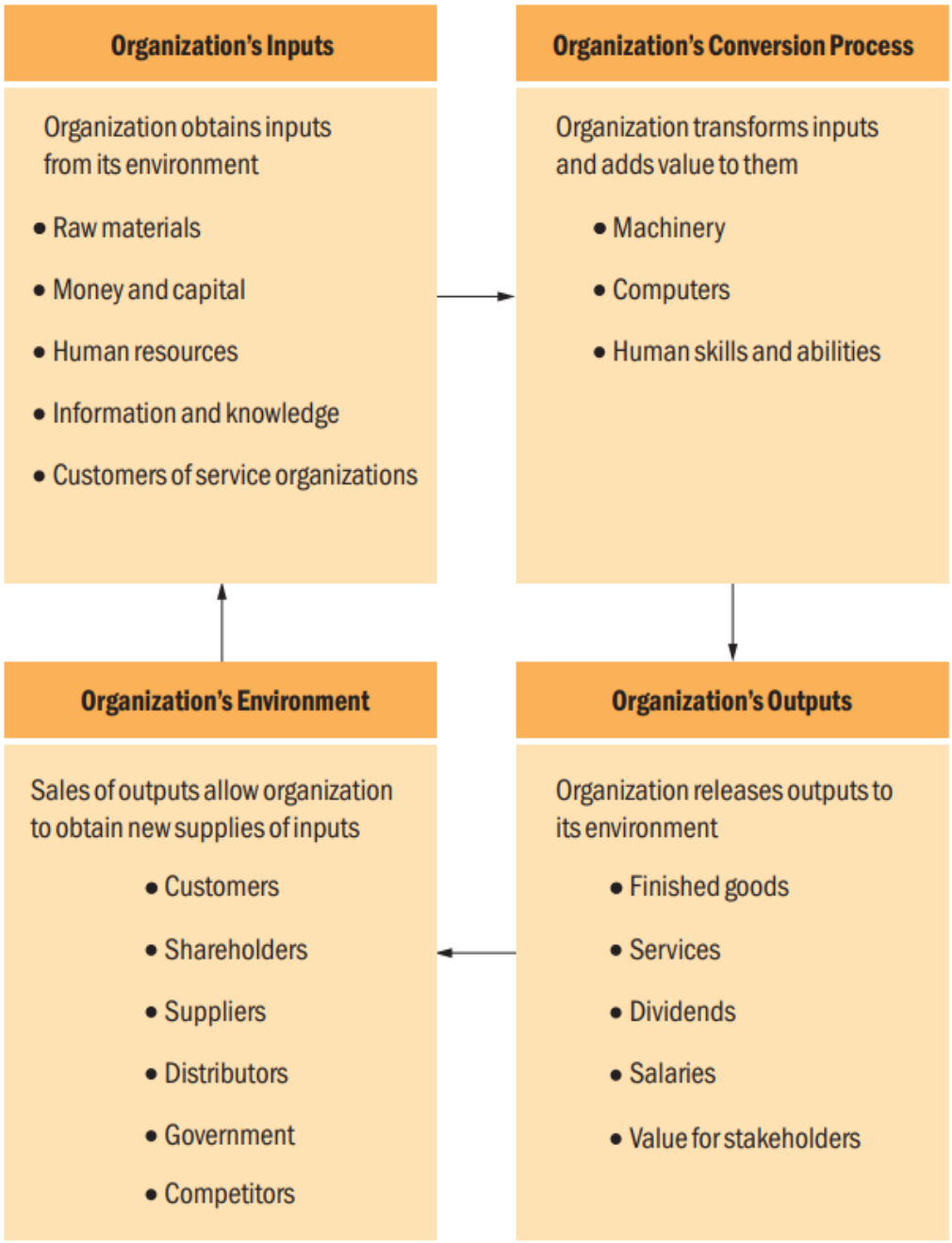

Figure 2.2 How the organization creates value by Jones(2013)

A value-creation model can be used to show how interaction between the organizations' components can generate a value. For example, a computer manufacturing company uses its inputs like manpower, capital, raw materials, its own technology and knowledge to create a personal computer as a product.

This product, or the value, is communicated with the organization's external environment including customers and suppliers in order to create a market for the product.

Jones (2013) justifies the need for the organization by five reasons: the first, the organization encourages the development of specialization in various capacities. The second, the organization has a considerable large-scale capital which enables it to use advanced technology. The third, the organization in its form is the best to manage external environment by best utilizing the inputs for effective outputs. The fourth is related to economization of transaction costs that emerge from interaction between the individuals to produce products and services. The organization can afford economy approach to resolve transaction costs. Lastly, the organization can impose power and control over individuals to direct them towards achieving goals and objectives.

Following the discussion on the definition of an organization, the upcoming sections will provide a more detailed examination of two crucial aspects of organizational management. Firstly, the structure of an organization will be explored in greater detail, highlighting the various models that exist and their respective strengths and weaknesses. Secondly, the focus will shift to organizations that operate in uncertain environments, with a particular emphasis on humanitarian and nonprofit organizations, and the challenges they face in managing their supply chains.

2.1.2. Organization Structure

The organization functions according to a specific structure that influences the overall organizational behavior and well known as Organization Structure (OS). Organization structure focuses on how the organization assigns responsibilities to individuals and manages reporting lines which shapes the work processes. It can be qualified as the pattern that the organization behaves in determination of relationships, power and internal communication (Cosh, Xiaolan , & Hughes, 2012). All can be concluded in this definition: "Organizational structure is the formal system of task and authority relationships

that control how people coordinate their actions and use resources to achieve organizational goals" (Jones, 2013). As stated in the former definition, organization structure is mainly shaped by internal strategies which are forced by external environment.

There are various types of organizational structures, including functional, divisional, matrix, and network structures (Robbins & Coulter, Management, 2012). In a functional structure, employees are grouped by the functions they perform, such as marketing, finance, and operations. In a divisional structure, the organization is divided into units based on geographical regions, product lines, or customer segments. The matrix structure combines both functional and divisional structures, where employees report to both a functional manager and a divisional manager. A network structure, on the other hand, is characterized by a flat, flexible, and decentralized organization that relies on collaboration among autonomous units (Gulati, Wohlgezogen, & Zhely, 2012).

The choice of organizational structure depends on various factors such as the size, complexity, and goals of the organization, as well as the external environment in which it operates (Cosh, Xiaolan , & Hughes, 2012). For instance, a functional structure is suitable for small organizations with a single product or service, while a divisional structure is more appropriate for large organizations with diverse product lines or operations in different regions. A matrix structure is often used in organizations with complex projects or in the aerospace industry (Koufteros, Rawski, & Rupak, 2010).

Studies have shown that organizational structure has a significant impact on organizational performance. For instance, research has demonstrated that a divisional structure is positively associated with financial performance, while a functional structure is positively related to non-financial performance such as innovation and customer satisfaction (Koufteros, Rawski, & Rupak, 2010). Moreover, a study by Kim and Park (2010) found that organizations with a network structure exhibit higher levels of flexibility and adaptability, which are essential for survival in dynamic and uncertain environments.

In conclusion, the organization structure is a critical component of any organization, influencing its behavior, performance, and success. The choice of organizational structure depends on various factors, including the size, complexity, goals, and external environment of the organization. The impact of organizational structure on performance is significant, and organizations should carefully consider their structure to leverage their performance potential.

In the section 2.2.5, it delves into the concept of internal integration as a model of Organization Structure. Internal integration, as one of the constructs of supply chain integration, refers to the degree to which various functions within an organization are linked together to facilitate communication and coordination. This includes the integration of departments such as production, marketing, and finance, to work together towards achieving common goals. The importance of internal integration in enhancing organizational performance has been highlighted in previous studies (Koufteros, Rawski, & Rupak, 2010). It has been suggested that an effective organizational structure can positively impact the level of internal integration, leading to better coordination and ultimately better performance. As such, it is important to examine the role of internal integration in the context of humanitarian organizations and the United Nations, particularly UNRWA, which will be the focus of the empirical analysis in this research. In the upcoming section, the literature on internal integration and its impact on organizational performance is reviewed. This review will be along with its relationship with other constructs of supply chain integration.

2.1.3. Organizations in Uncertain Environment: A Contingency View

Before the 1960s, organization theory was discussed in terms of internal organizational structure in isolation of external environment. Scholars, in modernists era, consider the best management practices and strategies that achieve operational performance. One example is the work of Weber in bureaucracy theory (Blomberg & Cohen, 2003). The organization at that era was viewed as a closed system where departments or business units interact and

communicate, and how individuals socially behave within the discipline of organization hierarchy. However, Globalization hits economical activities in all around the world resulting more external pressures on environments by increasing uncertainty and unpredictability (Cosh, Xiaolan , & Hughes, 2012). since the late 1960's, the vision of the organization was shifted from close system to an open one that well considers the impact of external environment on the internal organization structure. Neo-modernists and Post-modernists introduce open system theory which argues complexity of external environment and the organization should adjust its structure for best interaction with this environment in order to emerge innovation and gain a competitive advantage (Connor, 2004)

Also, this topic was discussed thoroughly in contingency theory which considers increasing uncertainty of external environment, and each organization should shape its own structure, behavior, design, planning and management strategies to over cope complexity resulted by unpredictability of external environment. The 'one-size-fits-all' approach is not workable, therefore contingency theory provides a guidance on how the organization should preposition itself for the best fit in interacting with its environment through building a unique organization structure that is flexible and respondent to uncertainties in its external environment (Donaldson, 2001).

It is also useful in this regard to unpin the uncertainty concept. There are two major sources of uncertainty: environmental uncertainty and behavioral uncertainty (Cousins, 2005). Environmental uncertainty arises from the difficulties in anticipation of future changes in the environment due to technological and volume reasons. Technological aspect related to continuous development in technology which does not affect only the specifications of products but also the wants and needs of customers. Volume dilemma refers to the fluctuating in demand and supply which generates unpredictability in the market direction. Both aspects create instability in prices and stock available in the market (Geyskens, Steenkamp, & Kumar, 2006).

Individuals' behavior is varying over the time depending on many marketing factors with unpredictable trends. This behavioral fluctuating results in changing wants and needs of individuals and though emerge uncertainty in demand which impacts availability of goods and its prices (Geyskens, Steenkamp, & Kumar, 2006).

Nonprofit organizations are not immune to the impact of uncertainty in the external environment. Scholars have reported the existence of tough competition among nonprofit organizations in the fundraising marketplaces, which is made worse by the scarcity of resources available to them (Tuckman, 1998). As a result, nonprofit organizations face increasing levels of uncertainty and complexity in their external environment. These challenges are particularly relevant to humanitarian organizations, which are tasked with responding to crises and emergencies in volatile and unpredictable settings. The humanitarian sector operates in a rapidly changing environment, characterized by geopolitical tensions, natural disasters, and complex emergencies. As such, it is essential for humanitarian organizations to be able to adapt to changing circumstances quickly and effectively, while maintaining their core values and mission (Son, Roscoe, & Sodhi, 2024).

In the forthcoming sections, it will be embarked on a comprehensive exploration of the concept of humanitarian organizations, including their definitions, functions, and characteristics. it will also be an examination for the unique challenges that these organizations face in navigating uncertain and dynamic environments, including increased competition for limited resources, political instability, and natural disasters. By exploring deeply, the complexities of humanitarian organizations, it sheds a light on their critical role in providing crucial services and support to vulnerable communities across the globe, and to gain a deeper understanding of the organizational structures and strategies that are needed to successfully manage and operate in these challenging environments.

2.1.4. Humanitarian or Nonprofit Organization

A nonprofit organization, also known as a not-for-profit organization, is an entity that operates to promote a particular social cause or serve a specific group of people without the primary goal of making a profit. Nonprofits exist in various sectors, including education, healthcare, social services, and the arts. These organizations can vary in size from small grassroots organizations to large, well-established organizations with a global presence (Courtney, 2002).

The term "NGO" was initially referenced in Article 71 of the United Nations Charter, specifically in the section dedicated to the Economic and Social Council. This article allows for the Economic and Social Council to establish appropriate channels for consulting with non-governmental organizations (NGOs) regarding matters within its jurisdiction. The Council can make these arrangements with both international and national organizations after consulting with the relevant Member of the United Nations, as outlined in the Charter (United Nations, 1945)

However, this does not mean that NGOs are considered organizations under international law. Rather, they are essentially private legal entities formed under and governed by national laws (Birchall, 2002). Although some national laws grant specific recognition to NGOs within the wider non-profit sector, international law has made little progress in determining exactly which bodies are recognized as NGOs (Kendall, 2015).

In Resolution 1996/31 of 25 July 1996, the Economic and Social Council defined an NGO as "any such organization that is not established by a governmental entity or intergovernmental agreement …including organizations that accept members designated by governmental authorities, provided that such membership does not interfere with the free expression of views of the organization. The basic resources of the organization shall be derived in the main part from contributions of the national affiliates … Any financial contribution or other support, direct or indirect, from a Government to the organization shall be

openly declared to the United Nations." (United Nations, United Nations Decade for Human Rights Education (1995-2004), 1996)

However, this institutional definition does not address the phenomenon of globalization, or the challenges faced by NGOs in uncertain environments (Fowler, 1997). For example, major contemporary NGOs are not financed mainly through members' contributions, but rather through fund-raising from the general public or donations by foundations and companies (Kendall, 2015).

Humanitarian organization and NGO refer to the same entity. According to Ryfman (2007), the concept of "humanity" was introduced by the French Encyclopaedists, were a group of French philosophers and scientists. This movement was driven by philosophers like Voltaire who were angered by the old monarchies' inability to respond to natural disasters, such as the Lisbon earthquake of 1755. The fight to abolish the slave trade and slavery itself in Great Britain, which occurred at the turn of the next century, was based on quasi-non-governmental networks and structures. In the late 19th century, faith-based organizations such as the Caritas network among Catholic believers and charitable movements born of Protestant communities such as the Quakers emerged and marked the lasting advent of faith-based organizations in the humanitarian field. Other organizations such as Catholic Relief Services (CRS) in the United States, Concern in Ireland, and Save the Children in the United Kingdom were formed after the First World War. The Second World War led to the creation of NGOs such as Oxfam in the United Kingdom and CARE in the United States. These organizations were designed to help civilian populations in occupied or newly liberated countries. Colonial propaganda in countries such as France, Belgium, and the Netherlands, both before and after 1945, focused on the iconic figures of doctors fighting major epidemics and missionaries promoting health and education. This helped to raise public awareness of the broader issues that were not yet referred to as the South.

Despite the challenges in defining and recognizing NGOs, they share common characteristics across different fields of action, including development, human rights, environment, and humanitarian action. These include the concept

of a volunteering or not-for-profit entity, a special legal framework dependent on national legislation, relationships with public and private authorities, a commitment to values and civic approaches, and the transnational nature of their work (Dijkzeul, 2003).

Anthony and Young (1984) define the non-profit organization as "an organization whose goal is something other than earning a profit for its owners. Usually, its goals are to provide services." Anthony and Young build on the definition of the organization with characterizing the goal of non-profit organization with two main qualities: the feature of nonprofit and propensity towards voluntary services.

The nonprofit sector has experienced significant global expansion, playing an increasingly pivotal role in various aspects of societal development, including education, healthcare, social services, and advocacy (Salamon & Anheier , The International Classification of Nonprofit Organizations, 1996). According to recent statistics, the sector employs over 7 million individuals worldwide, accounting for approximately 6.8% of the global workforce, with many engaged in full-time positions within nonprofit organizations (International Labour Organization, 2021). This growth reflects the sector's critical contribution to economic and social stability, particularly in addressing gaps left by governmental and market failures (Anheier & Salamon, 2006). In the United Kingdom alone, the nonprofit landscape comprises around 240,000 registered organizations, employing nearly one million individuals, underscoring its substantial impact on employment and service provision (Courtney, 2002). Furthermore, the sector’s influence extends beyond labor metrics, fostering civic engagement, social capital, and participatory governance (Putnam, 2000). As nonprofits continue to expand, their role in shaping public policy and delivering essential services is likely to grow even more prominent in the coming decades (Eikenberry & Kluver, 2004).

Nonprofits can take various legal forms, including charities, foundations, and social enterprises. Charities are nonprofits that primarily exist to carry out a specific charitable purpose, such as providing food, shelter, or education to a

particular group of people. Foundations, on the other hand, typically exist to provide grants and funding to other organizations that support a particular cause or issue. Social enterprises are a relatively new form of nonprofit that combines a social mission with a business model to generate revenue (Attorney , 2021).

The anthology of nonprofit organization imposes institutional settings that make a differential with profit ones. These differences posse redefinition of organizational culture, objectives, processes and functions based on social choice (DiMaggio & Anheier, 1990). Despite there is a clarity in literature on anthology of public and private organizations, however, there is ambiguity in classification of nonprofit organizations. Some schoolers argue the non-existence of a third classification, and non-profit organization is defined as part of public sector because it follows the public policy process and has similar objectives of building social capital and though non-profit organization. In other words current conceptualization of public sector is well fitting for nonprofit organizations (Boris & Mosher-Williams, 1998) (Gronbjerg, 1994) (Kearns, 1994).

Others claim that non-profit organization is a separate model of organization that has a definite scope of mission, goals, objectives, management practices and advocacy (Drucker, 1990). They also argue on the goal of nonprofit organization is different than privet incorporate for maximizing profit and public sector for maximizing quantity and quality of services provided to civilians. The goal is defined under a scope of maximizing objective defined function, function could be education, health, environment or any other form of services (Schiff & Weisbrod, 1991).

Nonprofit organizations differ from both public and private organizations in several ways. While public organizations are government-owned and private organizations are typically owned by shareholders, nonprofits are owned by no one and exist solely to serve their mission. One key difference between nonprofits and public organizations is the source of their funding. Public organizations, such as government agencies and departments, are primarily funded by taxpayers, while nonprofits rely on donations, grants, and other forms

of external funding to support their operations. This funding model gives nonprofits more flexibility and independence than public organizations, which may be subject to political pressure or budget cuts (Kearns, 1994). Another key difference between nonprofits and private organizations is their legal status. Private organizations are typically structured as for-profit corporations, while nonprofits are structured as tax-exempt entities. This tax-exempt status allows nonprofits to receive tax-deductible donations from individuals and corporations, making it easier for them to raise funds and carry out their mission. (Boris & Mosher-Williams, 1998)

Nonprofit organizations differ significantly from private, for-profit entities in their decision-making processes. While private corporations prioritize profit maximization and shareholder value (Hansmann, 1980), nonprofits are mission-driven, focusing on social impact and beneficiary needs (Drucker, 1990). This distinction creates unique governance challenges, as nonprofits must balance the interests of diverse stakeholders including donors, volunteers, staff, and the communities they serve. Additionally, nonprofits face heightened expectations for transparency and accountability due to their reliance on public trust and charitable funding (Cornforth, 2003). Unlike for-profits, which measure success through financial returns, nonprofits often assess performance based on social outcomes, requiring more complex evaluation frameworks (Sawhill & Williamson, 2001).

Finally, nonprofits differ from both public and private organizations in terms of their goals and objectives. While public organizations exist to provide public services and private organizations exist to generate profits, nonprofits exist to serve a particular social cause or group of people. Nonprofits may aim to alleviate poverty, promote education, advance environmental sustainability, or provide healthcare services, among other goals. Nonprofits measure success not in terms of financial profit, but in terms of the impact they make on their beneficiaries and the communities they serve (Boris & Mosher-Williams, 1998).

In conclusion, nonprofits differ from public and private organizations in several ways, including their funding sources, legal status, decision-making

processes, and goals and objectives. Nonprofits exist solely to serve their mission and the public good, and rely on donations, grants, and other forms of external funding to support their operations. Nonprofits play a crucial role in addressing social and environmental issues, and by supporting them, individuals and businesses can contribute to creating positive social change (Courtney, 2002).

A team of Johns Hopkins university was able to develop the international classification of Nonprofit Organizations though their work on the Comparative Nonprofit Sector Project. they introduce the conceptual model of nonprofit organization in the thirteen different countries that were involved in the research. According to Hopkins, nonprofit organization is themed with five qualities which are: organized i.e., institutionalized to some extent., private, i.e., is not part of public sector and institutionally separate from government, self-governing, i.e., equipped to control their own activities, non-profit-distributing, i.e., not returning profits generated to their owners or directors and voluntary, i.e., involving some meaningful degree of voluntary participation (Salamon & Anheier , The International Classification of Nonprofit Organizations, 1996).

Many scholars confirm the increasing role of nonprofit organizations due to the growing rate of humanitarian crises occurrence, including natural disasters such as pandemics like EVD and Covid-19, severe floods, tsunami, earthquakes and forest fires, or human disasters such as wars and conflicts around the world. Humanitarian crises enforce vulnerability and instability in communities that lay beyond the capacity of local governments to respond. This highlights the need for having nonprofit organizations to bridge the gap through their responsive capacity (Adler, Glymour, & Fielding, 2016) (Vink, Koskela-Huotari, & Tronvoll, 2020) (Boenigk, Kreimer, Becker, & Alkire, 2021).

Following the discussion of the concept of humanitarian organizations and their significance, it is worth noting that there is a particular organization that stands out as a major player in the field of humanitarian aid. This organization is none other than the United Nations (UN). The UN is a vast and complex network of organizations that operate as one cohesive unit in the humanitarian

field, with a multitude of agencies and programs that work towards the common goal of alleviating human suffering worldwide. In the upcoming section, deeper focus will be on the United Nations and examine its various functions and operations related to humanitarian efforts.

2.1.5. The United Nations Organizations

The United Nations (UN) is considered as the largest scale international humanitarian organization around the world. The UN was founded in 1945 with 51 Member States and currently made up of 193 Member States. The UN and its work are guided by the purposes and principles contained in its founding Charter. The Charter of the United Nations was signed on 26 June 1945, in San Francisco, at the conclusion of the United Nations Conference on International Organization , came into force on 24 October 1945 and has been amended three times in 1963, 1965, and 1973. All UN Member States are members of the General Assembly. States are admitted to membership by a decision of the General Assembly upon the recommendation of the Security Council. The UN has evolved over the years to keep pace with a rapidly changing world. It remains the one place on Earth where all the world's nations can gather together, discuss common problems, and find shared solutions that benefit all of humanity. The UN consists of many organizations and each one has its own vision and mission; however, the broad mission of the UN is below expressed by United Nations Secretary-General.

"*In the end, it comes down to values [...] We want the world our children inherit to be defined by the values enshrined in the UN Charter: peace, justice, respect, human rights, tolerance and solidarity."* By António Guterres, United Nations Secretary-General

The United Nations is part of the UN system, which, in addition to the UN itself, comprises many funds, programmes and specialized agencies, each of which have their own area of work, leadership and budget. The programmes and funds are financed through voluntary rather than assessed contributions. The

Specialized Agencies are independent international organizations funded by both voluntary and assessed contributions. The UN coordinates its work with these separate UN system entities, which cooperate with the Organization to help it achieve its goals. The UN specialized agencies are autonomous international organizations working with the United Nations. All were brought into relationship with the UN through negotiated agreements. Some existed before the First World War. Some were associated with the League of Nations. Others were created almost simultaneously with the UN. Others were created by the UN to meet emerging needs (United Nations, 2022).

In the following section, we will be providing a more focused literature review on UNRWA, which is a subsidiary of the United Nations organization. This literature review will primarily center on UNRWA, examining its organizational structure, management, and supply chain performance. The decision to focus specifically on UNRWA is based on the fact that it is a significant humanitarian organization in the Middle East, providing crucial aid and services to Palestinian refugees. Therefore, a comprehensive analysis of its supply chain management performance could offer insights that may be applicable to other humanitarian organizations in the region and beyond.

2.1.5.1. UNRWA: Overview

The United Nations Relief and Works Agency (UNRWA) stands as an example of humanitarian commitment which is addressing the multifaceted challenges arising from the Palestinian refugee crisis. Established as a dedicated entity under the United Nations umbrella, UNRWA operates in several critical regions, including Jordan, Lebanon, the Syrian Arab Republic, West Bank, and the Gaza Strip. Its foundational mandate is to provide essential relief, human development, and protection services to Palestine refugees, operationally defined as individuals who lost their homes and means of livelihood during the 1948 Arab-Israeli conflict and had their normal residence in Palestine between June 1946 and May 1948.

The scope of UNRWA's objectives is comprehensive, aiming not only to address the immediate humanitarian needs of Palestine refugees but also to strengthen their capacity to cope with the ongoing impact and consequences of their situation. Moreover, the agency is dedicated to mitigating factors that exacerbate vulnerability and might lead to displacement. Across all operational fields, UNRWA maintains a steadfast presence, implementing measures to sustain access to its installations and areas hosting a large number of Palestinian refugees.

To address the diverse needs of Palestine refugees, UNRWA has formulated a strategic approach focused on enhancing their capacity to navigate prevailing circumstances. This involves building upon the existing array of programs delivering critical services, including food assistance, cash support, medical care, education, and protection. With a resolute commitment to humanitarian assistance, UNRWA extends its reach to more than five million Palestine refugees, effectively mitigating the negative consequences on their livelihoods, nutrition, health, and education status.

Understanding the historical context is crucial in appreciating the significance of UNRWA's mission. The agency's inception in 1949 was a direct response to the large-scale displacement resulting from the 1948 Arab-Israeli conflict. Born out of the Nakba, an event that witnessed an estimated 700,000 Palestinians becoming refugees, UNRWA was tasked with providing essential services such as education, healthcare, and social services to those seeking refuge in neighboring countries. Several United Nations resolutions, including 302, 194, 212, and 513, underscore the importance of UNRWA's mission. These resolutions not only established and affirmed the agency but also expanded its role in addressing the evolving needs of the refugee population. The evolution of UNRWA's mandate, as recognized by UN Security Council Resolution 237, reflects the prolonged nature of the Palestinian refugee crisis and underscores the continued relevance of the agency's work in the absence of a comprehensive political settlement.

Throughout its history, UNRWA has encountered various challenges, ranging from financial constraints to political complexities. However, the agency's remarkable ability to adapt and innovate in response to these challenges has been crucial. Facing periods of heightened regional tensions, financial uncertainties, and changes in the geopolitical landscape, UNRWA has consistently demonstrated resilience in its unwavering commitment to the welfare of Palestinian refugees.

Beyond its immediate functions, UNRWA has a global impact, serving as a beacon of hope for millions of Palestine refugees and contributing to regional stability. The agency aligns its work with the core principles of the United Nations, promoting social and economic development, education, and healthcare. UNRWA remains a vocal advocate for the rights of Palestinian refugees, actively engaging with the international community to highlight the unique challenges faced by this vulnerable population. The agency emphasizes the importance of upholding the rights and dignity of refugees, working towards a just and lasting resolution to their dilemma (UNRWA, Annual Operational Report, 2021).

The core functions of UNRWA encapsulate education, healthcare, relief and social services, and community development.

UNRWA's commitment to education is a cornerstone of its strategy. Operating hundreds of schools, the agency not only imparts academic knowledge but also plays a crucial role in preserving Palestinian culture and identity. The educational programs are designed to instill a sense of pride and heritage among the refugee children, fostering a connection to their roots and ensuring the continuity of their cultural legacy. UNRWA administers a total of 706 elementary and preparatory schools distributed across its five operational regions. Among these, eight secondary schools are situated in Lebanon. This educational network serves as a platform for delivering free basic education to an estimated 543,075 Palestinian refugee children. Complementing the primary and secondary education offerings, UNRWA extends its educational support through technical vocational training and higher education initiatives. Eight

vocational training centers cater to around 8,000 Palestinian refugees across all operational fields. Additionally, two educational science faculties, specifically teacher training institutes, operate in the West Bank and Jordan, collectively accommodating 2,009 students. These institutions play a crucial role in advancing technical skills and fostering higher education opportunities for Palestinian refugees in the specified regions (UNRWA, www.unrwa.org/what-we-do/education, 2023).

Moreover, UNRWA's healthcare initiatives extend beyond basic medical services. The network of health centers established by the agency provides comprehensive healthcare, including maternal and child health services, communicable disease control, and general healthcare. The emphasis on maternal and child health underscores UNRWA's commitment to addressing the specific needs of vulnerable demographics within the refugee population, ensuring the well-being of future generations. The UNRWA Health Programme (HP) diligently provides indispensable, life-saving, and thorough Primary Health Care (PHC) services to Palestine refugees via a network comprising 140 primary healthcare facilities. As of 2020, the overall count of registered Palestine refugees had surged to approximately 5.8 million. Among them, around 1.9 million individuals had the privilege of accessing the 140 primary health care (PHC) centers strategically situated across UNRWA's five fields of operations (UNRWA, Health programme, 2021).

The relief and social services provided by UNRWA play a pivotal role in addressing the immediate needs of vulnerable refugees. UNRWA estimates that 1.2 out of 5.9 million Palestine refugees live in absolute poverty, and 700,000 refugees are in abject poverty. From emergency relief to social support, the agency ensures that refugees have access to vital resources. This not only mitigates the immediate impact of crises but also contributes to the overall well-being of the refugee community. As of the beginning of 2020 till the end of 2023, UNRWA succeeded to include 98,000 refugees in the five fields to Social Safety Net programme, where they can receive regular assistances (UNRWA, www.unrwa.org/what-we-do/relief-social-services, 2023).

In addition to these essential functions, UNRWA places a strong emphasis on community development projects. These initiatives are designed to empower refugees and strengthen their communities in a sustainable manner. Infrastructure development, economic opportunities, and skills training programs are integral components of these projects. By focusing on sustainable development, UNRWA aims to break the cycle of dependence and create avenues for self-sufficiency among the refugee communities.

Challenges have been inherent in UNRWA's journey, ranging from financial constraints to political complexities. Yet, the agency's ability to adapt and innovate in response to these challenges has been a testament to its resilience. Periods of heightened regional tensions, financial uncertainties, and geopolitical shifts have not deterred UNRWA from its commitment to the welfare of Palestinian refugees.

UNRWA's continued advocacy remains a crucial element of its mission. The agency consistently engages with the international community to shed light on the unique challenges faced by the vulnerable Palestinian refugee population. By emphasizing the importance of upholding the rights and dignity of refugees, UNRWA plays a pivotal role in garnering support and working towards a just and lasting resolution to their plight.

The agency operates in five critical fields, including Jordan, Lebanon, the Syrian Arab Republic, West Bank, and the Gaza Strip. Each field poses unique challenges, and UNRWA's operational presence in these regions is pivotal in addressing the multifaceted needs of the Palestinian refugee population.

the largest scale of operation is in Jordan where more than 2 million Palestine refugees resident in the country have enjoyed the protection and hospitality of the State and, with some exceptions, are fully enfranchised Jordanian citizens. The Government of Jordan strongly supports and advocates UNRWA’s continued presence and mandate to provide services to Palestine. It also reflects the reality that Jordan is a country with economic constraints and an appreciation that UNRWA shares some of the service provision burden imposed by the 2 million Palestine refugees living in the country. UNRWA

provides assistance and protection to Palestine refugees in Jordan through education, health, a social safety net, camp infrastructure, and micro credit. UNRWA administers 10 camps, 172 schools, with 122,000 pupils, 2 vocational and technical training centers and 24 primary health centers (UNRWA, Annual Operational Report, 2021).

The recent concurrent humanitarian crises is in Syria which hosts to approximately half a million Palestinian refugees, 395,000 (80%) of whom live in the greater Damascus area. The bulk of the refugee population in the rest of the country live in or around camps close to the major cities of Homs, Hama, Aleppo, Lattakia, and Dera'a. UNRWA's Syria Field Office provides education and health services, a social safety net programme, youth and vocational training, and improvements to housing and camp infrastructure. UNRWA estimates that up to 440,000 out of the total 540,000 Palestine refugees in Syria are in need of critical assistance, and up to 50 per cent of the total Palestine refugee population has been displaced at some point, with the majority seeking shelter in safer areas of the country, particularly Damascus. The conflict has now encroached on most Palestine refugee camps, causing not only extreme hardship and widespread displacement, but also unraveling social structure and support networks in Syria. UNRWA is providing humanitarian support to Palestine refugees resident in Syria and to those who have relocated across the border into Jordan and Lebanon. The numbers of people seeking assistance in Syria is growing rapidly, primarily due to the economic ramifications of the unrest. Numbers of Palestine refugees normally resident in Syria entering Jordan are small at present. UNRWA is providing food, cash, education, and health assistance (UNRWA, 2022).

In the following section, the concepts of supply chain management (SCM) will be presented, along with its constructs and aspects related to integration. These concepts will be examined in the context of humanitarian organizations, specifically the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA). An empirical study will be conducted to explore how SCM can be implemented in the UNRWA context where this study will

seek to provide insights into the challenges and opportunities of implementing SCM in humanitarian organizations and shed light on how integration in SCM can contribute to improving the efficiency and effectiveness of humanitarian operations.

2.2.SUPPLY CHAIN MANAGEMENT

2.2.1. Background and Definition

Commencing the literature review by elaborating on the definition of supply chain management and its interconnection with logistics could provide a beneficial starting point. Early references to logistics as a term is found and used in military applications in 1898 and then the concept was being used broadly by civilian organizations (Gen, Lin, & Cheng, 2008). And because this concept was born in military, early definitions reflect the military use of the concept. Baron Antoine-Henri Jomini, a well-noted French military thinker in his book "the Art of War" (1838), says "Logistics comprises the means and arrangements which work out the plans of strategy and tactics. Strategy decides where to act, logistics brings troops to this point" (Beaumont , 2014). In Jomini's definition, the logistics concept is totally linked to military operations. However, this concept was being developed to provide new managing and to cover new aspects for mostly each sector, making new definitions are quite far than the old ones. Martin Christopher refers to Logistics as a strategic management process for moving, storing materials, parts and ready inventory from the source and up to customers. (Christopher, Logistics & supply chain management, 2017)). Logistics as a management process mainly considers two parts: inbound (flow of goods from the source to the firm) and outbound logistics (flow of finished inventory from the firm to customers) (Rudd, 2021).

later, the term of supply chain management originated in the late 1920s, at the mass production period, to give a broad meaning of logistics and combine both inbound and outbound logistics in one comprehensive concept (Mentzer, 2004). At this era, the production cost was going down while the distribution

cost was increasing," what we are saving in production we are losing in distribution: (Ralph Barsodi, 1929)", which pushed the researchers to look into the whole process rather than focusing on some elements. These reasons lead to familiarize the concept of supply chain management. There is a believe that SCM serves two main functions; is either to agile or lean of the process. Agile of the supply chain works in uncertainty where the environment of the firm is unpredictable, therefore, this approach concerns on flexibility in responding to fluctuating cost or demand (Christopher, Logistics & supply chain management, 2017). Meanwhile, Lean of the supply chain, focuses on dismissing all unnecessary processes and save time in order to meet the given schedule (Naylor, Naim, & Berry, 1999).

Though, the real introduction of supply chain management concept in literature was at the beginning of the 1980 when the innovation of personal computer which added to the velocity of development and created a new vision for the firms to capture the importance of expanding their boundaries to remain competitive in the global market (Rudd, 2021).

Between 1920s and 1980s , there were research efforts accompanied with the new needs of industrial era in different fields including marketing, organizational theory, management and operational research, these efforts contributed to highlight new parts of supply chain management such as: optimization of channels by W. Anderson in 1957; production in distribution systems by J. Forrester in 1958, collaboration and cooperation in supply chain by D. Bowersox in 1969 and production planning hierarchy theory by A. Hax and H. Meal in 1975 (Felea & Albastroiu, 2013).

The concept of supply chain management has steadily revolved to adopt new theories and models in organizational behavior, management science and information management. Uncertainty in the environment, regarding the fluctuating supply and demand, adds more to complexity to the notion of SCM have proposed many definitions in the literature (Feldmann & Muller, 2003).

Up to 1990s, there are about 50 definitions of supply chain management (Bechtel & Jayaram, 1997). And 2 decades later, the number of definitions was

expanded to 165 ones (Stock & Boyer, 2009). One of a good generic definition of SCM that covers marketing and sales or long terms strategic planning made by Soonhong Min, Zach G. Zacharia , and Carlo D. Smith in their research "Defining Supply Chain Management: In the Past, Present, and Future" concludes these definitions with "supply chain management that emphasizes the benefit of sharing information, risk and reward sharing, cooperation, all of which based on partnering relationships are still necessary to implement a company's omni-channel and sustainability strategies" (Min, Zacharia, & Smi, 2019).

Table 2.1 presents key definitions of supply chain management (SCM), presenting a consolidated overview without repetition.

Table 2.1: Definitions of supply chain management

Definition	**Study**
"Supply chain management (SCM) is the process of planning, implementing, and controlling the operations of the supply chain with the purpose to satisfy customer requirements as efficiently as possible. Supply chain management spans all movement and storage of raw materials, work-in-process inventory, and finished goods from point-of-origin to point-of-consumption."	(Oliver & Webber, 1982)
"Supply chain management encompasses materials/supply management from the supply of basic raw materials to final product (and possible recycling and re-use). Supply chain management focuses on how firms utilize their suppliers' processes, technology and capability to enhance competitive advantage.	(Tan, Kannan, & Handfield, 1998)
"Supply chain (sometimes called the value chain or demand chain) management consists of firms collaborating to leverage strategic positioning and to improve operating efficiency. For each firm involved, the supply chain relationship reflects strategic choice. A supply chain strategy is a channel arrangement based on acknowledged dependency and relationship management. Supply chain operations require managerial processes that span across functional areas within individual firms and link trading partners and customers across boundaries."	(Bowersox, Closs, & Cooper, 2002)
Melnyk and Swink (2002) provide a holistic definition of the supply chain which is the entire network involved in: 1. converting raw materials and information into products and services, 2. consuming the products and services, 3. disposing of the products and services.	(Melnyk & Swink, 2002)
Supply chain management is a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system-wide costs while satisfying service level requirements.	(Simchi-Levi, Kaminsky, & Simchi-Levi, 2003)

Table 2.1: (Next) Definitions of supply chain management

Definition	Study
"Supply Chain Management is the systemic, strategic coordination of the traditional business function and tactics across these business functions within a particular company and across business within the supply chain, for the purpose of improving the long-term performance of the individual companies and the supply chain as a whole."	(Sweeney, 2007)
"Supply Chain Management is the active management of supply chain activities and relationships in order to maximize customer value and achieve a sustainable competitive advantage."	(Bozarth & Handfield, 2008)
"A supply chain consists of all parties involved, directly or indirectly, in fulfilling a customer request. The supply chain includes not only manufacturers and suppliers, but also transporters, warehouses, retailers, and even customers themselves."	(Chopra & Meindl , 2010)

Despite there is no common definition for supply chain, but it is generally agreed to include the whole chain of activities that flow from sourcing materials to delivering products and all in between including manufacturing and packing (Jacobs & Chase, 2018), (Christopher, Logistics and Supply Chain Management, 2011) , (Zijm, Klumpp, & Regattieri, 2019). Some scholars pay attention to the chain link that connect each element more than activities (Scott & Westbrook, 1991). Furthermore, marketers support defining supply chain as a series of activities that an organization uses to deliver value, either in the form of a product, service, or a combination of both, to its customers (Lin & Shaw, 1998).

Recent trends in defining supply chain reflect a shift from traditional operational efficiency toward more holistic, dynamic, technology-driven, and sustainability-oriented definitions. Christopher (2011) laid important groundwork by defining SCM as "the orchestration of a network of organizations, people, activities, information, and resources involved in moving

a product or service from supplier to customer," emphasizing its role in integrating end-to-end processes to create value, enhance efficiency, and ensure sustainability. This perspective marked a shift from linear supply chain models to networked value creation, recognizing the supply chain as a strategic function rather than merely a logistical one.

The digital transformation of supply chains has since emerged as a dominant theme, Ross (2016) expands the definition to incorporate "the strategic alignment of digital technologies, data analytics, and agile methodologies to optimize the flow of goods, information, and finances across a globally interconnected network." This reflects the growing importance of real-time data, predictive analytics, and automation in enhancing supply chain visibility and responsiveness to disruptions. Concurrently, sustainability has become a critical dimension, as Carter & Rogers (2017) argue that modern supply chain requires "the integration of sustainable practices into end-to-end operations, from sourcing to reverse logistics," ensuring that environmental stewardship, social responsibility, and economic viability are embedded in supply chain strategies.

The Fourth Industrial Revolution (Industry 4.0) has further redefined supply chain, with Hofmann& Rüsch (2018) highlighting how "IoT, AI, blockchain, and automation" enable smart, self-optimizing supply chains capable of autonomous decision-making and enhanced operational efficiency. This technological shift has been accompanied by an increased focus on resilience, particularly in the wake of global disruptions specially during the time of the COVID-19 pandemic. Ivanov et al (2019) thus repositions SCM as "the design and coordination of resilient networks that proactively mitigate risks, adapt to disruptions, and ensure continuity in volatile environments," underscoring the need for agile and robust supply chain architectures.

Additionally, the rise of omnichannel commerce has driven a customer-centric transformation in supply chain. For example, Sodhi & Tang (2021) define it as "the synchronization of omnichannel logistics, inventory, and fulfillment strategies to deliver seamless customer experiences," emphasizing the role of real-time demand sensing and data-driven logistics in meeting

evolving consumer expectations. Most recently, the circular economy has emerged as a key paradigm, with Genovese et al. (2022) describing SCM as "a circular system where products are designed for reuse, remanufacturing, and recycling," aligning supply chain practices with broader sustainability goals and regulatory pressures.

Collectively, these contemporary definitions illustrate that supply chain is no longer confined to cost and efficiency optimization but has evolved into a multidisciplinary field integrating digital innovation, sustainability, risk management, and customer-centricity. This reflects the growing complexity of global supply networks and the need for adaptive, future-ready strategies in an era of volatility and rapid technological change.

With all popularity of the concept of Supply Chain Management, there is still unclarity on its definite meaning, whether it refers to the function, the management process or the philosophy. Therefore, scholars refer the big count of definitions to the nature that SCM can be seen. Larson and Halldorsson (2004) classify these definitions according to four schools:

- Re-Labelers: think that SCM is just a new name for Logistics.
- Traditionalists: consider logistics as a part of SCM- logistics for outside activities while SCM as the whole process -.
- Unionists consider SCM is similar to Logistics but include marketing and sales.
- Inter-sectionists consider SCM as a long-term strategy logistics.

As outlined by the Council of Supply Chain Management Professionals (2022), the United Nations predominantly adheres to the Traditionalist approach to supply chain management, with the World Food Programme (WFP) serving as the principal body responsible for shaping and coordinating logistics and supply chain-related strategies across UN agencies. The Traditionalist perspective emphasizes the operational and logistical dimensions of supply chain management, focusing on the efficient movement and storage of goods, particularly in complex humanitarian contexts. Given the WFP’s authoritative

role in setting standards and best practices for logistics within the UN system, this study will adopt the Traditionalist approach as its conceptual framework, ensuring alignment with the methodologies currently employed by the UN in managing global supply chains. Figure2.3 (Howden, 2009) illustrates the concept of logistics and supply chain management in the humanitarian sector, providing a visual representation of the key business units involved in the operation.

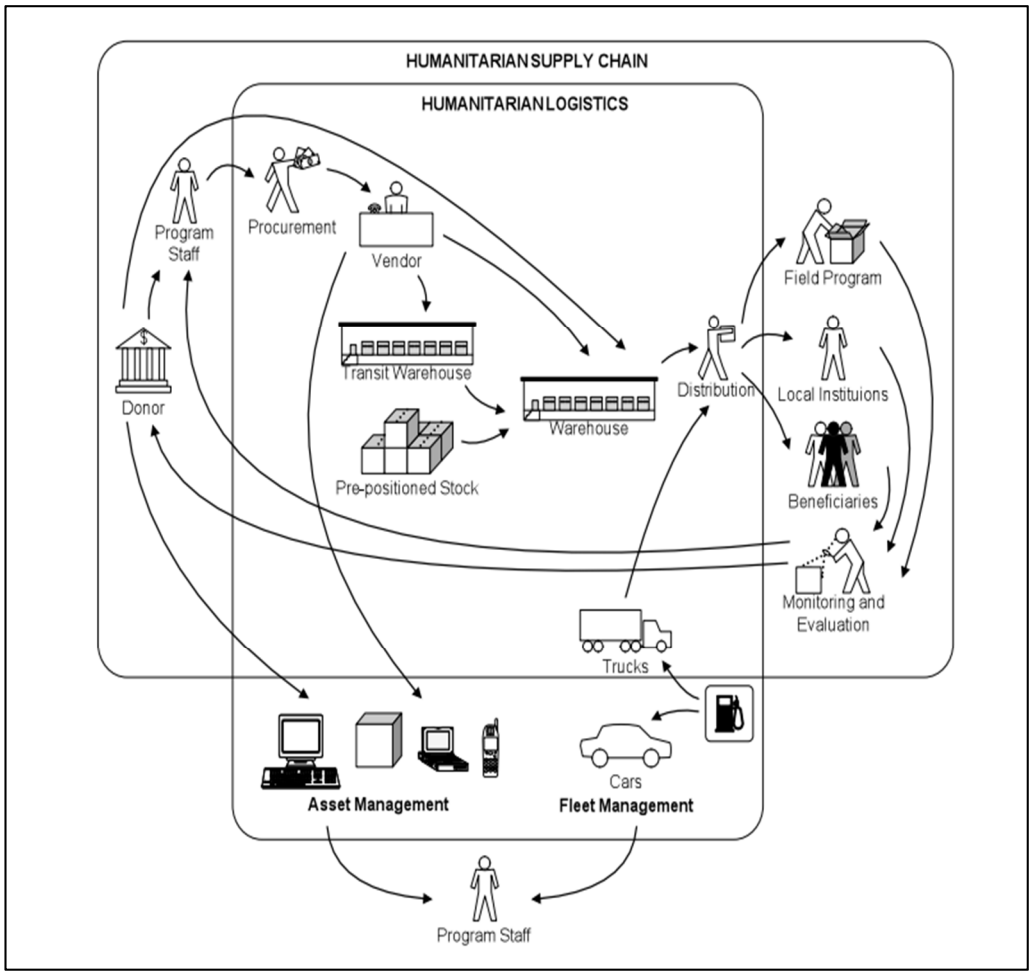

Figure 2.3: Humanitarian Logistics and HSC Flows (Howden, 2009)

Humanitarian supply chain management shares a foundational philosophy with private sector supply chain management but differs significantly in its

operational focus. While the private sector emphasizes cost-effectiveness, humanitarian operations prioritize other elements, such as lead time, to address the urgent needs of vulnerable populations during crises (Schulz & Blecken, 2010).

To go deeper, a fundamental distinction between humanitarian supply chain (HSC) and commercial supply chain lies in their underlying motives: while commercial operations are primarily profit-driven, humanitarian organizations operate on a non-profit basis, prioritizing social impact over financial gain. This difference in objectives significantly influences their operational strategies and decision-making processes. Moreover, HSCs are typically reactive in nature, mobilizing resources and delivering aid in response to sudden-onset disasters or protracted crises. In contrast, commercial supply chains are predominantly proactive, relying on demand forecasting, inventory optimization, and long-term planning to ensure efficiency and profitability (Tomasini & Van Wassenhove, 2009). The reactive nature of HSCs often leads to challenges such as unpredictable demand, resource shortages, and logistical complexities in unstable environments. Meanwhile, the proactive approach of commercial supply chains allows for greater stability, scalability, and cost-efficiency in predictable market conditions. This contradiction in the notion between HSC and commercial one highlights the need for tailored management strategies in HSC, where flexibility, rapid response, and stakeholder coordination are critical factors that are less emphasized in traditional commercial supply chain models.

Thus, a key factor driving the differences between humanitarian and commercial supply chains is the nature of humanitarian crises. Unlike commercial supply chains, which operate in stable, predictable environments, humanitarian supply chains must contend with sudden disasters, volatile demand, and complex logistical challenges arising from conflicts, natural catastrophes, or epidemics. Humanitarian crises necessitate a reliable and adaptable response, involving a complex network of participants, including governments, military agencies, civil society, private companies, and relief organizations (Chandes & Pache, 2010). This network functions as a

humanitarian supply chain, striving to deliver essential aid such as medical supplies and food to affected populations , therefore humanitarian supply chain management could be defined as the process encompasses all activities related to resource preparation and management during disaster relief operations, aiming to optimize logistics to effectively support victims (Nikbakhsh & Farahani, 2011).

One more complexity may be added specifically to humanitarian supply chain, that each disaster presents unique challenges and levels of uncertainty, demanding tailored responses for each crisis (Chandes & Pache, 2010).

One further difference in humanitarian supply chain is the fact it is complicated by critical time frames and the urgent need to mobilize diverse resources and team members quickly, which makes the success of supply chains relying heavily on human interactions and organizational relationships, necessitating effective coordination among all members and a focus on developing supply chain management capabilities, particularly in the context of human resources (Dubey & Gunasekaran, 2016).

To manage a supply chain effectively, it is crucial to consider Supply Chain Risk Management (SCRM) in conjunction with Supply Chain Management, particularly in the humanitarian context. This will be the focus of the next section.

2.2.2. Supply Chain Risk Management

It is beneficial to commence this literature review by providing a clear definition of the term "risk". According to the International Organization for Standardization (2023), a measurable uncertainty is generally referred to as a risk, although the technical definition of risk can vary across different disciplines. In project management, risk refers to the probability of not meeting goals and objectives. Production seeks risk as a possibility of undesirable events that may result in damage. In finance, risk occurs when there is a probability of a variance in investment return (Kaplan & Garrick, 1981). According to Ivanov et al. (2019), in decision theory, risk is a measure of the set of possible (negative)

outcomes from a single rational decision and their probabilistic values. In specific, supply chain risk, as defined by Zsidisin et al. (2005), is the probability of an event occurrence that disrupts part or the entire supply chain and has multiple sources, such as excessive material prices, product quality challenges, supplier mal-capacity, legal liabilities, unpredictable demand, and technology race.

Risk in the supply chain is categorized by some scholars into operational and disruption risks (Tang & Musa, 2011) (Christopher M. , Logistics & supply chain management, 2017) (Saad & Kleindorfer, 2005). Operational risks encompass the potential hazards arising from imbalances between the supply and the demand, which leads to challenges in the whole operations such as obsolescence of the whole supply chain, stock shortages, inability to do inventory replenishment, and penalties due to unmet demands. These risks stem from uncertainties in the external environment (e.g., fluctuations in demand, supply, and costs) and deficiencies in internal capabilities, including staffing, processes, and systems (Yinan, Zhao, & Sheu, 2011). Factors such as market instability, demand fluctuations and inaccurate forecasting can worsen inventory imbalances, thereby increasing the vulnerability of the organization to adverse operational outcomes (Tang & Musa, 2011).

Alternatively, disruption risk arises from the interruption of regular operational functions, triggered by events occurring within both internal and external components of the supply chain which is likely happen in humanitarian supply chain, these events like natural disasters, delays in transportation, port closures, and failures in supplier quality can impede or halt the smooth progression of components and materials through the supply chain (Reimann, Kosmol, & Kaufmann, 2017).

Supply chain risk management is crucial in minimizing the negative impacts of potential risks, whether these risks are operational or disruption ones, on the overall supply chain operations and performance (Ghadge, Dani, & Kalawsky, 2019). Therefore, identifying and assessing potential risks, prioritizing them based on their severity and developing contingency plans and

risk mitigation strategies are essential components of supply chain risk management (Christopher & Peck, 2004).

The aim of Supply Chain Risk Management is to minimize the impact of potential risks that may arise in the supply chain and ensure the continuity of operations. As a good practice, organizations should proactively identify, assess, and manage risks in their supply chains. According to Paulsson (2004), a useful approach to manage supply chain risk is to construct a matrix of all potential risks and then determine the probability and pattern of occurrence for each risk. Once identified, actions can be taken to either mitigate, eliminate, or ignore the risks. By addressing anticipated risks, organizations can improve the efficiency and effectiveness of their supply chains while reducing the likelihood of disruptions, which in turn can lead to improved performance of supply chain.

In summary, a comprehensive understanding of risk and supply chain risk management is essential for effective supply chain management. The identification, assessment, and mitigation of potential risks are crucial for maintaining the resiliency and efficiency of the supply chain and minimizing the negative impacts of potential disruptions. Further discussions on the performance of the supply chain and its various aspects will be presented in the following section.

2.2.3. Humanitarian Supply Chain Performance

Tan and his colleagues define the performance of supply chain as “the effective management of internal competencies and practices related to supply chain that can achieve a competitive advantage” (Tan, Kannan, & Handfield, 1998). This definition gives a broad vision on what the performance of supply chain should be, and results gained by achieving this performance. However, this definition lacks determination of the performance notion and what metrics could be used to capture it.

Despite the wide agreement on the importance of supply chain management in the operation at any organization, however there is no agreement on how to define the performance of supply chain, and according to what model

and instrumental measures. The confusion in defining performance of supply chain refers to two main reasons. Firstly, there are many departments involve in supply chain and each business unit has its own scope of work and success indicators to measure performance. For example, sales department links performance of supply chain with high rate of sales and high number of customers reached. While supply department considers supply chain performs well when it has a short lead time, production management focuses on low cost of materials, quality and turnover of stock. The second reason refers to the notion of supply chain itself. Supply chain management is usually viewed in abstract which makes it difficult to find instruments to measure elements of performance (Bechtel & Jayaram, 1997) (Dong-Young, 2013) (Rai, Patnayakuni, & Seth, 2006)

Before exploring supply chain performance, it's important to examine how overall organizational performance is assessed. Typically, performance metrics fall into two categories: i) financial and ii) operational. Financial metrics focus on strategic indicators related to economic outcomes, such as return on investment (ROI). In contrast, operational metrics address tactical aspects crucial for short- to mid-term activities, like lead time (Carton & Hofer, 2006).

However, some researchers point out that organizations often fail to balance these two types of metrics. This imbalance arises because managers tend to concentrate their analytical efforts on financial metrics, while researchers emphasize operational metrics when designing measurement frameworks (Van Looy & Shafagatova, 2016).

When narrowing the concept of performance to specifically address supply chains, a range of financial and operational metrics is proposed to evaluate performance based on organizational best practices. Collier and Evans (2021) present a comprehensive synthesis of both financial and operational supply chain performance metrics, as systematically illustrated in Figure2.4 of their work.

Performance Measurement Category	Typical Organizational-Level Performance Measures	Typical Operational-Level Performance Measures
Financial	Revenue and profit	Labor and material costs
	Return on assets	Cost of quality
	Earnings per share	Budget variance
Customer and market	Customer satisfaction	Customer claims and complaints
	Customer retention	Type of warranty failure/upset
	Market share	Sales forecast accuracy
Quality	Customer ratings of goods and services	Defects/unit or errors/opportunity
	Product recalls	Service representative courtesy
Time	Speed	Flow processing or cycle time
	Reliability	Percent of time meeting promised due date
Flexibility	Design flexibility	Number of engineering changes
	Volume flexibility	Assembly-line changeover time
Innovation and learning	New product development rates	Number of patent applications
	Employee satisfaction	Number of improvement suggestions implemented
	Employee turnover	Percent of workers trained on statistical process control
Productivity and operational efficiency	Labor productivity	Manufacturing yield
	Equipment utilization	Order fulfillment time
Sustainability	Environmental and regulatory compliance	Toxic waste discharge rate
	Product-related litigation	Workplace safety violations
	Financial audits	Percent of employees with emergency preparedness training

Figure 2.4 SC Performance Metrics by (Collier & Evans, 2021)

Scholars propose approximately 12 different indicators and metrics for measuring supply chain performance, each with varying levels of priority and significance. These metrics include Return on Investment (ROI), Total Supply Chain Cost, Lead Time, Order Fulfillment Rate, Inventory Turnover, Perfect Order Rate, Quality Metrics, Customer Satisfaction, Flexibility, Supplier Performance, Cash-to-Cash Cycle Time, and Sustainability Metrics (Saleheen & Habib, 2022) (Gunasekaran, Patel, & McGaughey, 2004). One of techniques used in commercial supply chain is the scorecard. The scorecard technique is often employed to evaluate the weight of each metric, helping to determine its importance within the proposed supply chain model (Beamon, 1999).

To gain a clearer understanding of these metrics and their importance in relevant to the sector of the supply chain, a systematic literature review was conducted, analyzing 57 articles published between 2000 and 2024 across four databases (IEEE Xplore, Web of Science, Scopus and JSTOR). After removing duplicates, twenty-six studies were retained and summarized in Table 2.2. This includes thirteen studies focus on supply chain performance metrics in the private sector, five in the public sector (government), and eight in the

humanitarian sector. Together, these insights provide a comprehensive view of supply chain performance and highlight areas for improvement.

Table 2.2: Studies focus on SC performance metrics

Study	**Ref**	**Focus metrics**	**Sector**
Performance of supply chain collaboration – A simulation study	(Ramanathan, 2014)	Cost	Private sector
Measuring supply chain performance	(Beamon, 1999)	Flexibility	Private sector
The study of supply chain management strategy and practices on supply chain performance	(Lapide L. , 2000)	Cost - Turnover- Leadtime	Private sector
Supply chain performance metrics	(Hausman, 2004)	Quality- Turnover	Private sector
A framework for supply chain performance measurement	(Gunasekaran, Patel, & McGaughey, 2004)	quality, Time, dependability, Flexibility and Cost	Private Sector
Organizational structures and the performance of SCM	(Kim S. , 2007)	Time - Cost	Private sector
Supply chain performance measurement: a literature review	(Arzu Akyuz & Erman Erkan, 2009)	Flexibility	Private Sector

Table 2.2: (Next) Studies focus on SC performance metrics

Study	Ref	Focus metrics	Sector
The impact of innovativeness on supply chain performance: is supply chain integration a missing link?	(Seo, Dinwoodie, & Kwak, 2014)	Time - Cost	Private sector
Enhancing supply chain performance through supply chain practices	(Hove-Sibanda & Pooe, 2018))	Cost – Quality	Private Sector
Supply Chain Performance Measurement Model: A Literature Review	(Saleheen & Habib, 2022)	Cost	Private sector
Procurement and SCM in government institutions: A case study of select departments in the Limpopo Province, South Africa	(Selomo & Govender, 2016)	Cost	Public sector
Influence of SCM practices on performance of government ministries in Kenya	(Apopa, 2018)	Time - Cost	Public sector
Effect of inventory management practices on supply chain performance of government health facilities in Kisumu county in Kenya	(Odhiambo & Kihara, 2018)	Inventory - Turnover	Public sector
Developing environmental supply chain performance measures	(Mhelembe & Mafini, 2019)	Quality - F	Public sector

Table 2.2: (Next) Studies focus on SC performance metrics

Study	Ref	Focus metrics	Sector
Business Performance Through Policies, Green Purchasing, and Reverse Logistics	(Hashmi, 2023)	Cost	Public sector
Humanitarian supply chain performance management: a systematic literature review	(Abidi, De Leeuw, & Klumpp, 2014)	Time	Humanitarian
A SCOR framework to measure logistics performance	(Lu, Goh, & Souza, 2016)	Time - Flexibility	Humanitarian
Humanitarian–business partnerships in managing humanitarian logistics	(Nurmal et al ,2017)	Flexibility	Humanitarian
An integrated AHP-based scheme for performance measurement in HSC	(Anjomshoae, Hassan, & Wong, 2019)	Time - Flexibility	Humanitarian
Dynamic capabilities in HCM: a systematic literature review	(Polater, 2020)	Flexibility	Humanitarian
Humanitarian logistics and SC standards. Literature review and view from practice	(Paciarotti, Piotrowicz, & Fenton, 2021)	Time - Flexibility	Humanitarian
Developing Performance Measurement Tool for Slow-Onset HSC	(Bhusiri & Ling Tay, 2021)	Time - Flexibility	Humanitarian
Key performance indicators in humanitarian logistics: A systematic literature review 2010-2020	(Da Silva et al, 2024)	Time - Flexibility	Humanitarian

Building upon the desk review of the literature and the preceding summary, this discussion will focus on four critical dimensions selected from the twelve previously identified performance indicators. These four metrics are time, quality, cost and flexibility, which have been the primary focus of most scholars, as summarized in Table2.

Prior to proceeding with a detailed analysis of these attributes, it is essential to define best practices which is the basis of identification of these indicators. According to Szulanski's (1996) a practice refers to “the organization's routine use of knowledge and often has a tacit component,

important strategic aspects, including the reliability, durability, safety, and conformity to specifications of the products or services being delivered (Karamouz, Ahmadi Kahnali, & Ghafournia, 2021). Achieving and maintaining quality standards requires effective quality control measures, supplier management, thorough inspection processes, and adherence to industry regulations and standards. By ensuring that quality is upheld at every stage of the supply chain, organizations can enhance their reputation, gain a competitive edge, and foster long-term relationships with customers and partners (Li , Yan, Zhang, & Yan, 2020).

The third aspect of the triangle is cost, which represents the financial considerations associated with the performance of a supply chain. Cost plays a crucial role in supply chain management as organizations, including public, private and humanitarian ones, strive to optimize their operations and achieve cost-efficiency without compromising on quality and timeliness (Lee, Seo, & Dinwoodie, 2016). Managing costs within the supply chain involves various components, including procurement, production, transportation, inventory management, and distribution. By implementing cost-effective strategies and practices, organizations can minimize expenses, maximize profitability, and ensure the affordability of products or services (Li , Yan, Zhang, & Yan, 2020). The organization usually does many approaches to optimize the cost in the supply chain. These approaches include negotiating favorable pricing with suppliers, reducing waste and inefficiencies, streamlining processes,

implementing lean practices, optimizing transportation routes, and employing technology and automation to enhance operational efficiency (Lee, Seo, & Dinwoodie, 2016).

While cost reduction is a critical objective, it is important to strike a balance with other performance dimensions such as Quality and Time. Pursuing excessively low costs may lead to compromised quality, delayed delivery, or inadequate customer service, which can ultimately have a negative impact on customer satisfaction and organizational reputation. The challenge lies in finding the optimal balance between cost and other performance factors. Supply chain managers must carefully analyze cost drivers, evaluate trade-offs, and make informed decisions to achieve the desired cost-effectiveness while meeting customer expectations (Vafaei-Zadeh, Ramayah, Hanifah, & Kurnia, 2020).

In the realm of supply chain management, the assessment of performance often revolves around three key attributes: Time, Quality, and Cost. However, the realization that it is challenging to achieve peak levels in all three dimensions simultaneously is a pivotal understanding for organizations. Recognizing the inherent trade-offs involved, organizations must adopt a strategic mindset that allows for prioritizing one or two of these attributes over the others (Kim S. , 2006). This intentional prioritization doesn't imply neglecting the remaining factors but acknowledges that adjustments might be necessary to strike an optimal balance. For instance, an organization may choose to emphasize timely delivery, prioritizing efficiency and reducing lead times, but this might necessitate a nuanced approach to cost management. Conversely, a focus on high-quality products may require more resources and time, impacting the cost and potentially extending delivery timelines. The key is to align the supply chain strategy with the overall organizational goals and demands. By doing so, organizations can navigate these trade-offs intelligently, ensuring that the chosen emphasis aligns with customer expectations and industry standards.

This strategic trade-off approach is essential for maintaining a realistic and achievable supply chain performance. It enables organizations to adapt to dynamic demand, customer preferences, and unforeseen challenges, fostering

resilience and sustainability in the face of complexity. As supply chain dynamics continue to evolve, the ability to make informed trade-offs becomes a cornerstone for success in achieving and maintaining optimal supply chain performance (Voldrich, Wieser, & Zufferey, 2020).

Building on that, the organization finds itself in a situation where it has to do a trade-off between one and other factors which adds more complexity in suggesting an appropriate model to present performance of supply chain (Dong-Young, 2013). Quick delivery requires to do a rapid assessment and fast upstream communication in the supply chain to procure goods which affects quality and cost. Procurement of affordable goods requires longer time of conducting market survey. Quality as well may need time to assess the needs of customers and match the needs and wants which applies more cost. Therefore, organizations should consider what performance of supply chain means according to the organization goals and objectives, and so it can determine what the most important attributes are which support achieving the goals of the organization. For instant, cost is the most important factor which serves the goal of commercial incorporates in maximizing profit. Some firms are looking for a differential product in their strategic goals which give more attention to Quality rather than Time and Cost. Manufactures of luxury vehicles could be given as an example (Bozarth & Handfield, 2008) (Christopher, Logistics & supply chain management, 2017) (Ivanov, Tsipoulanidis, & Schönberger, 2019).

The literature offers a clearer explanation of the tradeoff shapes in supply chain performance elements and how these shapes vary across different sectors. As illustrated in Table 2, in private sector, a supply chain that prioritizes and consistently delivers high-quality goods and services not only enhances customer trust and loyalty but also minimizes the likelihood of product recalls, returns, or negative reviews (Gattorna, 2016). However, in the humanitarian sector, the significance of quality is elevated even further, as it takes on a deeper meaning beyond mere product or service attributes. It is deeply linked to promoting dignity, respecting cultural values, and upholding the rights of affected individuals and communities. By prioritizing quality, humanitarian

organizations can effectively meet the needs of those they serve and contribute to meaningful and sustainable outcomes in times of crisis (Hashemi, Handayanto, Masudin, Zulfikarijah, & Jihadi, 2022).

Definition of supply chain performance is different in the context of non-profit organizations, where Time is the most critical key of performance. There is a necessity to deliver either materials or services as rapidly as possible to beneficiaries in order to save their lives. Time comes first rather than other parameters like quality and cost (Hashemi, Handayanto, Masudin, Zulfikarijah, & Jihadi, 2022).

As outlined before, many scholars prioritize specific elements beyond the traditional three constructs - Time, Cost and Quality- and a crucial factor associated with humanitarian supply chain performance is 'Flexibility' (Polater, 2020). Flexibility encompasses the ability of a supply chain to promptly and adeptly respond to sudden or unplanned shifts in demand, thereby ensuring the smooth flow of goods and services in the time of crisis or humanitarian emergencies. It refers to the agility and adaptability of the system to accommodate unexpected changes in demand patterns, or disruptions in the production and distribution processes. It encompasses various aspects, including but not limited to, the responsiveness of suppliers, the ability to quickly adjust production schedules, the availability of alternative sourcing options, and the capacity to rapidly deploy resources to areas in need (Childerhouse, Lewis, Naim, & Towi, 2003).

According to Heaslip et. al (2014), humanitarian and military supply chains are similar in having special qualities that make them different than the one in private sector. Both supply chains have a considerable flexibility to respond in time despite short notice and they focus on accomplishing the mission in time, therefore their performance measures are time centered. One of the key reasons why flexibility holds immense significance in the context of humanitarian organizations is the inherently unpredictable nature of their operations (Kovács, Tatham, & Larson, 2012).

Humanitarian crises, such as natural disasters, conflicts, or disease outbreaks, often result in sudden surges in demand for critical supplies and services. In such scenarios, the ability of the supply chain to swiftly adapt and respond becomes paramount to saving lives and alleviating suffering. By incorporating flexibility into their supply chain strategies, humanitarian organizations can proactively identify and respond to emerging needs, ensuring that aid reaches the affected areas in a timely manner (Kalyar, Shafique, & Ahmad, 2020). Furthermore, flexibility in the humanitarian supply chain allows for a proactive response to emerging needs. Humanitarian organizations often operate in dynamic and volatile environments where conditions can change rapidly. This includes changes in funding positions, trends of support approaches of stakeholders and legal space given by local governments (Chopra & Meindl , 2010).

However, achieving supply chain flexibility requires a comprehensive and integrated approach. It involves establishing robust communication channels and collaborative relationships with suppliers, manufacturers, distributors, and other stakeholders. Close coordination and information sharing among these entities enable rapid decision-making and facilitate the necessary adjustments in response to changing circumstances (Kalyar, Shafique, & Ahmad, 2020).

Before concluding this section, it is worth highlight that there are many challenges could hamper the overall supply chain performance, particularly humanitarian supply chain, in terms of efficiency and responsiveness. A research surveyed 40 humanitarian organizations operate in Kenya, and it identifies five different factors which are: a lack of well-definition of the role of supply chain management in humanitarian operation; interruptions in the operation due to domestic barriers; uncertainty in demand due to unplanned emergencies; failure in in accessing targeted beneficiaries; fluctuation in materials prices due to a spike demand (Nyamu, 2012).

This underscores the importance of two key elements: Flexibility and Time for humanitarian supply chain performance. Nayamu's study highlights how all challenges are connected to these two crucial factors.

Building upon the preceding literature review and theoretical discussions, this study will prioritize the dimensions of Time and Flexibility over Cost and Quality in its analytical framework. This selective approach is necessitated by research scope limitations that make comprehensive examination of all four-performance metrics impractical for the current investigation.

As explained earlier, these two elements emerge as the most pivotal and critical factors, particularly when delving into the discourse on humanitarian supply chain performance.

After delving into the topic of supply chain performance and the factors that can impact it, particularly in the context of humanitarian supply chains, the focus will now shift towards exploring the concept of integration in general and integration within supply chains.

The importance of integration in supply chains cannot be overstated, particularly in the context of humanitarian operations where timely and efficient delivery of aid is critical to saving lives and alleviating suffering. Effective integration in humanitarian supply chains can help to reduce operational costs, improve efficiency, enhance visibility and transparency, and ensure that aid is delivered to the right people at the right time. In the upcoming section, the concept of integration in supply chains will be explored in greater detail, with a focus on five integration constructs of supply chain.

2.2.4. Supply Chain Integration

Integration as a concept becomes avital requirements in all business models, and it have many applications across all management fields. The concept of integration can be defined generally as "the extent to which separate parties work together in a cooperative manner to arrive at mutually acceptable outcomes" (O'Leary-Kelly & B.E., 2002). The impact of integration has being discussed thoroughly by scholars especially in the science of supply chain and at different levels externally and internally (S. & Chalmeta, 2014). Supply chain integration is highly considered as a leverage for the organization to develop its competitive advantage (Swink, Narasimhan, & Wang, 2007).

The concept, which originated in the 1980s as a logistical coordination mechanism, has evolved into a multidimensional framework encompassing strategic, operational, and technological alignment across supply chain networks (Stevens, 1989).

The conceptualization of SCI has undergone significant refinement since its inception. One of early definitions of supply chain integration was provided by Houlihan (1987). Supply chain integration can be defined as “the integration of the various functional areas within an organization to enhance the flow of goods from immediate strategic suppliers through the manufacturing and distribution chain to end users”.

This perspective primarily focused on intra-organizational coordination, reflecting the operational realities of manufacturing-centric supply chains in the late 20th century. Subsequent scholarly work expanded this narrow view to incorporate inter-organizational dynamics. Mentzer (2004) advanced a more relational definition, describing SCI as "a strategic partnership among supply chain members to synchronize activities, share risks, and align objectives for mutual benefit." This shift mirrored the growing recognition of supply chains as complex ecosystems rather than linear sequences of transactions.

Contemporary interpretations further elaborate on SCI as a multidimensional construct. Pagell(2004) distinguishes between operational integration, which entails the harmonization of production, inventory, and logistics processes, and strategic integration, which involves long-term alignment of business objectives across partner organizations. Complementing these perspectives, Sanders (2016) emphasizes the centrality of informational integration, facilitated by digital technologies such as enterprise resource planning (ERP) systems, the Internet of Things (IoT), and blockchain platforms.

Supply chain integration is commonly framed in terms of internal (within the organization) and external (across partner networks) dimensions, as well as horizontal and vertical structures. Horizontal integration extends organizational boundaries toward customers and suppliers, enhancing coordination across the same supply chain tier. In contrast, vertical integration broadens these

boundaries to include external stakeholders such as governments, regulatory bodies, and strategic partners, fostering alignment across different tiers of the supply chain (Lambert, Emmelhainz, & Gardner, 1996).

A comprehensive definition that encompasses both internal and external dimensions of supply chain integration is provided by Pinto and Diemer (2020), who define supply chain integration as "the strategic collaboration within a supply chain, among its stakeholders, in order to improve the management of intra- and inter-organization processes." This definition will be adopted in the present study, as it offers a holistic perspective on integration by recognizing the importance of coordinated efforts both within individual organizations and externally with their stakeholders across the supply chain.

The relationship between SCI and organizational performance has been extensively examined, yielding nuanced insights. A substantial body of research supports the positive impact of SCI on operational and financial outcomes. Swink et al. (2007) found that high-integration firms achieve, on average, 30% faster cycle times and 25% lower inventory costs than their peers. Additionally, it demonstrates that broad supply chain integration correlates strongly with enhanced customer satisfaction and market share growth.

However, there is no common understanding on benefits of SCI, what constructs and direction of integration should be followed in order to emerge high performance supply chain (Gimenez & Ventura, 2005). Contingency theory posits that the efficacy of integration strategies depends on contextual factors such as volatility of external environment and complexity within the organization (Wiengarten, Pagell, & Fynes, 2015). Thus, not all researchers agree on the positive impact of integration among supply chain elements on performance. Empirical analyses conducted by some researchers have shown varying results, with instances where the relationship between supply chain integration and performance either does not exist or even exhibits a negative correlation, one of these examples is the work of Swink and his colleagues (2007). These findings highlight the complexity and contextual nature of supply chain integration. While integration is often considered beneficial in terms of

enhancing coordination, collaboration, and information sharing among supply chain partners, the actual outcomes may differ based on several factors. These factors could include industry-specific characteristics, organizational culture, the level of interdependence among supply chain entities, and the extent of technological adoption. The contradictory results emphasize the need for a nuanced understanding of supply chain integration and its impact on performance. It is essential for organizations to carefully assess their specific circumstances, evaluate the potential benefits and risks of integration, and tailor their strategies accordingly (Tomasini & Van Wassenhove, 2009).

While commercial supply chain integration has been widely studied, its application in humanitarian contexts remains underexplored. The integration concept has not yet been extended more to include humanitarian supply chain, despite there are some studies discussed civil-military cooperation like "Civil-Military Cooperation in Response to a Complex Emergency" by Sebastian Rietjens(2008) and "Using the military in disaster relief: systemizing challenges and opportunities" by Heaslip and Barber(2014).

In terms of supply chain integration constructs, some scholars pay attention to internal integration as a catalyst that puts all internal efforts of all cogs, business units, to make the machine of supply chain working effectively. Other authors consider other different elements such as information (Prabir , Byoung , & Tage , 2005), supplier, customer (Wantao, Mark , David , & Harvey, 2013) integration or combination of two or more (Dong-Young, 2013), specially internal , supplier and customer integration (Liu, Liu, & Gu, 2021).

This study builds upon existing efforts to advance the understanding of humanitarian supply chains by critically examining the notion of supply chain integration. While, as introduced before, existing literature has primarily focused on commercial supply chains, this work extends the conceptualization of SCI to encompass both internal and external dimensions within humanitarian contexts. Specifically, the study investigates SCI across five key constructs: Beneficiary, Supplier, Government and Political Stakeholders, Partner Organizations, and Internal.

These constructs were selected to reflect the multi-stakeholder nature of humanitarian operations, where alignment across diverse actors is critical to effective disaster response and long-term resilience. Each construct will be comprehensively analyzed in subsequent sections, with emphasis on their interdependencies, challenges, and practical implications for HSC performance.

By adopting this holistic framework, the study aims to bridge gaps in the literature, which has traditionally treated SCI in fragmented ways

2.2.4.1. Internal Integration

Internal integration plays a crucial role in the success of a supply chain management strategy. It encompasses the collaboration and coordination between different departments and functions within an organization, ensuring that they work together towards common goals and objectives. Therefore, internal integration is considered as an encouragement of leveling up the inter-organization coordination and collaboration through adapting boundaries of departments to easily facilitate flow of information and data among them. This alignment supports the achievement of supply chain performance and offers several benefits (Yinan, Zhao, & Sheu, 2011).

Internal integration is about how the organization restructures its entire body to improve smoothness of the internal flows of material and data & information amongst all departments including production and support services (Koufteros, Rawski, & Rupak, 2010) which requires the organization to utilize its best practices of employing existing internal resources for extending knowledge and efforts borders of single business unit to develop more energy that can support external integration activities and improve performance in supply chain (Huo, 2012). Some schoolers argued that an organization have a low level of internal integration, can't achieve efficiency by the best utilization of resources because departments focus on their own interest rather than the overall goal which lemmatizes their function (Schoenherr & Swink, 2012). In a comprehensive study assessing the performance of the humanitarian supply chain following the earthquake disaster in Uttarakhand state of North India on

June 14th, 2013, significant deficiencies were identified in the humanitarian supply chain at the course of relieving the people at disaster time. All these shortfalls are related to internal processes. The findings underscored that a lack of top management commitment, inadequate organizational structures for knowledge creation and sharing, and the absence of coordination policies emerged as primary barriers. Addressing these critical areas is paramount to mitigating coordination obstacles that severely hampered the humanitarian supply chain's performance (Gaurav, Ramesh, & Arshinder, 2015).

One of the significant advantages of internal integration is the reduction of information asymmetry within the organization (Flynn, Huo, & Zhao, 2010). By implementing cross-functional teams, employees from diverse departments come together to work on shared projects or goals. This collaboration allows for the exchange of knowledge and expertise, enabling the identification of potential issues or areas for improvement that may have been overlooked if departments were working in isolation. Additionally, cross-functional teams help break down silos and foster improved communication and collaboration between departments, leading to enhanced efficiency and effectiveness (Vickery, Jayaram, Cornelia, & Calantone, 2003)).

Developing a culture of collaboration is another critical aspect of internal integration. The success of an organization relies on individuals working together towards common goals. This can be achieved by establishing a shared vision and mission and promoting a culture of trust and openness among employees. When there is trust and respect within the organization, employees are more likely to collaborate effectively, contributing to overall success (Huo, 2012).

Furthermore, internal integration contributes to the development of a more agile and responsive supply chain. An agile supply chain is one that can quickly and effectively respond to changes in customer demand or market conditions. Achieving this requires a high degree of coordination and collaboration between different departments and functions, as well as a willingness to embrace change and adapt to new circumstances. Internal integration provides the foundation for

this agility, allowing the organization to respond swiftly to emerging challenges and opportunities (Pagell, 2004).

To ensure internal integration, organizations employ various practices and strategies. These include promoting internal communication, establishing multifunctional teams and cross-functional teams, implementing enterprise resource planning systems, and establishing joint planning committees (Zairi & Sinclair, 1995). Additionally, information technology applications and business process reengineering can be powerful tools for transforming internal integration. These approaches enhance communication, streamline processes, and facilitate the flow of information and data among departments (Nikolaos & Stergiou, 2022).

internal integration can't be discussed a way from dynamic capability theory that suggests that the organization requires to build its internal dynamic capabilities in order to gain sustained competitive advantage (Baden-Fuller & Teece, 2020). Also, dynamic capability theory is originated from resource-based theory which advocates that competitive advantage of the organization is mainly derived by its inimitable resources. Both theories emphasize on the importance of internal integration and its crucial rule in best utilization of resources to achieve a competitive advantage (Baden-Fuller & Teece, 2020).

It has been looked to a link between internal and external integration, either to consider internal integration as a catalyst or enabler that stimulates the occurrence of external integration, or even more in thinking that internal integration is a cause of condition for emergence of external integration. The last consideration is justified by how internal integration could help the organization in knowing better on what the customer needs and so it can innovate based on this knowledge by strengthening and leading existing capacity towards a unified goal specially when it comes to uncertain and unpredictable environment (Huo, 2012). Freije et. al (2022) investigate the interrelation between internal integration with customer and supplier integration. The findings show a strong correlation between both, and internal integration is a catalyst or enabler to have high level of customer and supplier integration. This role of internal integration

is important in the supply chain network dynamics. it plays a direct role in developing performance and as well as helps other integration constructs to develop more capabilities.

According to Marc Jegers(2008), a prominent researcher in the field, non-profit organizations share a similar need for internal integration as their private and public counterparts when it comes to maximizing their operational performance in fulfilling their social and economic roles. While the primary goals and objectives of non-profit organizations may differ from those of private or public organizations, the importance of internal integration remains equally significant across all sectors.

Internal integration is crucial for non-profit organizations to effectively coordinate their activities, align their various departments and functions, and streamline their processes. By fostering collaboration and communication within the organization, non-profits can optimize their operational performance and enhance their ability to fulfill their social and economic missions (Anthony & Young, 1984).

Just like private and public organizations, non-profits face challenges related to information flow, coordination, and collaboration among different departments and functions. Without proper internal integration, non-profits may struggle to achieve their objectives efficiently and effectively. For instance, the lack of coordination between fundraising and program delivery departments could result in misalignment of resources, duplication of efforts, or delays in service delivery (Jegers, 2008).

Empirical evidence provided by De Waal (2011) supports the notion that internal integration has a significant impact on the performance of non-profit organizations. This research demonstrates that internal integration plays a pivotal role in enhancing operational effectiveness, resource utilization, and overall performance outcomes in the non-profit sector. These findings reinforce the idea that non-profit organizations should prioritize internal integration just as much as their private and public counterparts do. By emphasizing internal integration, non-profits can benefit in various ways. Firstly, it enables effective

communication and collaboration among different departments, facilitating the sharing of information, resources, and best practices. This alignment of efforts enhances overall operational efficiency and reduces redundancy within the organization. Secondly, internal integration promotes a cohesive organizational culture and a shared sense of purpose among employees. When individuals from different departments work together towards common goals, it fosters a sense of unity and collective responsibility. This, in turn, improves employee morale, engagement, and commitment to the organization's mission. Thirdly, internal integration enables non-profits to better allocate and utilize their limited resources. By streamlining processes, eliminating duplication, and optimizing resource allocation, non-profits can maximize their impact and achieve their social and economic objectives more effectively.

A critical application of internal integration in humanitarian organizations is the concept of "Corporate Emergency" which is a special coordinated response mechanism activated during disasters or crises. This approach involves optimizing cross-functional collaboration within the supply chain to unify decision-making, streamline resource allocation, and enhance operational efficiency. By breaking down silos between procurement, logistics, warehousing, and field operations, humanitarian agencies can function as a single, agile entity, ensuring the best possible utilization of scarce resources during emergencies (Tomasini & Van Wassenhove, 2009).

A recent example of this practice is the World Food Programme (WFP)'s response in Sudan between January 2024 and March 2026. Facing complex challenges such as conflict-driven displacement and disrupted supply routes, the WFP activated an integrated internal emergency protocol. This internal integration includes procedures such as: real-time data sharing between headquarters, field offices, and local partners to monitor needs and adjust distributions dynamically, joint operations teams combining logistics, finance, and program staff to accelerate procurement and delivery of food aid and unified inventory management to prevent redundancies and reduce lead times. The WFP's Sudan intervention underscores that corporate emergency frameworks

are not theoretical ideals but operational necessities, particularly in high-risk environments where delays cost lives. (WFP, Evaluation of WFP's Corporate Emergency Response to the Sudan Regional Crisis, 2025)

In conclusion, internal integration is a critical element of a successful supply chain management strategy. It involves aligning different departments and functions within an organization to work towards common goals and objectives. Internal integration reduces information asymmetry, fosters collaboration and trust, enables agility and responsiveness, and contributes to overall supply chain performance. By employing various practices and strategies, organizations can strengthen internal integration and leverage its benefits in achieving competitive advantage and operational excellence.

2.2.4.2. Beneficiary Integration

By the 1990s, organizations began to realize the increasing importance of actively involving customers in their management processes to create superior customer value. This recognition led to a significant shift in supply chain management practices, as organizations sought to extend their boundaries and integrate customers into the overall supply chain. Researchers and practitioners alike began emphasizing the critical role of customer integration in achieving high supply chain performance (Martinelli & Tunisini, 2019).

Bowersox et al. (2002) conducted a study that underscored the significance of effective customer integration in the supply chain. They argued that organizations cannot attain high supply chain performance without a well-designed and smooth integration of customers, particularly in today's highly uncertain business environment. The authors highlighted that customer integration should go beyond simply treating the customer as the end receiver of the supply chain but rather position the customer as the central focus of the entire supply chain process. This perspective involves actively involving customers in various stages, from product design and development to order fulfillment and after-sales support.

In a highly competitive market environment characterized by immense product variety, unpredictable demand patterns, and short product life cycles, customer integration emerges as a crucial requirement for supply chain success. With customers actively integrated into the supply chain, organizations can gain a deeper understanding of customer needs, preferences, and expectations. This knowledge empowers organizations to align their operations more effectively, anticipate demand fluctuations, and tailor their offerings to meet customer requirements. By leveraging customer insights and collaboration, organizations can achieve improved supply chain responsiveness, enhance customer satisfaction, and ultimately gain a competitive edge (Juttner, Christopher, & Baker, 2007). Thus, and as introduced , beneficiary integration can be defined in traditional supply chain management literature as the systematic incorporation of end-users into supply chain processes to ensure that operations align with their needs and expectations (Christopher M. , Logistics & supply chain management, 2017). This concept emphasizes a demand-driven approach, where supply chain activities are designed to maximize value delivery to the final beneficiary (Lambert, Emmelhainz, & Gardner, 1996).

Beneficiary integration is closely associated with customer-centric supply chain strategies, where the ultimate goal is to enhance satisfaction, reduce inefficiencies, and improve responsiveness (Mentzer, 2004). It involves mechanisms such as demand sensing, feedback loops, and collaborative planning with distributors and retailers to ensure that beneficiary requirements are met effectively (Lee, Seo, & Dinwoodie, 2016).

The literature emphasis on key dimensions of beneficiary integration which includes:

- Demand-driven coordination concept by aligning production and distribution with actual beneficiary demand to minimize waste and improve service levels (Houlihan, 1987).
- Feedback and responsiveness technique through integrating real-time data from distribution points, customer surveys, and market research to refine supply chain strategies (Fisher, 1997).

- Enhances agility in responding to changing beneficiary preferences, demands and needs (Christopher & Peck, 2004).
- Value chain synchronization practice which ensures that all supply chain stages, including procurement, manufacturing and logistics, contribute cohesively to a beneficiary value (Paciarotti, Piotrowicz, & Fenton, 2021).

The concept of customer integration holds particular significance in the context of humanitarian supply chain management. While the term "customer" is often replaced with "beneficiary," the fundamental principle remains the same - satisfying the needs and requirements of the recipients of humanitarian aid. Humanitarian organizations aim to provide timely assistance and support to affected individuals or communities in crisis situations. Therefore, customer or beneficiary integration becomes crucial for humanitarian organizations to effectively meet their social mission and achieve a humanitarian competitive advantage (Chen & Graddy, 2010).

Beneficiary integration refers to the active involvement of disaster-affected populations in humanitarian supply chain decisions, ensuring aid aligns with their needs (Balcik, Beamon, Krejci, Muramats, & Ramirez, 2010). Unlike traditional top-down approaches, beneficiary-integrated models emphasize participatory decision-making, recognizing that affected communities possess critical local knowledge (Tomasini & Van Wassenhove, 2009).The concept of beneficiary integration draws from two theories. Firstly from stakeholder theory which argues that involving all affected parties improves outcomes (Freeman, 1984).The second theory is community-based disaster management which prioritizes local empowerment of communities by rehabilitating their practices of engagement in supply chain process and design (Melnyk & Swink, 2002).

Oloruntoba and Gray (2009) argue that in the scope of humanitarian supply chain management, customer or beneficiary integration is essential, especially in highly unpredictable and challenging environments. These environments often feature scarce resources, limited infrastructure, and complex logistics. By actively involving beneficiaries in the supply chain, humanitarian organizations

can gain insights into their unique needs, preferences, and cultural sensitivities. This integration allows organizations to tailor their aid programs accordingly, ensuring a more efficient and effective allocation of resources, delivery of aid, and overall humanitarian response.

Moreover, customer integration in humanitarian supply chains enables organizations to foster trust, transparency, and accountability. By involving beneficiaries in decision-making processes and incorporating their feedback, humanitarian organizations can demonstrate a genuine commitment to their welfare. This engagement also enhances the legitimacy and credibility of the organization, contributing to long-term partnerships and community support (Overstreet, Hall, Hanna, & Kelly Rainer, 2011).

The evolution of beneficiary integration practices in humanitarian supply chains reflects a paradigm shift from supply-driven to demand-driven aid. By incorporating participatory approaches, digital technologies, and market-based solutions, humanitarian actors can better align their interventions with beneficiary needs and preferences

Within humanitarian supply chain literature, beneficiary integration has emerged as a critical component for ensuring aid effectiveness and accountability. Scholars and practitioners increasingly recognize that meaningful engagement with affected populations leads to more responsive and appropriate interventions (Van Looy & Shafagatova, 2016). There are some key best practices for beneficiary integration drawn from recent field applications and theoretical frameworks.

A fundamental practice involves participatory needs assessments, which move beyond traditional top-down approaches by actively involving beneficiaries in identifying priorities and vulnerabilities. As emphasized by ALNAP (2018), such assessments often employ community consultations, focus group discussions, and surveys conducted by local organizations to ensure marginalized voices are heard. This participatory model aligns with the rights-based approach to humanitarian action, which views affected populations as active stakeholders rather than passive recipients.

Additionally, the rise of digital platforms has significantly enhanced two-way communication between aid providers and beneficiaries. For instance, UNHCR's (2022) two-way SMS systems enable refugees in camp settings to report protection concerns, request assistance, and provide feedback on service delivery. Similarly, the International Organization for Migration (IOM, 2021) has implemented mobile-based feedback tools that allow displaced populations to evaluate aid effectiveness in real time. These technological solutions not only improve accountability but also create valuable data streams for adaptive programming.

Co-design of aid programs represents another critical practice, where beneficiaries participate directly in shaping intervention strategies. The UNHCR (2022) has institutionalized this approach through beneficiary committees in camp management, where elected representatives collaborate with humanitarian agencies on resource allocation and service provision. The World Bank (2021) has documented similar successes with participatory budgeting in post-disaster reconstruction, demonstrating how community involvement can enhance project relevance and sustainability.

Cash-based interventions (CBI) have gained prominence as a means of empowering beneficiaries through choice and market-based solutions. Research by Peachey et al. (2018) shows that conditional and unconditional cash transfers, such as those implemented by the World Food Programme (WFP), not only meet immediate needs but also stimulate local economies. They further highlights how CBIs preserve beneficiary dignity by allowing individuals to prioritize their own needs rather than receiving predetermined aid packages.

Another best practice involves effective beneficiary integration which requires robust feedback and adaptive learning mechanisms. The Red Cross's "Beneficiary Communication" system exemplifies this practice through its real-time complaint and response mechanisms. Also, post-distribution monitoring (PDMs) is standardized to provide systematic evidence for refining future interventions based on beneficiary experiences and outcomes (IFRC, 2019).

These practices collectively contribute to Accountability to Affected Populations (AAP), a framework that institutionalizes beneficiary integration across the program cycle. The Sphere Handbook, which standardizes humanitarian practices across iNGOs, emphasizes that meaningful AAP requires both transparency in aid allocation decisions and accessible grievance redress systems to address power imbalances and potential misuse of resources. (Sphere Association, 2018).

Despite the widely recognized necessities of beneficiary integration in humanitarian supply chains, its practical implementation faces significant challenges that often undermine its effectiveness. These obstacles stem from structural, logistical, and socio-cultural factors that complicate meaningful participation and equitable engagement.

A primary challenge arises from power imbalances within humanitarian governance structures. While participatory approaches are frequently emphasized in policy discourse, decision-making authority often remains concentrated within international agencies rather than being transferred to affected communities (Rodríguez-Espíndola, Chowdhury, & Beltagui, 2022).

Logistical constraints present another major barrier to effective beneficiary integration. In many crisis-affected regions, inadequate infrastructure - such as limited internet connectivity - hinders the implementation of digital feedback mechanisms, particularly in rural and remote areas (Heaslip & Barber, 2014). Additionally, the urgency inherent in emergency responses frequently restricts opportunities for thorough community consultation, as operational timelines prioritize rapid delivery over participatory processes (Holguín-Veras, Jaller, Van Wassenhove, Pérez, & Wachtendorf, 2012).

The integration of beneficiaries is further complicated by cultural and ethical concerns. Gender disparities, for instance, often exclude women from meaningful participation in decision-making forums, despite their critical role in community resilience. Moreover, the engagement of vulnerable groups without adequate safeguards risks exploitation, as observed in contexts where

consultations have inadvertently exposed participants to traumatization or security threats (Arora, Hofman, & Vatsa, 2023).

These challenges collectively highlight the tension between the theoretical commitment to beneficiary integration and the practical realities of humanitarian operations. Addressing these barriers requires systemic reforms in funding structures, investment in adaptive logistical capacities, and the development of culturally sensitive engagement frameworks that prioritize both inclusion and protection.

One more point before concluding this section, while beneficiary integration is a crucial factor in humanitarian supply chain performance, it is important to note that it does not operate in isolation of other integration constructs. For example, Danese and Romano (2011) argue that beneficiary integration alone cannot serve as the sole driver of supply chain performance. Rather, beneficiary integration and supplier integration are interconnected and mutually dependent. Both dimensions are necessary for achieving high supply chain performance and ensuring seamless coordination across the supply network. Effective supplier integration enables organizations to build strong relationships with their suppliers, fostering collaboration, knowledge sharing, and joint problem-solving. Supplier integration ensures a smooth flow of materials, timely delivery, and reliable quality, which directly impact beneficiary satisfaction and supply chain performance. Conversely, when supplier integration is low or ineffective, it can hinder beneficiary integration efforts and have a detrimental effect on overall supply chain efficiency. Supplier integration will be discussed thoroughly in the upcoming section.

In conclusion, beneficiary integration has emerged as a critical paradigm in humanitarian supply chain management, representing a shift from traditional supply-driven models to more responsive, demand-driven frameworks. Rooted in stakeholder theory and community-based disaster management, this concept emphasizes the active involvement of crisis-affected populations in shaping supply chain decisions, thereby aligning aid delivery with their real needs and preferences. The literature highlights that effective beneficiary integration

contributes significantly to improved supply chain responsiveness, accountability, and legitimacy, particularly in uncertain and resource-constrained environments. Practices such as participatory needs assessments, digital feedback systems, co-designed aid programs, and cash-based interventions have demonstrated the potential to enhance both operational efficiency and beneficiary satisfaction. However, practical implementation remains hindered by structural power imbalances, logistical barriers, and socio-cultural constraints, underscoring the need for systemic reform and context-sensitive engagement strategies. Furthermore, while beneficiary integration is essential, it must be understood as part of a broader network of integration dimensions, particularly supplier integration, which directly influences the effectiveness of beneficiary-focused strategies. A holistic integration approach that simultaneously strengthens relationships with both beneficiaries and suppliers is thus imperative for achieving sustainable, high-performing humanitarian supply chains.

2.2.4.3. Supplier Integration

This section examines the role of supplier integration in supply chain in general and humanitarian one in specific, exploring its conceptual foundations, implementation challenges, and best practices for enhancing coordination between aid organizations and suppliers.

Suppliers are critical stakeholders in the operations of an organization, serving as the primary source of materials and components needed for production. The quality, cost, and availability of these inputs directly impact the organization's overall performance and competitiveness. As organizations strive to achieve operational excellence and maximize supply chain performance, the integration of suppliers becomes increasingly important (Prajogo, Chowdhury, Yeung, & Cheng, 2012).

Early research by Spekman and colleagues (1998) highlighted the significance of positive supplier interactions in advancing supply chain performance. They proposed a comprehensive model outlining the stages of

supplier integration within the supply chain. The model begins with open market negotiations, where organizations select suppliers based on price considerations. As the relationship progresses, the second stage involves establishing long-term contracts, indicating a higher level of cooperation. The third stage focuses on coordination, characterized by the sharing of information and plans between the organization and its suppliers. Finally, the fourth stage represents collaborative integration, where a deep level of integration is achieved, fostering a close and mutually beneficial relationship.

Supplier integration is about having direct engagement with protentional suppliers with high coordination and coloration for achieving some benefits like reducing operational and transactional cost, material cost, lead time, level of materials stock and risk in a cut at supply chain by decreasing uncertainties.

Supplier integration, as a sophisticating concept, refers to the practices that the organization follows with its suppliers that contributes to a smooth and effective transfer of information and resources which are needed to generate mutual gains for both (Danese, Romano, & Marco, 2013). It entails direct engagement with potential suppliers, emphasizing high levels of coordination, collaboration, and mutual trust. By pursuing supplier integration, organizations can realize several benefits. Firstly, supplier integration enables organizations to reduce operational and transactional costs (Boon□itt & Wong , 2011). Through closer collaboration and communication, organizations can streamline their procurement processes, optimize inventory levels, and eliminate inefficiencies, leading to cost savings. Moreover, supplier integration facilitates the reduction of material costs by enhancing joint planning and forecasting, enabling suppliers to optimize their production and sourcing strategies.

Secondly, supplier integration plays a crucial role in reducing lead time, which is essential in meeting customer demands and maintaining a competitive edge. By closely aligning production schedules, sharing real-time information, and collaborating on demand forecasting, organizations and their suppliers can reduce lead times and enhance responsiveness to market dynamics (Zhu, Geng,

& Lai, 2010). This responsiveness is particularly crucial in industries characterized by volatile demand patterns and short product life cycles.

Furthermore, supplier integration helps mitigate supply chain risks by enhancing visibility and resilience. Collaborative relationships with suppliers allow organizations to proactively identify potential risks, such as supply disruptions or quality issues, and develop joint strategies to address them (Christopher M. , Logistics & supply chain management, 2017). This proactive risk management approach helps organizations build resilience and maintain continuity in their supply chains, even in the face of unforeseen disruptions.

Supplier integration also fosters innovation and product development. By involving suppliers in the early stages of the product design and development process, organizations can tap into their expertise, technological capabilities, and market insights (Lee, Seo, & Dinwoodie, 2016). Collaborative product development efforts enable organizations to leverage suppliers' knowledge and resources, leading to improved product quality, faster time-to-market, and increased customer satisfaction.

Some schoolers discuss these benefits and link it to how supplier integration can contribute to achieve sustainability in supply chain which is essential in uncertain environment (Fallahpour, Yew Wong, & Rajoo, 2021). Sustainability comes from the fact that supplier integration leads to a long-term engagement between the organization and the supplier which helps the organization to overcome fluctuations in price and quality of materials and extend its control over the supplier's behavior (Lambert, Emmelhainz, & Gardner, 1996). On the other side, the supplier will reduce the indirect cost of acquisition related to marketing and attaining new customers by having a committed and loyal customer, which is the organization, and though the supplier, in turn, will reduce uncertainty and increase sustainability (Janda, Murray, & Burton, 2002)

By narrowing the focus to humanitarian supply chain management, supplier integration is a critical component of effective humanitarian supply chain, ensuring that procurement, logistics, and distribution processes align with

the needs of disaster-affected populations. Unlike commercial supply chains, where supplier relationships are primarily driven by cost and efficiency, humanitarian operations must balance speed, equity, and ethical sourcing while operating in high-risk environments (Van Wassenhove, 2006).

In the context of humanitarian sector, supplier integration refers to the strategic alignment between humanitarian organizations and their suppliers to improve the efficiency, responsiveness, and reliability of aid delivery (Kovács, Tatham, & Larson, 2012). In commercial supply chains, integration typically involves long-term partnerships, shared information systems, and collaborative planning. However, humanitarian supply chains face unique constraints, including unpredictable demand, volatile funding, and geopolitical instability, which complicate supplier relationships (Chen & Graddy, 2010).

Scholars and practitioners have identified three key dimensions through which supplier integration can be analyzed in the humanitarian supply chain: strategic partnerships, operational coordination, and local supplier development.

The first dimension, strategic supplier partnerships, refers to the establishment of long-term, collaborative relationships with pre-qualified suppliers to ensure rapid mobilization during emergencies. These partnerships are often formalized through framework agreements that define pricing, quality standards, and delivery timelines in advance of crises. A prominent example is the World Food Programme's (WFP) use of framework contracts with regional food suppliers, which enables the organization to secure essential commodities swiftly during sudden-onset disasters. Such arrangements not only reduce procurement lead times but also foster trust and predictability between humanitarian organizations and their supply partners (Balcik, Beamon, Krejci, Muramats, & Ramirez, 2010).

The second dimension, operational coordination, focuses on the mechanisms of real-time information sharing and joint decision-making that facilitate effective day-to-day operations. This includes the exchange of data on inventory levels, transportation status, and demand fluctuations to support dynamic planning and rapid problem resolution. A notable illustration of this is

the use of digital platforms such as Enterprise Resource Planning (ERP) systems across various United Nations entities. These digital platforms enable real-time tracking of supplier deliveries, particularly in critical contexts such as refugee camps, where visibility and timeliness are paramount. By integrating suppliers into these systems, humanitarian organizations can enhance supply chain transparency, reduce redundancies, and respond more efficiently to changing ground realities (Koliousis, He, Wu, & Sarpong, 2020).

The third dimension, local supplier development, emphasizes the strategic importance of building the capacity of local vendors to enhance the resilience and sustainability of humanitarian supply chains. This involves providing training, technical assistance, and financial support to improve the quality, reliability, and scalability of local suppliers' operations. As highlighted by Day et al. (2012), such efforts not only strengthen local economies but also reduce dependence on international suppliers and improve the speed and relevance of aid delivery. Establishing a network of capable local vendors ensures that humanitarian organizations can source goods and services closer to the point of need, thereby shortening supply chains and increasing their adaptability in volatile environments.

Together, these three dimensions underscore the multifaceted nature of supplier integration in humanitarian contexts. Strategic partnerships provide the foundation for preparedness, operational coordination ensures effective execution, and local supplier development contributes to long-term sustainability and resilience. When effectively implemented, these practices enable humanitarian organizations to build more responsive, accountable, and adaptive supply chains that are better equipped to meet the evolving needs of affected populations.

While supplier integration offers significant advantages in enhancing responsiveness, coordination, and efficiency in humanitarian supply chains, its implementation in practice is often hindered by several critical barriers. These challenges stem from structural, operational, and ethical complexities inherent to the humanitarian context. This section outlines three key categories of

obstacles: market fragmentation and supply uncertainty, coordination failures among multiple stakeholders, and ethical and compliance risks.

- Market fragmentation and supply uncertainty

Humanitarian interventions frequently take place in regions characterized by weak or underdeveloped market structures, where local suppliers often lack the capacity, infrastructure, or resources to respond effectively to sudden and large-scale demands. Such fragmented markets create significant bottlenecks in procurement and supply continuity. Oloruntoba and Gray (2009) note that supply uncertainty is exacerbated in disaster-prone or conflict-affected areas, where vendors may be informal, unregistered, or logistically inaccessible. For instance, following the 2010 Haiti earthquake, humanitarian organizations faced severe delays due to the limited availability of qualified local suppliers, resulting in bottlenecks in aid distribution and procurement (Holguín-Veras, Jaller, Van Wassenhove, Pérez, & Wachtendorf, 2012). These conditions make it difficult to establish reliable sourcing networks, thereby undermining the efficiency and timeliness of relief operations.

- Coordination failures among multiple stakeholders

The involvement of multiple actors—ranging from international NGOs and UN agencies to government institutions and private contractors—often leads to coordination challenges within humanitarian supply chains. Fragmented communication, competing mandates, and lack of centralized oversight can result in overlapping efforts, misallocation of resources, and procurement inefficiencies. Besiou et al. (2011) argue that the absence of integrated supply management frameworks contributes to issues such as redundant ordering, inflated prices, and delivery inconsistencies. A case in point is the response to the 2015 Nepal earthquake, where inadequate coordination among stakeholders led to significant disparities in aid distribution across affected regions (Dubey & Gunasekaran, 2016). Without harmonized supplier engagement strategies, organizations risk duplicating efforts or creating gaps in service provision.

- Ethical and compliance risks

Humanitarian procurement is particularly vulnerable to ethical risks such as corruption, fraud, and supplier misconduct. These issues can severely compromise the effectiveness and legitimacy of aid efforts. González-Padrón et al. (2021) highlight that the urgency and complexity of humanitarian contexts often reduce oversight, increasing the susceptibility to unethical practices. For example, post-tsunami audits in Indonesia revealed instances of collusion among contractors, substandard construction materials, and the diversion of relief funds (Telford & Cosgrave, 2007). These ethical breaches not only waste critical resources but also erode trust among donors, beneficiaries, and implementing agencies. Ensuring compliance with procurement standards and instituting transparent monitoring mechanisms remain ongoing challenges for humanitarian actors.

In conclusion, supplier integration plays a pivotal role in enhancing the effectiveness, responsiveness, and resilience of both commercial and humanitarian supply chains. In the humanitarian context, where the risks are high and operational constraints are particularly challenging, the integration of suppliers is essential for ensuring timely and equitable aid delivery. By fostering long-term strategic partnerships, improving operational coordination, and investing in local supplier development, humanitarian organizations can better navigate the complexities of crisis response and recovery. These practices not only streamline procurement and logistics but also contribute to the sustainability and adaptability of aid operations, particularly in environments marked by volatility and uncertainty. However, despite the substantial benefits, several barriers—such as market fragmentation, coordination failures, and ethical risks—continue to impede the full realization of supplier integration in humanitarian supply chains. Overcoming these obstacles requires concerted efforts to enhance collaboration across stakeholders, improve supply chain visibility, and strengthen ethical standards and compliance mechanisms. Ultimately, effective supplier integration is crucial for building more efficient, resilient, and accountable humanitarian supply chains that can meet the evolving needs of affected populations in an increasingly unpredictable environment.

2.2.4.4. Government and Political Stakeholders Integration

This section explores the role of government and political stakeholders in humanitarian supply chains, examining theoretical perspectives, empirical evidence, and practical implications for effective integration. The discussion entails the Influence of government policies on humanitarian operations in general and then it narrows to humanitarian supply chain.

Humanitarian organizations most likely take a form of multinational organizations which impose these organizations to work in different locations and deal with various governments. Each government has its own direction in viewing the way that multinational organizations, including humanitarian ones, should work and how they should be shaped. The vision of governments affects the pattern of humanitarian organizations either in negative or positive way. Breg and Puck (2007) in their study on 19 largest German multinational organizations provide an empirical prove on the influence of government and political stakeholders on increasing or limiting size of organization's activities in countries. The absence of government and political stakeholders integration could cause a severe damage in services where the humanitarian organization operates. Some scholars refer failure of the humanitarian organization operations to low level of integrating with local governments which results in a conflict in interest for both, humanitarian organization and government. That conflict increases unpredictability and uncertainty in the organization's environment and creates significant barriers to effective implementation (Nielsen, 2014). However, in politically volatile environments, such conflict, requiring humanitarian organizations to rely on informal networks and local intermediaries to facilitate their operations which adds another layer of complexity (Kovács, Tatham, & Larson, 2012)

It's a government responsibility to oversee the formulation and implementation of public policies that govern economic and social development in communities and direct the overall change process. This role requires a deep involvement of the government in the work of humanitarian organizations

(Visser, Steytler, & Machingau, 2010). Also, there is no unified vision on how governments overlook to humanitarian organizations. Every government organizes a specific act in its public law based on how the government defines the nonprofit organization. Salamon and Anheier (1997), in their book "Defining the nonprofit sector: a cross-national analysis", concludes there are considerable differences in acts and laws which organize the work of nonprofit organizations in 13 countries, that were studied, and these differences refer to various understanding of the notion of nonprofit sector by each government.

From governments perspective, to apply good governance, which it is an important goal for improving best utilization of public resources, it is a requirement to ensure involvement of humanitarian actors in strategic planning and scoping of future because humanitarian organizations play an essential role in serving civilians of the government (Bicking & Wimmer, 2011).

Furthermore, the integration of government and political stakeholders represents a critical dimension in humanitarian supply chain management, particularly given the multinational nature of most humanitarian organizations. Operating across diverse geopolitical landscapes, these organizations must navigate varying governmental regulations, political agendas, and institutional frameworks, all of which significantly influence their operational efficacy (Berg & Puck, 2007). The extent to which humanitarian actors successfully integrate with governmental structures can determine the success or failure of relief efforts, particularly in complex emergencies where state actors control access, security, and resource allocation (Nielsen, 2014).

From a governance perspective, the integration of humanitarian organizations into national disaster response frameworks is essential for optimizing resource utilization and ensuring alignment with local priorities (Visser, Steytler, & Machingau, 2010). As introduced before, local governments are responsible for public policy formulation, infrastructure maintenance, and security provision—all of which directly impact humanitarian supply chain. Effective integration ensures that humanitarian supply chains complement rather than duplicate government efforts, particularly in large-scale emergencies where

coordination failures can lead to inefficiencies and inequities in aid distribution (Balcik, Beamon, Krejci, Muramats, & Ramirez, 2010).

Despite all mentioned advantages of government-humanitarian integration, however this integration faces several challenges. Political instability, corruption, and bureaucratic inefficiencies can hinder collaboration, particularly in fragile states where governance structures are weak (Heaslip & Barber, 2014). Additionally, humanitarian principles of neutrality and impartiality may conflict with government agendas, particularly in conflict zones where aid is politicized (Rietjens, 2008). A further complication arises from the dynamic nature of political stakeholders. Changes in government leadership or policy shifts can abruptly alter the operational landscape for humanitarian organizations, necessitating continuous stakeholder engagement and scenario planning. For example, in contexts where humanitarian aid is perceived as undermining state rule, organizations may face restrictions on their activities, requiring diplomatic negotiation and adaptive programming (Tomasini & Van Wassenhove, 2009).

Therefore, there are some strategies used for enhancing government and political stakeholder integration which includes: firstly, pre-crisis engagement by establishing relationships with government before disasters occur to facilitate smoother coordination during emergencies (Day, Melnyk, Larson, & Davis, 2012). Secondly, policy advocacy by engaging in dialogue with policymakers to shape favorable regulatory environments for humanitarian operations (Bicking & Wimmer, 2011). And the third strategy is about institutionalizing hybrid coordination model with the local government. This model requires supporting government institutions in disaster preparedness and response to enhance local resilience (Jahre, Jensen, & Listou, 2016).

One of good examples on the government integration is the emergency response in Haiyan. Strong typhoons hit Haiyan city in Philippines in 2013 resulting thousands of killed persons and causalities, in addition to a destruction of houses, premises and infrastructure. Logistics was disrupted due to bad or cut roads. The World Food Program (WFP) integrated its supply chain with the local

government to distribute life relief items to people affected by the crises (Ivanov, Tsipoulanidis, & Schönberger, 2019).

2.2.4.5. Partner Organizations Integration

The theory of systems interprets the organization as a cog in continuous interaction with its external environment through a set of relationships between the organization and its stakeholders (Kauffman, 1993). And with increasing level of complexity at external environment, the ability of organizations to show flexibility in managing its environment becomes important in intensive competitive markets (Miller, Crabtree, & McDaniel, 1998). Systems and complexity theory proposes changing the organization's direction to pay more focus in extending its boundaries by emerging vertical integration and establishing alliances with other organizations to decrease its isolation and to increase its positive interaction with its own environment (Byrne, 1998). Collaboration with other organizations, specially at the era of scarcity of resources, becomes a mandatory for the organization to secure necessary resources that required to more effectively meet each organizations' needs and achieve objectives. This collaboration is extended to a level of partnership with organizations that share mutual objectives (Proulx, Hager, & Klein , 2014).

Partnership is defined in literature as "a tailored business relationship based on mutual trust, openness, shared risk, and shared rewards that yields a competitive advantage, resulting in business performance greater than would be achieved by the firms individually" (Lambert, Emmelhainz, & Gardner, 1996). Arenas et al. (2013) explains partnership in the light of organization theory as a relationship between the organization and one or more other organizations where organizations have to change their boundaries, behaviors and practices to a collaborative approach.

By narrowing the scope of partnership in the context of supply chain , it can be defined as "a relationship between two entities in the logistical channel that entails a sharing of benefits and burdens over some agreed upon time horizon" (Ellram & Hendrick, 1995).

Lambert et al. (1996) provides more clarification on the need of establishment of partnership integration. Thus, when having an abstract view on the global supply chain, it is obvious that each organization is a part of supply chain of others. And every organization has its own understandings, directions and strategies for its supply chain which may conflict with others' strategies. However, when having an integration between partner organizations, then this conflict can be resolved and lead to a harmonization in global supply chain for all partners involved.

Humanitarian or nonprofit organizations, in their turn, change their pattern by seeking for a close corporation with other organizations to strengthen capacity or even equip with a new one in order to respond positively to uncertain and unpredictable environment. This relationship is usually a win- win, mutual benefit, co-evolution, or partnership. Building on that concept, Xiang & Zhou (2021) define partnership as a level of collaboration between two organizations on a relative scale and enable both parties to have an access on each asset. Partnership as inter-organizational relationship takes one of three forms: contracting, extension, and co-optation.

Partnership is not necessary to be with a nonprofit organization. Andreasen (1996) argues that on some occasions, nonprofit organizations look for an alliance with profit incorporates to develop their mutual business. As in example, American Express provided more than 16 million bank cards to beneficiaries supported by Charge Against Hunger organization in 4 years. American Express in return was able to increase the number of its customer and though encourages more merchants to involve in its operations.

Partnership can also take other forms of relationship between two non-profit organizations or non-profit organization with a public one. Chen and Graddy (2010) studied the impact of a partnership between nonprofit organizations and public institutions in Los Angeles for providing community-based services to children and family, they found a significant scaleup in the level of effectiveness for social service delivery and more ability for both parties to meet their programmatic and organizational objectives.

An example for a partnership between two nonprofit organizations; Atouba and Shumate (2020) conducted a survey to a number of nonprofit organizations perform interorganizational collaboration through partnership. The results show that partnership between humanitarian organizations emerge remarkable implications on effectiveness, complementarity in resources and quality of services.

Localization is another example of partnership between two nonprofit organizations. Localization is a common practice approached by large scale of international humanitarian organization, including United Nations entities, when it has a fund to implement an intervention in a new operation that does not have necessary infrastructure. Then the organization seeks a partnership with local nonprofit organization operating in the place to do the implementation part of the intervention. The capacity of local nonprofit organization helps in better targeting, best utilization of resources and optimum effectiveness. The United Nations- Department of Economic and Social Affairs adopts localization in its Sustainable Development Goals (SDG) -2030 (Chowdhury, Sharma, Daniel , & Jomo , 2016).

This section will be concluded by delving to the key benefits of partner organization integration which can be summarized by the following aspects:

- Enhanced resource mobilization and efficiency:

Partner integration mitigates duplication of efforts and optimizes resource allocation by pooling expertise, funding, and logistical capacities (Balcik, Beamon, Krejci, Muramats, & Ramirez, 2010). For example, during the 2015 Nepal earthquake, coordinated procurement between the World Food Programme (WFP) and local NGOs reduced procurement costs by 30% while accelerating delivery timelines (Dubey & Gunasekaran, 2016). Such synergies are particularly vital in funding-constrained environments, where fragmented efforts can lead to wastage.

- Improved information sharing and decision-making

Integrated partnerships facilitate real-time data exchange, enabling joint situational analysis and adaptive response strategies (Tomasini & Van

Wassenhove, 2009). The United Nations Humanitarian Response Depot (UNHRD), for instance, uses shared platforms with more than fifty partners to track global inventory levels, preventing stockouts during concurrent disasters (Oloruntoba & Gray, 2009). This transparency reduces information asymmetry which is a common challenge in multi-stakeholder operations (Besiou, Pedraza-Martinez, & Van Wassenh, 2011).

- Risk mitigation and resilience building

Long-term partnerships with local organizations enhance contextual adaptability, as local actors provide critical insights into socio-political dynamics (Maghsoudi, Zailani, Ramayah, & Paziran, 2021). In the Syrian refugee crisis, partnerships between the United Nations High Commissioner for Refugees (UNHCR) and Jordanian community groups improved last-mile distribution while minimizing security risks. Such networks also foster capacity building, ensuring sustainable preparedness for future crises (Ertem, Aharoni, & Ketter, 1476-1493).

- Scalability and rapid response

Collaborative frameworks allow organizations to scale operations dynamically during sudden disasters by using their own resources. The 2010 Haiti earthquake response demonstrated this when Médecins Sans Frontières (MSF) and Red Cross shared transportation networks to deploy medical teams 48% faster than standalone efforts (Holguín-Veras, Jaller, Van Wassenhove, Pérez, & Wachtendorf, 2012).

2.3.LITERATURE SUMMARY

Chapter 2 provides a thorough review of the literature relevant to organizational structures and humanitarian supply chain management, with particular emphasis on supply chain integration and performance in complex and uncertain environments. The chapter begins by examining the concept of organizations, their definitions, and structural frameworks, highlighting how organizations function and adapt to varying environmental conditions. Then

discussion is extended to the Contingency theory which serves as a foundational lens for this research, positing that there is no universally optimal way to design, structure, or manage an organization or its processes. Rather, the most effective course of action is contingent upon the specific internal and external conditions in which the organization operates. The theory underscores that organizational effectiveness is achieved when there is a strong alignment between internal structures and the uncertainties and complexities of the external environment. Within the humanitarian context, this perspective highlights the need for a dedicated humanitarian supply chain model. This one is specifically designed to accommodate the volatility, urgency, and resource constraints inherent to humanitarian operations. In line with contingency theory, existing commercial or public-sector supply chain models cannot be directly transplanted into humanitarian settings, as they are not structured to meet the unique demands and uncertainties of crisis environments.

Within this context, humanitarian and nonprofit organizations are explored, emphasizing their unique objectives, operational constraints, and approaches compared to traditional commercial organizations. The chapter also focuses on United Nations organizations, using UNRWA as a case study to illustrate the challenges of organizational design and operational management in resource-constrained and conflict-affected contexts.

The second part of the chapter is devoted to supply chain management. It begins with foundational definitions and concepts, establishing a clear understanding of supply chain processes, flows, and objectives. Supply chain risk management is highlighted as a critical component, given the unpredictable and often volatile environments in which humanitarian organizations operate.

The discussion then turned to supply chain performance, highlighting how its definition varies significantly across the private, public, and humanitarian sectors. While private-sector supply chains typically prioritize profitability, efficiency, and customer satisfaction, public-sector supply chains tend to focus on service delivery, regulatory compliance, and equitable access. In contrast, humanitarian supply chains emphasize responsiveness and the ability to deliver

lifesaving goods and services under conditions of uncertainty and resource constraints. Within the humanitarian context, supply chain performance is examined through key dimensions such as lead time, flexibility, cost efficiency, quality, and capacity to meet beneficiary needs. All these determents are especially critical in emergency and crisis settings. The discussion then explored the trade-offs among these performance dimensions, recognizing that it is rarely possible to maximize all simultaneously.

Ultimately, the focus narrowed to two priority dimensions: flexibility and lead time as these are most critical in humanitarian operations. Flexibility ensures the supply chain can rapidly adapt to shifting needs, unpredictable environments, and volatile access conditions, while lead time reflects the urgency of delivering aid quickly to affected populations. Together, these two dimensions form the core criteria for evaluating and improving humanitarian supply chain performance in practice.

A significant portion of the chapter is dedicated to supply chain integration, which is presented as a multidimensional concept involving coordination across internal functions, suppliers, beneficiaries, government and political stakeholders, and partner organizations.

The literature identifies five interrelated constructs of integration as foundational to the effectiveness of humanitarian supply chains. These five constructs - beneficiary integration, supplier integration, government and political stakeholder integration, partner-organization integration, and internal integration - constitute a comprehensive framework for strengthening humanitarian supply chain integration, thereby improving lead time, flexibility, and overall performance in crisis settings.

Beneficiary integration entails the systematic inclusion of end-users in the planning, implementation, and evaluation of aid delivery, thereby enhancing responsiveness, appropriateness, and accountability. Supplier integration involves the development of collaborative relationships with geographically dispersed and heterogeneous suppliers to ensure the timely provision of goods and services of requisite quality. Government and political stakeholder

integration underscores the necessity of aligning humanitarian operations with national and local policies, regulatory frameworks, and security requirements to facilitate access and operational legitimacy. Partner-organization integration highlights the importance of coordinated planning, information sharing, and joint action among multiple humanitarian actors to minimize duplication, leverage complementary capabilities, and maximize collective impact. Finally, internal integration refers to the alignment of intra-organizational structures, processes, and information systems to improve visibility, resource utilization, and decision-making efficiency.

Overall, this chapter synthesizes the current understanding of organizational structures and supply chain management in humanitarian contexts. It highlights the importance of integrating multiple stakeholders to achieve effective supply chain performance and identifies gaps in existing research, particularly in understanding how integration mechanisms influence operational outcomes. By providing a comprehensive review of theory and practice, this chapter establishes the conceptual foundation for the empirical investigation that follows, offering insights into how humanitarian supply chains can be structured and managed to improve performance in uncertain and resource-constrained environments.

CHAPTER 3

3. RESEARCH AND METHODOLOGY

Chapter 3 navigates into the methodological underpinnings and framework of the research study. This chapter begins with an introduction that provides a contextual overview of the research, followed by a discussion on the conceptual framework that guides the study. Subsequently, the chapter outlines the hypotheses formulated for the research, setting the stage for understanding the study's objectives and expected outcomes. Moving forward, the chapter details the research design employed, encompassing key elements such as epistemology, data collection methods, and ethical considerations. The rationale behind the chosen epistemological stance is explained, along with insights into the data collection process and measures taken to ensure ethical conduct throughout the research endeavor.

Furthermore, the chapter delves into the regression model utilized to analyze the data, shedding light on the statistical techniques employed to test the research hypotheses. Emphasis is placed on the validity and reliability of the research findings.

Additionally, the chapter discusses the tools and instruments utilized in data collection, providing insights into their development and implementation. Moreover, it delineates the various data sources utilized in the study, explaining the rationale behind their selection and integration into the research framework.

Finally, the chapter concludes with a reflection on the limitations inherent in the research methodology, acknowledging constraints and potential areas for future exploration. Through a comprehensive exploration of these methodological facets.

Figure3.1 provides a visual overview of the structure of Chapter 3, illustrating its key components and offering guidance on how to navigate through the chapter systematically.

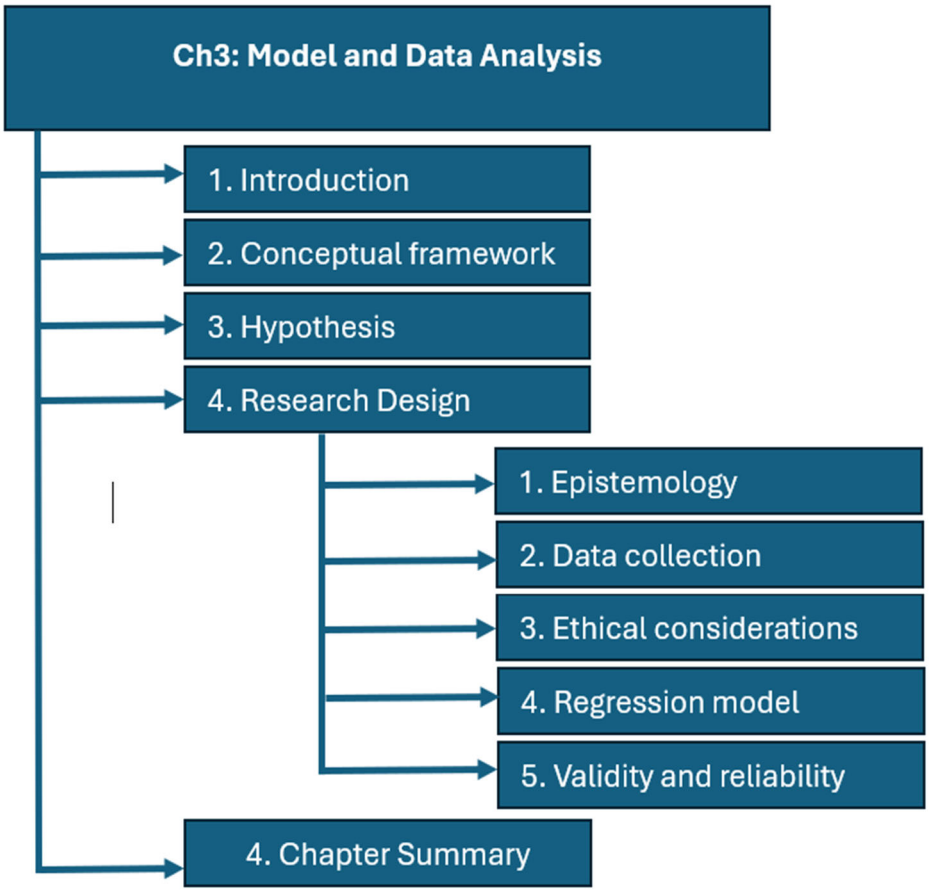

Figure 3.1 Chapter3 Structure

3.1.CONCEPTUAL FRAMEWORK

The conceptual framework is build based on a thorough review of the literature. As shown in Figure3.2, the independent variable "supply chain integration" comprises five distinct constructs. These constructs collectively represent the interrelation and collaboration within the supply chain network. It is hypothesized that the degree of integration across these constructs will have a significant impact on the dependent variable "supply chain performance."

Through rigorous analysis and examination, this study seeks to uncover the extent to which supply chain integration influences performance outcomes, shedding light on the critical factors that drive efficiency, effectiveness, and overall success within the supply chain context.

The conceptual framework of the study is anchored in a series of hypotheses that seek to interpret the relationships between various constructs related to supply chain integration and the overall performance of humanitarian supply chains. With the dependent variable of performance encompassing two critical components, lead time and flexibility, the study investigates how these variables are influenced by five key constructs: beneficiary integration, supplier integration, government and political stakeholders integration, partner organizations integration, and internal integration.

The conceptual framework suggests positive links between each of these constructs and both the time element and the flexibility element of supply chain performance as it will be introduced in the following section of Hypothesis.

This conceptual framework provides a structured lens through which to explore and analyze the dynamics of supply chain integration and its implications for performance outcomes in humanitarian contexts. By systematically testing this framework, the study aims to contribute valuable insights into the strategic management of humanitarian supply chains, ultimately enhancing their effectiveness and responsiveness in delivering aid to those in need.

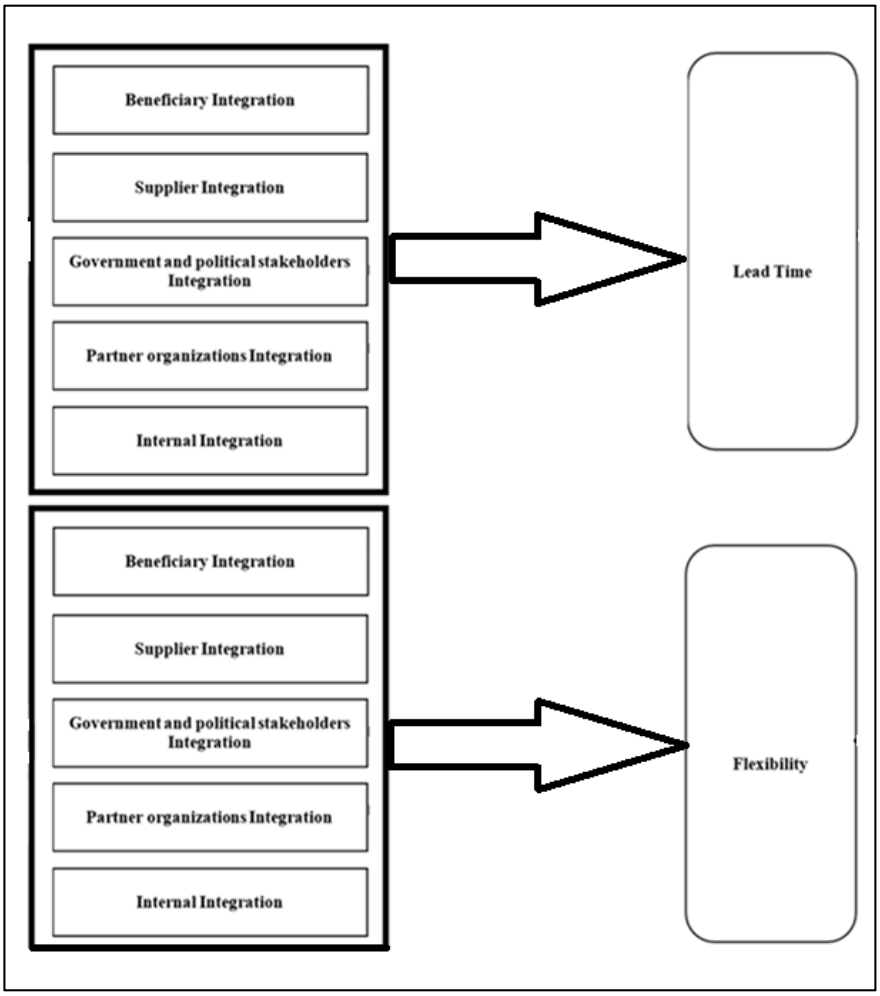

Figure 3.2 Conceptual framework

As shown in Figure3.2, the five constructs are presented as independent variables, each of which plays a unique role in shaping the overall model. These constructs were examined extensively in the literature review and based on this discussion, are briefly defined and contextualized below. Together, they form the foundation of the conceptual framework linking supply chain integration to key performance outcomes in humanitarian settings.

Beneficiary Integration: Beneficiary integration refers to the deliberate and strategic activities undertaken by humanitarian organizations to enhance the services provided to end-users by actively involving them in planning, implementation, and evaluation processes. Such engagement fosters sustainable

relationships with beneficiaries, strengthens trust, and improves the accuracy of needs forecasting. In humanitarian contexts, beneficiary integration also supports greater equity and accountability, as organizations can tailor assistance to actual rather than assumed needs.

Supplier Integration: Supplier integration encompasses the processes through which organizations share information on plans, forecasts, and strategic objectives with their suppliers. This coordination improves the reliability of procurement, reduces costs, and decreases lead times by aligning supply capacity with organizational demand. Supplier integration in humanitarian operations often requires building partnerships with both global and local suppliers to ensure availability and timely delivery under challenging conditions.

Government and Political Stakeholder Integration: Government and political stakeholder integration involves incorporating relevant authorities into planning and strategic decision-making processes related to the supply chain. Such involvement increases collaboration, improves regulatory compliance, and facilitates access to restricted or high-risk areas, ultimately helping humanitarian organizations overcome operational challenges. In politically complex environments, this integration also enhances legitimacy and coordination with national response mechanisms.

Partner Organization Integration: Partner organization integration refers to the early and systematic sharing of information with collaborating agencies and NGOs during the planning and implementation stages. This approach minimizes duplication of assistance, optimizes the allocation of scarce resources, and expands the collective reach to a larger number of beneficiaries. Integration with partners also fosters interoperability, standardization of procedures, and joint monitoring, which are essential for large-scale, multi-actor humanitarian responses.

Internal Integration: Internal integration entails the alignment and coordination of processes, resources, and information flows across different functional departments within an organization to achieve strategic objectives. In the context of supply chain integration, internal integration can be defined as the

management practices that enable seamless collaboration between internal units while linking these functions to the broader supply chain. High levels of internal integration enhance decision-making, improve the visibility of supply flows, and strengthen the organization's capacity to respond quickly to changing demands.

These five constructs are conceptually linked to two critical dependent variables in humanitarian supply chain performance: lead time and flexibility.

Lead Time: Lead Time denotes the total duration between the initiation of a supply chain process-such as procurement or dispatch-and the delivery of goods or services to the end user or beneficiary. In humanitarian operations, Lead Time is a crucial indicator of operational effectiveness, as it directly affects the speed with which aid reaches affected populations. Shorter lead times are particularly important in disaster and emergency response situations, where delays can exacerbate human suffering. By improving integration across beneficiaries, suppliers, governments, partners, and internal units, organizations can significantly reduce bottlenecks and accelerate delivery.

Flexibility: Flexibility refers to the ability of a supply chain to adapt to fluctuations in demand, supply disruptions, or other unforeseen events. Within humanitarian contexts, flexibility is essential for responding to the volatile and unpredictable nature of crises, which often require rapid adjustments in procurement, delivery routes, and inventory management. A flexible supply chain can quickly reconfigure its operations, develop alternative sourcing options, and adjust to evolving needs, thereby increasing resilience and responsiveness. Effective integration across all stakeholder groups enhances this adaptability by ensuring real-time data sharing, clear communication, and diversified supply networks.

Taken together, these constructs and performance dimensions establish the theoretical foundation for understanding how supply chain integration influences operational outcomes in humanitarian contexts. They also provide a framework for developing empirically testable models aimed at improving the efficiency, responsiveness, and overall effectiveness of humanitarian supply chains.

In the upcoming section, hypotheses will be presented that outline the relationships between the five constructs (independent variables) and the two dependent variables, which together represent the performance of the humanitarian supply chain. These hypotheses aim to provide a clear understanding of how the key factors influencing humanitarian supply chains contribute to essential outcomes such as Lead time and Flexibility.

3.2.HYPOTHESIS

Reference to what has been discussed earlier, research consistently suggests that the supply chain integration positively impacts the performance (Flynn, Huo, & Zhao, 2010). However, there is still concerns about the optimal level of the supply chain integration required to maximize the performance. For example, certain studies find no direct relationship or even a negative one, between SCI and operational performance (Swink, Narasimhan, & Wang, 2007). Thus, and based on the conceptual framework, this research proposes ten hypotheses to test the impact of the supply chain integration on the performance in the context of humanitarian sector.

Hypotheses 1 to 5 suggest that greater integration with beneficiaries, suppliers, government and political stakeholders, partner organizations, and internal functions will improve lead time performance. Hypotheses 6 to 10 propose that these same integrative efforts will positively impact the Flexibility aspect of supply chain performance.

- *H1: Beneficiary integration is positively linked to time element of humanitarian supply chain performance.*
- *H2: Supplier integration is positively linked to time element of humanitarian supply chain performance.*
- *H3: Government and political stakeholders integration is positively linked to time element of humanitarian supply chain performance.*
- *H4: Partner organizations integration is positively linked to time element of humanitarian supply chain performance.*

- *H5: Internal integration is positively linked to time element of humanitarian supply chain performance.*
- *H6: Beneficiary integration is positively linked to flexibility element of humanitarian supply chain performance.*
- *H7: Supplier integration is positively linked to flexibility element of supply chain performance.*
- *H8: Government and political stakeholders integration is positively linked to flexibility element of supply chain performance.*
- *H9: Partner organizations integration is positively linked to flexibility element of supply chain performance.*
- *H10: Internal integration is positively linked to flexibility element of supply chain performance.*

3.3.RESEARCH DESIGN

This section addresses three key components of the research process undertaken in this thesis. Initially, it will delineate the epistemological and ontological framework embraced for this study, contrasting it with alternative perspectives and assessing its relevance for the research objectives.

Subsequently, the methodology employed to collect data will be explored. Additionally, this subsection also will delve into the utilization of secondary data to complement primary sources and mitigate common source bias. Emphasis will be placed on constructing the integration in humanitarian supply chain measurement, the dependent variables utilized consistently throughout the subsequent statistical analyses.

Lastly, the ethical considerations preceding and following the data collection phase will be examined.

3.3.1. Epistemology

Epistemology can be interpreted as the general configuration shaping the researcher's approach to gathering and analyzing information. The philosophical

stance adopted in a research endeavor influences the nature of inquiries, data collection methods, and the researcher's contribution to existing literature (Kelly & Licona, 2018). In other words, Epistemology is what knowledge should be known and how to reach to and validate this knowledge with identifying the limits attached to the researcher's approach (Ekström & Westlund, 2019).

Therefore, the epistemological stance adopted in this research leans towards objectivism and positivism.

Objectivism is regarding evidential support, which asserts that the facts concerning the extent to which evidence backs a hypothesis are objective, plays a vital role in advocating for the rational of knowledge of the research (Hedden, 2015). While Positivism, a scientific paradigm impacting numerous fields of study and instructional approaches, prioritizes observable phenomena and underscores empirical evidence. Positivism approach admits the existence of the ontology and the epistemology to reach it through empirical approach with a technology of using a survey (Fuller, 2001). Therefore, in research, positivism highlights the importance of hypothesis testing, utilizing large sample sizes, drawing generalizable inferences, replication, and conducting controlled experimentation, all of which steer scientific advancements (Park, Konge, & Artino, 2019).

Both objectivism and positivism theories advocate for the deductive analysis approach, which is valuable for testing existing theories in diverse contexts or comparing categories longitudinally. Meanwhile, inductive content analysis proves beneficial for elucidating a phenomenon from raw data (Elo & Kyngäs, 2008).

The research questions introduced earlier follow a deductive approach, drawing from the existing literature to explore potential relationships between the independent and dependent variables within the proposed model of integration in humanitarian supply chains. The design of the research questions and proposals is thereby influenced by an objectivistic and positivistic perspective, aimed at investigating the relationships between performance of humanitarian supply chain and its relevant constructs.

Quantitative and positivist research often associated with challenges stemming from social desirability biases. One strategy to mitigate these challenges involves integrating both qualitative and quantitative methodologies (Cyrus-Lai, Tierney, Plessis, & Nguyen, 2022). Consequently, in this study, both qualitative and quantitative approaches are utilized as data collection instruments. This is detailed in the following subsection.

3.3.2. Data Collection

As previously mentioned, this study adopts a quantitative approach followed by qualitative verification for the findings. This integration serves not only to address social desirability biases but also to uncover additional insights that may not be apparent through quantitative methods alone (Bryman, 2006). Data collection for both phases was conducted during the first quarter of 2025 (Q1 2025) and involved UNRWA staff across five operational locations—Gaza, the West Bank, Syria, Lebanon, and Jordan—as outlined below:

- *Quantitative survey questionnaire*

  The survey methodology employed in this study serves as a comprehensive approach to assess the performance of UNRWA's humanitarian supply chains across five operational locations. This methodology utilizes a quantitative survey questionnaire, targeting 360 staff members directly involved in supply chain operations within UNRWA.

  Sample size is calculated based on the population of about 5000 staff working in humanitarian supply chain field , calculations sample size show 357 or more surveys are needed to have a confidence level of 95% that the real value is within ±5% of the measured/surveyed value (Sample size calculator, 2022). However, the sample size will be rounded to 360 questionnaires.

  The questionnaire is designed to measure various constructs of supply chain Integration and its performance, using a five-point Likert scale. This scale with end points of 'strongly disagree' and 'strongly

agree' is used to measure the SCI constructs. Another five points Likert scale with end points of 'do not conduct' and 'conducted extensively' is used to measure the coordination with different stakeholders.

Data collection is facilitated through an online "google form" survey, and the link will be shared through the email, which targets all supply team across various management levels within procurement and logistics departments, as well as emergency/humanitarian program personnel across the five operational locations of UNRWA. This approach ensures representation from various management levels within the organization, thereby enhancing the validity and reliability of the survey results.

To enhance the response rate and minimize non-response bias, the data collection process adopts a modified version of Dillman's total design method. This method involves sending an initial email containing a covering letter and the survey questionnaire, with read notification enabled to track responses. Subsequently, a reminder is sent to all potential respondents two weeks after the initial mailing (Dillman, et al., 2008). For non-respondents, a second email is sent, followed by a probable telephone call to urge their response. This multi-faceted approach ensures that all staff members have an opportunity to participate in the survey, thereby enhancing the representativeness of the data collected.

One more essential consideration when developing a survey questionnaire is to mitigate non-response bias. This bias arises when the research predominantly attracts respondents from one segment of the population while neglecting other groups. (Berg N. , 2005). In this study, particular attention is paid to ensure representation across all levels of management and the five operational categories based on number of supply staff working in each operation. Table 3.1 provides an estimate of the numbers of participants stratified within each category.

Table 3.1 : Distribution of participants

	Top management (Head of supply , deputy head)	**Middle management (Supply officer, warehouse, procurement officer,fleet officer,distribution officer)**	**Operations management (Supply associate, Procurement associate , warehouse keeper, Distributer , Fleet assistant)**	**Total**
Gaza Operation	2	10	80	92
WestBank Operation	2	5	40	47
Syria Operation	2	5	70	77
Lebanon Operation	2	5	55	62
Jordan Operation	2	10	70	82
Total	10	35	315	360

- *Measures and operationalization of variables*

The theoretical constructs are operationalized into specific items to measure the variables, drawing from an extensive literature review and insights gleaned from interviews. Table 4 presents the operationalized items for each variable, along with their corresponding references.

As shown in Table 3.2, the indicators were derived from each variable based on an extensive review of the relevant literature. The survey questions designed to measure these indicators were developed in alignment with established theoretical frameworks and previous empirical studies. To ensure systematic organization and facilitate data analysis, the coding of questionnaire items follows a construct-based format. Specifically, each question is labeled with the initial letter of its corresponding construct. For example, items related to Beneficiary Integration are coded sequentially as B1 through B5. This coding scheme is applied consistently across all constructs, enabling clear mapping between questionnaire items and their theoretical constructs, as well as enhancing the traceability and reliability of subsequent analyses.

Table 3.2: Measures and operationalization of variables

Variable	Indicator	Code	Reference	Questions
Beneficiary Integration	Sharing information	B1	(Munir, Jajja, Chatha, & Farooq, 2020)	Information shared between beneficiaries and our org is Q1: timely. Q2:accurate. Q3: complete. Q4: adequate. Q5:reliable.
	Developing collaboration approaches	B2	(Munir, Jajja, Chatha, & Farooq, 2020) (Tian, Huo, Park, & Kang, 2021)	Q1: to what extent is the organization developing collaboration approaches with its beneficiaries?
	Joint decision making	B3	(Munir, Jajja, Chatha, & Farooq, 2020) (Tian, Huo, Park, & Kang, 2021)	Q1: Does the organization make its programmatic decisions jointly with beneficiaries?
	Customized services	B4	(Huo, 2012)	Q1: To what extent the organization could customize its services based on the feedback of its beneficiaries?

Table 3.2: (Next) Measures and operationalization of variables

Variable	Indicator	Code	Reference	Questions
Supplier Integration	Sharing information	S1	(Munir, Jajja, Chatha, & Farooq, 2020)	Information shared between Suppliers and our org is Q1: timely. Q2:accurate. Q3: complete. Q4: adequate. Q5:reliable.
	Developing collaboration approaches	S2	(Munir, Jajja, Chatha, & Farooq, 2020) (Tian, Huo, Park, & Kang, 2021)	Q1: to what extent is the organization developing collaboration approaches with its suppliers?
	System coupling with key suppliers	S3	(Munir, Jajja, Chatha, & Farooq, 2020) (Tian, Huo, Park, & Kang, 2021)	Q1: Does the organization have system coupling with suppliers?
	Joint decision making	S4	(Munir, Jajja, Chatha, & Farooq, 2020) (Tian, Huo, Park, & Kang, 2021)	Q1: Does the organization make its programmatic decisions jointly with its suppliers?

Table 3.2: (Next) Measures and operationalization of variables

Variable	Indicator	Code	Reference	Questions
Government and political stakeholders Integration	Joint strategic planning	G1	(Bicking & Wimmer, 2011)	Q1: to what extent that the organization does its strategic planning jointly with the local government?
	Joint project inception	G2	(Bicking & Wimmer, 2011)	Q1: Does the organization establish new projects jointly with the local government ?
	Information sharing	G3	(Bicking & Wimmer, 2011)	Information shared between government and our org is : Q1: timely. Q2:accurate. Q3: complete. Q4: adequate. Q5:reliable.

Table 3.2: (Next) Measures and operationalization of variables

Variable	Indicator	Code	Reference	Questions
Partner organizations integration	Joint strategic planning	P1	(Bicking & Wimmer, 2011)	Q1: to what extent that the organization does its strategic planning jointly with its partner organizations?
	information sharing	P2	(Bicking & Wimmer, 2011)	Information shared between our partners and our org is Q1: timely. Q2:accurate. Q3: complete. Q4: adequate. Q5:reliable.
Internal Integration	information sharing across all departments	I1	(Munir, Jajja, Chatha, & Farooq, 2020) (Yuen & Thai, 2017)	Q1: a high level of responsiveness Q2: an integrated system Q3 : information flows Q4: Physical flows
	joint decision making	I2	(Munir, Jajja, Chatha, & Farooq, 2020) (Yuen & Thai, 2017)	Q1: collaboratively make decisions with all internal business units and departments?

Table 3.2: (Next) Measures and operationalization of variables

Variable	Indicator	Code	Reference	Questions
Performance	Time	T	(Wong, Sinnandavar, & Soh, 2021) (Li , Yan, Zhang, & Yan, 2020)	Q1: To what degree is the accuracy of the service lead time ensured?
	Flexibility	F	(Childerhouse, Lewis, Naim, & Towi, 2003) (Kalyar, Shafique, & Ahmad, 2020) (Lee, Seo, & Dinwoodie, 2016) (Li , Yan, Zhang, & Yan, 2020)	Q1: To what extent does the organization offer customizability in services, allowing for tailored solutions to meet beneficiaries needs? Q2: What is the average time required for the SC to respond to an unplanned 20%* increase in demand without incurring service or cost penalties?

Humanitarian supply chains operate under high uncertainty and must maintain the ability to adjust rapidly to sudden demand increases. Humanitarian standards such as the Sphere Handbook and Core Humanitarian Standard suggests this threshold and it is widely used in academic modeling and planning exercises to test the agility and responsiveness of supply chain designs (Sphere Association, 2018).

Qualitative semi-structured interviews with the heads of procurement and logistics department and emergency /humanitarian programmes.

The purpose of conducting qualitative semi-structured interviews is to validate the findings with supply chain experts working at UNRWA and to gain deeper insights into the results. These interviews allow for the exploration of context-specific perspectives, clarification of observed patterns, and the identification of nuanced factors that may not be captured through quantitative methods alone.

As previously discussed, employing a qualitative semi-structured interview can enhance objectivity and reduce social bias in studies, thereby increasing the credibility of the results. Kallio et al. (2016) proposes a model that researchers should consider when conducting semi-structured interviews, outlining a five-step process to develop such interviews and justify the decisions made during their implementation. These steps encompass the following phases: (1) identifying the prerequisites for utilizing semi-structured interviews; (2) drawing upon and incorporating previous knowledge; (3) formulating the initial semi-structured interview guide; (4) piloting the guide; and (5) presenting the finalized semi-structured interview guide (Kallio, Pietilä, Johnson, & Kanga, 2016). Kallio's guidance is followed in constructing the semi-structured interviews.

Preliminary semi-structured interviews are conducted with some executives and experts working on procurement and logistics department and emergency /humanitarian programmes in the five fields (less than five officials will be stratified to cover all fields). The interview should take between 30 to 45

minutes in general and should not be extended to more than 60 minutes by using Zoom application via video calls. Video calls will be recorded, and records will be uploaded to OneDrive cloud for further watching. A consent form should be filled and signed by each interviewee with an acceptance on the interview to be recorded.

The semi-structured interview comprises a series of open-ended questions designed to get more explanations for the findings.

3.3.3. Ethical Considerations

Generally, The ESRC Framework for Research Ethics (FRE) classifies research involving online respondents as inherently entailing more than minimal ethical risk. It justifies this classification by highlighting concerns regarding privacy, informed consent, and the potential ambiguity surrounding participant identity, which introduce novel and unfamiliar ethical considerations (Orton-Johnson, 2010).

Additionally, the ESRC outlines six principles for guiding the design of social research (Stanley & Wise, 2010), which will be elaborated upon as follows. This study will incorporate an online questionnaire along with adherence to these six principles.

1. *Research should be designed, reviewed, and conducted with integrity and quality assurance in mind.*

The initial phase of this study involves administering an online questionnaire. Subsequently, select some expert participants to be contacted again to arrange for a Zoom online interview to verify findings. Dividing the survey instrument into two parts does not compromise the research's quality; instead, it is believed to enhance the survey instrument's reliability. The second part of the survey is typically completed by participants at senior levels, while the questionnaire involves participants from various organizational levels. Each participant is assured that their involvement in the research will not exceed 20 minutes for the survey and 45 minutes for the interview. If the interview extends

beyond the anticipated duration, the interviewer seeks the interviewee's consent to continue or arranges for a follow-up interview to complete the survey. Additionally, participants are informed that the information they provide will be used solely for research purposes and will not be shared outside the scope of the study.

2. *Both research personnel and participants must receive comprehensive information about the research's objectives and associated risks.*

During the contact phase, participants are briefed on essential aspects of the research, including their time commitment and the topics covered in both phases of the research process. They are informed about the research's benefits and provided sufficient time to consider participating before commencing the survey.

3. *The confidentiality and privacy of participants must be upheld.*

Participants were assured of complete anonymity and confidentiality throughout the study. Upon request, participants are issued a confidentiality statement, which guaranteed both confidentiality and anonymity for both the individuals and the organization they represent.

4. *Participation must be voluntary for all participants.*

All participants engaged in the study voluntarily. All participants approached will be asked if they are interested in participating to gain further insights into the research.

5. *The research must avoid causing harm to participants.*

This principle is not applicable to the purpose of this study.

6. *The research must uphold independence and be free from conflicts of interest.*

To mitigate any potential conflicts, this research is self- financed, and no financial support is sought from any professional bodies. Furthermore, it is important to note that the researcher is no longer affiliated with UNRWA organization.

The questionnaire was cleared by the ethics committee of the university on mid Dec 2024. The decision is attached in Annex 1.

3.3.4. Regression model

Generally, a regression model is a statistical technique used to examine the relationship between one or more independent variables and a dependent variable. It aims to identify and quantify the influence of these independent variables on the dependent variable. Specifically, a linear regression model assumes a linear relationship between the variables (Welc & Esquerdo, 2017). In a linear regression model, the relationship is represented by a straight line, and the model estimates the coefficients that define the slope and intercept of this line. Linear regression is particularly useful for understanding and predicting relationships between variables when there is a linear association. It provides insights into the strength and direction of the relationship, enabling researchers to make predictions or infer the impact of changes in independent variables on the dependent variable. (James, Witten, Hastie, & Tibshirani, 2021).

In this study, a linear regression model will be employed to explore the connection between the dependent and independent variables. Two linear regression models will be developed to analyze the relationship between SCI constructs and performance outcomes:

- Model 1 examines the impact of SCI on lead time (T), using the five constructs of SCI (beneficiary integration, supplier integration, government and political stakeholder integration, partner organization integration, and internal integration) as independent variables.
- Model 2 explores the relationship between SCI and Flexibility (F), with the same independent variables.

The models are specified as follows:

$$T = a0 + a1*B + a2*S + a3*G + a4*P + a5*I$$

$$F = = a0 + a1*B + a2*S + a3*G + a4*P + a5*I$$

Where:

- T is the Lead Time and represents the first dependent variable,
- F is the Flexibility and represents the second dependent variable,
- The independent variables in our analysis were operationalized using the coding scheme B, S, G, P, and I, as systematically defined in Table 4.
- The coefficients associated to independent variables are defined as:
    - a0 is the intercept,
    - a1 is the wight and slope of B,
    - a2 is the wight and slope of S,
    - a3 is the wight and slope of G
    - a4 is the wight and slope of P,
    - a5 is the wight and slope of I,

SPSS will be used for statistical analysis, including tests for multicollinearity, model fit, and significance of the independent variables. Additionally, Principal Component Analysis (PCA) will be employed to reduce the dimensionality of the data and verify the underlying structure of the constructs.

3.3.5. Validity and Reliability

In quantitative research, validity and reliability are widely recognized as the fundamental indicators of quality and credibility. Together, they form the cornerstone of robust research design and measurement (Ahlqvist, 2009). Validity concerns the extent to which an instrument accurately measures what it purports to measure, while reliability concerns the consistency and stability of those measurements over time or across conditions. (Heale & Twycross, 2015). A measurement instrument that produces consistent results but fails to measure the intended construct would be reliable but not valid. Conversely, an instrument that reflects the intended construct but does so inconsistently would be valid in

concept but unreliable in practice. High□quality empirical research demands that both validity and reliability be established to ensure that findings are credible, reproducible, and theoretically meaningful (Heale & Twycross, 2015).

The following section outlines how validity and reliability will be addressed in this study. It first defines and differentiates the key forms of validity and reliability, then details the specific procedures, statistical tests, and methodological safeguards to be employed.

3.3.5.1. Conceptualizing Validity

Validity refers to the degree to which a research instrument accurately captures the phenomenon or construct it intends to measure (Stone, 2019). It is not a single property but rather a multidimensional concept encompassing several complementary types. In this study, the four primary forms of validity - construct validity, content validity, face validity, and criterion validity - are considered, as summarized in Table3.3. Each type of validity has been operationalized through specific measures and statistical techniques to ensure the robustness of the study's instruments and analyses.

Table 3.3: Types of Validity

Type	Definition	Methods
Construct validity	pertains to the extent to which a measurement instrument accurately captures the concept it intends to assess. Threats of Construct validity are driven by poor operationalization and subjective bias (Stone, 2019).	Convergent and Discriminant validity with correlations is done to see if results from research data are positively or negatively related to those of other established researched.

Table 3.3: (Next) Types of Validity

Type	Definition	Methods
Content validity	evaluates whether the questionnaire comprehensively represents all facets of the concept it seeks to measure. It examines the alignment between the test items and the content domain, ensuring that no significant aspects are overlooked. Content validity is achieved when the questions actually measure what they are intended them to (Fitzpatrick, 1983).	A test will be conducted by 5 experts in supply chain and Content Validity Ratio will be calculated based on the following formula: CVR = (a − b/2) / (b/2) Where a is number of experts indicating "essential" and b is the total number of experts. Values range from +1 to −1 where values above 0 are accepted (at least half of the experts consider it as essential).
Face validity	concerns the superficial appearance or plausibility of the test in relation to its objectives. It assesses whether the content of the test seems appropriate and relevant to its intended purpose, providing an initial impression of its suitability (Turner, 1979).	- By Literature Review: Examining pertinent literature and research investigations offers valuable insights into the items or tasks frequently employed to assess the construct of interest. Aligning the measurement instrument with established practices in the field can bolster its face validity (Turner, 1979).

Table 3.3: (Next) Types of Validity

Type	Definition	Methods
Criterion validity	assesses the extent to which the results obtained from a measurement tool correspond with concrete outcomes or criteria. It examines whether the test accurately predicts or correlates with external criteria, demonstrating its effectiveness in measuring the intended construct (Iddekinge, Roth, Raymark, & Odle-Dusse, 2012).	- correlation coefficient is used to assess relationship between scores on a test and a criterion variable, ranging from -1 to +1. , 1 indicates perfect positive correlation, 0 indicates no correlation, and -1 indicates perfect negative correlation. Test is done via SPSS known as Pearson's r. A positive correlation suggests the test's validity, while no correlation or a negative correlation implies that the test and the criterion variable measure different concepts.

a. Construct Validity

Construct validity is concerned with the degree to which an instrument actually measures the theoretical construct it claims to assess. It is achieved by linking the operationalization of a concept to its theoretical definition and verifying that this operationalization behaves as predicted (Stone, 2019). In this study, construct validity will be evaluated using convergent and discriminant validity tests. Convergent validity will be established by examining whether measures of theoretically related constructs correlate positively, while discriminant validity will test whether constructs expected to be unrelated indeed show low or negative correlations.

To complement these tests, principal component factor analysis will be applied in SPSS to assess the internal structure of the measurement scales. By reducing the data into underlying factors, this approach helps verify whether items cluster together as theorized, thus providing strong evidence for construct validity.

b. Content Validity

Content validity refers to how comprehensively an instrument covers the full domain of the construct it aims to measure (Fitzpatrick, 1983). An instrument lacking content validity risks omitting essential dimensions of the construct, thus undermining its explanatory power.

This study will ensure content validity through an expert panel review. Five specialists in supply chain management will independently evaluate each survey item for its relevance and essentiality. The Content Validity Ratio (CVR) will be calculated using the formula:

$$CVR = (a - b/2) / (b/2)$$

where a is the number of experts rating an item as "essential" and b is the total number of experts. CVR values range from +1 (perfect agreement on essentiality) to –1 (no agreement). Items with CVR values above 0 will be retained, ensuring that at least half of the experts deem the item essential. This method provides a quantitative benchmark for the adequacy of content coverage.

c. Face Validity

While face validity is often considered the most superficial form of validity, it remains important for ensuring respondent engagement and the initial plausibility of the instrument (Turner, 1979). It assesses whether the instrument "looks like" it measures what it purports to measure. In this study, face validity will be enhanced by aligning questionnaire items with established constructs in the literature and by conducting a pilot test to obtain feedback on item clarity and perceived relevance. This step ensures that participants can easily interpret and respond to the questions, thereby increasing the likelihood of high-quality data.

d. Criterion Validity

Criterion validity assesses the extent to which the scores from a measurement instrument correlate with an external criterion or outcome variable (Iddekinge, Roth, Raymark, & Odle-Dusse, 2012). In predictive contexts, it evaluates how well the instrument can forecast outcomes of interest.

In this study, Pearson's correlation coefficient (r) will be employed to evaluate the relationship between the instrument scores and relevant criterion variables. Correlations ranging from –1 to +1 indicate the direction and strength of the relationship: +1 indicates a perfect positive correlation, 0 indicates no relationship, and –1 indicates a perfect negative correlation. Significant positive correlations would support the criterion validity of the instrument, while nonsignificant or negative correlations would indicate that the instrument may not adequately measure the intended construct.

3.3.5.2. Conceptualizing Reliability

Whereas validity concerns accuracy, reliability concerns consistency. An instrument is considered reliable if it yields stable and consistent results over time, across different raters, or under different conditions (Heale & Twycross, 2015). This study applies multiple statistical techniques to ensure reliability, including the Kaiser-Meyer-Olkin (KMO) test, Bartlett's test, and Cronbach's alpha.

a. Kaiser-Meyer-Olkin (KMO) Test

The KMO test measures the sampling adequacy of the dataset for factor analysis. It evaluates the proportion of variance among variables that might be common variance. High KMO values indicate that factor analysis is likely to be useful, while low values suggest that remedial action may be needed. Following Nunes et al. (2020), this study adopts the following thresholds:

- 0.80–1.00: Sampling is adequate.
- 0.60–0.79: Mediocre but acceptable.
- Below 0.60: Unsuitable for factor analysis (remedial action recommended).

By applying the KMO test to each variable as well as the overall model, this study ensures that the data are structurally suitable for factor analysis and subsequent regression modeling.

b. Bartlett's Test of Sphericity

Many multivariate techniques assume that variances and covariances across samples are equal. Bartlett's test of sphericity examines whether the observed correlation matrix differs significantly from an identity matrix, thus verifying whether sufficient correlations exist to justify factor analysis (Tobias & Carlson, 1969). A significant test ($p < 0.05$) indicates that factor analysis can be meaningfully applied.

c. Cronbach's Alpha

Cronbach's alpha is the most widely used statistic for assessing internal consistency reliability- the degree to which items within a scale measure the same construct. Coefficients of 0.70 or higher are typically regarded as acceptable (Dodge, 2010). In this study, Cronbach's alpha will be calculated for each construct, with items below the threshold considered for revision or removal. This approach ensures that each construct represents a cohesive set of items.

d. Intraclass Correlation Coefficient (ICC)

To further evaluate the reliability of ratings across different observers or measurement occasions, the Intraclass Correlation Coefficient (ICC) will be used. This measure assesses the degree of agreement or consistency among raters, providing an additional safeguard for the dependability of the data (Dodge, 2010).

3.3.5.3. Diagnostic and Model Validation Procedures

Beyond validity and reliability of the measurement instruments themselves, the study employs several diagnostic procedures to validate the model estimation process. These procedures ensure that the assumptions of regression analysis are met and that the estimated relationships between supply

chain integration constructs and performance outcomes are not artifacts of statistical error.

- Durbin-Watson Test for autocorrelation of residuals.
- Variance Inflation Factor (VIF) to assess multicollinearity among predictors.
- Breusch-Pagan Test for heteroscedasticity of residuals.
- ANOVA, t-tests, and F-tests to evaluate model significance and predictor effects.

These diagnostics collectively ensure that the regression models are statistically sound, increasing the reliability of the conclusions drawn from the data.

3.3.5.4. Factor Analysis

Because this study investigates multiple SCI constructs (beneficiary integration, supplier integration, government/political stakeholder integration, partner-organization integration, and internal integration), factor analysis serves as a central tool for reducing dimensionality and validating the structure of the constructs before regression analysis.

Factor analysis offers several advantages in the context of this research. First, it reduces complexity by condensing a large set of interrelated variables into a smaller number of meaningful factors, thereby simplifying the analysis without losing critical information. Second, it enhances reliability by minimizing multicollinearity, which improves the stability and robustness of the regression coefficients used to assess relationships between supply chain integration dimensions and performance outcomes. Finally, it improves interpretability by clarifying which SCI dimensions exert the strongest influence on performance outcomes, allowing researchers and practitioners to identify and prioritize the most critical areas for strategic decision-making within humanitarian supply chains. Steps for Factor Analysis:

1. Assessing Data Suitability:

KMO and Bartlett's tests confirm whether the dataset is appropriate for factor analysis. KMO values above 0.6 and significant Bartlett's tests ($p < 0.05$) will indicate suitability.

2. Factor Extraction:

Principal Axis Factoring (PAF) will be employed to identify latent variables underlying the observed items. PAF does not assume perfect measurement, making it more robust for real-world data.

3. Factor Rotation:

Rotation methods such as varimax (orthogonal) and promax (oblique) will be used to improve interpretability. The choice depends on whether factors are assumed to be correlated.

4. Factor Retention:

Factors with eigenvalues greater than 1 (Kaiser's criterion) and the "elbow" in the scree plot will guide retention decisions.

5. Regression Models:

The resulting factor scores will be included as predictors in regression models assessing their effects on Lead Time and Flexibility.

6. Confirmatory Factor Analysis (CFA):

CFA will validate the factor structure identified in the exploratory stage. Fit indices such as RMSEA, CFI, and Chi-square will assess model adequacy.

7. Multicollinearity and Model Refinement:

VIF values will be examined to ensure independence of factors. Refinements will be made if high collinearity is detected.

8. Final Regression Analysis:

Hypothesis testing via ANOVA, t-tests, and F-tests will determine the significance of the SCI factors in predicting Lead Time and Flexibility.

3.3.5.5. Integrating Validity and Reliability into the Research Design

Establishing validity and reliability is not a single event but an ongoing process embedded throughout the research lifecycle. In this study, these considerations inform every stage - from instrument development and pilot testing to data collection, statistical analysis, and interpretation. This systematic integration of validity and reliability safeguards against measurement error, strengthens the generalizability of the findings, and ensures that the conclusions drawn are grounded in sound empirical evidence.

3.3.5.6. Summary of Validity and Reliability

In sum, this study adopts a comprehensive, multi-method approach to validity and reliability, ensuring that both the measurement instruments and the statistical models used for analysis are rigorous and defensible. By combining expert reviews, statistical testing, and diagnostic procedures, the research provides a robust empirical basis for examining the relationships between humanitarian supply chain integration constructs and performance outcomes such as Lead Time and Flexibility.

3.4.CHAPTER SUMMARY

Chapter 3 provides a thorough exposition of the research methodology and analytical framework used to examine the relationship between supply chain integration and humanitarian supply chain performance. The chapter opens by situating the study within a conceptual framework that identifies five distinct constructs of SCI - beneficiary integration, supplier integration, government and political stakeholder integration, partner organization integration, and internal integration. These constructs are hypothesized to influence two critical performance dimensions in humanitarian supply chains: Lead Time and Flexibility. The framework builds on existing literature to suggest that higher

degrees of integration across these constructs facilitate better coordination, faster delivery, and greater adaptability in humanitarian operations, ultimately improving operational efficiency and responsiveness.

The chapter then articulates ten hypotheses derived from the conceptual framework. Hypotheses 1 to 5 focus on the effect of each SCI construct on lead time, while Hypotheses 6 to 10 examine their impact on Flexibility. These hypotheses are informed by prior studies on supply chain performance and integration, highlighting both the potential benefits and the uncertainties regarding the optimal levels of integration in humanitarian contexts. The formulation of these hypotheses establishes a clear roadmap for empirical testing and serves as the foundation for subsequent data collection and analysis.

A key section of the chapter addresses the research design, which is grounded in a positivist and objectivist epistemology. This philosophical stance emphasizes empirical evidence, observable phenomena, and deductive reasoning, supporting hypothesis testing through structured data collection. The research employs a mixed-methods approach, integrating quantitative surveys with qualitative semi-structured interviews. The quantitative survey targets 360 staff members involved in humanitarian supply chain operations across five UNRWA locations-Gaza, West Bank, Syria, Lebanon, and Jordan-ensuring stratified representation across management levels. Survey items are operationalized using a five-point Likert scale to capture both the extent of SCI implementation and performance outcomes. The qualitative interviews with procurement, logistics, and humanitarian program experts serve to validate survey findings, uncover nuanced insights, and enhance the credibility of results.

Ethical considerations are thoroughly discussed, adhering to recognized frameworks such as the ESRC Research Ethics guidelines. Participation is voluntary, informed consent is obtained, and privacy and confidentiality are maintained throughout the research process. These measures ensure the ethical integrity of the study while safeguarding the rights and interests of participants.

For data analysis, the chapter outlines the application of linear regression models to investigate the relationships between SCI constructs and the two

dimensions of supply chain performance. Two separate models are developed: one for lead time and one for Flexibility, each incorporating the five SCI constructs as independent variables. Factor analysis, including both exploratory and confirmatory techniques, is employed to reduce dimensionality, validate construct structures, and enhance interpretability. Diagnostics, such as the Durbin-Watson test, variance inflation factor (VIF), Breusch-Pagan test, ANOVA, and t-tests, are applied to ensure statistical assumptions are met and the models are robust.

The chapter also elaborates on the rigorous procedures for ensuring validity and reliability. Multiple forms of validity-construct, content, face, and criterion- are systematically assessed. Construct validity is examined through convergent and discriminant validity tests, supplemented by principal component factor analysis. Content validity is established using expert panel review and the Content Validity Ratio (CVR), while face validity is ensured via literature alignment and pilot testing. Criterion validity is assessed using Pearson's correlation coefficient. Reliability is measured through Cronbach's alpha for internal consistency, the Kaiser-Meyer-Olkin (KMO) test for sampling adequacy, Bartlett's test for sphericity, and intraclass correlation coefficients (ICC) for inter-rater consistency. Together, these procedures ensure that the instruments accurately and consistently capture the theoretical constructs under investigation.

Finally, the chapter emphasizes the integration of validity, reliability, and diagnostic procedures into the research lifecycle. By embedding these considerations from instrument development to data collection and analysis, the study minimizes measurement errors, enhances generalizability, and strengthens the empirical basis for interpreting the effects of SCI on performance outcomes. The chapter, therefore, establishes a comprehensive methodological foundation, providing the tools and analytical rigor necessary to examine the complex interactions between supply chain integration and humanitarian performance metrics, and paving the way for subsequent empirical findings.

CHAPTER 4

4. METHODOLOGY

This chapter presents the quantitative analysis conducted to address the research questions outlined in the preceding chapters. The purpose of this analysis is to systematically examine the data collected through surveys and to test the hypotheses formulated in the conceptual framework. The primary objective is to derive meaningful insights from the data, which will contribute to a deeper understanding of supply chain integration.

The analysis is structured in a way that first provides a descriptive overview of the collected data, followed by inferential statistical methods to test the relationships between the key variables. Various quantitative techniques, including regression analysis and factor analysis are employed to ensure the validity and reliability of the findings.

By leveraging these quantitative tools, this chapter aims to uncover patterns, correlations, and causal relationships that can provide evidence to support the hypotheses. The results are discussed in relation to the theoretical framework, shedding light on how the findings align with or challenge existing literature. Ultimately, the analysis in this chapter serves as a critical step toward achieving the research objectives and advancing the theoretical contributions of this study.

the analysis is organized into two main sections: the first focuses on the Lead-Time model, and the second on Flexibility. Detailed tables and graphs illustrating the results are provided and referred to as annexes to enhance clarity and provide a more comprehensive understanding of the findings.

For easier navigation through this chapter, the chapter is organized to follow a clear and logical progression as outlined in Figure4.1, beginning with an introduction that outlines the analytical strategy and objectives.

Section 4.2 details the process of collecting primary data, including an overview of the instruments used and the respondent profile. Following this, Section 4.3 addresses data processing, encompassing the essential preliminary steps to prepare the dataset for statistical analysis. These include checking for missing data, identifying, and handling outliers, and defining the operational variables, as outlined in Subsections 4.3.1 through 4.3.3.

The analysis then proceeds to the development of the lead time regression model in Section 4.4. This section systematically evaluates the model through a sequence of statistical procedures. It begins with a reliability test using Cronbach's Alpha (4.4.1), followed by factor analysis to assess construct validity (4.4.2). Section 4.4.3 presents the total variance explained by the extracted factors, while Section 4.4.4 checks for multicollinearity among predictors. An analysis of variance (ANOVA) is conducted in Section 4.4.5 to assess overall model significance, followed by the regression analysis itself in Section 4.4.6. The coefficient of determination (R^2) is examined in Section 4.4.7 to evaluate model strength, and the findings are summarized in Section 4.4.8.

Section 4.5 mirrors the structure of Section 4.4 but focuses on the Flexibility regression model. It begins with reliability and validity assessments in Sections 4.5.1 and 4.5.2, followed by an analysis of total variance (4.5.3) and multicollinearity (4.5.4). Subsequent sections present the ANOVA results (4.5.5), regression findings (4.5.6), and R^2 evaluation (4.5.7), culminating in a summary of results and interpretations in Section 4.5.8.

This structured approach allows to trace the analytical logic from data preparation through to the interpretation of results for each dependent variable, ensuring the proper evaluation of the hypothesized relationships.

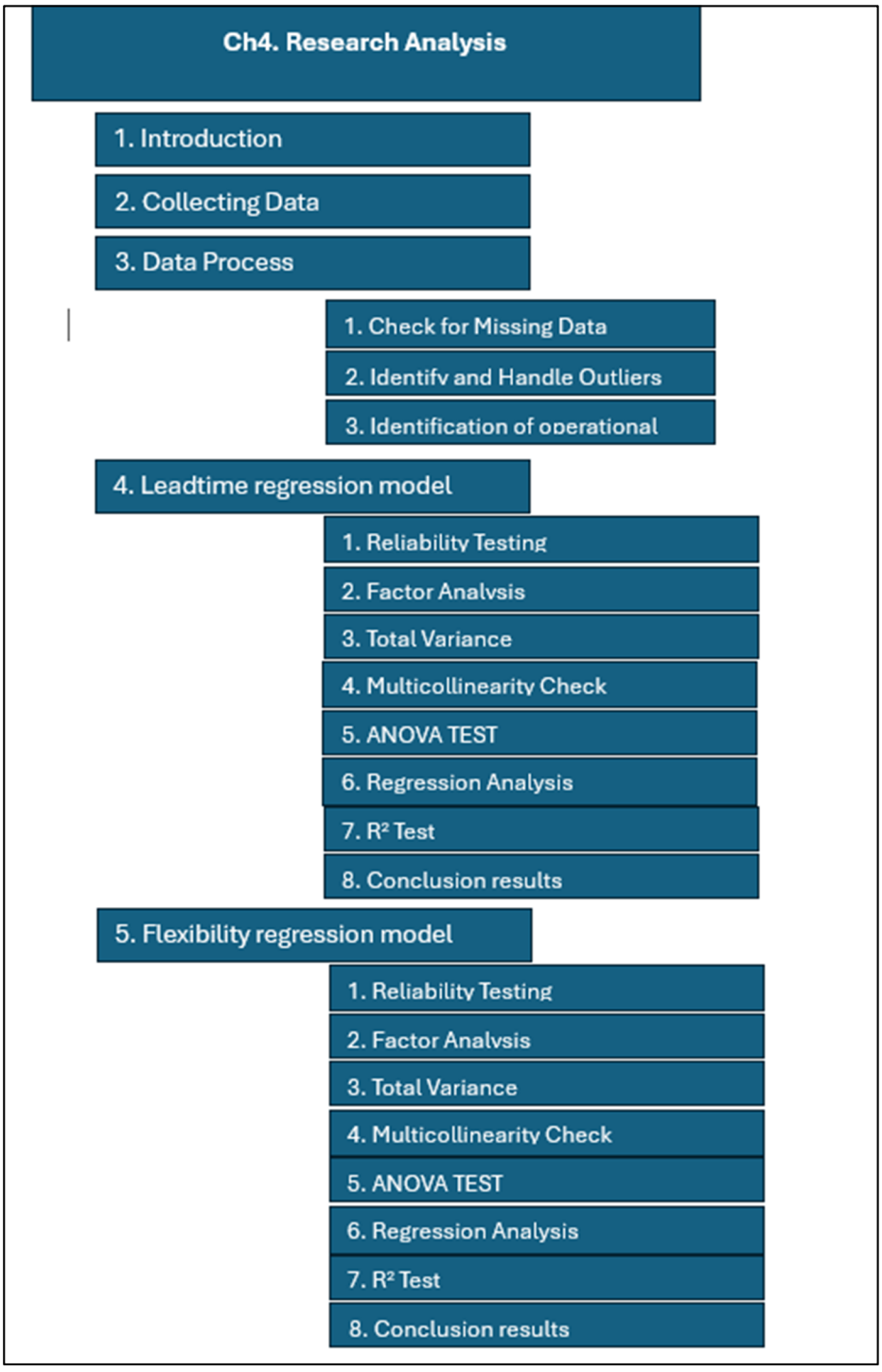

Figure 4.1 Chapter4 Structure

4.1.COLLECTING DATA PROCESS

The data collection period began in mid-December 2024 and concluded on January 10, 2025. This process was carried out in two phases. The first phase took place during the initial two weeks, during which participants who had already responded were included. The second phase involved sending reminder emails and making phone calls to encourage additional responses from those who had not yet participated.

While the target was to reach 360 participants, a total of 363 individuals were approached. These participants represented a diverse range of roles across various levels, including individuals, middle management, and top management, from the five countries in which UNRWA operates. Ultimately, 206 individuals responded, resulting in a response rate of 57%. The highest response rate was observed in the Gaza operation, while the lowest was in Syria, with a response rate of 44%. Full details are outlined in Table 4.1.

Table 4.1: Survey Response Details

Location	**Targeted**	**Approached**	**Responded**	**Response Rate**
Gaza Operation	92	96	61	64%
WestBank Operation	47	43	22	51%
Syria Operation	77	71	31	44%
Lebanon Operation	62	64	29	45%
Jordan Operation	82	89	47	53%
Not mentioned			16	
Total	360	363	206	57%

4.1.1. Cleaning Data

Cleaning data is an essential step in the data analysis process to ensure that the data is accurate, consistent, and ready for analysis. Data cleaning involves checking for errors, missing values, outliers, and ensuring that the variables are properly formatted. SPSS is used to do date cleaning following the hereunder procedures:

4.1.2. Check for Missing Data

Although the Google Form, which is used in this survey, does not allow null or empty data, a test is done in SPSS for checking any missing values by running the Descriptive Statistics - Frequencies test (Table 4.2).

Table 4.2: Frequencies test

	1	2	3	4	1	2	3	4	1	2	3	4	1	2	1	2	3	4		
alid	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06
issin g																				

The test shows that all 206 records don't have any null data.

4.1.3. Identify and Handle Outliers

Another essential test in the data cleaning process was conducted in SPSS to detect outliers, as these outliers can skew results and may need to be removed or adjusted. The output includes boxplots, which help identify outliers (values outside the whiskers of the boxplot). For reference, see Annex 3.

4.1.4. Identification of Operational Variables

A process was initiated in SPSS to compute the construct scores for each variable, followed by the calculation of the overall variables.

Two rounds of variable computation were conducted. The first round involved calculating the mean of the individual questions to derive sub-operational variables. For example, B1-Q1, B1-Q2, B1-Q3, B1-Q4, and B1-Q5 were averaged to produce the value for B1. The second round involved calculating the construct values based on the same criteria. This process is done through SPSS - *Compute Variable* command.

4.2.LEADTIME REGRESSION MODEL

This section delves into the analysis process of the Leadtime model and tests the associated four hypotheses. The model is based on linear regression, and its statistical validity was confirmed through reliability and validity tests, which were introduced in Chapter 3.

Linearity was assessed through scatter plots, residual-versus-fitted value plots, and partial regression plots. The diagnostics indicated no systematic curvature or pattern, suggesting that the assumption of linearity was reasonably satisfied. Therefore, linear regression was deemed appropriate for modeling the relationships between the predictors and the dependent variable.

4.2.1. Reliability Testing (Cronbach's Alpha)

After creating the construct scores, the internal consistency of each of constructs using Cronbach's Alpha as introduced in chapter3 is tested. Outputs tabulated in table 4.3, shows the Cronbach's Alpha value.

A value of 0.70 or higher is typically acceptable, indicating that the items within a construct are consistent (Taber, 2018).

Table 4.3: Reliability Statistics

Cronbach's Alpha		N of Items
.930		6

As shown in Table 8, the Cronbach's Alpha value is 0.930 which is greater than 0.70 which means that it is typically acceptable, indicating that the items within a construct are consistent.

4.2.2. Factor Analysis (Validity Testing)

Since each construct has multiple items, Exploratory Factor Analysis (EFA) is applied to ensure that the items are appropriately grouped together and that they measure the underlying construct. The EFA is run in SPSS using the Dimension Reduction process, and then EFA is applied to each construct with a choose of Principal Component Analysis (PCA) and for Rotation, Varimax Rotation (assuming expect factors to be uncorrelated) is selected, output is shown in Table 4.4.

Table 4.4: EFA - Extraction Method: Principal Component Analysis

	Initial	Extraction
T	1.000	.765
B	1.000	.758
G	1.000	.690
I	1.000	.716
P	1.000	.761
S	1.000	.796

An average value of extracted communalities is greater than 0.6 is considered to be acceptable is the sample size is less than 100, meanwhile it is acceptable for greater than 0.5 if sample size is greater than 100 (MacCallum, Widaman, Zhang, & Hong, 1999).

The extracted communalities are less than 1, indicating that the factors extracted do not explain all of the variance in each variable. For example, the variable G (with a communal value of 0.690) is explained by the factors to only 69% of its total variance, leaving 31% unexplained.

Higher communalities (like S with 0.796) suggest that the factor model fits this variable better, meaning a higher proportion of its variance is explained by the factors.

If the communalities were significantly low (close to 0), that would indicate that the factor model is not doing a good job explaining the variance for that variable. In this case, most of communalities seem reasonably high (over 0.69), suggesting that the factor analysis model is effectively explaining a good portion of the variance for each of the variables.

4.2.3. Total Variance

The Total Variance table 4.5 shows how much of the total variance in the data is explained by the extracted factors:

Table 4.5: Total Variance

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.487	74.788	74.788	4.487	74.788	74.788
2	.395	6.584	81.372			
3	.355	5.916	87.288			
4	.288	4.803	92.091			
5	.259	4.318	96.408			
6	.215	3.592	100.000			

Extraction Method: Principal Component Analysis.

Table 4.5 explains:

1. Initial Eigenvalues:

- Eigenvalue represents how much variance in the original data is accounted for by each factor (or component). Higher eigenvalues indicate that a factor explains more variance.
- Component 1 has an eigenvalue of 4.487. This means that the first factor explains 4.487 units of variance.
- Component 2 has an eigenvalue of 0.395, meaning it explains 0.395 units of variance.

- Similarly, components 3, 4, 5, and 6 have eigenvalues of 0.355, 0.288, 0.259, and 0.215, respectively.

2. % of Variance:

- This column tells what percentage of the total variance is explained by each component.
- Component 1 explains 74.788% of the total variance. This is a large proportion, meaning the first component is very important in explaining data.
- The second component explains only 6.584% of the variance, and the remaining components explain progressively less.
- For example, Component 2 explains 6.584%, Component 3 explains 5.916%, and so on.

3. Cumulative %:

- This column shows the total cumulative variance explained by the components, adding up the variance explained by each component sequentially.
- After Component 1, having 74.788% of the variance explained.
- Adding Component 2 brings the cumulative variance explained to 81.372%.
- Component 6, the total cumulative variance explained is 100%. So all six components together explain the total variance in the data.

4. Total Variance Explained: all six components explain 100% of the variance in the dataset.

4.2.4. Multicollinearity Check

Before running regression analysis, it is advisable to run multicollinearity test to ensure that the constructs are not highly correlated with each other (which would indicate multicollinearity) (Shrestha, 2020). Table 4.6 shows the collinearity diagnostics.

Table 4.6: Collinearity Diagnostics

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions					
				(Constant)					
1	1	5.951	1.000	.00	00	00	00	00	00
	2	.017	18.813	.92	06	00	00	04	01
	3	.010	24.128	.03	01	73	03	22	00
	4	.009	25.827	.04	52	01	57	01	01
	5	.007	28.779	.00	42	01	34	25	26
	6	.006	22.878	.00	00	24	06	48	72

As shown in Table 11:

1. Dimension 1:
    - Eigenvalue: 5.951 (relatively large)
    - Condition Index: 1.000 (low, no indication of multicollinearity)

- Variance Proportions: All variance proportions for the variables (B, G, I, P, S) are 0.00, suggesting that this dimension does not explain much variance for any of the variables.

2. Dimension 2:
    - Eigenvalue: 0.017 (very small, suggesting potential collinearity problems)
    - Condition Index: 18.813 (moderate, suggesting some collinearity, but not severe)
    - Variance Proportions:
        1. B has a variance proportion of 0.92, which indicates that B is highly associated with this dimension, suggesting that this dimension explains a large portion of the variance for B.
        2. Other variables (G, I, P, S) have very low variance proportions, indicating that they are less affected by this dimension.
3. Dimension 3:
    - Eigenvalue: 0.010 (very small)
    - Condition Index: 24.128 (moderate, suggesting potential issues with multicollinearity)
    - Variance Proportions:
        1. I has a variance proportion of 0.73, indicating it is highly associated with this dimension.
        2. P has a variance proportion of 0.22, and other variables have very low proportions, which means I and P are strongly influenced by this dimension.
4. Dimension 4:
    - Eigenvalue: 0.009 (very small)
    - Condition Index: 25.827 (moderate, suggesting some collinearity issues)
    - Variance Proportions:

        1. B and I have higher variance proportions of 0.52 and 0.57, respectively, suggesting that they are heavily associated with this dimension.

5. Dimension 5:
    - Eigenvalue: 0.007 (very small)
    - Condition Index: 28.779 (moderate to high, indicating potential collinearity issues)
    - Variance Proportions:
        1. P has a variance proportion of 0.25, and S has 0.26, suggesting they are moderately associated with this dimension.
6. Dimension 6:
    - Eigenvalue: 0.006 (very small)
    - Condition Index: 22.878 (moderate to high, indicating potential collinearity issues)
    - Variance Proportions:
        1. S has a high variance proportion of 0.72, suggesting that this dimension explains much of the variance in S.

As a conclusion , the Condition Index: The condition indices are between 18.813 and 28.779, which suggests low to moderate multicollinearity in some dimensions which is not extreme and values suggest that there is some level of redundancy or intercorrelation between variables (B, G, I, P, S) however it is not considered to an extent that affect the multicollinearity in variables (less than 30) (Shrestha, 2020).

4.2.5. ANOVA Test

As introduced in chapter 3, the ANOVA (Analysis of Variance) test helps assess the overall significance of the regression model, specifically whether the predictors (S, I, G, B, P) explain a significant portion of the variance in the dependent variable T. Table 4.7 shows the output of the test:

Table 4.7: ANOVA Test

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	77.277	5	15.455	79.976	.000[b]
	Residual	38.650	200	.193		
	Total	115.927	205			

a. Dependent Variable: T

b. Predictors: (Constant), S, I, G, B, P

Following is a breakdown of the ANOVA Table:

1. Regression (Between Groups)

- Sum of Squares (77.277): This represents the total variation in T that is explained by the predictors (S, I, G, B, P). It measures how much of the variation in T can be attributed to the independent variables in the regression model.
- df (5): This is the number of predictors (S, I, G, B, P), which is 5, as these are the variables used to predict T.
- Mean Square (15.455): This is the Sum of Squares divided by the degrees of freedom for the regression model. It represents the average variation explained by each predictor variable in the model.

2. Residual (Error, Within Groups)

- Sum of Squares (38.650): This represents the portion of the total variation in T that is not explained by the predictors (i.e., the residual or error term). It shows how much of the variation in T is left unexplained after accounting for the predictors.

- df (200): This represents the number of observations minus the number of predictors minus 1. In this case, there are 206 observations (df = 205) and 5 predictors, so the degrees of freedom for the residuals is 200.
- Mean Square (0.193): This is the residual sum of squares divided by the residual degrees of freedom. It represents the average unexplained variation in T after accounting for the predictors.
- Total: Sum of Squares (115.927): This represents the total variation in T (the dependent variable). It is the sum of the regression and residual sum of squares. Essentially, it is the total variance in T before any predictors are included.
- df (205): This is the total number of observations minus 1.

3. F-statistic (79.976):

- The F-value is a ratio of the Mean Square of Regression to the Mean Square of Residuals.
- The F-statistic tests whether the model as a whole is statistically significant. A higher F-value typically indicates that the model explains a significant amount of variance in the dependent variable compared to the error or residual variance.

4. Significance Level (Sig. = 0.000):

- The Sig. (p-value) of 0.000 is extremely small, which means that the probability of observing an F-statistic this large if the null hypothesis were true (i.e., if the model did not explain any variance in T) is essentially zero.
- This result indicates that the regression model is highly significant, and at least some of the predictors (S, I, G, B, P) are meaningfully related to T.

Interpretation:

- The overall model is statistically significant, as indicated by the very low p-value ($p < 0.001$), which means that the combination of S, I, G, B, and P is significantly related to the dependent variable T.

- The F-statistic of 79.976 is quite large, suggesting that the regression model fits the data well and explains a significant portion of the variance in T.
- The R^2 which is the proportion of variance explained by the model 0.667, This means that approximately 66.7% of the variance in T is explained by the independent variables (S, I, G, B, P).

As a conclusion the model explains a significant portion of the variance in T (about 66.7%), and the predictors (S, I, G, B, P) are significantly related to T. Since the p-value is less than 0.05, the null hypothesis can be rejected. Therefore, the regression model is statistically significant, and the independent variables (S, I, G, B, P) collectively contribute to explaining T.

4.2.6. Regression Analysis

Once it is assured constructs are aggregated and as well as for both reliability and validity, it can proceed with the Multiple Regression analysis to examine the effect of each of the five integration constructs on the lead time the first SC performance outcome. Table 4.8 shows the output of SPSS order:

Table 4.8: Multiple Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	-.697	.220		-3.173	.002		
	B	.343	.084	.276	4.085	.000	.366	2.735
	G	.213	.080	.166	2.650	.009	.423	2.364
	I	.190	.084	.147	2.266	.025	.398	2.511
	P	.184	.088	.149	2.089	.038	.327	3.060
	S	.260	.097	.199	2.674	.008	.302	3.313

a. Dependent Variable: T

Breakdown of the Coefficients Table:

1. Unstandardized Coefficients:

These coefficients represent the change in the dependent variable (T) for a one-unit change in each independent variable, while holding all other predictors constant.

- Constant (Intercept): B = -0.697. This is the estimated value of T when all predictors (B, G, I, P, and S) are zero.
- B: B = 0.343. This means that for every one-unit increase in B, T increases by 0.343, holding other predictors constant.
- G: B = 0.213. This means that for every one-unit increase in G, T increases by 0.213, holding other predictors constant.
- I: B = 0.190. This means that for every one-unit increase in I, T increases by 0.190, holding other predictors constant.
- P: B = 0.184. This means that for every one-unit increase in P, T increases by 0.184, holding other predictors constant.

- S: B = 0.260. This means that for every one-unit increase in S, T increases by 0.260, holding other predictors constant.

2. Standardized Coefficients (Beta):

These coefficients are expressed in standard deviation units and allow for direct comparison of the relative importance of each predictor. They show how much the dependent variable (T) will change in terms of standard deviations for a one-standard-deviation change in the predictor variable.

- B (Beta = 0.276): B has the highest standardized coefficient, indicating that it has the greatest impact on T compared to other predictors.
- G (Beta = 0.166): G has a relatively smaller standardized coefficient compared to B.
- I (Beta = 0.147): I also has a smaller impact than B and G.
- P (Beta = 0.149): P's impact on T is slightly lower than that of I.
- S (Beta = 0.199): S's impact on T is somewhat higher than I and P, but lower than B.

3. t-Statistic:

The t-statistic is used to test the null hypothesis that each coefficient is equal to zero (no effect). A large t-statistic (in absolute value) suggests that the coefficient is significantly different from zero, implying that the predictor variable has a significant impact on the dependent variable (T) (Bevans, 2023).

- The t-statistics for B, G, I, P, and S are all statistically significant because their p-values (Sig.) are less than 0.05.
    - B: t = 4.085
    - G: t = 2.650
    - I: t = 2.266
    - P: t = 2.089
    - S: t = 2.674

These t-values confirm that B, G, I, P, and S are statistically significant predictors of T.

4. Significance (Sig.):

The p-value associated with each t-statistic tests whether the coefficient is significantly different from zero.

- B, G, I, P, and S all have p-values less than 0.05, which means that each of these predictors has a statistically significant relationship with T. Specifically:
    - B (Sig. = 0.000)
    - G (Sig. = 0.009)
    - I (Sig. = 0.025)
    - P (Sig. = 0.038)
    - S (Sig. = 0.008)

These p-values indicate that all of the independent variables have a statistically significant impact on T, and the null hypothesis can be rejected.

5. Collinearity Statistics (Tolerance and VIF):

These statistics help assess multicollinearity—whether the predictor variables are highly correlated with each other.

- Tolerance: Measures the proportion of the variance in the predictor that is not explained by the other predictors. A lower tolerance value indicates higher multicollinearity.
    - B: Tolerance = 0.366
    - G: Tolerance = 0.423
    - I: Tolerance = 0.398
    - P: Tolerance = 0.327
    - S: Tolerance = 0.302
- VIF (Variance Inflation Factor): VIF is the inverse of tolerance and provides a more direct measure of multicollinearity. Higher VIF values

suggest more multicollinearity. A VIF value greater than 10 suggests high multicollinearity (Bevans, 2023).

- B: VIF = 2.735
- G: VIF = 2.364
- I: VIF = 2.511
- P: VIF = 3.060
- S: VIF = 3.313

All the VIF values are below 10, indicating low multicollinearity among the predictors. This suggests that there are no serious issues with collinearity that could distort the regression estimates.

Interpretation:

- Significant Predictors: All the independent variables (B, G, I, P, S) have significant effects on T, as indicated by their low p-values. Among these, B has the strongest effect on T, followed by S.
- Impact and Direction:
  - B has the largest unstandardized coefficient (0.343), meaning it has the strongest positive effect on T.
  - G, I, P, and S also have positive effects, but their impact is smaller compared to B.
- Multicollinearity: The tolerance and VIF values are within acceptable ranges, indicating that there is no significant multicollinearity problem in the model.

As a conclusion:

- All predictors are significant and contribute positively to predicting T.
- B is the most influential predictor, followed by S.
- There is no serious multicollinearity issue, as indicated by the VIF and tolerance statistics.

4.2.7. R2 Test

The Model Summary table provides important overall statistics for assessing the performance and fit of the regression model, shown in table 4.9:

Table 4.9: R2

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.816a	.667	.658	.440

a. Predictors: (Constant), S, I, G, B, P

Breakdown of the model Summary:

- R (Correlation Coefficient): R = 0.816: This is the correlation coefficient between the observed values of the dependent variable (T) and the predicted values from the regression model. An R value of 0.816 suggests a strong positive linear relationship between the predicted and actual values of T. The closer R is to 1, the better the model fits the data (Dodge, The Concise Encyclopedia of Statistics., 2008).
- R Square (R^2): $R^2 = 0.667$: This value tells the proportion of the variance in the dependent variable (T) that is explained by the independent variables (S, I, G, B, P).
    - 67% of the variance in T is explained by the predictors in the model.
    - The higher the R^2 value, the better the model explains the variability in the dependent variable. A value of 0.667 is generally considered a moderate to good fit, meaning the model explains a substantial portion of the variation in T.
- Adjusted R Square: Adjusted $R^2 = 0.658$: This is a modified version of R^2 that adjusts for the number of predictors in the model. It provides a more accurate estimate of model fit when having multiple predictors. Unlike R^2, Adjusted R^2 accounts for the possibility that adding more

predictors might artificially inflate the R^2 value, even if they don't improve the model.

  - 0.658 suggests that, after accounting for the number of predictors, the model still explains a significant portion (about 66%) of the variance in T.

- Standard Error of the Estimate: Standard Error of the Estimate = 0.440: This value represents the average distance that the observed values of T fall from the predicted values of T. In other words, it measures the accuracy of the model's predictions.
  - A standard error of 0.440 means that, on average, the predicted values of T are within 0.440 units of the actual values.

Interpretation:

- Model Fit: The R^2 value of 0.667 indicates that the regression model explains approximately 67% of the variance in T, suggesting a fairly good model fit. This implies that the predictor variables (S, I, G, B, and P) collectively provide a meaningful explanation of the variation observed in T. In applied research areas such as humanitarian supply chain and logistics management, achieving very high R^2 values is often difficult due to the complexity, uncertainty, and context-specific factors that characterize operational environments. Prior studies note that R^2 values above 0.50 are generally considered acceptable and indicative of satisfactory explanatory power when modeling complex systems influenced by multiple interrelated factors (Cohen, 1988; Hair, Black, Babin, & Anderson, 2019). Therefore, the obtained R^2 value can be regarded as robust and consistent with empirical expectations, demonstrating that the model captures a substantial proportion of the underlying relationships while acknowledging the influence of external factors not explicitly included in the analysis.

- Adjusted R^2 of 0.658: This value is slightly lower than R^2, which is typical and indicates that the model's goodness of fit holds even after adjusting for the number of predictors used.
- Standard Error of the Estimate (0.440): The model's predictions are, on average, off by about 0.440 units. This is the typical error in predicting T, indicating how well the model performs in predicting new observations.

In Summary:

- R^2 of 0.667 shows a strong relationship between the predictors and the dependent variable T, explaining 67% of the variance.
- Adjusted R^2 of 0.658 confirms that the model still explains most of the variance, even after adjusting for the number of predictors.
- The model's predictions are relatively accurate, with an average prediction error of 0.440 units.
- This suggests that the regression model is both statistically significant and provides a fairly good fit to the data.

4.2.8. Results of Leadtime Model

The final regression model introduced in section 3.5 is specified as follows:

$$T = -0.697 + 0.343B + 0.213S + 0.190G + 0.184P + 0.260I$$

The model has been statistically validated. All coefficients are statistically significant, with p-values for each independent variable below the standard significance threshold of 0.05. This indicates that each independent variable (B, S, G, P, I) significantly contributes to the prediction of T.

The null hypothesis for each independent variable (that the coefficient is equal to zero, implying no effect) has been rejected for all predictors. This means

that all the independent variables have a statistically significant effect on the dependent variable T, and the model is a valid representation of the relationship.

The Variance Inflation Factors (VIFs) for all independent variables range from 2.364 to 3.313, which is below the common threshold of 10. This indicates that multicollinearity is not a major issue in the model, ensuring that the individual coefficients are reliable. The model explains a significant portion of the variation in the dependent variable T. The t-values and corresponding p-values indicate strong predictive power and demonstrate the validity of the model.

Overall, the model is statistically approved, the null hypothesis has been rejected for all independent variables, and it provides a solid basis for understanding the relationship between T (Leadtime) and the independent variables (B, S, G, P, I).

4.3.FLEXIBILITY REGRESSION MODEL

This section delves into the analysis process of the Flexibility model and tests the associated four hypotheses. The model is based on linear regression, and its statistical validity was confirmed through reliability and validity tests, which were introduced in Chapter 3.

Linearity was assessed through scatter plots, residual-versus-fitted value plots, and partial regression plots. The diagnostics indicated no systematic curvature or pattern, suggesting that the assumption of linearity was reasonably satisfied. Therefore, linear regression was deemed appropriate for modeling the relationships between the predictors and the dependent variable.

4.3.1. Reliability Testing (Cronbach's Alpha)

After creating the construct scores, the internal consistency of each of constructs using Cronbach's Alpha as introduced in chapter 3 will be tested.

The output, in table 4.10, shows the Cronbach's Alpha value. A value of 0.70 or higher is typically acceptable, indicating that the items within a construct are consistent (Taber, 2018).

Table 4.10: Reliability Statistics

Alpha	N of Items
.923	6

As shown in Table 15, the Cronbach's Alpha value is 0.923 which is greater than 0.70 which means that it is typically acceptable, indicating that the items within a construct are consistent.

4.3.2. Factor Analysis (Validity Testing)

Since each construct has multiple items, Exploratory Factor Analysis (EFA) is applied to ensure that the items are appropriately grouped together and that they measure the underlying construct. The EFA is run in SPSS using the *Dimension Reduction* formula, then EFA is applied to each construct with a choose of Principal Component Analysis (PCA) and for Rotation, Varimax Rotation (assuming expect factors to be uncorrelated) is selected, output is shown in Table 4.11.

Table 4.11: EFA

	Initial	**Extraction**
B	**1.000**	**.755**
G	**1.000**	**.684**
I	**1.000**	**.733**
P	**1.000**	**.760**
S	**1.000**	**.777**

F	**1.000**	**.660**

An average value of extracted communalities is greater than 0.6 is considered to be acceptable is the sample size is less than 100, meanwhile it is acceptable for greater than 0.5 if sample size is greater than 100 (MacCallum, Widaman, Zhang, & Hong, 1999).

The extracted communalities are less than 1, indicating that the factors extracted do not explain all of the variance in each variable. For example, the variable G (with a communal value of 0.684) is explained by the factors to only 68% of its total variance, leaving 31% unexplained.

Higher communalities (like S with 0.777) suggest that the factor model fits this variable better, meaning a higher proportion of its variance is explained by the factors.

If the communalities were significantly low (close to 0), that would indicate that the factor model is not doing a good job explaining the variance for that variable. In this case, most of communalities seem reasonably high (over 0.66), suggesting that the factor analysis model is effectively explaining a good portion of the variance for each of the variables.

4.3.3. Total Variance

The Total Variance in table 4.12 shows how much of the total variance in the data is explained by the extracted factors:

Table 4.12: Total Variance

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.369	72.819	72.819	4.369	72.819	72.819
2	.438	7.302	80.120			
3	.386	6.442	86.562			

4	.340	5.659	92.221			
5	.251	4.189	96.410			
6	.215	3.590	100.000			
Extraction Method: Principal Component Analysis.						

Table 17 explains:

1. Initial Eigenvalues:

- Eigenvalue represents how much variance in the original data is accounted for by each factor (or component). Higher eigenvalues indicate that a factor explains more variance.
- Component 1 has an eigenvalue of 4.369. This means that the first factor explains 4.369 units of variance.
- Component 2 has an eigenvalue of 0.438, meaning it explains 0.438 units of variance.
- Similarly, components 3, 4, 5, and 6 have eigenvalues of 0.386, 0.340, 0.251, and 0.215, respectively.

2. % of Variance:

- This column tells what percentage of the total variance is explained by each component.
- Component 1 explains 72.819% of the total variance. This is a large proportion, meaning the first component is very important in explaining data.
- The second component explains only 7.3% of the variance, and the remaining components explain progressively less, and so on.

3. Cumulative %:

- This column shows the total cumulative variance explained by the components, adding up the variance explained by each component sequentially.
- After Component 1, having 72.819% of the variance explained.

- Adding Component 2 brings the cumulative variance explained to 80.120%.
- Component 6, the total cumulative variance explained is 100%. So all six components together explain the total variance in the data.

4. Total Variance Explained: all six components explain 100% of the variance in the dataset.

4.3.4. Multicollinearity Check

Before running regression analysis, it is advised to run multicollinearity test to ensure that the constructs are not highly correlated with each other (which would indicate multicollinearity) (Shrestha, 2020). Table 4.13 shows the collinearity diagnostics.

Table 4.13: Collinearity Diagnostics

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	B	G	I	P	S
1	1	5.951	1.000	.00	.00	.00	.00	.00	.00
	2	.017	18.813	.92	.06	.00	.00	.04	.01
	3	.010	24.128	.03	.01	.73	.03	.22	.00
	4	.009	25.827	.04	.52	.01	.57	.01	.01
	5	.007	28.779	.00	.42	.01	.34	.25	.26
	6	.006	22.878	.00	.00	.24	.06	.48	.72

a. Dependent Variable: F

As shown in Table 4.13:

1. Dimension 1:
    - Eigenvalue: 5.951 (relatively large)
    - Condition Index: 1.000 (low, no indication of multicollinearity)

- Variance Proportions: All variance proportions for the variables (B, G, I, P, S) are 0.00, suggesting that this dimension does not explain much variance for any of the variables.

2. Dimension 2:
    - Eigenvalue: 0.017 (very small, suggesting potential collinearity problems)
    - Condition Index: 18.813 (moderate, suggesting some collinearity, but not severe)
    - Variance Proportions:
        1. B has a variance proportion of 0.92, which indicates that B is highly associated with this dimension, suggesting that this dimension explains a large portion of the variance for B.
        2. Other variables (G, I, P, S) have very low variance proportions, indicating that they are less affected by this dimension.
3. Dimension 3:
    - Eigenvalue: 0.010 (very small)
    - Condition Index: 24.128 (moderate, suggesting potential issues with multicollinearity)
    - Variance Proportions:
        1. I has a variance proportion of 0.73, indicating it is highly associated with this dimension.
        2. P has a variance proportion of 0.22, and other variables have very low proportions, which means I and P are strongly influenced by this dimension.
4. Dimension 4:
    - Eigenvalue: 0.009 (very small)
    - Condition Index: 25.827 (moderate, suggesting some collinearity issues)
    - Variance Proportions:

        1. B and I have higher variance proportions of 0.52 and 0.57, respectively, suggesting that they are heavily associated with this dimension.
5. Dimension 5:
    - Eigenvalue: 0.007 (very small)
    - Condition Index: 28.779 (moderate to high, indicating potential collinearity issues)
    - Variance Proportions:
        1. P has a variance proportion of 0.25, and S has 0.26, suggesting they are moderately associated with this dimension.
6. Dimension 6:
    - Eigenvalue: 0.006 (very small)
    - Condition Index: 22.878 (moderate to high, indicating potential collinearity issues)
    - Variance Proportions:
        1. S has a high variance proportion of 0.72, suggesting that this dimension explains much of the variance in S.

As a conclusion , the Condition Index: The condition indices are between 18.813 and 28.779, which suggests low to moderate multicollinearity in some dimensions which is not extreme and values suggest that there is some level of redundancy or intercorrelation between variables (B, G, I, P, S) however it is not considered to an extent that affect the multicollinearity in variables (less than 30) (Shrestha, 2020).

4.3.5. ANOVA Test

As introduced in chapter 3, the ANOVA (Analysis of Variance) test helps assess the overall significance of the regression model, specifically whether the predictors (S, I, G, B, P) explain a significant portion of the variance in the dependent variable F Table 4.14 shows the output of the test:

Table 4.14: ANOVA Test

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	53.884	5	10.777	49.307	.000b
	Residual	43.713	200	.219		
	Total	97.597	205			

a. Dependent Variable: F

b. Predictors: (Constant), S, I, G, B, P

The following is a breakdown of the ANOVA Table:

1. Regression (Between Groups)

- Sum of Squares (53.884): This represents the total variation in F that is explained by the predictors (S, I, G, B, P). It measures how much of the variation in F can be attributed to the independent variables in the regression model.
- df (5): This is the number of predictors (S, I, G, B, P), which is 5, as these are the variables used to predict F.
- Mean Square (10.777): This is the Sum of Squares divided by the degrees of freedom for the regression model. It represents the average variation explained by each predictor variable in the model.

2. Residual (Error, Within Groups)

- Sum of Squares (43.713): This represents the portion of the total variation in F that is not explained by the predictors (i.e., the residual or error term). It shows how much of the variation in F is left unexplained after accounting for the predictors.
- df (200): This represents the number of observations minus the number of predictors minus 1. In this case, having 206 observations (df = 205) and 5 predictors, so the degrees of freedom for the residuals is 200.

- Mean Square (0.219): This is the residual sum of squares divided by the residual degrees of freedom. It represents the average unexplained variation in F after accounting for the predictors.
- Total: Sum of Squares (115.927): This represents the total variation in T (the dependent variable). It is the sum of the regression and residual sum of squares. Essentially, it is the total variance in F before any predictors are included.
- df (205): This is the total number of observations minus 1.

3. F-statistic (49.307):

- The F-value is a ratio of the Mean Square of Regression to the Mean Square of Residuals.
- The F-statistic tests whether the model as a whole is statistically significant. A higher F-value typically indicates that the model explains a significant amount of variance in the dependent variable compared to the error or residual variance.

4. Significance Level (Sig. = 0.000):

- The Sig. (p-value) of 0.000 is extremely small, which means that the probability of observing an F-statistic this large if the null hypothesis were true (i.e., if the model did not explain any variance in F) is essentially zero.
- This result indicates that the regression model is highly significant, and at least some of the predictors (S, I, G, B, P) are meaningfully related to F.

Interpretation:

- The overall model is statistically significant, as indicated by the very low p-value ($p < 0.001$), which means that the combination of S, I, G, B, and P is significantly related to the dependent variable F.
- The F-statistic of 79.976 is quite large, suggesting that the regression model fits the data well and explains a significant portion of the variance in F.
- The R^2 which is the proportion of variance explained by the model 0.667, This means that approximately 54% of the variance in F is explained by the independent variables (S, I, G, B, P).

As a conclusion the model explains a significant portion of the variance in F (about 54%), and the predictors (S, I, G, B, P) are significantly related to F. Since the p-value is less than 0.05, the null hypothesis can be rejected. Therefore, the regression model is statistically significant, and the independent variables (S, I, G, B, P) collectively contribute to explaining F.

4.3.6. Regression Analysis

Once it is assured constructs are aggregated and ensured reliability and validity, it can proceed with the Multiple Regression analysis to examine the effect of each of the five integration constructs on the Flexibility the second SC performance outcome. Table 4.15 shows the output of SPSS order:

Table 4.15: Multiple Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	.034	.234		.144	.046		
	B	.316	.089	.277	3.537	.001	.366	2.735

G	.155	.085	.132	1.818	.041	.423	2.364
I	.351	.089	.295	3.931	.000	.398	2.511
P	.164	.094	.144	1.745	.043	.327	3.060
S	.001	.103	.001	.007	.044	.302	3.313

a. Dependent Variable: F

Breakdown of the Coefficients Table:

1. Unstandardized Coefficients:

These coefficients represent the change in the dependent variable (F) for a one-unit change in each independent variable, while holding all other predictors constant.

- Constant (Intercept): B = 0.34. This is the estimated value of F when all predictors (B, G, I, P, and S) are zero.
- B: B = 0.316. This means that for every one-unit increase in B, F increases by 0.316, holding other predictors constant.
- G: B = 0.155. This means that for every one-unit increase in G, F increases by 0.155, holding other predictors constant.
- I: B = 0.351. This means that for every one-unit increase in I, F increases by 0.351, holding other predictors constant.
- P: B = 0.164. This means that for every one-unit increase in P, F increases by 0.164, holding other predictors constant.
- S: B = 0.001. This means that for every one-unit increase in S, F increases by 0.001, holding other predictors constant.

2. Standardized Coefficients (Beta):

These coefficients are expressed in standard deviation units and allow for direct comparison of the relative importance of each predictor. They show how much the dependent variable (F) will change in terms of standard deviations for a one-standard-deviation change in the predictor variable.

- I (Beta = 0.295): I has the highest standardized coefficient, indicating that it has the greatest impact on F compared to other predictors.
- S (Beta = 0. 001): I has a relatively smaller standardized coefficient compared to I.

3. t-Statistic:

The t-statistic is used to test the null hypothesis that each coefficient is equal to zero (no effect). A large t-statistic (in absolute value) suggests that the coefficient is significantly different from zero, implying that the predictor variable has a significant impact on the dependent variable (F) (Bevans, 2023).

- The t-statistics for B, G, I, P, and S are all statistically significant because their p-values (Sig.) are less than 0.05.

These t-values confirm that B, G, I, P, and S are statistically significant predictors of F.

4. Significance (Sig.):

The p-value associated with each t-statistic tests whether the coefficient is significantly different from zero.

- B, G, I, P, and S all have p-values less than 0.05, which means that each of these predictors has a statistically significant relationship with F. These p-values indicate that all of the independent variables have a statistically significant impact on F, and the null hypothesis can be rejected.

5. Collinearity Statistics (Tolerance and VIF):

These statistics help assess multicollinearity—whether the predictor variables are highly correlated with each other.

- Tolerance: Measures the proportion of the variance in the predictor that is not explained by the other predictors. A lower tolerance value indicates higher multicollinearity.
- VIF (Variance Inflation Factor): VIF is the inverse of tolerance and provides a more direct measure of multicollinearity. Higher VIF values suggest more multicollinearity. A VIF value greater than 10 suggests high multicollinearity (Bevans, 2023).
    - B: VIF = 2.735
    - G: VIF = 2.364
    - I: VIF = 2.511
    - P: VIF = 3.060
    - S: VIF = 3.313

All the VIF values are below 10, indicating low multicollinearity among the predictors. This suggests that there are no serious issues with collinearity that could distort the regression estimates.

Interpretation:

- Significant Predictors: All the independent variables (B, G, I, P, S) have significant effects on F, as indicated by their low p-values. Among these, B has the strongest effect on F, followed by S.
- Impact and Direction:
    - I has the largest unstandardized coefficient (0. 351), meaning it has the strongest positive effect on F.
    - G, I, P, and S also have positive effects, but their impact is smaller compared to B.
- Multicollinearity: The tolerance and VIF values are within acceptable ranges, indicating that there is no significant multicollinearity problem in the model.

As a conclusion:

- All predictors are significant and contribute positively to predicting F.

- I is the most influential predictor, followed by B.
- There is no serious multicollinearity issue, as indicated by the VIF and tolerance statistics.

4.3.7. R2 Test

The Model Summary table provides important overall statistics for assessing the performance and fit of the regression model, shown in Table 4.16:

Table 4.16: R2

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.743a	.552	.541	.4675

a. Predictors: (Constant), S, I, G, B, P

Breakdown of the model Summary:

- R (Correlation Coefficient): R = 0.743: This is the correlation coefficient between the observed values of the dependent variable (F) and the predicted values from the regression model. An R value of 0.743 suggests a strong positive linear relationship between the predicted and actual values of F. The closer R is to 1, the better the model fits the data (Dodge, The Concise Encyclopedia of Statistics., 2008).
- R Square (R^2): $R^2 = 0.552$: This value tells the proportion of the variance in the dependent variable (F) that is explained by the independent variables (S, I, G, B, P).
    - 55% of the variance in F is explained by the predictors in the model.
    - The higher the R^2 value, the better the model explains the variability in the dependent variable. A value of 0.552 is generally considered a moderate to good fit, meaning the model explains a substantial portion of the variation in F.

- Adjusted R Square: Adjusted $R^2 = 0.541$: This is a modified version of R^2 that adjusts for the number of predictors in the model. It provides a more accurate estimate of model fit when having multiple predictors. Unlike R^2, Adjusted R^2 accounts for the possibility that adding more predictors might artificially inflate the R^2 value, even if they don't improve the model.
    - 0.541 suggests that, after accounting for the number of predictors, the model still explains a significant portion (about 54%) of the variance in F.
- Standard Error of the Estimate: Standard Error of the Estimate = 0.468: This value represents the average distance that the observed values of F fall from the predicted values of F. In other words, it measures the accuracy of the model's predictions.
    - A standard error of 0.468 means that, on average, the predicted values of F are within 0.468 units of the actual values.

Interpretation:

- Model Fit: The R^2 value of 0.552 indicates that the regression model explains approximately 55.2% of the variance in F, suggesting a fairly good model fit. This implies that the predictor variables (S, I, G, B, and P) collectively provide a meaningful explanation of the variation observed in F. In applied research areas such as humanitarian supply chain and logistics management, achieving very high R^2 values is often difficult due to the complexity, uncertainty, and context-specific factors that characterize operational environments. Prior studies note that R^2 values above 0.50 are generally considered acceptable and indicative of satisfactory explanatory power when modeling complex systems influenced by multiple interrelated factors (Cohen, 1988; Hair, Black, Babin, & Anderson, 2019). Therefore, the obtained R^2 value can be regarded as robust and consistent with empirical expectations, demonstrating that the model captures a substantial proportion of the

underlying relationships while acknowledging the influence of external factors not explicitly included in the analysis.

- Adjusted R^2 of 0.541: This value is slightly lower than R^2, which is typical and indicates that the model's goodness of fit holds even after adjusting for the number of predictors used.
- Standard Error of the Estimate (0.468): The model's predictions are, on average, off by about 0.468 units. This is the typical error in predicting F, indicating how well the model performs in predicting new observations.

In Summary:

- R^2 of 0.552 shows a strong relationship between the predictors and the dependent variable F, explaining 55% of the variance.
- Adjusted R^2 of 0.541 confirms that the model still explains most of the variance, even after adjusting for the number of predictors.
- The model's predictions are relatively accurate, with an average prediction error of 0.468 units.
- This suggests that the regression model is both statistically significant and provides a fairly good fit to the data.

4.3.8. Results of Flexibility Model

The final regression model introduced in section 3.5 is specified as follows:

$$F = 0.034 + 0.316B + 0.155G + 0.351I + 0.164P + 0.001S$$

The model has been statistically validated. All coefficients are statistically significant, with p-values for each independent variable below the standard significance threshold of 0.05. This indicates that each independent variable (B, S, G, P, I) significantly contributes to the prediction of F.

The null hypothesis for each independent variable (that the coefficient is equal to zero, implying no effect) has been rejected for all predictors. This means

that all the independent variables have a statistically significant effect on the dependent variable F, and the model is a valid representation of the relationship.

The Variance Inflation Factors (VIFs) for all independent variables range from 2.364 to 3.313, which is below the common threshold of 10. This indicates that multicollinearity is not a major issue in the model, ensuring that the individual coefficients are reliable. The model explains a significant portion of the variation in the dependent variable F. The t-values and corresponding p-values indicate strong predictive power and demonstrate the validity of the model.

Overall, the model is statistically approved, the null hypothesis has been rejected for all independent variables, and it provides a solid basis for understanding the relationship between F and the independent variables (B, S, G, P, I).

4.4.CHAPTER SUMMARY

This chapter examined the empirical testing of two supply chain performance models: Lead-Time and Flexibility which developed from the study's conceptual framework (chapter3). Each model operationalizes five core constructs of Humanitarian Supply Chain Integration as independent variables and tests their effect on key humanitarian supply chain outcomes. Following best practices in quantitative research, the chapter detailed the processes of construct validation, reliability testing, factor analysis, and regression modeling to ensure the robustness of the results. The findings from both models provide substantive evidence of how integration constructs influence performance outcomes in humanitarian settings.

The first part of the chapter focused on the Lead-Time model, which evaluated the influence of the five HSCI constructs on the lead-time performance of humanitarian supply chains. Indicators for each construct were derived from the literature, and survey questions were systematically coded to ensure traceability of responses to their respective constructs. Reliability analysis using

Cronbach's Alpha confirmed strong internal consistency for all constructs, with values exceeding the recommended threshold of 0.70, indicating that the items reliably measure their underlying dimensions.

Factor analysis further validated construct groupings by demonstrating acceptable communalities (greater than 0.60 for most items) and strong loadings on their respective factors. This step ensured that the constructs represent distinct yet related dimensions of supply chain integration. The extraction of principal components and Varimax rotation produced a solution where the first component accounted for the majority of variance in the data, underscoring the conceptual coherence of the SCI framework.

The ANOVA test for the Lead-Time model indicated the overall regression was highly significant ($p < 0.001$). This means that the combined HSCI constructs explain a statistically meaningful portion of the variation in lead-time performance. The R^2 statistic reported a substantive proportion of explained variance, confirming the model's predictive capacity. Regression coefficients showed that some constructs- particularly those related to inter-organizational coordination and process integration- had stronger effects on lead-time outcomes than others. In short, the Lead-Time model validated the first set of hypotheses by demonstrating that HSCI significantly reduces delays and improves delivery times in humanitarian contexts.

Finally, the estimated regression equation for Lead-Time is:

$$T = -0.697 + 0.343B + 0.213S + 0.190G + 0.184P + 0.260I$$

The second part of the chapter focused on the Flexibility model, which tested five hypotheses linking SCI constructs to supply chain flexibility. The model underwent a parallel process of reliability, validity, and regression testing. Cronbach's Alpha for the Flexibility constructs was 0.923 (Table 15), far above the acceptable minimum of 0.70, confirming excellent internal consistency. This high reliability implies that the instrument consistently measures supply chain flexibility across respondents.

Exploratory Factor Analysis (EFA) (Table 16) showed that the extracted communalities ranged from 0.660 to 0.777, indicating that the factors explained a substantial portion of variance for each variable. Higher communalities, such as 0.777 for variable S, suggested a stronger model fit, while even the lowest value (0.660 for F) remained acceptable. The Total Variance Explained (Table 17) revealed that the first principal component accounted for 72.8% of the total variance, indicating a strong unidimensional factor structure. This high variance explained by the first component reflects the robustness of the HSCI–Flexibility relationship and suggests that the integration constructs capture the underlying flexibility construct well.

Multicollinearity diagnostics (Table 18) produced Condition Index values between 18.8 and 28.8, which indicates only low-to-moderate multicollinearity among variables. Variance Inflation Factors (VIFs) ranged from 2.364 to 3.313, comfortably below the threshold of 10. This confirmed that the model's coefficients were not distorted by multicollinearity, thus ensuring the reliability of the regression estimates.

The ANOVA test for the Flexibility model (Table 19) yielded a regression Sum of Squares of 53.884 (df = 5) with an F-statistic of 49.307 ($p < 0.001$), indicating the model as a whole is highly significant. This confirms that the five SCI constructs jointly explain a significant proportion of variance in Flexibility performance. The reported R^2 value of 0.552 (Adjusted $R^2 = 0.541$) shows that approximately 55% of the variance in the Flexibility outcome variable (F) is explained by the independent variables (B, G, I, P, S). This is a substantial explanatory power for a model with five predictors and underscores the model's validity in humanitarian supply chain contexts.

Multiple regression analysis (Table 20) showed that all five constructs had positive and statistically significant coefficients ($p < 0.05$). Among these, the construct I had the largest unstandardized coefficient (B = 0.351) and standardized beta (0.295), indicating it exerts the strongest influence on Flexibility. This was followed by B (B = 0.316), P (B = 0.164), and G (B = 0.155). The construct S had only a marginal effect (B = 0.001) but was still

statistically significant. Taken together, these results suggest that while all constructs positively contribute to Flexibility, integration at the information-sharing and beneficiary levels (I and B) are particularly critical drivers of a more adaptable and responsive supply chain.

Model fit and predictive power were further confirmed by the Model Summary (Table 21), which reported R = 0.743 and a Standard Error of Estimate of 0.468. This strong correlation coefficient and relatively low error demonstrate that the model's predictions of Flexibility are reasonably accurate. The adjusted R^2 of 0.541 indicates that even after accounting for the number of predictors, the model retains most of its explanatory power, which validates the stability of the results.

Finally, the estimated regression equation:

$$F = 0.034 + 0.316B + 0.155G + 0.351I + 0.164P + 0.001S$$

summarizes the combined effects of the five SCI constructs on Flexibility. Each coefficient is statistically significant, and all VIFs fall well below the threshold for multicollinearity concerns. This equation operationalizes how changes in integration constructs translate into changes in Flexibility performance and can serve as a predictive tool for humanitarian supply chain planners.

Across both models, the chapter demonstrates the robust link between supply chain integration and performance outcomes. The Lead-Time model confirms that SCI reduces delays and enhances delivery efficiency, while the Flexibility model shows that SCI enables more adaptable and resilient supply chains. Together, the models support the study's overarching proposition that integrating activities, information, and stakeholder coordination significantly improves humanitarian supply chain performance.

The statistical findings- high Cronbach's Alpha values, acceptable communalities, strong ANOVA results, substantial R^2 values, and significant regression coefficients- provide converging evidence of the models' reliability

and validity. Importantly, both models exhibit low to moderate multicollinearity, which enhances confidence in the interpretation of individual predictors.

In conclusion, this chapter provides a rigorous quantitative evaluation of the hypothesized relationships between SCI constructs and two critical humanitarian supply chain performance outcomes. The results of the Lead-Time model show that integration reduces operational delays, while the Flexibility model reveals that integration enhances adaptability to changing conditions. The combination of strong reliability, validity, and regression results across both models not only validates the study's conceptual framework but also offers practical insights for policy and operational decision-making in humanitarian logistics.

By establishing and statistically validating both the Lead Time and Flexibility models, this chapter has confirmed the reliability, validity, and explanatory power of the proposed constructs. The results provide a solid empirical foundation for understanding how the identified integration dimensions influence supply chain performance outcomes.

Having both models clearly specified and approved, the next step is to interpret these findings in a broader context. Therefore, Chapter 5 will present a deeper discussion of the results, linking them to the existing literature, exploring their implications for humanitarian supply chain management, and formulating practical recommendations based on the evidence generated.

CHAPTER 5

5. QUALITATIVE ANALYSIS OF EXPERT INTERVIEWS

To complement the quantitative findings presented in Chapter 4, this chapter provides a comprehensive qualitative analysis derived from semi-structured interviews conducted with four senior supply chain experts from UNRWA. The qualitative phase was designed to deepen the understanding of how the integration mechanisms- beneficiary, internal, supplier, government, and partner integration-influence key performance outcomes, specifically Lead Time and Flexibility in humanitarian supply chains.

The interviewed experts represent diverse professional positions within UNRWA, including procurement management, logistics operations, emergency response, and programme coordination. They also operate in different geographical fields of UNRWA's mandate, offering a broad range of contextual insights. Their perspectives illuminate operational realities, strategic challenges, and contextual nuances that cannot be fully captured through quantitative analysis alone.

The interviews were guided by several key questions emerging from the statistical findings:

- How does beneficiary integration reduce lead time and improve flexibility in humanitarian supply chains?
- How do beneficiary feedback mechanisms support real-time adjustments during crises?
- How does internal integration enhance flexibility, and why is its impact on lead time more indirect?
- How do unified internal processes and cross-functional coordination improve supply chain response during emergencies?
- Why does supplier integration improve lead time but have little effect on flexibility?

- How do Long-Term Agreements (LTAs) affect both procurement speed and adaptability in emergencies?
- How do government actions such as customs clearance and regulatory support influence lead time and flexibility?
- How do partner NGOs improve last-mile distribution and overall supply chain responsiveness?

Together, these questions form the analytical backbone of the qualitative inquiry with adding some follow up questions to get more feedback.

The remainder of this chapter presents the methodology underlying the interview process followed by an extensive thematic analysis. Each theme synthesizes insights from the four experts while also highlighting the unique contributions or divergent viewpoints offered by each participant. The chapter also provides cross-case interpretations, methodological reflections, and an integrative conclusion linking the qualitative and quantitative findings.

5.1.METHODOLOGICAL APPROACH

This section outlines the qualitative methodological approach adopted to support and enrich the findings of the quantitative phase of the study. It explains the rationale for selecting semi-structured expert interviews, describes the development of the interview guide, and details the participant selection and data collection procedures. The section concludes by presenting the analytical framework used to interpret the qualitative data.

5.1.1. Rationale for Using Qualitative Semi-Structured Interviews

Semi-structured interviews were selected for this study due to their capacity to combine structure with flexibility. On the one hand, the predetermined guiding questions ensure comparability across interviews; on the other, the open-ended interview format allows experts to expand on operational complexities, disclose contextual sensitivities, and introduce new perspectives

that would not emerge through structured surveys or purely quantitative instruments.

Given the purpose qualitative of validating quantitative findings and explore complex relationships in humanitarian operations, semi-structured interviews provide a precise method for capturing the lived experiences of practitioners. This approach is also particularly suitable for exploring topics such as supply chain integration, which depend heavily on situational factors, organizational culture, and informal coordination mechanisms.

5.1.2. Development of the Interview Guide

The interview guide followed the five-step model proposed by Kallio et al. (2016):

- Identifying the prerequisites for semi-structured interviews: The exploratory nature of the study and the need for rich practitioner insight supported the use of semi-structured interviews.
- Drawing on previous knowledge: Literature related to humanitarian supply chains, integration mechanisms, and performance dimensions (Lead Time and Flexibility) was reviewed extensively to identify key themes and develop informed questions.
- Formulating the initial interview guide: Open-ended questions were drafted to probe the five integration constructs and their relationship to performance outcomes.
- Piloting the guide: Preliminary interviews with UNRWA operations staff helped refine the clarity and sequence of questions.
- Finalizing the interview guide:

Based on pilot feedback, the final guide emphasized practical examples, operational experiences, and explanations of perceived causal mechanisms.

5.1.3. Participants and Sampling Strategy

Although fewer than five individuals were interviewed, the sample was intentionally stratified across UNRWA's five fields to capture diverse operational environments. The four experts interviewed occupy senior roles:

- Expert A - Humanitarian Response Officer (Supply Chain), Lebanon

Expert A is a humanitarian supply chain professional currently serving as a Humanitarian Response Officer specializing in supply chain operations in Lebanon. Since beginning his career in 2005, he has worked extensively across high-risk and crisis-affected environments, including Gaza-Palestine and Syria. His experience spans nearly two decades of managing emergency logistics, coordinating humanitarian response mechanisms, and supporting complex field operations. In addition to his work with UNRWA, he has worked with UNHCR in several locations, including Uganda, Iran, Ukraine, and Afghanistan.

- Expert B - Humanitarian Response Officer (Supply Chain), Syria

Expert B is an experienced supply chain and emergency response officer currently based in Syria. he began his humanitarian career in 2003 with UNRWA and has since held key roles supporting operations in Gaza and Syria. With more than 20 years of continuous service, he brings deep institutional knowledge, strong operational expertise, and a proven track record in managing large scale supply chain and relief activities in protracted crisis contexts. He has worked in Sudan, South Sudan, Timor-Leste, and Morocco, with various organizations including DPKO, UNICEF, and UNRWA.

- Expert C - Emergency Coordinator, Jordan (HQ - Amman)

Expert C is a highly experienced Emergency Coordinator with a career in humanitarian response spanning multiple crisis settings since 2000. he served in Gaza, the West Bank, Syria, and are currently based at the Jordan headquarters in Amman. his wide regional exposure and senior-level coordination experience make him a valuable leader in strategic planning, emergency preparedness, and cross-country emergency operations. Rather than working with UNRWA, he

was employed by the World Bank in multiple locations, including Mali, Chad, and Ethiopia. He also worked with the World Food Programme (WFP) in Yemen and Chad, and with UNICEF in Syria.

- Expert D - Head of Emergency Programme, Syria

Expert D is the Head of the Emergency Programme in Syria, bringing more than two decades of humanitarian experience. Although he assumed his current role in 2012, his humanitarian career began in 2002 and includes work with many humanitarian organizations such as the World Bank, UNICEF, WFP, and others. His experience covers multi-agency coordination, emergency programme leadership, and operational management within complex and rapidly evolving crisis environments. His roles ensured coverage of both upstream and downstream supply chain processes.

5.1.4. Data Collection Procedures

Interviews were conducted via Zoom video calls, each typically lasting between 30 and 45 minutes. Recordings were made with explicit consent and were stored securely on OneDrive for repeated review during the coding and analysis stages. Participants were assured of confidentiality and anonymity; thus, their insights are referenced throughout this chapter using the labels Experts A, B, C, and D.

5.1.5. Analytical Framework

A thematic analysis approach was used. After initial familiarization, interview transcripts were coded inductively and deductively; themes were developed by identifying relational patterns, convergences, divergences, and explanatory mechanisms. Themes were then mapped against the quantitative findings to facilitate triangulation.

5.2.QUALITATIVE FINDINGS AND ANALYSIS

This section presents and analyzes the qualitative findings derived from the expert interviews. The analysis is structured around the five supply chain integration constructs examined in the quantitative model, allowing for direct comparison and triangulation of results. By linking practitioner insights to performance outcomes specifically Lead Time and Flexibility, this section explains the mechanisms underlying the statistical relationships and highlights contextual nuances across humanitarian settings. The section concludes with a cross-case synthesis that integrates convergent and divergent perspectives across the interviews.

5.2.1. Beneficiary Integration

All four experts strongly emphasized the centrality of beneficiary integration, echoing the quantitative results where beneficiary integration had the strongest effect on Lead Time and Flexibility.

- Beneficiary Integration and Lead Time Reduction

Experts consistently explained that real-time needs assessments significantly reduce mismatches between supply and demand, thereby accelerating procurement and distribution.

Expert B described situations in which timely beneficiary input prevented the shipment of unnecessary items, reducing resupply cycles by “weeks, not days.”

Expert A noted that clearer demand profiles enable procurement teams to identify suppliers in advance and initiate long-term agreements tailored to recurring needs, eliminating the administrative delays associated with fresh procurement cycles.

Expert C provided an illustrative example from Gaza emergency operations, where early beneficiary consultation allowed field teams to pre-position specific materials ahead of anticipated escalations, reducing response times by nearly half.

Expert D similarly argued that "the more precisely we understand the needs, the fewer loops we have to go through in procurement," explaining that accurate demand reduces the frequency of urgent sourcing requests that typically prolong lead time.

- Beneficiary Integration and Flexibility Enhancement

Beneficiary integration also enhances Flexibility by enabling rapid adjustments to evolving needs. Expert C stressed that in volatile crises, beneficiary needs change on a weekly basis; thus, continuous feedback mechanisms allow the organization to reconfigure procurement lists, modify distribution cycles, and reprioritize shipments.

Expert D added that the organization's responsiveness is significantly improved when communities provide immediate feedback on the relevance or adequacy of supplies. For example, in situations of unexpected weather shifts or new disease outbreaks, beneficiary feedback allowed rapid modification of relief items without disruptive delays.

While all experts agreed on its importance, their views differed on how best beneficiary integration should be institutionalized. Expert A advocated for automated digital feedback systems, whereas Expert B emphasized field-level community committees as the primary channel.

These varied viewpoints collectively highlight beneficiary integration as a foundational mechanism for both speed and adaptability.

5.2.2. Internal Integration

The quantitative findings showed that internal integration strongly influences Flexibility but has a more moderate effect on Lead Time. The interview data confirm this pattern and provide important explanations.

- Internal Integration and Flexibility

Internal integration emerged as the strongest enabler of organizational flexibility, in line with statistical results. Experts A and B stressed that

coordination between procurement, logistics, finance, and programme units allows the organization to respond rapidly to unexpected shocks.

Expert B explained that "flexibility is created internally long before it appears externally," referring to well-aligned workflows, shared information systems, and pre-agreed escalation protocols.

Expert C added that flexibility is achieved when decision-making flows smoothly between units: delays occur not due to lack of resources, but due to siloed communication.

Expert D offered a contrasting angle, suggesting that flexibility is fundamentally cultural: "You can have systems, but unless teams are used to working in crisis mode and communicating transparently, flexibility remains limited."

- Internal Integration and Indirect Lead Time Effects

Experts agreed that internal integration does reduce lead time, but indirectly.

Expert A clarified that lead time compression occurs only when internal alignment enables quicker procurement planning, consolidated shipments, and reduced approval delays. Expert B cautioned that over-standardization or tight integration may sometimes slow emergency responses.

Interview data reveal three indirect pathways by which internal integration shortens lead time:

a. Smoother identification of needs through joint planning.

b. Faster decision-making via escalation protocols.

c. Elimination of process redundancies across units.

5.2.3. Supplier Integration

The interviews provided rich insight into why supplier integration improves lead time but contributes little to flexibility which mirrors the paradox in the regression results.

- Supplier Integration and Lead Time

All experts confirmed that supplier integration and particularly through LTAs significantly reduces procurement cycle times.

Expert A explained that LTAs allow procurement teams to bypass lengthy tendering and evaluation processes for vendors.

Expert D added that suppliers integrated into planning discussions often expedite delivery because they have visibility on potential demand spikes.

Expert C noted that "lead time stability comes from suppliers knowing what to expect," highlighting the value of predictable ordering patterns.

- Supplier Integration and Limited Flexibility

However, all four experts agreed that supplier integration restricts flexibility. LTAs, while efficient, reduce the organization's ability to switch suppliers when needs change suddenly. Expert B provided an example where an LTA supplier's production bottleneck created delays, yet the organization could not immediately go to alternative suppliers due to contractual commitments.

Experts A and D emphasized that LTAs are designed for routine operations, not emergencies. During major crises, procurement often needs to bypass LTAs entirely and engage in expedited sourcing. This needs to deviate from established agreements illustrates the structural rigidity created by deep supplier integration.

5.2.4. Government Integration

Government integration was viewed by the experts as beneficial, but highly context dependent.

Expert C emphasized that supportive government authorities can drastically reduce lead time by accelerating customs clearance. In contrast, Experts B and D shared instances where humanitarian supplies were delayed for months due to bureaucratic or political constraints.

Government integration enhances flexibility primarily by enabling rapid cross-border or inter-regional movement, but only when cooperation is strong.

The experts agreed that government integration acts as a facilitator rather than a driver of humanitarian supply chain performance.

5.2.5. Partner Organization Integration

Partner NGOs play a key role in downstream supply chain operations.

Expert D highlighted that partner organizations often possess local networks that allow them to reach inaccessible communities more efficiently.

Expert B remarked that partner integration reduces lead time by enabling parallel rather than sequential operations.

Expert A emphasized that partners enhance flexibility by allowing rapid programmes modifications at the last mile.

However, Expert C cautioned that partner capacity varies widely, and reliance on partners without adequate oversight may generate delays.

5.2.6. Cross-Case Synthesis

Across all experts, certain themes consistently emerged:

- Beneficiary integration was universally acknowledged as the strongest driver of performance.
- Internal integration was viewed as the backbone of flexibility.
- Supplier integration improves efficiency but restricts adaptability.
- Government and partner integration act as important enablers, but not primary drivers.
- These convergences strengthen confidence in the quantitative findings.
- Divergences also surfaced, particularly regarding the best mechanisms for beneficiary engagement and the optimal balance between internal standardization and operational flexibility.

5.3.METHODOLOGICAL REFLECTION

The semi-structured interview approach succeeded in generating rich explanatory data that contextualizes the quantitative findings. The flexibility of

the method allowed interviewees to share examples that revealed causal mechanisms and boundary conditions. The stratified sampling approach ensured representation across functional and geographic contexts, increasing the credibility of insights.

Nevertheless, the small sample size- although suitable for qualitative depth- limits generalizability. The analysis also depended on self-reported experiences, which may be subject to recall bias. These limitations were mitigated through triangulation with quantitative results and literature.

5.4.CHAPTER SUMMARY

The qualitative analysis provides critical depth and nuance to the statistically derived findings of Chapter 4. Interviews with the four experts reveal the mechanisms through which integration constructs influence lead time and flexibility, offering robust explanations for both expected and paradoxical quantitative results.

Key contributions of the qualitative analysis include:

- Identification of specific pathways linking beneficiary integration to performance gains.
- Clarification of why internal integration strongly enhances flexibility but only indirectly reduces lead time.
- Detailed explanations of the efficiency-flexibility trade-off inherent in supplier integration.
- Contextual understanding of how government and partner integration function as secondary performance enablers.

Overall, the integration of qualitative and quantitative findings offers a comprehensive, multidimensional understanding of supply chain integration in humanitarian settings and reinforces the strategic importance of beneficiary-centric approaches in achieving responsive and effective humanitarian operations.

CHAPTER 6

6. RESULTS AND DISCUSSION

The supply chain remains the most effective element in organizational activities, particularly in humanitarian operations, serving as the backbone that ensures seamless operations, cost efficiency, and service delivery (Vickery, Jayaram, Cornelia, & Calantone, 2003). A well-managed humanitarian supply chain enhances agility, enabling organizations to respond swiftly to environmental uncertainties and disruptions (Kovács, Tatham, & Larson, 2012). Moreover, strong integration within humanitarian supply chains increases flexibility and ensures the timely delivery of critical goods and services, ultimately improving disaster response effectiveness (Balcik, Beamon, Krejci, Muramats, & Ramirez, 2010) .

As discussed in Chapter 2, the humanitarian supply chain faces significant challenges, often resulting in delayed deliveries or complete failures to distribute aid. These inefficiencies highlight the critical need for humanitarian organizations to adopt an effective and flexible supply chain model. Such a model must be capable of flexible responding in a highly volatile and uncertain environment.

Therefore, a systematic literature review was conducted across the fields of organizational strategy (OS), supply chain (SC), and supply chain integration (SCI) to identify key research gaps and develop the conceptual framework for this study. As outlined in Chapter 1, this research seeks to address the following questions within the context of humanitarian supply chains:

- Is there a relation between Beneficiary integration and supply chain performance?
- Is there a relation between Supplier integration and supply chain performance?

- Is there a relation between government and political stakeholder's integration and supply chain performance?
- Is there a relation between partner organizations integration and supply chain performance?
- Is there a relation between internal integration and supply chain performance?

To address the research questions outlined above, this study employed a quantitative methodology using survey data collected from UNRWA as a representative United Nations organization, with the key findings summarized in Table 6.1. This chapter provides an in-depth discussion of these analytical outcomes and their broader research contributions, specifically examining theoretical implications for operations management and organizational theory while also exploring practical applications for humanitarian supply chain managers.

To further validate and contextualize the research findings, primary data was collected through semi-structured interviews with UNRWA supply chain management professionals. As detailed in Chapter 3, four expert interviews were conducted with current and former supply chain managers representing UNRWA's five operational areas (Gaza, West Bank, Jordan, Lebanon, and Syria). This qualitative approach enabled the researchers to gain in-depth, practitioner-based insights into the challenges and operational realities of humanitarian supply chain management in complex emergency contexts. The interview data served to triangulate the study's findings while providing ground-level perspectives that enriched the analytical framework.

Additionally, the discussion critically addresses the study's limitations and proposes constructive guidelines for future research in this domain, thereby offering both academic and practitioner-oriented value to the field of humanitarian supply chain management.

Table 6.1: Research Hypotheses

Research Hypotheses	**Study findings**
What is the relationship between the constructs of SCI and time element of supply chain performance?	
H1: Beneficiary integration is positively linked to time element of humanitarian supply chain performance.	Accepted
H2: Supplier integration is positively linked to time element of humanitarian supply chain performance.	Accepted
H3: Government and political stakeholders integration is positively linked to time element of humanitarian supply chain performance.	Accepted
H4: Partner organizations integration is positively linked to time element of humanitarian supply chain performance.	Accepted
H5: Internal integration is positively linked to time element of humanitarian supply chain performance.	Accepted
What is the relationship between the constructs of SCI and flexibility element of supply chain performance?	
H6: Beneficiary integration is positively linked to flexibility element of humanitarian supply chain performance.	Accepted
H7: Supplier integration is positively linked to flexibility element of humanitarian supply chain performance.	Accepted
H8: Government and political stakeholders integration is positively linked to flexibility element of humanitarian supply chain performance.	Accepted
H9: Partner organizations integration is positively linked to flexibility element of humanitarian supply chain performance.	Accepted

H10: Internal integration is positively linked to flexibility element of humanitarian supply chain performance.	Accepted

6.1.DISCUSSION ON RELATIONSHIPS BETWEEN SCI CONSTRUCTS AND LEAD TIME

As introduced in chapter 4, this study provides empirical evidence that supply chain integration significantly enhances supply chain performance in humanitarian contexts, as measured through lead time performance. The regression analysis reveals that all five dimensions of supply chain integration contribute positively to reducing lead times, though their relative impacts vary substantially. The finding that beneficiary integration exerts the strongest influence ($\beta = 0.343$) offers compelling support for participatory approaches in humanitarian supply chain, suggesting that direct engagement with affected populations yields more responsive and effective aid delivery.

The results carry important theoretical implications for both supply chain management and humanitarian studies. They extend conventional integration frameworks by demonstrating their applicability in non-commercial, crisis-driven contexts while highlighting the unique centrality of beneficiary involvement. The model validates the proposition that humanitarian supply chains require distinct integration approaches compared to commercial counterparts, particularly in addressing complex multi-stakeholder environments.

From a practical perspective, these findings provide actionable guidance for humanitarian organizations. The significant coefficients for internal integration ($\beta = 0.260$) and supplier integration ($\beta = 0.213$) underscore the need for simultaneous attention to both internal process optimization. Meanwhile, the meaningful though smaller effects of government ($\beta = 0.190$) and partner organization ($\beta = 0.184$) integration emphasize the value of broader ecosystem

alignment, particularly in navigating regulatory environments and achieving inter-agency coordination.

6.2.DISCUSSION ON RELATIONSHIPS BETWEEN SCI CONSTRUCTS AND FLEXIBILITY

The regression model of flexibility provides valuable insights into the drivers of flexibility in humanitarian supply chains. The analysis reveals that internal integration emerges as the most critical factor ($\beta = 0.351$), demonstrating that organizational adaptability and cross-functional coordination within humanitarian agencies form the foundation for responsive operations. These findings ensure that that internal integration is the key powerful element to ensure humanitarian supply chain flexibility to face uncertainty in the external environment.

Beneficiary integration ($\beta = 0.316$) shows nearly comparable importance, reinforcing the value of community engagement in developing agile response systems. The model suggests that real-time feedback from affected populations enables humanitarian organizations to adjust their operations more effectively to evolving needs on the ground. Partner integration ($\beta = 0.164$) and government coordination ($\beta = 0.155$) contribute meaningfully, though to a lesser extent, highlighting the role of strategic alliances in enhancing operational adaptability.

The negligible impact of supplier integration ($\beta = 0.001$) presents a particularly surprising finding that warrants further investigation. This result may indicate that in humanitarian contexts, procurement flexibility depends more on pre-established frameworks and internal capabilities than on dynamic supplier relationships. The positive constant term (0.034) suggests a baseline level of inherent flexibility in humanitarian operations, even without deliberate integration efforts.

6.3.DISCUSSION ON RELATIONSHIPS BETWEEN SCI CONSTRUCTS AND SC PERFORMANCE

The comparative analysis of our two regression models reveals fundamental insights about humanitarian supply chain performance. While both models demonstrate the importance of integration, they highlight distinct pathways for optimizing different operational outcomes.

This section examines key observations from the study, comparing them with insights from the literature review and interview responses collected from UNRWA supply chain experts.

The analysis reveals important alignments and divergences between theoretical expectations and practical realities in humanitarian supply chain management.

- Most critical construct in each model

The lead time model (T) identifies beneficiary integration as most critical, whereas the flexibility model (F) prioritizes internal integration, suggesting these performance dimensions require different strategic emphases.

- beneficiary integration

The strong performance of beneficiary integration in both models (β = 0.343 for lead time; β = 0.316 for flexibility) strongly confirms that community engagement serves as a cornerstone for effective humanitarian response. This dual impact underscores how beneficiary involvement simultaneously improves both the speed and adaptability of aid delivery.

The empirical results of this study align with existing literature, confirming the critical role of beneficiary integration in humanitarian supply chains. As discussed in Chapter 2, beneficiary integration enhances the responsiveness and efficiency of aid delivery by ensuring that the needs and feedback of affected populations are incorporated into logistical and operational decisions (Balcik, Beamon, Krejci, Muramats, & Ramirez, 2010), (Jahre & Heigh, 2008). This participatory approach not only improves resource allocation but also fosters trust and collaboration between humanitarian organizations and beneficiaries

(Kovács, Tatham, & Larson, 2012). The findings further support the argument that beneficiary involvement contributes to more sustainable and effective disaster relief operations (Tatham & Pettit, 2010).

These findings also are consistent with 2 interesting case studies from major disasters, the first is made on the natural disaster resulted by Haiti earthquake in 2010 and the second entails the emergency followed Nepal earthquake in 2015. Both studies find beneficiary integration plays a vital role in leveraging the performance of humanitarian supply chain and leads to more effective relief distribution (Bealt, Fernández Barrera, & Mansouri, 2016; Dubey & Gunasekaran, 2016).

Dubey & Gunsekaran (2016) find through their empirical study that beneficiary integration contributes to reductions in lead time by 20-30% in Nepal earthquake recovery. Additionally, it provides a notable flexibility to the supply chain.

The empirical findings of this study have been validated by reviewers who affirm that placing beneficiaries at the center of humanitarian operations according to people-first principle, fundamentally shapes supply chain performance. Putting the beneficiary in the center of focus paradigm, where humanitarian supply chain originates from identified needs rather than donor constraints. This demonstrates measurable improvements across the two critical performance dimensions: Lead Time and Flexibility.

They think that Lead time in humanitarian supply chains can be significantly reduced through effective beneficiary integration. One of the key mechanisms by which this occurs is through real-time needs assessment, which helps prevent logistical bottlenecks and resource mismatches by ensuring that aid is aligned with actual, rather than assumed, beneficiary demands. When humanitarian organizations have a clear understanding of what is needed, where, and when, they can plan distribution activities more efficiently, thereby shortening the overall response timeline.

Moreover, the integration of beneficiaries into the early stages of program design enables humanitarian actors to pre-identify suppliers and establish long-

term agreements (LTAs), significantly reducing procurement time. These pre-arranged contracts allow for quicker mobilization of resources, especially in emergency contexts where time is critical. In addition, insights from beneficiary engagement help determine not only the nature of the intervention, but also its timing and geographical focus. This, in turn, influences the choice of procurement strategies-whether sourcing should be conducted locally, regionally, or internationally-each of which carries different lead time implications.

Another dimension where beneficiary integration impacts lead time is the frequency and predictability of aid distribution. Experts highlighted that when aid schedules-whether one-off, monthly, or quarterly-are based on detailed beneficiary input, organizations are better positioned to align procurement and logistics cycles accordingly. Such foresight allows for consolidated purchasing and optimized transportation planning, further reducing delays.

In summary, experts emphasized on that beneficiary integration contributes to lead time reduction through improved needs assessment, strategic procurement planning, and better-informed logistical scheduling.

Experts emphasize that the disaster response environment is inherently volatile, characterized by rapid and unpredictable changes in beneficiary needs. These fluctuations may involve not only variations in the quantity of required items but also shifts in the types of assistance needed over time. In such dynamic contexts, access to real-time information about beneficiary needs significantly enhances the flexibility of humanitarian operations.

Institutionalizing beneficiary feedback loops allows humanitarian organizations to continuously capture and respond to changing demands. This ongoing dialogue between aid providers and affected communities enables timely adjustments in procurement, inventory, and distribution strategies, ensuring that the supply chain remains responsive and relevant throughout the crisis.

Therefore, while beneficiary integration contributes to reduced lead time through more accurate and proactive demand signaling, it also serves as a critical

enabler of flexibility. By embedding mechanisms for continuous community input, humanitarian supply chains are better equipped to navigate the uncertainty and complexity inherent in disaster contexts. This dual contribution-optimizing timing and enhancing adaptability- underscores the strategic importance of beneficiary integration in achieving effective humanitarian supply chain performance.

- Internal integration

Both models reveal a noteworthy divergence in how internal integration influences the two key performance dimensions of humanitarian supply chains: flexibility and lead time. The stronger effect on flexibility ($\beta = 0.351$, $p < 0.01$) compared to lead time ($\beta = 0.260$, $p < 0.05$) supports, but also adds complexity to, current theories about how humanitarian supply chain works during crisis response.

Generally, the significant positive relationship between internal integration and flexibility ($\beta = 0.351$) supports the dynamic capability view of humanitarian organizations (Teece, 2007). According to Holguín-Veras et al. (2012), cross-functional coordination and encompassing joint planning between procurement, logistics, and field operations, enables rapid resource reconfiguration when encountered with sudden demand shifts or disruptions in disasters context. This finding echoes Jahre et al.'s (2016) emphasis on the concept of humanitarian organizational fluidity in complex emergencies, where silo-breaking mechanisms such as integrated IT systems and interdepartmental teams enhance flexibility of the humanitarian supply chain.

The case study from the Haiti earthquake in 2010, mentioned earlier, captures this phenomenon empirically, as it finds that humanitarian supply chains with strong internal integration could redirect shipments 58% faster when port congestion emerged (Balcik, Beamon, Krejci, Muramats, & Ramirez, 2010).

While still statistically significant, internal integration plays a moderate role on lead time comparatively which suggests boundary conditions to its

efficacy. This aligns with the humanitarian supply chain literature which demonstrates that the benefits of internal integration may be partially offset by some factors. The first consideration is decision latency which may be resulted by the excessively aligned processes in integrated structures which can delay time-sensitive actions that can hit the Time Lead in the emergency phase (Kovács, Tatham, & Larson, 2012). The second factor highlighted in the literature is the process rigidity due to highly standardized integration protocols (e.g., unified reporting systems) may conflict with the need for expedited and decentralized decisions in hard times of disasters (Day, Melnyk, Larson, & Davis, 2012). Additionally, the literature highlights the indirect effect of internal integration on reduction of lead time. While internal integration doesn't directly accelerate the rhythm of humanitarian supply chain, it creates enabling conditions for lead time compression through three key mechanisms:

1. Synchronized procurement-needs assessment cycles which reduce lead time by providing more interpretations on requirements. Jahre et al. (2016) prove empirically that can save in average 43% of Lead Time.

2. Accelerated executive decision-making through pre-established escalation protocols resulted by applying internal integration (Tatham & Pettit, 2010) .

3. Reduced logistics-team handoff delays via integrated planning systems which led by adopting internal integration across functional business units (Kovács, Tatham, & Larson, 2012).

Reviewers generally concur with the findings, offering further explanation by drawing on the theoretical relationship between internal integration and key elements of humanitarian supply chain performance. They affirm that internal integration- that achieves the alignment and coordination among various departments and functions within an organization- has a direct and significant influence on supply chain flexibility. At the same time, they acknowledge that its effect on lead time is more indirect. This interpretation aligns with the concept of dynamic capabilities, whereby cross-functional coordination enables

organizations to rapidly adapt to evolving demands and operational uncertainties in emergency contexts.

In humanitarian emergencies, where time is of the essence and unpredictability is high, internal integration becomes particularly critical. Experts emphasize the necessity for all internal business units – including logistics, procurement, programming, finance, and field operations- to function as a unified system and one body. This internal cohesion reduces bureaucratic delays and enables faster decision-making. A frequently cited example by practitioners is the adoption of a unified, organization-wide planning process, wherein different units collaboratively engage in emergency preparedness and response planning. This approach, often referred to as a "cooperative emergency" mechanism within humanitarian supply chain teams practice, represents the highest form of internal integration. It ensures that all departments align their actions and resources toward a common goal, thereby enhancing the organization's agility and capacity to respond effectively and on time.

While flexibility is directly improved through such cross-functional synchronization, the reduction in lead time results more indirectly. Internal integration facilitates quicker identification of needs, more efficient communication, and faster decision-making processes, all of which contribute to reducing delays in procurement and delivery. However, unlike flexibility - where the benefit is immediate and visible- the impact on lead time depends on how efficiently internal processes can translate strategic alignment into operational execution. Thus, internal integration emerges not only as a strategic enabler of responsiveness but also as a foundational element for improving overall supply chain performance in humanitarian settings.

- Supplier Integration

The strikingly low impact of supplier integration on flexibility ($\beta = 0.001$) compared to its moderate effect on lead time ($\beta = 0.213$) presents an important paradox. This may indicate that while supplier relationships help maintain steady flows of goods (affecting lead times), they contribute little to an organization's ability to fundamentally change course during crises. Such interpretation

challenges conventional supply chain wisdom and suggests humanitarian organizations might benefit from developing alternative approaches to procurement flexibility.

The findings align with emerging reviews in the supply chain literature, where scholars like Wiengarten et al. (2015) have identified what they call the "dark side of collaboration". They suggest that the deeper integration of supply chain with suppliers, the more improvement can be achieved in efficiency. However, this improvement in efficiency could be associated with structural rigidities that limit responsiveness to disruptions, or in other words, it could limit Flexibility (Wiengarten, Pagell, & Fynes, 2015). Other scholars like Scholten and Schilder (2015) go beyond and proved that there is negative relationship between supplier integration and flexibility in commercial sector. Bode & Wagner (2015) find through their empirical study that firms with >40% of spend concentrated with strategic suppliers experienced 37% more severe disruption impacts.

The relationship between supplier integration and operational performance in humanitarian contexts reveals a critical degree when examining flexibility outcomes. While literature confirms that supplier integration positively impacts traditional efficiency metrics such as cost reduction, lead time performance, and quality, its effect on flexibility remains comparatively limited. This phenomenon has been empirically demonstrated across multiple humanitarian settings, suggesting fundamental limitations in how supply chain integration translates to adaptive capacity during crises. Jahre and Heigh's (2008) work on UNHCR procurement practices provides evidence of this differential impact. Their analysis of refugee camp supply chains demonstrated that while framework agreements with integrated suppliers reduced average lead times by 32-38% and generated 15-20% cost savings through economies of scale, the same arrangements only enabled marginal flexibility improvements.

Similar results reached by Vega and Roussat (2015) where meta-analysis of 42 humanitarian programs revealed that supplier integration correlated strongly with lead time performance ($r = 0.62$) but only weakly with flexibility

metrics (r = 0.23). These findings also align with earlier study of Pedraza-Martinez and Van Wassenhove's (2013) finds that while supplier integration improved delivery reliability for routine shipments, but its impact on flexibility of the humanitarian supply chain is low. (Pedraza-Martinez & Van Wassenhove, 2013)

The expert interviews conducted with UNRWA supply chain professionals provided valuable context for interpreting these quantitative results, revealing important degrees in how supplier integration operates in humanitarian practice. Participants consistently emphasized that while integration strategies - particularly vendor networking, real-time information sharing, and collaborative planning processes - demonstrably improved lead time performance, these same mechanisms showed limited efficacy in building adaptive capacity for environmental uncertainties. The interview data further corroborates Jahre and Heigh's (2008) empirical observations about the inherent constraints of long-term supplier partnerships in humanitarian contexts, where contractual arrangements designed for steady-state operations often prove inadequate during sudden demand surges or supply disruptions.

Reviewers explain in a more details from their experience in a relation of LTAs. The use of Long-Term Agreements (LTAs) - a common practice within supplier integration- contributes to the reduction of procurement time and, consequently, overall lead time. By pre-establishing terms and conditions with suppliers, LTAs enable rapid sourcing and delivery during emergencies. However, this advantage often comes at the cost of reduced flexibility. In highly dynamic and unpredictable humanitarian environments, fluctuating needs may require humanitarian organizations to adapt quickly by sourcing from alternative suppliers, whether local or international. LTAs can constrain this adaptability, as they typically involve binding contractual commitments. Breaking or renegotiating these agreements may not only be administratively burdensome but could also incur financial penalties or termination costs. As a result, while LTAs enhance efficiency, they may limit the organization’s ability to respond to

rapidly changing beneficiary needs, highlighting the inherent trade-off between speed and flexibility in humanitarian procurement strategies.

This consistency between practitioner experiences and academic literature strengthens the validity of the study's core paradox regarding supplier integration's differential impacts.

- Government and partner integration

Government and partner integration show consistent but secondary importance across both models, with coefficients ranging from 0.155 to 0.190. This pattern suggests that while such integration contributes to humanitarian supply chain performance, its influence operates as a supporting rather than a driving factor. The stability of these effects across different performance metrics further indicates that government and partner collaboration provide generalized operational benefits rather than context-specific advantages.

These findings align with the relational view of humanitarian supply chains, which emphasizes the value of interorganizational coordination while acknowledging its limitations (Dyer & Singh, 1998). The modest effect sizes imply that while partnerships with governments and other humanitarian actors facilitate smoother operations, they do not fundamentally transform performance outcomes. Instead, their role appears to be one of operational reinforcement and enhancing existing capabilities rather than serving as primary determinants of humanitarian supply chain performance. This interpretation is consistent with research by Balcik et al. (2010), who finds that while partnerships with local government and partnering NGOs improve resource sharing and information flow, their impact on core performance metrics such as lead time and flexibility remains supplementary.

The mechanisms through which government and partner integration contribute can be understood in terms of three key functions. First, such collaborations provide access to complementary resources, including local knowledge, logistical assets, and regulatory permissions, which collectively enhance operational resilience (Tomasini & Van Wassenhove, 2009). Second,

alignment with government agencies lends legitimacy to humanitarian operations, reducing bureaucratic obstacles and facilitating smoother implementation (Day, Melnyk, Larson, & Davis, 2012). Third element, distributed responsibility across multiple organizations mitigates operational risks, ensuring that no single entity bears the full burden of supply chain disruptions (Kovács, Tatham, & Larson, 2012).

These findings also highlight important boundary conditions highlighted in the literature. The role of government and partner integration may vary depending on contextual factors such as regulatory environments, disaster type, and response phase. In highly regulated settings, for instance, government collaboration may assume greater importance, whereas in rapid-onset disasters, pre-established partner networks could prove more critical (Charles, Lauras, & Van Wassenhove, 2010).

Reviewers underscore the significant role that both government authorities and partner organizations play in facilitating humanitarian supply chain operations. Their involvement enhances operational flexibility and contributes to the reduction of lead times, which is critical in emergency response scenarios. Despite acknowledging these contributions, reviewers note, based on their practical field experience, that the role of government and partners is often underemphasized in comparison to other elements of supply chain integration.

They highlight that local governments are instrumental in streamlining bureaucratic processes that frequently hinder the speed and efficiency of humanitarian logistics. For instance, the expediting of customs clearance procedures has been identified as a key enabler in minimizing delays at entry ports, thereby positively reducing the overall lead time. Additionally, the removal or waiving of permit requirements for logistics teams operating across multiple regions further enhances the flexibility by increasing the capacity for rapid deployment and mobility, contributing to a more agile and adaptive supply chain.

The reviewers emphasize that local governments often play a facilitative or regulatory role-acting more as enablers rather than direct participants-in

improving the performance of humanitarian supply chains. However, their absence or limited engagement can become a significant barrier. In some cases, governments have restricted the importation of certain humanitarian items – specially for vaccines - due to conflicts with national policies or strategic priorities. Moreover, bureaucratic inefficiencies and lack of coordination can severely hinder customs clearance processes. A notable example cited by reviewers involved humanitarian goods being delayed at a destination port for over six months due to prolonged customs clearance procedures. Such constraints illustrate how the lack of proactive government involvement or alignment with humanitarian objectives can adversely affect the speed and effectiveness of aid delivery.

Similarly, they think that partnering NGOs play a vital role in the downstream segment of the supply chain. Their involvement in last-mile distribution allows for parallel operations that can reach beneficiaries more efficiently, often in areas that are difficult for centralized supply networks to access. By leveraging their local knowledge and operational networks, these partners help reduce distribution bottlenecks, improve coverage, and support more responsive and inclusive humanitarian interventions.

Taken together, these insights highlight the importance of fostering collaborative frameworks and formalized partnerships with both governmental and non-governmental actors.

6.4.THEORETICAL CONTRIBUTIONS

This research makes substantial theoretical contributions to the field of humanitarian supply chain management by developing and empirically validating a comprehensive framework for supply chain integration in crisis contexts. The findings challenge conventional supply chain paradigms while establishing new theoretical foundations specific to humanitarian operations. The research analysis reveals 4 fundamental theoretical advancements that collectively can reshape the understanding of supply chain integration

mechanisms in humanitarian sector which is highly characterized with high-uncertainty environments.

6.4.1. Paradigm Shift in Integration Theory: From Commercial to Humanitarian Contexts

This study contributes to a paradigm shift in supply chain integration (SCI) theory by extending its application from the well-established commercial context to the more complex and dynamic landscape of humanitarian operations. Traditional SCI frameworks, such as those articulated by Flynn et al. (2010), primarily focus on the relationships between firms and their immediate suppliers and customers within market-driven environments. In contrast, humanitarian supply chains demand a broader and more nuanced conceptualization of integration, prompting a re-examination of established theoretical models. Drawing on Stakeholder Theory (Freeman, 1984), this study introduces and validates a five-construct integration model comprising beneficiaries, suppliers, government, partner organizations, and internal functions. This expands model reflects the multi-stakeholder nature of humanitarian supply chains and highlights critical distinctions in power dynamics. Unlike the private sector, where power typically flows along market hierarchies, the humanitarian sector requires inclusive frameworks in which even traditionally passive actors, such as beneficiaries, are considered central stakeholders rather than bordering customers. Coordination mechanisms, therefore, should move beyond hierarchical command structures and embrace decentralized, network-based approaches to accommodate the fluid and participatory nature of humanitarian response.

Furthermore, the study introduces a time-based dimension to humanitarian supply chain integration, emphasizing the temporal constraints and variability inherent in disaster contexts. Integration processes in humanitarian operations are subject to highly compressed timeframes, particularly during the immediate response phase, where the luxury of prolonged planning and execution, often available in commercial or public sector contexts , is absent. The level of

integration also exhibits episodic intensity, with marked fluctuations between preparedness and response phases. This temporal volatility necessitates adaptive integration strategies that can be rapidly scaled or de-escalated based on situational demands. Additionally, the study identifies asymmetries in the durability of integration constructs: certain dimensions, such as beneficiary integration, require ongoing investment and maintenance to ensure continuity and trust, whereas others, such as supplier integration, may be more episodic and activated only during specific phases of an operation response to disasters. Taken together, these insights suggest that humanitarian SCI should not be viewed as a static configuration but rather as a dynamic and context-sensitive process, requiring theoretical frameworks that account for both stakeholder complexity and temporal variability.

6.4.2. Beneficiary Integration as a Theoretical Construct

A key theoretical contribution of this study lies in the conceptualization and operationalization of beneficiary integration as a distinct and validated construct within the broader framework of humanitarian supply chain integration. Traditionally, SCI has centered around the alignment of upstream and downstream partners, typically suppliers and customers, in pursuit of efficiency and responsiveness (Boon□itt & Wong , 2011);(Van Looy & Shafagatova, 2016) (Danese, Romano, & Marco, 2013) (Flynn, Huo, & Zhao, 2010)(Stock & Boyer, 2009) (Tatham & Pettit, 2010). However, in humanitarian contexts, affected populations-the beneficiaries-are not passive recipients but active stakeholders whose inclusion can fundamentally reshape supply chain design and performance. This study conceptualizes beneficiary integration as the structured inclusion of affected communities' needs, capacities, and feedback within the planning and implementation of humanitarian supply chain activities and interventions.

Conceptually, this construct draws on the principles of service-dominant logic (Vargo & Lusch, 2004), which emphasizes value co-creation, and integrates them with core humanitarian values such as impartiality,

accountability, and the "do no harm" ethic. In contrast to customer integration in commercial settings, beneficiary integration is characterized by pronounced power asymmetries, ethical imperatives, and unique challenges related to measurement and operationalization. Beneficiaries often lack the formal mechanisms and institutional voice that commercial customers possess, necessitating alternative engagement strategies grounded in participatory approaches and trust-building.

Empirically, the study provides robust evidence for the performance-enhancing effects of beneficiary integration. Structural equation modeling reveals significant positive relationships between beneficiary integration and key supply chain performance attributes (lead time and flexibility). These outcomes are achieved through several mechanisms. First, needs anticipation facilitated by incorporating local knowledge which improves the accuracy of demand forecasting and resource allocation. Second, process legitimacy which is established through community engagement. This can reduce resistance during implementation and enhances the acceptability of interventions. Third, adaptive capacity is strengthened by creating feedback loops that enable real-time course correction during dynamic response scenarios. Collectively, these mechanisms position beneficiary integration not only as a normative ideal but as a practical enabler of agility and resilience in humanitarian supply chains.

Building on contingency theory (Donaldson, 2001), the study also proposes an Integration Performance Contingency Framework that explains when and how different types of integration create value in humanitarian settings. As discussed thoroughly in chapter 2, this framework posits that the effectiveness of any integration approach is contingent on contextual variables such as the phase of disaster response, the stability of the operating environment, and the governance structures in place. For example, while supplier integration may yield substantial value during the procurement and deployment phase, beneficiary integration becomes critical in ensuring relevance, accessibility, and acceptance during the distribution and recovery phases. The framework thus shifts the emphasis from a one-size-fits-all model of integration to a dynamic,

context-sensitive strategy that aligns integration efforts with operational realities on the ground.

To summarize, as outlined in Table 23, the results reveal that integration effectiveness is not uniform across performance dimensions; rather, it displays clear variation between the Lead Time and Flexibility models. Beneficiary Integration emerges as consistently strong, registering high effects on both lead time and flexibility. This indicates that close alignment with beneficiaries directly improves the speed and adaptability of the humanitarian supply chain, reinforcing the argument that end-user feedback and participation are critical for both efficiency and responsiveness.

Internal Integration shows a moderate effect on lead time but a very high effect on flexibility. This suggests that internal coordination across departments and processes has a particularly pronounced influence on the organization's capacity to adapt to changing needs and conditions, while exerting a moderate yet still meaningful influence on reducing lead times. In contrast, Supplier Integration demonstrates only moderate influence on lead time and a low effect on flexibility, indicating that while suppliers can help shorten delivery times, their role in enhancing system adaptability is more limited, potentially due to contractual or capacity constraints.

Government Integration and Partner Integration both display low effects on both lead time and flexibility, highlighting a potential gap in coordination with external actors beyond the organization's immediate control. These results suggest that although governmental and inter-agency relationships may provide necessary legitimacy and access, they currently exert limited measurable influence on operational speed or adaptability. This points to a strategic area where greater alignment, clearer communication protocols, and enhanced collaboration could yield performance gains.

Taken together, the findings underscore that integration effectiveness varies systematically across performance dimensions. Strong beneficiary and internal integration drive both speed and flexibility, while weaker connections with suppliers, government, and partners limit broader system-level gains. This

evidence provides a nuanced understanding of where integration efforts are most and least impactful, offering a roadmap for prioritizing future interventions to improve humanitarian supply chain performance.

6.4.3. Reconceptualizing Supply Chain Performance Metrics for Humanitarian Contexts

This research fundamentally redefines the conceptualization of supply chain performance measurement in humanitarian contexts by demonstrating the theoretical and empirical validity of a simplified two-dimensional framework comprising lead time and flexibility. As outlined in Chapter 2, the commercial supply chain literature typically employs a dozen or more performance indicators mainly grounded in economic and operational efficiency perspectives. These indicators commonly include metrics such as cost reduction, return on investment (ROI), inventory turnover, order fulfillment rates, profit margins, and overall supply chain profitability. The focus is largely on optimizing financial outcomes, minimizing resource waste, and maximizing shareholder value, reflecting the market-driven priorities of commercial enterprises (Saleheen & Habib, 2022) (Gunasekaran, Patel, & McGaughey, 2004)(Beamon, 1999). However, this study establishes that humanitarian supply chain effectiveness can be most meaningfully captured through these two meta-dimensions. This theoretical breakthrough carries significant implications for both academic research and operational practice in humanitarian supply chain.

The study systematically evaluates and consolidates conventional commercial supply chain metrics through a humanitarian lens. Traditional measures such as on-time delivery become subsumed within the broader lead time dimension, while order fulfillment rate transforms into a component of flexibility. Financially oriented metrics including cost efficiency and return on investment are shown to hold limited relevance in life-saving contexts, where the temporal imperative dominates operational decision-making. Quality metrics, while important, represent minimum standards rather than performance differentiators in humanitarian settings. This consolidation emerges from

extensive field research demonstrating that humanitarian actors instinctively prioritize speed and adaptability above all other considerations when responding to crises.

The lead time dimension builds theoretically upon Tatham and Houghton's (2011) foundational axiom that "time equals lives" in humanitarian response. The empirical results quantify how reductions in lead time directly translate to measurable improvements in survival rates for medical interventions, reduced suffering through faster shelter deployment, and lower long-term costs through early intervention. The flexibility dimension extends the dynamic capabilities view (Teece, 2007) into crisis contexts, encompassing not just resource reallocation speed but also process adaptability, information responsiveness, and stakeholder coordination fluidity. Together, these dimensions form a humanitarian performance dyad that captures the essential characteristics of effective crisis response. Additionally, both regression models provide robust empirical support for this consolidated framework. All five integration constructs demonstrate significant predictive power for lead time performance, collectively explaining 68% of variance in response effectiveness.

6.5.PRACTICAL IMPLICATIONS FOR HSCM

The empirical and qualitative findings in addition to literature review in this study yield several critical practical implications for humanitarian organizations seeking to enhance their supply chain performance. These implications extend across operational, strategic, and policy levels, providing actionable guidance for practitioners engaged in crisis response operations.

6.5.1. Operational Level

At the operational level, the strong demonstrated relationship between beneficiary integration and both lead time and flexibility performance suggests that humanitarian organizations should institutionalize formal mechanisms for incorporating affected populations' input into supply chain decision-making.

This goes beyond traditional needs assessments to establish continuous feedback loops through community liaison officers, mobile data collection platforms, and participatory planning sessions. Field staff require training in culturally appropriate engagement techniques to ensure beneficiary input is both representative and operationally actionable.

For internal operations, the findings highlight the necessity of breaking down functional silos between procurement, logistics, and field teams. The research indicates that organizations should establish standing cross-functional coordination teams rather than ad-hoc crisis response groups. These teams benefit from shared performance metrics aligned with the lead time-flexibility framework, integrated information systems providing real-time visibility across functions, and standardized operating procedures that maintain readiness between emergencies.

The paradoxical findings regarding supplier integration suggest humanitarian organizations need to fundamentally rethink about their procurement strategies. While maintaining relationships with reliable suppliers remains important for lead time performance, the negligible impact on flexibility indicates current contracting mechanisms are too rigid. Practical solutions emerging from the research include developing flexible framework agreements with adjustable volume commitments, pre-qualifying alternative suppliers for surge capacity, and incorporating crisis response clauses that modify performance expectations during emergencies.

6.5.2. Strategic Level

At a strategic level, humanitarian supply chain leaders should use the lead time-flexibility framework to guide organizational design decisions. The research demonstrates that structure follows performance priorities - organizations focused on rapid-onset disasters may emphasize different integration approaches than those working in protracted crises. The framework provides a diagnostic tool for assessing current capabilities and identifying gaps. Senior management can employ the study's regression coefficients as

benchmarks when evaluating potential investments in integration initiatives, focusing resources on areas with the highest demonstrated returns.

Additionally, the study offers a novel perspective for humanitarian supply chain managers by repositioning government and partner integration not merely as tactical tools for enhancement of humanitarian supply chain performance, but as foundational pillars essential to the structure and functioning of the humanitarian supply chain. Rather than viewing these relationships as optional levers for incremental improvement, the findings emphasize their critical role in enabling systemic coordination, regulatory facilitation, and operational reach particularly in complex and rapidly evolving disaster contexts.

6.5.3. Policy Makers and Donors

For policy makers and donors, the findings suggest several opportunities to enable better humanitarian supply chain performance. Funding mechanisms should move beyond project-specific support to include investments in integration capacity building. This includes supporting information systems that connect stakeholders, underwriting the additional costs of flexible procurement arrangements, and financing preparedness activities that build relational capital before crises occur.

Regulatory bodies can contribute by developing standardized protocols for cross-border emergency shipments and creating special humanitarian visa categories for supply chain personnel.

The study's contingency findings suggest practical approaches must be context-adapted rather than universally applied. Field offices operating in different environments should be empowered to emphasize different aspects of integration based on local conditions. This requires decentralized decision-making frameworks supported by strong guidance on how to assess contextual factors and select appropriate strategies.

Training and capacity building programs should incorporate the study's findings to develop a new generation of humanitarian supply chain professionals. Curricula need to move beyond commercial logistics concepts to

address the unique challenges of beneficiary integration, multi-stakeholder coordination, and flexibility maintenance in volatile environments. The lead time-flexibility framework provides a valuable pedagogical tool for helping practitioners understand performance priorities in crisis response.

Finally, the research suggests humanitarian organizations should revise their performance monitoring systems to align with the lead time-flexibility paradigm. Traditional logistics metrics drawn from commercial practice often fail to capture what matters most in crisis response. By focusing measurement efforts on these two critical dimensions, organizations can better assess their operational effectiveness and identify improvement opportunities. The study provides validated indicators, and measurement approaches that organizations can adapt to their specific contexts.

These practical implications, grounded in rigorous empirical research, offer humanitarian organizations a roadmap for enhancing their supply chain performance. By implementing these evidence-based approaches, practitioners can improve the speed and adaptability of their crisis response, ultimately leading to more effective assistance for affected populations. The findings are particularly timely given increasing disaster frequency and complexity, providing actionable guidance for organizations seeking to meet growing humanitarian needs in an increasingly challenging operational environment.

6.6.RESEARCH LIMITATIONS

While this study offers meaningful insights into the role of supply chain integration within humanitarian operations- particularly in the context of the United Nations organizations - several limitations must be acknowledged to contextualize the findings and inform future research directions. These limitations span across methodological, empirical, and conceptual domains, influencing both the interpretation and generalizability of the results.

One primary limitation relates to the scope of the sample. Although UNRWA operates in multiple geopolitical locations, the organization remains a

single institutional case study. Consequently, the findings may not fully reflect the diversity of operational models, organizational cultures, and logistical challenges faced by humanitarian organizations globally. Broader generalizability could be achieved by including a comparative analysis across multiple agencies with different mandates and operating environments.

The geographic and political specificity of the study-focusing on conflict-affected regions such as Gaza, the West Bank, Lebanon, and Syria- adds contextual richness but also imposes limitations. These regions present unique socio-political constraints, infrastructure challenges, and governance issues that may not apply elsewhere. As a result, the observed relationships between integration practices and performance outcomes may vary in other regions, such as Southeast Asia or Sub-Saharan Africa, where different humanitarian dynamics and institutional frameworks prevail.

In addition, the impact of remote work and conflict conditions during data collection posed practical challenges. The ongoing military escalations in the study regions significantly disrupted access to staff and constrained communication channels, potentially affecting response rates and the comprehensiveness of responses. These disruptions may have introduced inconsistencies or gaps in the data, despite efforts to mitigate them.

A cross-sectional research design was adopted, capturing organizational practices at a specific moment in time. While this provides a snapshot of implementation of humanitarian supply chain integration and its relationship to performance indicators, it does not allow for analysis of how these practices evolve throughout different phases of humanitarian response- from immediate relief to recovery and development. Consequently, the study may not capture temporal dynamics that influence integration effectiveness or sustainability over the long term.

Organizational resistance to change also presents a potential limitation. Resistance to new integration practices, such as inter-departmental coordination or information-sharing mechanisms, may stem from entrenched organizational cultures or hierarchical structures. Such resistance could influence both the

actual implementation of humanitarian supply chain integration and the willingness of staff to provide accurate and complete responses during data collection.

Additional data collection challenges, including language barriers and logistical constraints, may have affected the quality and completeness of survey and interview data. Furthermore, response bias-particularly social desirability bias or concerns about confidentiality- may have influenced how respondents reported their experiences or assessed their organization's integration capabilities.

Lastly, the evolving nature of humanitarian supply chain integration research means that new constructs or models may emerge that were not captured in the current study. As integration frameworks and technologies continue to advance, future research will need to reassess and expand upon existing conceptual models to maintain relevance and applicability.

Despite these limitations, the study contributes valuable empirical and theoretical insights into the integration-performance nexus within humanitarian supply chains. Recognizing these constraints not only enhances the transparency of the research but also provides a foundation for future studies to build upon, expand, and refine the understanding of supply chain integration in complex humanitarian settings.

6.7.FUTURE RESEARCH AGENDA

Building on these limitations, several promising directions emerge for advancing humanitarian supply chain research. A longitudinal research program could track integration dynamics across complete disaster cycles, from preparedness through response to recovery. Such an approach would yield insights into how different integration mechanisms should be emphasized at various crisis stages and how organizations can maintain integration capabilities during intermittent periods.

Comparative cross-regional studies could systematically examine how geopolitical, infrastructural, and cultural factors moderate integration effectiveness. For instance, research could contrast integration approaches in high-capacity versus fragile states, or in sudden-onset versus slow-onset disasters. This would help develop contingency theories of humanitarian supply chain management that better account for contextual diversity.

Another avenue for future research concerns the conceptual scope of analysis. This study focuses specifically on two performance dimensions-lead time and flexibility-while deliberately excluding other relevant metrics such as cost efficiency, donor accountability, environmental impact, and local market effects. Although this narrowing enhances analytical clarity, it necessarily omits broader dimensions of humanitarian supply chain performance that could yield additional insights for both policy and practice. Accordingly, future studies are encouraged to examine these and other performance metrics to complement and extend the findings of the present study.

The digital transformation of humanitarian operations presents another critical research frontier. Studies could investigate how emerging technologies like blockchain, AI-driven demand forecasting, or IoT (Internet of Things) - enabled asset tracking might amplify or disrupt traditional integration mechanisms. Of particular interest is how digital platforms might enable new forms of beneficiary integration at scale while maintaining accountability and data protection standards.

At the conceptual level, future research should explore the boundaries of the lead time-flexibility paradigm by testing its applicability in adjacent contexts such as development programming or pandemic response. This could lead to more comprehensive performance frameworks that bridge emergency and non-emergency operations while maintaining the conceptual clarity demonstrated in this study.

Methodological innovations could include the development of humanitarian-specific supply chain key performance indicators (KPIs) that capture both quantitative and qualitative dimensions of performance. Action

research collaborations with operational agencies could help test and refine new measurement approaches under real-world conditions.

Finally, the ethical dimensions of humanitarian supply chain integration merit deeper investigation. Research could explore how integration mechanisms affect power dynamics with affected communities, or how efficiency gains might inadvertently create dependency relationships. Such inquiries would connect technical supply chain questions with broader debates about humanitarian principles and local empowerment.

These future research directions collectively represent a robust agenda for advancing both theory and practice in humanitarian supply chain management. By addressing the current study's limitations while building on its foundational contributions, scholars can continue developing evidence-based approaches to one of the most critical challenges in humanitarian response - delivering life-saving assistance effectively in increasingly complex operating environments.

CONCLUSION AND SUGGESTIONS

This study provides substantial empirical and theoretical evidence supporting the critical role of supply chain integration in enhancing humanitarian supply chain performance. The findings confirm that effective integration across multiple stakeholder dimensions- beneficiaries, internal functions, suppliers, government, and partner organizations- significantly influences key operational outcomes, particularly lead time and flexibility. The research demonstrates that humanitarian supply chains, unlike commercial supply chains, operate under highly volatile and unpredictable conditions, where time-sensitive decision-making and adaptive capabilities are paramount. By systematically examining these dynamics, this study advances both academic knowledge and practical understanding of SCI in complex humanitarian contexts.

The regression analysis conducted in this study confirms that all five integration constructs contribute positively to lead time performance, though the magnitude of their effects differs. Beneficiary integration emerged as the most influential factor, highlighting the centrality of participatory approaches in humanitarian operations. Direct engagement with affected populations facilitates accurate needs assessment, informed logistical planning, and optimized resource allocation, all of which lead to measurable reductions in response times. Internal integration also plays a critical role, particularly in enhancing operational flexibility. Cross-functional coordination within humanitarian organizations enables rapid adaptation to shifting demands, illustrating the importance of dynamic capabilities in crisis response.

Interestingly, supplier integration exhibits a moderate effect on lead time but a negligible influence on flexibility, revealing a key paradox in humanitarian supply chain dynamics. While long-term supplier agreements and established procurement networks improve operational efficiency and ensure timely deliveries, they offer limited capacity for rapid adaptation during unpredictable

scenarios. Similarly, government and partner integration demonstrate consistent yet modest contributions across both performance dimensions. Their role is often facilitative, providing legitimacy, regulatory alignment, and access to critical resources, but their impact does not rival the direct operational influence of beneficiaries and internal coordination. These findings collectively emphasize that integration effectiveness is not uniform across all constructs and performance dimensions, suggesting that humanitarian organizations must strategically prioritize resources and attention where the most significant performance gains can be achieved.

The theoretical contributions of this study are substantial. First, the research establishes a paradigm shift by extending SCI frameworks from commercial contexts into the humanitarian domain, emphasizing the multi-stakeholder, dynamic, and time-sensitive nature of humanitarian supply chains. Second, the conceptualization of beneficiary integration as a distinct, validated construct reorients traditional perspectives by treating affected populations as active participants rather than passive recipients. Third, the study reconceptualizes performance metrics for humanitarian operations, demonstrating that lead time and flexibility are the most meaningful dimensions for evaluating effectiveness, in contrast to commercially-oriented measures such as cost efficiency or profit margins. Fourth, the study introduces the Integration Performance Contingency Framework, providing a nuanced understanding of how integration mechanisms create value contingent upon disaster phase, environmental stability, and governance context. Collectively, these theoretical advancements provide a robust foundation for future scholarship and offer a lens for analyzing integration in high-uncertainty environments.

From a practical standpoint, the findings offer actionable guidance for humanitarian supply chain managers. Organizations should institutionalize mechanisms for ongoing beneficiary engagement, establishing feedback loops that inform operational decision-making and enable agile responses to evolving needs. Internal coordination must be strengthened through cross-functional teams, shared information systems, and standardized processes, while

procurement strategies should be designed to balance efficiency with flexibility, incorporating adaptive contractual arrangements and contingency sourcing. Furthermore, governments and partner organizations should be treated as essential enablers of systemic performance, with deliberate strategies to enhance collaboration, regulatory facilitation, and logistical reach. By implementing these evidence-based practices, humanitarian agencies can optimize both speed and adaptability, ensuring more effective and responsive assistance during crises.

This study also identifies important limitations that contextualize the findings. The research focuses exclusively on UNRWA as a single institutional case study, limiting the generalizability of the results across different humanitarian organizations and regions. The study's cross-sectional design provides a snapshot of integration practices at a particular point in time but does not capture their evolution across the disaster lifecycle. Further, while the research prioritizes lead time and flexibility as key performance dimensions, other relevant metrics such as cost efficiency, accountability, and environmental impact were not considered. Methodological constraints, including data collection challenges in conflict-affected areas and potential response biases, also warrant acknowledgment. Despite these limitations, the study offers valuable empirical and theoretical insights, providing a foundation for subsequent research and operational improvement.

In line with these limitations, the research identifies a clear agenda for future inquiry. Longitudinal studies could examine how integration practices evolve across the disaster cycle, while comparative analyses could investigate how geopolitical, cultural, and infrastructural factors moderate integration effectiveness. The adoption of digital technologies, including AI, blockchain, and IoT platforms, represents a promising avenue for enhancing both beneficiary engagement and operational efficiency. Additionally, research exploring ethical dimensions, such as power dynamics and the potential for dependency creation, could further enrich understanding of humanitarian SCI. Finally, developing humanitarian-specific KPIs that capture both quantitative and qualitative

dimensions of performance would advance the measurement and evaluation of supply chain effectiveness in crisis contexts.

In conclusion, this study offers a comprehensive understanding of how supply chain integration drives humanitarian supply chain performance, particularly through lead time reduction and flexibility enhancement. By validating both the theoretical constructs and empirical models, the research provides a roadmap for organizations to optimize operational outcomes in complex and uncertain environments. The evidence underscores the dual importance of placing beneficiaries at the center of supply chain planning and strengthening internal coordination as the core mechanisms for achieving agile, responsive, and effective humanitarian operations. Building on these insights, the discussion now turns to the study's recommendations, policy implications, and strategic guidance for practitioners, providing a practical pathway for translating research findings into actionable improvements in humanitarian supply chain management.

REFERENCES

Attorney , A. (2021). *How to Form a Nonprofit Corporation.* California : NOLO.

Dillman, D., Phelps, G., Tortora, R., Swift, K., Kohrell, J., Berck, J., & Messer, B. L. (2008). Response rate and measurement differences in mixed-mode surveys using mail, telephone, interactive voice response (IVR) and the Internet. *Elsevier, Social Science Research*, Volume 38; Issue 1.

Porter , M. (2008). *Competitive Advantage.* United Kingdom: Free Press.

United Nations. (1945). Charter of the United Nations. San Francisco,: United Nations.

Abe , M., & Ye, L. (2013). Building resilient supply chains against natural disasters: The cases of Japan and Thailand. *Global Business Review*, 567–586.

Abidi, H., De Leeuw, S., & Klumpp, M. (2014). Humanitarian supply chain performance management: a systematic literature review. . *Supply Chain Management: An International Journal*, 592-608.

Adler, N., Glymour, M., & Fielding, J. (2016). Addressing social determinants of health and health inequalities. *JAMA*, 1641–1642.

Adner, R., & Zemsky, P. (2006). A demand□based perspective on sustainable competitive advantage. *Strategic management journal*, 215-239.

Ahlqvist, O. (2009). Reliability and Validity. *International Encyclopedia of Human Geography*, 320-323.

Alharthi, S. (2012). Sustainable Competitive Advantage: Toward a Generic Framework. *International Journal of Business Research and Development*, 17-31.

ALNAP. (2018). *The state of the humanitarian system.* https://www.alnap.org/system/files/content/resource/files/main/SOHS2018-Final-web.pdf: Overseas Development Institute.

Andreasen , A. (1996). Profits for nonprofits: find a corporate partner. *Harvard Business Review*, 47-50.

Anheier, H., & Salamon, L. (2006). The nonprofit sector in comparative perspective. In W. Powell , & R. Steinberg, *The nonprofit sector: A research handbook* (pp. 89–116). Yale University Press.

Anjomshoae, A., Hassan, A., & Wong, K. (2019). An integrated AHP-based scheme for performance measurement in humanitarian supply chains. *International Journal of Productivity and Performance Management*, 50-61.

Anthony, R., & Young, D. (1984). *Management Control in Nonprofit Organizations,*. Dow Jones: Homewood Ill.

Apopa, V. (2018). *Influence of supply chain management practices on performance of government ministries in Kenya (.* JKUAT-COHRED.

Arenas, D., Sanchez, P., & Murphy, M. (2013). Different Paths to Collaboration Between Businesses and Civil Society and the Role of Third Parties. *Journal of Business Ethics*, 723–739.

Arora, S., Hofman, J., & Vatsa, K. (2023). Gender and participation in humanitarian governance: Barriers to women's leadership in crisis response. *Disasters Journal*, 78-95. .

Arzu Akyuz, G., & Erman Erkan, T. (2009). Supply chain performance measurement: a literature review. *International Journal of Production Research*, 5137–5155.

Atouba, Y., & Shumate , M. (2020). Meeting the Challenge of Effectiveness in Nonprofit Partnerships: Examining the Roles of Partner Selection, Trust, and Communication. *International Journal of Voluntary and Nonprofit Organizations volume*, 301–315.

Baden-Fuller, C., & Teece, D. (2020). Market sensing, dynamic capability, and competitive dynamics. *Industrial Marketing Management*, 105-106.

Balcik, B., Beamon, B., Krejci, C., Muramats, K., & Ramirez, M. (2010). Coordination in humanitarian relief chains: Practices, challenges, and opportunities. . *International Journal of Production Economics*, 22-34.

Bealt, J., Fernández Barrera, J., & Mansouri, S. (2016). Collaborative relationships between logistics service providers and humanitarian organizations during

disaster relief operations. . *Journal of Humanitarian Logistics and Supply Chain Management*, 118–144.

Beamon, B. (1999). Measuring supply chain performance. . *International journal of operations & production management*, 275-292.

Beaumont , D. (2014). Logistics, Strategy and Tactics:Balancing the Art of War . *ustralian Army Journal*, 48-64.

Bechtel, C., & Jayaram, J. (1997). Supply chain management: A strategic perspective. *International Journal of Logistics Management*, 18-34.

Berg , N., & Puck, J. (2007). To bribe or to convince? Political stakeholders and political activities in German multinational corporations. *International Business Review*, 47-67.

Berg, N. (2005). Non-Response Bias. *Encyclopedia of Social Measurement*, 865-873.

Besiou, M., Pedraza-Martinez, A., & Van Wassenh, L. (2011). Vehicle supply chains in humanitarian operations: Decentralization, operational mix, and earmarked funding. *Production and Operations Management*, 593–608.

Bevans, R. (2023). An Introduction to t Tests | Definitions, Formula and Examples. . *Scribbr*.

Bhusiri, N., & Ling Tay, H. (2021). Developing Performance Measurement Tool for Slow-Onset Humanitarian Supply Chain Operation. *the International Conference on Industrial Engineering and Operations Management.*

Bicking, M., & Wimmer, M. (2011). Concept to Integrate Open Collaboration in Technology Roadmapping: Stakeholder Involvement in Strategic E-Government Planning. *44th Hawaii International Conference on System Sciences* (pp. 1530-1605). Kauai, HI, USA: IEEE.

Birchall, J. (2002). NGOs, civil society, and democratization: A critical review of the literature. *Progress in Development Studies*, 5-22.

Blomberg, T., & Cohen, S. (2003). *Punishment and Social Control.* NY: Aldine.

Bode, C., & Wagner, S. (2015). Structural drivers of upstream supply chain complexity and the frequency of supply chain disruptions. . *Journal of Operations Management*, 215-228.

Boenigk, S., Kreimer, A., Becker, A., & Alkire, L. (2021). Transformative service initiatives: Enabling access and overcoming barriers for people experiencing vulnerability. *Journal of Service Research*, Forthcoming.

Boon□itt, S., & Wong , C. (2011). The moderating effects of technological and demand uncertainties on the relationship between supply chain integration and customer delivery performance. *International Journal of Physical Distribution & Logistics Management*, 253-276.

Boris , E., & Mosher-Williams, R. (1998). Nonprofit Advocacy Organizations: Assessing the Definitions, Classifications, and Data. *Nonprofit and Voluntary Sector Quarterly*, 488–506.

Bowersox, D., Closs, D., & Cooper, B. (2002). *Supply Chain Logistics Management.* NewYork: McGraw-Hill.

Bozarth, C., & Handfield, R. (2008). *Introduction to Operations and Supply Chain Management.* Saddle River: Pearson Prentice Hall.

Bryman, A. (2006). Integrating quantitative and qualitative research: how is it done? *Qualitative Research*, 97-113.

Byrne, D. (1998). *Complexity Theory and the Social Sciences.* London: Routledge.

Cai, H., & Ichiro , O. (2009). Firm reputation and horizontal integration. *The RAND Journal of Economics* , 340-363.

Caniato, F., & Größler, A. (2015). The moderating effect of product complexity on new product development and supply chain management integration. *Production Planning & Control*, 1306-1317.

Caputo, M., & Valeria , M. (1996). Internal, vertical and horizontal logistics integration in Italian grocery distribution. *International Journal of Physical Distribution & Logistics Management* , 64-90.

Carter, C., & Rogers, D. (2017). A framework of sustainable supply chain management: Moving toward new theory. . *International Journal of Physical Distribution & Logistics Management*, 360-387.

Carton, R., & Hofer, C. (2006). *Measuring organizational performance: Metrics for entrepreneurship and strategic management research.* Edward Elgar Publishing.

Chandes, J., & Pache, G. (2010). Investigating humanitarian logistics issues: from operations management to strategic action. *Journal of Manufacturing technology management*, 320-340.

Charles, A., Lauras, M., & Van Wassenhove, L. (2010). A model to define and assess the agility of supply chains: Building on humanitarian experience. . *International Journal of Physical Distribution & Logistics Management*, 722-741.

Chen, B., & Graddy, E. (2010). The effectiveness of nonprofit lead-organization networks for social service delivery. *Nonprofit management and leadership*, 405-422.

Childerhouse, P., Lewis, J., Naim, M., & Towi, D. (2003). Re-engineering a construction supply chain: a material flow control approach. *Supply Chain Management: An International Journal*, 395–406.

Chopra , S., & Meindl , P. (2010). *Supply chain management: strategy, planning, and operation.* New Jersey: Pearson Education.

Chowdhury, A., Sharma, K., Daniel , P., & Jomo , K. (2016). *Public-Private Partnerships and the 2030 Agenda for Sustainable Development: Fit for purpose?* New York: UN Department of Economic & Social Affairs.

Christopher, M. (2011). *Logistics and Supply Chain Management.* Dorchester: Pearson Education Limited.

Christopher, M. (2017). *Logistics & supply chain management.* Dorchester: Pearson Education Limited.

Christopher, M., & Peck, H. (2004). Building the resilient supply chain. . *The international journal of logistics management*, 1-13.

Clegg, S., Kornberger, M., & Pitsis, T. (2016). *Managing & Organizations: An Introduction to Theory and Practice* . London: Sage Publications.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences (2nd ed.).* Lawrence Erlbaum Associates.

Collier, D., & Evans, J. (2021). *Operations and Supply Chain Management.* Boston: Cengage.

Connor, S. (2004). *The Cambridge Companion to Postmodernism.* Cambridge : Cambridge University Press.

Cornforth, C. (2003). *The governance of public and nonprofit organizations: What do boards do?* . Routledge.

Cosh, A., Xiaolan , F., & Hughes, A. (2012). Organisation structure and innovation performance in different environments. *Small Business Economics*, 301-317.

Council of Supply Chain Management Professionals. (2022, 1 1). *Council of Supply Chain Management Professionals*. Retrieved from Supply Chain Management: https://cscmp.org/CSCMP/Educate/SCM_Definitions_and_Glossary_of_Terms/CSCMP/Educate/SCM_Definitions_and_Glossary_of_Terms.aspx?hkey=d845cf4b-e9f2-4973-95ce-8e6ae2316b8f

Courtney, R. (2002). *Strategic Management for Voluntary Nonprofit Organizations.* London: Routledge.

Cousins, P. (2005). *European welfare states: Comparative perspectives.* Sage.

Coyne, K. (1986). Sustainable competitive advantage—What it is, what it isn't. *Business horizons*, 54-61.

Craig, C. W., Hultb, G., & Ketchen, D. (2009). The effects of innovation–cost strategy, knowledge, and action in the supply chain on firm performance. *Journal of Operations Management*, 405-421.

Cyrus-Lai, W., Tierney, W., Plessis, C., & Nguyen, M. (2022). Avoiding Bias in the Search for Implicit Bias. . *Psychological Inquiry*, 203 - 212.

da Silva, A., Fontana, M., Vidal, R., & Marque, P. (2024). Key performance indicators in humanitarian logistics: A systematic literature review 2010-2020. . *AIP Conference.*

Danese, P., & Romano, P. (2011). Supply chain integration and efficiency performance: a study on the interactions between customer and supplier integration. *Supply Chain Management*, 220-230.

Danese, P., Romano, P., & Marco, F. (2013). The impact of supply chain integration on responsiveness: The moderating effect of using an international supplier network. *Transportation Research Part E: Logistics and Transportation Review*, 125-140.

Day, J., Melnyk, S., Larson, P., & Davis, E. (2012). Humanitarian and disaster relief supply chains. . *Journal of Supply Chain Management*, 21–36.

de Waal, A. G. (2011). The impact of performance management on the results of a non profit organization. *International Journal of Productivity and Performance Management*, 778-796.

Diabat, A., & Govindan, K. (2011). An analysis of the drivers affecting the implementation of green supply chain management. *Resources, Conservation and Recycling*, 659-667.

Dijkzeul, D. (2003). The NGO Scramble: Organizational Insecurity and the Political Economy of Transnational Action. . *International Journal of Voluntary and Nonprofit Organizations*, 1-21.

DiMaggio , P., & Anheier, H. (1990). The Sociology of Nonprofit Organizations and Sectors. *Annual Reviews* , 137-159.

Dodge, Y. (2008). *The Concise Encyclopedia of Statistics.* New York, NY: Springer.

Dodge, Y. (2010). *The Concise Encyclopedia of Statistics.* Springer.

Donaldson, L. (2001). *The Contingency Theory of Organizations.* London: Sage.

Dong-Young, K. (2013). Relationship between supply chain integration and performance. *Operations Management Research*, 74–90.

Drucker, P. (1990). *Managing the Non-Profit Organization.* London: Routledge.

Dubey, R., & Gunasekaran, A. (2016). The sustainable humanitarian supply chain design: agility, adaptability and alignment. *International Journal of Logistics Research and Applications*, 62-82.

Dyer, J., & Singh, H. (1998). The relational view: Cooperative strategy and sources of interorganizational competitive advantage. . *Academy of Management Review*, 660-679.

Eikenberry, A., & Kluver, J. (2004). The marketization of the nonprofit sector: Civil society at risk. *Public Administration Review*, 132–140.

Ekström, M., & Westlund, O. (2019). Epistemology and Journalism. . *Oxford Research Encyclopedia of Communication*, 50-62.

Ellram, L., & Hendrick, T. (1995). Partnering characteristics: A dyadic perspective. *Journal of Business Logistics*, 41-64.

Elo, S., & Kyngäs, H. (2008). The qualitative content analysis process. *Journal of advanced nursing*, 107-122 .

Ertem, M., Aharoni, Y., & Ketter, W. (1476-1493). Collaborative humanitarian relief: The role of partner organizations in refugee crises. *Production and Operations Management*, 2020.

Fahy, J. (2002). A resource-based analysis of sustainable competitive advantage in a global environment. *International Business Review*, 57-77.

Fallahpour, A., Yew Wong, K., & Rajoo, S. (2021). An integrated approach for a sustainable supplier selection based on Industry 4.0 concept. *Collaboration in Value Chain for Life-Cycle and Management of Production*.

Feldmann, M., & Muller, S. (2003). An Incentive Scheme for True Information Providing In Supply Chains. *OMEGA*, 63–73.

Felea, M., & Albastroiu, I. (2013). Defining the Concept of Supply Chain Management. *Amfiteatru Economic Journal*, 74-88.

Fisher, M. (1997). What is the right supply chain for your product? . *Harvard Business Review*, 105–116.

Fitzpatrick, A. (1983). The Meaning of Content Validity. *Applied Psychological Measurement*, 13- 3.

Flynn, B., Huo, B., & Zhao, X. (2010). The impact of supply chain integration on performance:a contingency and configuration approach. *Journal of Operations Management*, 58-71.

Fowler, W. (1997). Empowerment and the entanglements of power. *American Journal of Community Psychology,* , 581-596.

Freeman, R. (1984). *Strategic management: A stakeholder approach.* . Boston: Pitman.

Freije, I., Calle, A., & Ugarte, J. (2022). Role of supply chain integration in the product innovation capability of servitized manufacturing companies. *Technovation*, https://doi.org/10.1016/j.technovation.2020.102216.

Fuller, S. (2001). Positivism, History of. *International Encyclopedia of the Social & Behavioral Sciences*, 619-624.

Garcia, F., Marchetta, M., Camargo, M., Morel, L., & Forradellas, R. (2012). A framework for measuring logistics performance in the wine industry. *International Journal of Production Economics*, 84–298.

Gattorna, J. (2016). *Dynamic Supply Chain Alignment: A New Business Model for Peak Performance in Enterprise Supply Chains Across All Geographies.* London: Routledge.

Gaurav , K., Ramesh, A., & Arshinder, K. (2015). Identification and prioritization of coordination barriers in humanitarian supply chain management. *International Journal of Disaster Risk Reduction*, 128-138.

Gen, M., Lin, L., & Cheng, R. (2008). *Logistics Network Models.* Springer.

Genovese, A., Acquaye, A., Figueroa, A., & Koh, S. (2022). Sustainable supply chain management and the transition towards a circular economy: Evidence and some applications. . *Omega*, 103, 102452. https://doi.org/10.1016/j.omega.2021.102452.

Geyskens, I., Steenkamp, J., & Kumar, N. (2006). Make, buy, or ally: A transaction cost theory meta-analysis. *Academy of management journal*, 519-543.

Ghadge, A., Dani, S., & Kalawsky, R. (2019). Supply chain risk management: present and future scope. . *International Journal of Physical Distribution & Logistics Management*, 63-82.

Gimenez, C., & Ventura, E. (2005). Longistics-production,longistics-marketing and external integration: their impact on performance. *International Journal of Operations & Production Management*, 20-38.

Gonçalves, P., Moshtari, M., Heikkilä, J., & Altay, N. (2021). Procurement in Humanitarian Organizations: Body of Knowledge and Practitioner's Challenges. . *International Journal of Production Economics*, 108017.

Gronbjerg, K. (1994). Using NTEE to classify non-profit organizations: An assessment of human service and regional applications. *Voluntas*, 301-328.

Gulati, R., Wohlgezogen, F., & Zhely, P. (2012). The Two Facets of Collaboration: Cooperation and Coordination in Strategic Alliances. *Academy of Management*, 531–583.

Gunasekaran, A., Patel, C., & McGaughey, R. (2004). A framework for supply chain performance measurement. *International journal of production economics*, 333-347.

Hair, J., Black, W., Babin, B., & Anderson, R. (2019). *Multivariate data analysis (8th ed.)*. Cengage Learning.

Hansmann, H. (1980). The role of nonprofit enterprise. . *Yale Law Journal*, 835–901.

Hashemi, S., Handayanto, E., Masudin, I., Zulfikarijah, F., & Jihadi, M. (2022). The effect of supply chain integration, management commitment and supply chain challenges on non-profit organizations performance: Empirical evidence from Afghanistan. *Cogent Business & Management*, 1-9.

Hashmi, R. (2023). Business Performance Through Government Policies, Green Purchasing, and Reverse Logistics: Business Performance and Green Supply Chain Practices. . *South Asian Journal of Operations and Logistics*, 1-10.

Hausman, W. (2004). Supply chain performance metrics. . *The practice of supply chain management: Where theory and application converge*, 61-73.

Heale, R., & Twycross, A. (2015). Validity and reliability in quantitative studies. *Evidence-Based Nursing*, 66 - 67.

Heaslip, G., & Barber, E. (2014). Using the military in disaster relief: systemising challenges and opportunities. *Journal of Humanitarian Logistics and Supply Chain Management*, 60 - 81.

Hedden, B. (2015). A defense of objectivism about evidential support. *Canadian Journal of Philosophy*, 716 - 743.

Hervani, A., Helms, M., & Sarkis , J. (2005). Performance measurement for green supply chain management. *Benchmarking: An International Journal*, 330-353.

Hofmann, E., & Rüsch, M. (2018). Industry 4.0 and the current status as well as future prospects on logistics. . *Computers in Industry*, 23-34.

Holguín-Veras, J., Jaller, M., Van Wassenhove, L., Pérez, N., & Wachtendorf, T. (2012). On the unique features of post-disaster humanitarian logistics. . *Journal of Operations Management*, 494–506.

Houlihan, J. (1987). International Supply Chain Management. *International Journal of Physical Distribution and Materials Management*, 51-66.

Hove-Sibanda, P., & Pooe, R. (2018)). Enhancing supply chain performance through supply chain practices. *Journal of Transport and Supply Chain Management*, 1-13.

Howden, M. (2009). How Humanitarian Logistics Information Systems Can Improve Humanitarian Supply Chains. *The 6th International ISCRAM Conference.* Gothenburg, Sweden.

Huo, B. (2012). The impact of supply chain integration on company performance: An organizational capability perspective. *Supply Chain Management: An International Journal*, 596 - 610.

Iddekinge, C., Roth, P., Raymark, P., & Odle-Dusse. (2012). The criterion-related validity of integrity tests: an updated meta-analysis. *The Journal of applied psychology*, 499-530.

IFRC. (2019). *Minimum standards for community engagement.* . https://www.ifrc.org/document/minimum-standards-community-engagement: International Federation of Red Cross and Red Crescent Societies. .

International Labour Organization. (2021). *The role of digital labour platforms in transforming the world of work.* https://www.ilo.org/global/research/global-reports/weso/2021/lang--en/index.htm: World employment and social outlook.

International Organization for Standardization. (2023, 1 1). *International Organization for Standardization*. Retrieved from ISO 31000: https://www.iso.org/standard/65694.html

IOM. (2021). *Beneficiary feedback mechanisms in displacement settings.* . https://publications.iom.int/books/beneficiary-feedback-mechanisms-displacement-settings: International Organization for Migration. .

Ivanov, D., Tsipoulanidis, A., & Schönberger, J. (2019). *Global Supply Chain and Operations Management.* Cham, Switzerland: Springer.

Jacobs, R. F., & Chase, R. B. (2018). *Operations and Supply Chain Management.* New York: McGraw Hill.

Jahre, M., & Heigh, I. (2008). Does the current constraints in funding promote failure in humanitarian supply chains? *Supply Chain Forum*, 44-54.

Jahre, M., Jensen, L., & Listou, T. (2016). Theory development in humanitarian logistics. . *Supply Chain Management: An International Journal*, 711–728.

James, G., Witten, D., Hastie, T., & Tibshirani, R. (2021). *An Introduction to Statistical Learning.* Pittsburgh,US: Springer.

Janda, S., Murray, J., & Burton, S. (2002). Manufacturer-supplier relationships. *Industrial Marketing Management*, 411–420.

Jaynie, L., & William, G. (2006). *Creating Competitive Advantage.* United Kingdom: Crown.

Jegers, M. (2008). *Managerial Economics of Non-Profit Organizations.* London: Routledge.

Jones, G. (2013). *Organizational Theory,Design, and Change.* US: Pearson Education Limited.

Juttner, U., Christopher, M., & Baker, S. (2007). Demand chain management integrating marketing and supply chain management. *Industrial Marketing Management*, 377-392.

Kak, A. (2002). Sustainable competitive advantage with core competence: a review. *Global Journal of flexible systems management*, 23-38.

Kallio, H., Pietilä, A., Johnson, M., & Kanga, M. (2016). Systematic methodological review: developing a framework for a qualitative semi-structured interview guide. *Journal of advanced nursing*, 72-84.

Kalyar, M., Shafique, I., & Ahmad, B. (2020). Effect of innovativeness on supply chain integration and performance Investigating the moderating role of environmental uncertainty. *International Journal of Emerging Market*, 362-386.

Kannan, V., & Tan, K. (2010). Supply chain integration: cluster analysis of the impact of span of integration. *Supply Chain Management207-215.*, 207-215.

Kaplan, S., & Garrick, B. (1981). The quantitative definition of risk. *Risk analysis*, 11-27.

Karamouz, S., Ahmadi Kahnali, R., & Ghafournia, M. (2021). Supply chain quality management performance measurement: systematic review. *International Journal of Quality & Reliability Management*, 484-504.

Kauffman, S. (1993). *Origins of order: self organisation and selection in evolution.* Oxford University Press.

Kearns, K. (1994). The Strategic Management of Accountability in Nonprofit Organizations: An Analytical Framework. *Public Administration Review*, 185-192.

Kelly, G., & Licona, P. (2018). Epistemic Practices and Science Education. In G. Kelly, & P. Licona , *History, Philosophy and Science Teaching* (pp. 139-165). Springer.

Kendall, D. (2015). *Sociology in Our Times: The Essentials.* Boston: Cengage Learning.

Kesidou, S., & Sorell, S. (2018). Low-carbon innovation in non-domestic buildings: The importance of supply chain integration. *Energy Research & Social Science*, 195-213.

Kim, D., & Park, H. (2010). The effect of organizational network structure on organizational learning. *The Learning Organization*, 313-330.

Kim, D., Cavusgil, T., & Cavusgil, E. (2013). Does IT alignment between supply chain partners enhance customer value creation? An empirical investigation. *Industrial Marketing Management*, 880-889.

Kim, S. (2006). Effects of supply chain management practices,integration and competition capability on performance. *Supply Chain Management*, 241–248.

Kim, S. (2007). Organizational structures and the performance of supply chain management. . *International Journal of Production Economics*, 323-345.

Koliousis, I., He, Q., Wu, Q., & Sarpong, D. (2020). Using an integrated humanitarian supply chain ERP system to improve refugee flow management: A conceptual framework and validation. . *Production Planning & Control*, 676–691.

Koufteros, X., Rawski, G., & Rupak, R. (2010). Organizational Integration for Product Development: The Effects on Glitches, On-Time Execution of Engineering Change Orders, and Market Success. *Journal of Quality and Service Sciences*, 349-367.

Kovács, G., Tatham, P., & Larson, P. (2012). What skills are needed to be a humanitarian logistician? *Journal of business logistics*, 245-258.

Kowalczyk, A. (2023). *Turkey Earthquakes Hit Global Supply Chains.* https://asstra.com/press-centre/news/2023/2/turkey-earthquakes-hit-global-supply-chains/.

Kumar, C., Garza-Reyes, K., & Arturo, J. (2017). The Impact of Supply Chain Integration on Performance: Evidence from the UK Food Sector. *International Conference on Flexible Automation and Intelligent* , 27-30.

Lambert, D., Emmelhainz, M., & Gardner, J. (1996). Developing and Implementing Supply Chain Partnerships. *The International journal o f Logistics Management*, 1-17.

Lamotta, R. (2017). *Business Management and Organizational Theory.* College Publishing House: NY.

Lapide, l. (2000). What about measuring supply chain performance. *Achieving Supply Chain Excellence Through Technology*, 287-297.

Lapide, L. (2000). What about measuring supply chain performance. . *Achieving Supply Chain Excellence Through Technology*, 287-297.

Larson, P., & Halldorsson, A. (2004). Logistics versus supply chain management: An international survey. *International Journal of Logistics*, 17-31.

Lee, H.-Y., Seo, Y.-J., & Dinwoodie, J. (2016). Supply chain integration and logistics performance: the role of supply chain dynamism. *The International Journal of Logistics Management*, 668-685.

Li , Q., Yan, R., Zhang, L., & Yan, B. (2020). Empirical study on improving international dry port competitiveness based on logistics supply chain integration: evidence from China. *The International Journal of Logistics Management*, 1040-1068.

Libecap, G., & Thursby, M. (2008). Chapter 7 Competitive advantage in technology intensive industries. In F. Rothaermel, *Technological Innovation: Generating Economic Results (Advances in the Study of Entrepreneurship, Innovation and Economic Growth* (pp. 201-225). Bingley: Emerald Group Publishing Limited.

Lin, F., & Shaw, M. (1998). Reengineering the order fulfillment process in supply chain networks. *The International Journal of Flexible Manufacturing Systems*, 197-229.

Linnenluecke, M. (2017). What is resilience?Resilience in business and management research: A review of influential publications and a research agenda. *International journal of management reviews*, 4-30.

Liu, A., Liu, H., & Gu, J. (2021). Linking business model design and operational performance: The mediating role of supply chain integration. *Industrial Marketing Management*, 60–70.

Lu, Q., Goh, M., & Souza, R. (2016). A SCOR framework to measure logistics performance of humanitarian organizations.

MacCallum, R., Widaman, K., Zhang, S., & Hong, S. (1999). Sample size in factor analysis. *Psychological Methods*, 84–99.

Maghsoudi, A., Zailani, S., Ramayah, T., & Paziran, A. (2021). Coordination of efforts in disaster relief supply chains: The moderating role of resource scarcity and redundancy. . *International Journal of Production Economics*, 232-249.

Makepeace, D., Tatham, P., & Wu, Y. (2017). Internal integration in humanitarian supply chain management: perspectives at the logistics-programmes interface. *Journal of Humanitarian Logistics and Supply Chain Management*, 1-37.

Maloni, M., & Benton, W. (1997). Supply chain partnerships: Opportunities for operations research. *European Journal of Operational Research*, 419-429.

Manning, K. (2017). *Organizational theory in higher education.* Routledge.

Markley, M., & Davis, L. (2007). Exploring future competitive advantage through sustainable supply chains. *International Journal of Physical Distribution & Logistics Management* , 763-774.

Martinelli, E., & Tunisini, A. (2019). Customer integration into supply chains: literature review and research propositions. *Journal of Business & Industrial Marketing*, 24-38.

Melnyk, S., & Swink, M. (2002). *Supply Chain Structure and Strategy.* Irwin: McGraw-Hill.

Mentzer, J. T. (2004). *Fundamentals of Supply Chain Management: Twelve Drivers of Competitive Advantage.* SAGE Publications, Inc.

Mhelembe, K., & Mafini, C. (2019). Modelling the link between supply chain risk, flexibility and performance in the public sector. . *South African Journal of Economic and Management Sciences*, 1-12.

Miller, W., Crabtree, B., & McDaniel, R. (1998). Understanding Change in Primary Care Practice Using Complexity Theory. *The Journal of Family Practice*, 369-376.

Min, S., Zacharia, Z., & Smi, C. (2019). Defining Supply Chain Management: In the Past, Present, and Future. *Journal of Business Logistics*, 1-12.

Munir, M., Jajja, M., Chatha, K., & Farooq, S. (2020). Supply chain risk management and operational performance: The enabling role of supply chain integration. *International Journal of Production Economics*, https://doi.org/10.1016/j.ijpe.2020.107667.

Nassos, G., & Avlonas, N. (2020). *Practical Sustainability Strategies: How to Gain a Competitive Advantage.* USA: Wiley.

Naylor, B., Naim, M., & Berry, D. (1999). Leagility: integrating the lean and agile manufacturing paradigms in the total supply chain. *International Journal of Production Economics*, 107-18.

Nielsen, B. (2014). Imperatives and Trade-Offs for the Humanitarian Designer: Off-Grid Energy for Humanitarian Relief. *Journal of Sustainable Development*, 15-24.

Nikbakhsh, E., & Farahani, R. (2011). *Humanitarian Logistics Planning. Logistics operations and management: Concepts and models.* Kingston.

Nikolaos , A., & Stergiou, K. (2022). Development of a retail supply chain process reference model incorporating Lean Six Sigma initiatives. *International Journal of Lean Six Sigma*.

Nunes, A., Monteiro, P., & Nunes, A. (2020). Factor structure of the convergence insufficiency symptom survey questionnaire. *PLOS ONE*.

Nurmala, N., Leeuw, S., & Dullaert, W. (2017). Humanitarian–business partnerships in managing humanitarian logistics. . *Supply Chain Management*, 82-94.

Nyamu, T. (2012). *Impact of Supply Chain Management Challenges on Humanitarian Organizations in Kenya.* Nairobi: The University of Nairobi.

O'Leary-Kelly, S., & B.E., F. (2002). The ıntegration of manufacturing and marketing/sales decisions: Impact on organizational performance. *Journal of Operations Management*, 221-240.

OCHA. (2015). *Shrinking the Supply Chain, OCHA POLICY AND STUDIES SERIES.* United Nations Office for the Coordination of Humanitarian Affairs (OCHA).

Odhiambo, M., & Kihara, A. (2018). Effect of inventory management practices on supply chain performance of government health facilities in Kisumu county in Kenya. Journal of International Business, . *Innovation and Strategic Management*, 145-166.

Oliver, R., & Webber, M. (1982). *Supply-chain management.* London: Chapman & Hall.

Oloruntoba, R., & Gray, R. (2009). Customer service in emergency relief chains. *International Journal of Physical Distribution & Logistics Management*, 486-505.

Orton-Johnson, K. (2010). Ethics in Online Research; Evaluating the ESRC Framework for Research Ethics Categorisation of Risk. . *Sociological Research Online*, 126 - 130.

Overstreet, R., Hall, D., Hanna, J., & Kelly Rainer, R. (2011). Research in humanitarian logistics. *Journal of Humanitarian Logistics and Supply Chain Management*, 114-131.

Paciarotti, C., Piotrowicz, W., & Fenton, G. (2021). Humanitarian logistics and supply chain standards. Literature review and view from practice. . *Journal of Humanitarian Logistics and Supply Chain Management*, 40-51.

Pagell, M. (2004). Understanding the Factors That Enable and Inhibit the Integration of Operations, Purchasing and Logistics. *Journal of Operations Management*, 459-487.

Park, Y., Konge, L., & Artino, A. (2019). The Positivism Paradigm of Research. *Academic Medicine*, 690 - 694.

Paulsson, U. (2004). Supply chain risk management. In C. Brindley, *Supply chain risk* (pp. 79-96). London: Routledge.

Peachey, S., Barca, V., & Fidalgo, L. (2018). The state of evidence on humanitarian cash transfers. . *Overseas Development Institute.* , https://www.calpnetwork.org/publication/the-state-of-evidence-on-humanitarian-cash-transfers/.

Pedraza-Martinez, A., & Van Wassenhove, L. (2013). Vehicle replacement in the International Committee of the Red Cross. . *Production and Operations Management*, 365-376.

Pinto, J., & Diemer, A. (2020). Supply chain integration strategies and circularity in the European steel industry. *Resources, Conservation & Recycling*, https://doi.org/10.1016/j.resconrec.2019.104517.

Polater, A. (2020). Dynamic capabilities in humanitarian supply chain management: a systematic literature review.

Prabir , K., Byoung , C., & Tage , S.□L. (2005). Supply chain integration: a European survey. *The International Journal of Logistics Management*, 275-294.

Prajogo, D., & Olhager, J. (2012). Supply chain integration and performance: The effects of long-term relationships, information technology and sharing, and logistics integration. *International Journal of Production Economics*, 514-522.

Prajogo, D., Chowdhury, M., Yeung, A., & Cheng, T. (2012). The relationship between supplier management and firm's operational performance: A multi-dimensional perspective. *International Journal of Production Economics*, 123-130.

Proulx, K., Hager, M., & Klein , K. (2014). Models of collaboration between nonprofit organizations. *International Journal of Productivity and Performance Management*, 746-765.

Putnam, R. (2000). *Bowling alone: The collapse and revival of American community.* . Simon & Schuster.

Queiroz, M., Renato, T., & Silvia , H. (2020). Blockchain and supply chain management integration: a systematic review of the literature. *Supply chain management: An international journal*, 241-254.

Rai, A., Patnayakuni, R., & Seth, N. (2006). Firm Performance Impacts of Digitally Enabled Supply Chain Integration Capabilities. *MIS Quarterly*, 225-246.

Ramanathan, U. (2014). Performance of supply chain collaboration–A simulation study. . *Expert Systems with Applications*, 210-220.

Reimann, F., Kosmol, T., & Kaufmann, L. (2017). Responses to supplier-induced disruptions:A fuzzy-set analysis. . *Journal of Supply Chain Management*, 37–66.

Rietjens, S. (2008). *Civil-Military Cooperation in Response to a Complex Emergency: Just Another Drill?* International Studies in Sociology and Social Anthropology.

Robbins , S., & Judge , T. (2005). *Organizational Behavior.* Pearson College Div.

Robbins, S., & Coulter, M. (2012). *Management.* Boston: Pearson.

Rodríguez-Espíndola, O., Chowdhury, S., & Beltagui, A. (2022). The role of local participation in humanitarian supply chains. . *Production and Operations Management*, 1567-1585.

Ross, D. (2016). *Introduction to supply chain management technologies* . CRC Press.

Rudd, J. (2021). *A Practical Guide to Logistics: An Introduction to Transport, Warehousing, Trade, and Distribution.* Jakarta: INFO BUKU.

Ryfman, P. (2007). Non-governmental organizations: an indispensable player of humanitarian aid. *International Review of the Red Cross*, 21-45.

S. , P., & Chalmeta, R. (2014). A guide for supply chain ıntegration in SMEs. Production Planning and Control. . *Journal of Operations Management*, 372–400.

Saad, G., & Kleindorfer, P. (2005). Managing disruption risks in supply chains . *Production and Operations Management*, 53-68.

Salamon , L., & Anheier , H. (1996). *The International Classification of Nonprofit Organizations.* Maryland: The Johns Hopkins University Institute for Policy Studies.

Salamon, L., & Anheier, H. (1997). *Defining the Nonprofit Sector: A Cross-national Analysis.* Manchester : Manchester University Press.

Saleheen, F., & Habib, M. (2022). Supply Chain Performance Measurement Models: A Comparative Study. *International Journal of Supply Chain Management*, 11-74.

Sample size calculator. (2022, 05 15). *Sample size calculator*. Retrieved from https://www.calculator.net/sample-size-calculator.html?type=1&cl=95&ci=5&pp=50&ps=5000&x=0&y=0

Sanders, N. (2016). How to Use Big Data to Drive Your Supply Chain. *California Management Review*, 26-48.

Sawhill, J., & Williamson, D. (2001). Mission impossible? Measuring success in nonprofit organizations. . *Nonprofit Management & Leadership*, 371–386.

Schaltegger, S., & Burritt, R. (2014). Measuring and managing sustainability performance of supply chains: Review and sustainability supply chain management framework. . *Supply Chain Management: An International Journal*, 232-241.

Schiff, J., & Weisbrod, B. (1991). Competition between for□profit and nonprofit organizations in commercial markets. *Annals of public and cooperative economics* , 619-640.

Schliephake, K., Stevens, G., & Clay, S. (2009). Making resources work more efficiently – the importance of supply chain partnerships. *Journal of Cleaner Production*, 1257-1263.

Schoenherr, T., & Swink, M. (2012). Revisiting the arcs of integration: Cross-validations and extensions. *Journal of Operations Management*, 99-115.

Scholten, K., & Schilder, S. (2015). The role of collaboration in supply chain resilience. . *Supply Chain Management: An International Journal*, 471-484.

Schulz, S., & Blecken, A. (2010). Horizontal cooperation in disaster relief logistics: benefits and impediments. *International Journal of Physical Distribution & Logistics Management*, 636-656.

Scott, C., & Westbrook, R. (1991). New Strategic Tools for Supply Chain Management. *International Journal of Physical Distribution & Logistics*, 23-33.

Selomo, M., & Govender, K. (2016). Procurement and Supply Chain Management in government institutions: A case study of select departments in the Limpopo Province, South Africa. . *Dutch Journal of Finance and Management*, 37-47.

Seo, Y.-J., Dinwoodie, J., & Kwak, D.-W. (2014). The impact of innovativeness on supply chain performance: is supply chain integration a missing link? *Supply Chain Management*, 733-746.

Shaw, S., Grant, D., & Mangan, J. (2010). Developing environmental supply chain performance measures. *International Journal, Vol. 17 No. 3*, 320-339.

Shrestha, N. (2020). Detecting Multicollinearity in Regression Analysis. *American Journal of Applied Mathematics and Statistics*, 39-42.

Simchi-Levi, D., Kaminsky, P., & Simchi-Levi, E. (2003). *Designing and Managing the Supply Chain.* London: McGraw-Hill.

Sodhi, M., & Tang, C. (2021). Supply chain management for extreme conditions: Research opportunities. . *Journal of Supply Chain Management*, 7-16.

Son, B.-G., Roscoe, S., & Sodhi, M. (2024). Dynamic capabilities of global and local humanitarian organizations with emergency response and long-term development missions. *International Journal of Operations & Production Management* , 45-59.

Spekman, R., kammuf, J., & Myhr, N. (1998). An empirical investigation into supply chain management: a perspective on partnerships. *Supply Chain Management: An International Journal*, 53-67.

Sphere Association. (2018). *The Sphere Handbook: Humanitarian charter and minimum standards in humanitarian response (4th ed.).* . https://spherestandards.org/handbook/: Sphere Association.

Stanley, L., & Wise, S. (2010). The ESRC's 2010 Framework for Research Ethics: Fit for Research Purpose? *Sociological Research Online*, 106- 115.

Stevens, G. (1989). Integrating the Supply Chain. *International Journal of Physical Distribution & Materials Management*, 3-8.

Stewart, G. (1997). Supply-chain operations reference model. *Logistics Information Management, 10*, 62 - 67.

Stock, J., & Boyer, S. (2009). Developing a consensus definition of supply chain management: a qualitative study. *International Journal of Physical Distribution & Logistics Management*, 690-711.

Stone, C. (2019). A Defense and Definition of Construct Validity in Psychology. . *Philosophy of Science*, 1250-1261.

Sukati, I., Hamid, A., Baharun, R., & Yusoff, R. (2012). The study of supply chain management strategy and practices on supply chain performance. . *Procedia-Social and Behavioral Sciences*, 225-233.

Sweeney, E. (2007). *Perspectives on Supply Chain Management and Logistics.* Dublin: Blackhall Publishing.

Swink, M., Narasimhan, R., & Wang, C. (2007). Managing beyond the factory walls: Effects of four types of strategic integration on manufacturing plant performance. *Journal of Operations Management*, 148-164.

Szulanski, G. (1996). Exploring internal stickiness: impediments to the transfer of best practice within the firm. *Strategic Management Journal*, 27–43.

Taber, K. (2018). The Use of Cronbach's Alpha When Developing and Reporting Research Instruments in Science Education. . *Res Sci Educ 48*, 1273–1296.

Tan, K., Kannan, V., & Handfield, R. (1998). Supply Chain Management: Supplier Performance and Firm Performance. *International Journal of Purchasing and Materials Management*, 2-9.

Tang, O., & Musa, N. (2011). Identifying risk issues and research advancements in supply chain risk management. *International Journal of Production Economics*, 25–34.

Tatham, P., & Houghton, L. (2011). The wicked problem of humanitarian logistics and disaster relief aid : Meeting the challenge of preparing for and responding to disasters. In C. Christopher, & P. Tatham, *Humanitarian logistics* (pp. 15–44). Kogan.

Tatham, P., & Pettit, S. (2010). Transforming humanitarian logistics: The journey to supply network management. . *International Journal of Physical Distribution & Logistics Management*, 609–622.

Teece, D. (2007). Explicating dynamic capabilities. *Strategic Management Journal*, 1319–1350.

Telford, J., & Cosgrave, J. (2007). The international humanitarian system and the 2004 Indian Ocean earthquake and tsunamis. . *Disasters*, 1–28.

The United Nations Global Compact. (2008). *The United Nations and private sector.* United Nations: The United Nations Global Compact.

Tian, M., Huo, B., Park, Y., & Kang, M. (2021). Enablers of supply chain integration: a technology organization-environment view. *Industrial Management & Data Systems*, 871-1895.

Tobias, S., & Carlson, J. (1969). BRIEF REPORT: BARTLETT'S TEST OF SPHERICITY AND CHANCE FINDINGS IN FACTOR ANALYSIS. *Multivariate behavioral research*, 375-382.

Tomasini, R., & Van Wassenhove, L. (2009). *Humanitarian logistics.* Springer.

Trkman, P., Indihar , S., & Jaklic, J. (2007). Process approach to supply chain integration. . *Supply chain management: international journal*, 116-128.

Tuckman, H. (1998). Competition, commercialization, and the evolution of nonprofit organizational structures. *Spring* , 175-194.

Turkishmaritime. (2024, 1 3). Retrieved from http://www.turkishmaritime.com.tr/

Turner, S. (1979). The concept of face validity. *Quality and Quantity*, 85-90.

Ulrich, D., & Lake, D. (1991). Organizational capability: creating competitive advantage. *Academy of Management*, 77-92 .

UNHCR. (2022). *Global report on community-based protection.* https://reporting.unhcr.org/globalreport2022: United Nations High Commissioner for Refugees.

unicef. (2022, 1 1). Retrieved from unicef: https://www.unicef.org/nigeria/press-releases/nigeria-delays-and-shortages-disrupt-unicef-supported-vaccination-campaigns

United Nations. (1996). United Nations Decade for Human Rights Education (1995-2004). *General Assembly resolution* (p. 51/240). UN: . Retrieved from https://www.ohchr.org/en/professionalinterest/pages/decade.aspx.

United Nations. (2022, 12 10). Retrieved from United Nations: https://www.un.org/en/about-us/

UNRWA. (2021). *Annual Operational Report.* Amman: UNRWA.

UNRWA. (2021). *Health programme.* Retrieved from UNRWA: https://www.unrwa.org/sites/default/files/content/resources/unrwa_health_programme_2021_eng.pdf

UNRWA. (2022, 12 10). *UNRWA*. Retrieved from UNRWA: www.UNRWA.org

UNRWA. (2023, 12 26). *www.unrwa.org/what-we-do/education*. Retrieved from www.unrwa.org/what-we-do/education: www.unrwa.org/what-we-do/education

UNRWA. (2023, 12 26). *www.unrwa.org/what-we-do/relief-social-services*. Retrieved from www.unrwa.org/what-we-do/relief-social-services: www.unrwa.org/what-we-do/relief-social-services

Vafaei-Zadeh, A., Ramayah, T., Hanifah, H., & Kurnia, S. (2020). Supply chain information integration and its impact on the operational performance of manufacturing firms in Malaysia. *Information & Management*, https://doi.org/10.1016/j.im.2020.103386.

Van Looy, A., & Shafagatova, A. (2016). Business process performance measurement: a structured literature review of indicators, measures and metrics. . *SpringerPlus*, 5(1), 1797.

Van Wassenhove, L. (2006). Humanitarian aid logistics: Supply chain management in high gear. . *Journal of the Operational Research Society*, 475-489.

Vargo, S., & Lusch, R. (2004). Evolving to a new dominant logic for marketing. . *Journal of Marketing*, 1–17.

Vega, D., & Roussat, C. (2015). Humanitarian supply chains and cross-sector cooperation: . *The case of Haiti. Disasters*, 41-49.

Vickery, S., Jayaram, J., Cornelia, D., & Calantone, R. (2003). The effects of an integrative supply chain strategy on customer service and financial performance: an analysis of direct versus indirect relationships. *Journal of Operations Management*, 523-539.

Vink, J., Koskela-Huotari, K., & Tronvoll, B. (2020). Service ecosystem design: Propositions, process model, and future research agenda. *Journal of Service Research*, 168–186.

Visser, J., Steytler, N., & Machingau, N. (2010). *Local government reform in Zimbabwe:A policy dialogue.* Bellville: Community Law Centre,University of the Western Cape.

Voldrich, S., Wieser, P., & Zufferey, N. (2020). Optimizing the trade-off between performance measures and operational risk in a food supply chain environment. . *Soft Computing*, 3365-3378.

Wantao, Y., Mark , A., David , S., & Harvey, E. (2013). The effects of supply chain integration on customer satisfaction and financial performance: An organizational learning perspective. *International Journal of Production Economics*, 346-358.

Welc, J., & Esquerdo, P. (2017). *Basics of Regression Models.* Springer.

WFP. (2013). *Managing the Supply Chain of Specialized Nutritious Foods.* Rome: World Food Programme.

WFP. (2022, 01 01). Retrieved from WFP: https://www.wfp.org/news/news-release/air-drops-and-land-convoys-wfp-scaling-meet-needs-yemen

WFP. (2025). *Evaluation of WFP's Corporate Emergency Response to the Sudan Regional Crisis.* ReliefWeb.

WHO. (2020, 03 03). *WHO*. Retrieved from WHO: https://www.who.int/news-room/detail/03-03-2020-shortage-of-personal-protective-equipment-endangering-health-workers-worldwide

Wiengarten, F., Pagell, M., & Fynes, B. (2015). The importance of contextual factors in the success of outsourcing practices: A study of the German automotive industry. *International Journal of Production Research*, 3437-3451.

Wilhelm, M. (2011). Managing coopetition through horizontal supply chain relations: Linking dyadic and network levels of analysis. *Journal of Operations Management*, 663-676.

Wong, W., Sinnandavar, C., & Soh, K.-L. (2021). The relationship between supply environment, supply chain integration and operational performance: The role of business process in curbing opportunistic behaviour. *International Journal of Production Economics*, https://doi.org/10.1016/j.ijpe.2020.107966.

World Bank. (2021). *Community-driven development in post-disaster recovery.* . https://www.worldbank.org/en/topic/communitydrivendevelopment: World Bank Group. .

Xiang, X., & Zhou, X. (2021). Connecting for good: a case of NSO-NPOs partnership in China. *Asia Pacific Journal of Social Work and Development*, 79-95.

Yinan, Q., Zhao, X., & Sheu, C. (2011). The Impact of Competitive Strategy and Supply Chain Strategy on Business Performance: The Role of Environmental Uncertainty. *International Journal of Production Economics*, 371-389.

Yuen, K., & Thai, V. (2017). The influence of supply chain integration on operational performance. *The International Journal of Logistics Management*, 444-463.

Zairi, M., & Sinclair, D. (1995). Business process re□engineering and process management: a survey of current practice and future trends in integrated management. *Management Decision*, 3-16.

Zhu, Q., Geng, Y., & Lai, K. (2010). Circular economy practices among Chinese manufacturers varying in environmental-oriented supply chain cooperation and the performance implications. *Journal of Environmental Management*, 1324-1331.

Zijm, H., Klumpp, M., & Regattieri, A. (2019). *Operations, Logistics and Supply Chain Management.* Singapore: Springer.

Zsidisin, G., & Smith, M. (2005). Managing supply risk with early supplier involvement: a case study and research propositions . *Journal of supply chain management*, 44-57.

APPENDICES

APPENDIX 1: QUESTIONNAIRE

The Impact of Supply Chain Integration on Performance of the humanitarian organizations

Dear Esteemed Participants,

Thank you for participating in our survey investigating "The Impact of Supply Chain Integration on the Performance of Humanitarian Organizations," with a focus on the case study of UNRWA (United Nations Relief and Works Agency for Palestine Refugees).

This PHD study seeks to comprehend the influence of integrating the elements of supply chain on the performance of humanitarian organizations' supply chain, using UNRWA as a case study. By delving into the intricate dynamics of supply chain integration, we aim to identify key insights that can enhance the efficiency and effectiveness of humanitarian supply chain.

The survey explores various facets of supply chain integration, emphasizing its impact on UNRWA's overall supply chain performance. We delve into beneficiary integration, supplier integration, government and political stakeholder integration, partner organization integration, and internal integration.

Employing a mixed-method approach, this research incorporates both qualitative and quantitative methods to rigorously examine and validate our hypotheses. Your candid responses will play a pivotal role in shaping the findings of this study.

We anticipate that the findings will contribute significantly to the discourse on humanitarian supply chain management, providing valuable insights for both UNRWA and broader humanitarian contexts. By understanding the impact of

integration, we aim to propose recommendations that can enhance the organization's overall supply chain performance.

Your thoughtful responses are instrumental in advancing our understanding of supply chain dynamics within the humanitarian sector. We appreciate your time and commitment to this research, as it contributes to the ongoing improvement of humanitarian operations.

Thank you for being an integral part of this study.

Sincerely, Monther

Quantitative Survey: Supply Chain Integration and Performance

Please respond to the following questions using the scale below: 1 = Strongly Disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly Agree

Section 1: Beneficiary Integration

B1. Information Sharing

1. How timely is the information shared between beneficiaries and your organization?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
2. How accurate is the information shared between beneficiaries and your organization?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
3. How complete is the information shared between beneficiaries and your organization?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
4. How adequate is the information shared between beneficiaries and your organization?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
5. How reliable is the information shared between beneficiaries and your organization?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

B2. Developing Collaboration Approaches
6. To what extent is your organization developing effective collaboration approaches

with its beneficiaries?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

B3. Joint Decision-Making
7. Does your organization make programmatic decisions jointly with beneficiaries?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

B4. Customized Services
8. How well does your organization customize its services based on feedback from beneficiaries?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Section 2: Supplier Integration

S1. Information Sharing
9. How timely is the information shared between suppliers and your organization?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

10. How accurate is the information shared between suppliers and your organization?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
11. How complete is the information shared between suppliers and your organization?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
12. How adequate is the information shared between suppliers and your organization?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
13. How reliable is the information shared between suppliers and your organization?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

S2. Developing Collaboration Approaches
14. To what extent is your organization developing effective collaboration approaches with its suppliers?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

S3. System Coupling with Key Suppliers
15. Does your organization integrate its systems and processes with key suppliers?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

S4. Joint Decision-Making
16. Does your organization make programmatic decisions jointly with its suppliers?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Section 3: Government and Political Stakeholder Integration

G1. Joint Strategic Planning

17. To what extent does your organization conduct strategic planning jointly with local governments?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

G2. Joint Project Inception

18. Does your organization establish new projects in collaboration with local governments?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

G3. Information Sharing

19. How timely is the information shared between local governments and your organization?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

20. How accurate is the information shared between local governments and your organization?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

21. How complete is the information shared between local governments and your organization?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

22. How adequate is the information shared between local governments and your organization?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

23. How reliable is the information shared between local governments and your organization?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Section 4: Partner Organization Integration

P1. Joint Strategic Planning

24. To what extent does your organization conduct strategic planning jointly with its partner organizations?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

P2. Information Sharing

25. How timely is the information shared between your partner organizations and your organization?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

26. How accurate is the information shared between your partner organizations and your organization?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

27. How complete is the information shared between your partner organizations and your organization?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

28. How adequate is the information shared between your partner organizations and your organization?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

29. How reliable is the information shared between your partner organizations and your organization?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Section 5: Internal Integration

I1. Information Sharing Across Departments

30. How responsive is your organization in meeting the needs of other departments?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

31. How well integrated is the system across functional areas like procurement, inventory, sales, and distribution in your organization?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

32. How well does information flow across production, warehousing, and transportation departments?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

I2. Joint Decision-Making

33. Does your organization collaborate in making programmatic decisions across all internal business units?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

I3. Innovativeness

34. How often does your organization try out new ideas in its supply chain operations?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

35. How actively does your organization explore new ways of operating within the supply chain?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

36. How creative is your organization in its supply chain methods and in introducing new processes?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

I4. Cross-Functional Teams in Process Improvement

37. How effective is cross-functional collaboration in improving processes within your organization?
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Section 6: Supply Chain Performance

T1. Lead Time

38. How accurately does your organization ensure the service lead time in its supply chain operations?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

F1. Flexibility

39. How well does your organization offer customizable services that allow for tailored solutions to meet beneficiaries' needs?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

40. How effectively can your organization respond to an unplanned 20% increase in demand without incurring service or cost penalties?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

APPENDIX 2: ETHICS COMMITTEE'S DECISION

T.C.
FMV IŞIK ÜNİVERSİTESİ
Etik Kurul

Sayı : E-32760440-050.04-44696 17.12.2024 Konu : Monther ALAFF'a ait Etik Kurul Kararı

İLGİLİ MAKAMA

Lisansüstü Eğitim Enstitüsü Müdürlüğü'nün, Çağdaş İşletme Yönetimi Bölümü Doktora Programına kayıtlı olan Monther ALAFF'a ait "The Impact of Supply Chain Integration on Performance in The Humanitarian Organizations" başlıklı tez çalışması 05.12.2024 tarih ve 2024/13 sayılı Etik Kurul Komisyon Toplantısında görüşülerek 09 No.lu karar uyarınca etik açıdan uygun bulunmuştur.

Gereği için bilgilerinize arz/rica ederim.

Prof. Dr. Adnan UZUN
Kurul Başkanı

KARAR:

9. Lisansüstü Eğitim Enstitüsü Müdürlüğü'nün, 27.11.2024 tarihli ve 44145 sayılı yazısı görüşüldü. Çağdaş İşletme Yönetimi Bölümü Doktora Programına kayıtlı olan numaralı Monther ALAFF'a ait "The Impact of Supply Chain Integration on Performance in The Humanitarian Organizations" başlıklı tez çalışması kurulumuz tarafından yapılan incelemeler sonucunda katılımcıların risklerinin bulunmadığı, çalışmada savunmasız herhangi bir katılımcının bulunmadığı, katılımcıların gönüllü olarak çalışmalarda yer aldıklarını belirten bilgilendirilmiş onay formların düzenlendiği, katılımcıların gizlilik ilkesine uygun olarak bilgi ve verilerinin korunduğu, kimlik bilgilerinin saklı tutularak bulguların sadece bilimsel amaçla ve toplum yararı için kullanılacağının açıklandığı görülmüş olup etik açıdan ekte belirtilen şekilde uygun olduğuna **oy birliği ile karar verildi. (EK-9)**

Prof.Dr. Adnan UZUN
Kurul Başkanı