An investigation of the development of soft skills required for health supply chain practice in developing economies.

CHINDOVE, S.

2024

AN INVESTIGATION OF THE DEVELOPMENT OF SOFT SKILLS REQUIRED FOR HEALTH SUPPLY CHAIN PRACTICE IN DEVELOPING ECONOMIES

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B. Pharmacy, MPH, MSc

A thesis submitted in partial fulfilment of
the requirements of
Robert Gordon University
for the degree of Doctor of Business Administration

November 2024

ABSTRACT

Soft skills, also referred to as non-technical skills, are becoming increasingly important in today's business environment. The focus now is on developing a well-rounded workforce with a blend of soft and technical skills to be better equipped to handle the complexities of the real world. However, there has been a tendency in developing economies to prioritise technical skill development, particularly in health supply chains. This research addresses this gap by examining the significance of soft skills in health supply chain performance and exploring the factors contributing to soft skill development in resource-limited environments.

The research consists of a literature review of the soft skills most relevant to supply chain practice. It explores the effect of learning and work-related practices on developing skills in health supply chain management. A sequential combination of qualitative and quantitative methods was employed across four empirical studies to gain a comprehensive understanding of the experiences of employers and the health supply chain workforce. The first study analysed health supply chain job advertisements using a mixed methods approach to identify employers' soft skill requirements. In the second study, a modified two-stage Delphi survey with a panel of health supply chain experts was conducted to determine consensus (or not) of the soft skills required for health supply chain practice. The third study employed partial least square-structural equation modelling to test the research conceptual model and research hypotheses using responses gathered through an online survey of the health supply chain workforce. Lastly, in study four, semi-structured interviews were conducted with a purposively selected sample of health supply chain professionals to gain in-depth insights into developing soft skills.

The investigation identified ten soft skill categories (*entrepreneurial mindset, communication, leadership, flexibility, self-management, teamwork, relationship management*, *result-oriented, sense of duty, and negotiation*) that are essential for success in health supply chain practice. However, the findings show that limited exposure to soft skill development during

undergraduate training is due to deficiencies in the supply chain curricula and a lack of adequate strategies to contextualise existing soft skill development programs to the contexts of health supply chains in developing economies. This means that efforts to address soft skill gaps primarily focus on employee-led and on-the-job initiatives. The findings suggest that an individual's motivation is influenced by their work environment, and social practices, and indirectly affects their development of soft skills and workforce performance.

This research illuminates the significance of soft skills in recruitment within the current job market. It offers valuable insights for managers and policymakers to consider when revising focus areas for soft skill development in current and upcoming investments. Furthermore, the research draws attention to the perceived changes in the relative importance of soft skills as a result of global events such as COVID-19. These findings have essential implications for managers, practice, policy, and theory, and suggest areas for future research to further advance our understanding of soft skill development in the context of supply chain practice.

Keywords: soft skills, health supply chain, workforce, developing economies, supply chain practice

DECLARATION

An investigation of the development of soft skills required for health supply chain practice in developing economies

To the best of my knowledge, this is entirely my work, and where any material points to the ideas of others, it is fully cited and referenced with appropriate acknowledgements given.

STANLEY CHINDOVE

October 2024

ACKNOWLEDGEMENTS

I would like to express my sincere appreciation to my supervisory team, which includes my principal supervisor Professor Rhona Flin, my second supervisor Dr Moira Nikodem, Professor Heather Fulford (former principal supervisor and DBA Director), and Dr Ama Lawal (former second supervisor). I am indebted to you for your invaluable insights, constructive advice, and practical guidance throughout this journey.

I also want to extend my heartfelt thanks to all the research participants from across the world who took the time to participate in this research project. Your insights and experiences were crucial to the success of this project, and I am grateful for your support. I would also like to thank IAPHL for providing a platform to reach out to the health supply chain community worldwide.

My sincere gratitude goes to my wife and children. I am grateful to my children, Anesu and Farirai for your patience and understanding throughout this long journey. To my wife, Noreen, who was always available to listen to me, review my drafts and share valuable suggestions. Thank you for your unwavering support, and for keeping me going when the journey was challenging.

I would also like to thank my colleagues in health supply chain management with whom I have exchanged thoughts on skill development. Your encouragement and support gave me the confidence to pursue this project. A special thanks to Dr Andrew Brown for sharing useful resources and engaging in thoughtful discussions related to this project.

Finally, I want to extend my heartfelt thanks to the staff at RGU Graduate School and Aberdeen Business School for all their support throughout this journey. I would like to give special thanks to Alison Orellana, Nick Anderson, and Dr Omaima Hassan for the coordination and support that they provided during this journey.

LIST OF ACRONYMS

ASCM	Association for Supply Chain Management
AI	Artificial Intelligence
AVE	Average Variance Extracted
CHAI	Clinton Health Access Initiative
COVID-19	Coronavirus Disease 2019
CR	Composite Reliability
DBA	Doctor Business of Administration
DCV	Dynamic Capability View
EI	Emotional Intelligence
FHI360	Family Health International 360
FIP	International Federation of Pharmacy
GDPR	General Data Protection Regulation
GNI	Gross National Income
HTMT	Heterotrait–Monotrait Ratio
I4.0	Industry Revolution 4.0
IAPHL	International Association of Public Health Logisticians
ICCM	Integrated Community Case Management
IPR	Inter-Percentile Range
ISL	In-Service Learning
IQ	Intelligent Quotient
JIT	Just in Time
JSI	John Snow Inc
KBV	Knowledge-based View
KMO	Kaiser-Meyer-Olkin
KSA	Knowledge, Skills and Abilities
LMIC	Low-and Middle-Income Country
MSH	Management Science for Health

NTS	Non-Technical Skills
OECD	Organisation of Economic Co-operation and Development
OSA	On-Shelf Availability
PBV	Practice-based View
PSL	Pre-Service Learning
PtD	People that Deliver
RBV	Resource-based View
RTRC	Regional Training Reference Centres
SAPICS	South African Production and Inventory Control Society
SDG	Sustainable Development Goals
SEM	Structural Equation Modelling
UN	United Nations
UNIDO	United Nations Industrial Development Organisation
VIF	Variance Inflation Factor
WHO	World Health Organisation

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER ONE: INTRODUCTION

1.1. Introduction

Equipping the workforce with the right mix of technical and non-technical skills (NTS) is considered critical to ensuring the workforce is ready for real-world complexities (Lamri and Lubart, 2023; Cannella et al., 2018). In general, skill refers to the norms, techniques, attitudes and abilities that the workforce acquires and readily uses appropriately in executing professional functions (Aranda et al., 2022, p.2). The strategies for the future of work focus more on the importance of NTS. However, supply chain management research has focused more on technical skills, with limited research on the development of NTS. The latter are also commonly referred to as soft skills or people skills. Briefly, they denote personal and interpersonal abilities that are essential in the workplace and facilitate the optimisation of performance (Fletcher and Kristen, 2023; Polakova et al., 2023). The distinction between technical and NTS (soft skills) will be further elaborated in section 1.5. For the remainder of the thesis, the term ‘soft skills’ will be used to denote NTS because it is the term that is widely used in the field of supply chain management.

1.2. Background to the research

1.2.1. Importance of health supply chains and the workforce to health systems

A well-functioning supply chain and a skilled and motivated health workforce are critical components of health system performance (Jbaily et al, 2020; Seidman and Atun, 2017). They form part of the building blocks outlined in the WHO framework for health system strengthening (WHO, 2007). These components combined with other building blocks, which include leadership and governance; health financing; health information system and service delivery, to drive the health systems strengthening agenda to achieve universal health coverage, reduce morbidity, and mortality and improve quality of life (WHO, 2010).

The health systems strengthening agenda is aligned with the Sustainable Development Goals (SDGs) or the 2030 Agenda for Sustainable Development, which were adopted by the 193 member states of the United Nations (UN). The seventeen SDGs generally seek to foster changes that strengthen systems to create a sustainable and resilient future for all (UN, 2016). Health supply chain management is denoted as a critical component of the SDGs. Specifically, SDG 3.8 focuses on essential health services and health supply chain management to ensure quality and affordable essential health products are accessible to all (WHO, 2022). Thus, health supply chain management and the health workforce are critical components towards the goal of achieving SDG 3.8. In addition, the importance of health supply chain systems in the health system is emphasised by its recognition as one of the resource-intensive building blocks for health system strengthening efforts in developing economies (Witter et al., 2019; Beaman et al., 2018; Stenberg et al., 2017). This establishes health supply chain systems as a key priority in strengthening health systems.

The expected outcome of strengthening the health supply chain is ensuring sustained performance. The supply chain's performance determines the health systems' ability to provide affordable and high-quality healthcare services at all levels. This highlights the need to invest in robust and well-functioning supply chains. Several countries are focusing on improving health supply chain practices and performance through supply chain transformation and allocating more resources to the health system (Duwiejua et al., 2024; Jbaily et al, 2020).

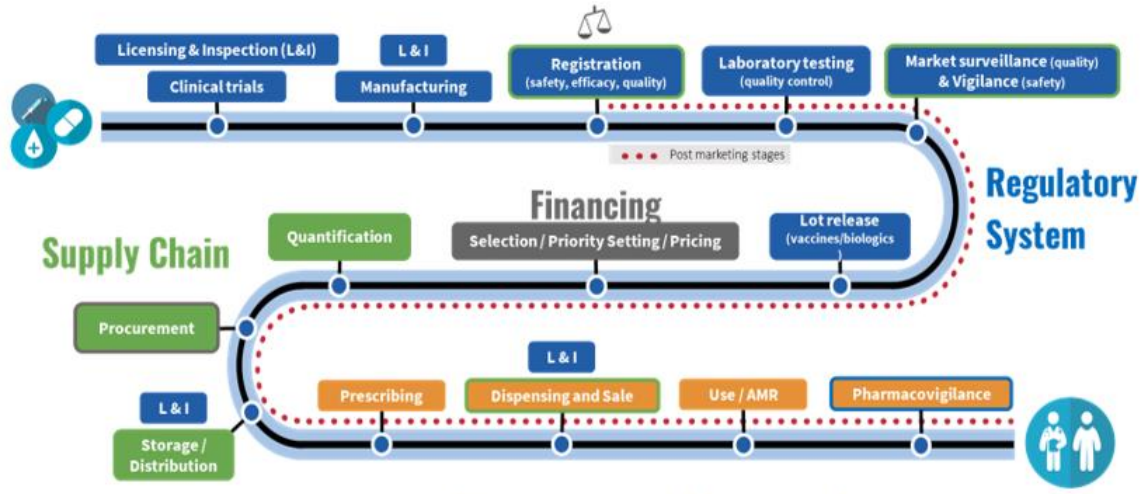
1.2.2. Complexities of managing performance in current health supply chains

A typical health supply chain system consists of structures, processes, and resources. These elements interact within the broader health system, to ensure adequate performance, which is characterised by equitable and timely access to safe, effective, quality pharmaceutical products and related services that promote their appropriate and cost-effective use to improve health outcomes (Medicines, Technologies and Pharmaceutical Services (MTaPS) Program,

2023). The structure of health supply chain systems involves a wide array of operating models that consist of a complex combination of stakeholders from the private, public and non-governmental organisations specialising in manufacturing, regulatory, logistics and various auxiliary functions that combine to make health products available to the beneficiaries (Subramanian, 2021; Yadav, 2015).

The main processes in a health supply chain system, depicted in Figure 1.1, include quantification of health products, procurement, storage and distribution. These processes operate within national and global regulatory and policy frameworks. The key resources include finance, information and the health supply chain workforce. The latter is the focus of this thesis and is further explained in section 1.5.

Figure 1.1: Elements of a health supply chain system



Source: MTaPS, 2023

Health supply chain systems in developing economies are distinct and particularly challenging to manage, which makes them different from other industries and sectors that have been previously studied (Frisch et al., 2021; WHO, 2018). In addition, health systems in developing economies are fragile due to acute resource constraints in these contexts (Alabi et al., 2023; Kruk et al., 2018; WHO, 2018; Bloom et al., 2018). This has led to sub-optimal performance of the supply chains, which inevitably impacted the consistent and reliable provision of health

products and attainment of global health goals in such countries (Chow et al., 2018; Ewen et al., 2017; Mukasa et al., 2017).

The operating environment for health supply chain systems has been experiencing significant changes, characterised by rapid transitions, driven by industrial revolution 4.0 (I4.0) technologies, such as artificial intelligence (AI) and big data analytics (Ciecierski-Holmes et al., 2022; Cetrulo and Nuvolar, 2019; Chaveesuk et al., 2019), and changes in the labour market (Krymova et al., 2022) in an increasingly competitive environment (Munteanu et al., 2020). Automation and introduction of strategies, such as Just In Time (JIT) and lean six sigma, to improve operational effectiveness, requires health supply chain systems to make necessary adaptions and adjustments in the ways of doing business going into the future. Service supply chain management from the perspective of behavioural operations has gained a lot of attention over the last decade to improve performance at the last mile (Liu et al., 2019).

Recent global events have heightened awareness that supply chain structures and processes are fluid and need to adapt to changing political, economic, and socio-ecological contexts to maintain or improve performance (Crick and Crick, 2020; Kiseľáková et al., 2019). The global outbreak of the coronavirus disease at the end of 2019 (COVID-19) exposed the vulnerability of health supply chain systems and the workforce. The COVID-19 pandemic had a catastrophic effect on the performance of health supply chains and ultimately threatened the achievement of the SGDs (Arji et al., 2023; Martin-Blanco et al., 2022). The situation was worse for developing economies due to the fragility of health supply chain systems in these contexts (Ghaffar et al., 2021). As a result, the drive to optimise supply chain networks, making them leaner to minimise lead times and operational costs may have come at the cost of resilience (Hannah, 2021).

The COVID-19 pandemic demonstrated the devastating human and economic costs of this vulnerability, with spiralling prices and widespread shortages of critical health products, such as diagnostic kits, vaccines and personal protective equipment (Gupta and Morain, 2021; Torres et al., 2021). The WHO estimates that more than 115,000 health workers have died from COVID-19 (Ghebreyesus, 2021). Epidemic-related deaths of health workers will set back many countries in further constraining human resources, especially developing economies. The COVID-19 pandemic has also had a significant psychological burden on health workers in the form of burnout, depression, and post-traumatic stress (Mehta et al., 2021). Besides the COVID-19 pandemic, other crises, like the ongoing Russo-Ukrainian and Israel-Hamas wars; the conflict in Yemen and the US-China trade war, have been triggering disruptions to global supply chains and exposing their vulnerabilities (Yoganandham and Kareem, 2023; Jagtap et al., 2022; Fan et al., 2022). At the time of finalising this thesis, the tensions between some European countries and the Houthis in the Red Sea, Arabian Sea and the Gulf of Aden were rising, which had significant implications on the global shipping of goods, lead times and costs.

Before COVID-19, health supply chain systems in many developing economies were already burdened with serious challenges, which were affecting performance, and have been struggling to meet the rising demand for sustained availability and access to quality and affordable health products (Sonak et al., 2018; Yadav, 2015). This is putting treatment programs at risk and weakening the overall health system's ability to respond to the healthcare needs of the population (Subramanian, 2021). This investigation is relevant in the current context as countries prioritise strengthening health supply chains and health workforce, especially in developing economies. The COVID-19 pandemic emerged three years after the commencement of this Doctor in Business Administration (DBA) research project.

The effects of the pandemic in exacerbating the global supply chain challenges and performance-related issues elevated the relevance of this research. The COVID-19 pandemic

and other global crises have demonstrated the importance of fostering resilient health supply chain systems and dynamic capability development that can enable responses to constantly changing global situations with more agility and flexibility (UNICEF, 2021; Kähkönen et al., 2021). As countries look towards recovery from the effects of these crises and build robust health supply chains to prepare for future pandemics, the health supply chain workforce has emerged as an important enabler in mitigating some of the challenges (Mekonen et al., 2024; Subramanian, 2020).

1.2.3. Global strategies to enhance health workforce performance

Several global stakeholders provide guidance and direction to countries to build resilient systems and optimise health workforce performance. These stakeholders include WHO, the International Pharmaceutical Federation (FIP), the Global Health Workforce Alliance and the Centre for Workforce Intelligence. These stakeholders are raising awareness and supporting countries by developing strategies, policies and guidance to drive improvements in health workforce performance. Examples of global strategies include the 2030 global strategy on the health workforce that seeks to optimise performance, quality, and impact of the health workforce through evidence-informed policies for human resources for health (WHO, 2016a); and the FIP workforce development goals that focus on implementation of strategies on professional development, policy development, planning and monitoring systems (FIP, 2017).

These global strategies and policies are relevant to this research project because they contribute to some of the practices being deployed by national governments and implementing partners in some of the developing economies and the findings of this investigation may help with future revisions of global and/or country-specific strategies on workforce development. In addition, these global strategies demonstrate the significance that is being given to workforce development in health systems and the priorities to strengthen the health supply chain workforce.

Specific to health supply chain systems in developing economies, investments to strengthen the capacity and performance of the health supply chain workforce are guided by the *'Building Human Resources for Supply Chain Management Theory of Change'* framework (Brown et al., 2018). The framework has been developed by People that Deliver (PtD), a coalition of global health supply chain partners. This framework seeks to catalyse investments in health supply chain workforce development by focusing on four critical pathways, i.e., *staffing, skills, working conditions and motivation*. This framework emphasises country-owned, sustainable models to improve workforce management processes and skills in health supply chain systems.

Recent research studies, such as Birou et al. (2022), Harland et al. (2021) and Fenta (2017), add weight to the relevance of this investigation by highlighting the significance of understanding and bridging gaps in skills requirements for supply chain management in the current and future global business environment. This will be discussed further in subsequent parts of this thesis. These studies together with the global agenda and strategies to further develop the health supply chain workforce in developing economies provide the foundation of the scope of this research and position the relevance of the research project within the current global goals, strategies and policies on workforce development. These strategies and priorities point to the need for skill development for the health supply chain workforce.

1.3. Skill requirements for modern supply chain systems

Kasonde and Steele (2017) highlighted that the workforce is the soul of supply chain management. In general, the collective knowledge, skills, and abilities of the supply chain workforce are considered as a pillar upon which supply chain management functions are built (Sweeney, 2013). In reality, the collective knowledge, skills, and abilities of the supply chain workforce serve as a key differentiator and provide a source of competitive advantage for supply chain organisations, particularly in a changing business environment (Davis, 2017).

Research in supply chain management has become multi-disciplinary, including "working *with* several disciplines", "working *between* several disciplines" and "working *across and beyond* several disciplines" (Wystra et al., 2019). In the end, this evolution has brought significant changes in organisational culture, structures, information systems capability and operational processes (Fu et al., 2022). These changes offer alternative ways to collaborate, cooperate, and engage stakeholders. As supply chain systems evolve to advance the integration of processes and propel performance improvements, the workforce and organisational processes to support these aspirations are expected to progress simultaneously (Shub and Stonebraker, 2009).

This requires the workforce to have appropriate skills and significant commitment by individuals and organisations to sustain ongoing efforts to develop management acumen and a continuous learning environment (Lim, 2023; Christopher, 2012). Specifically, realising this goal requires highly developed soft skills (Polakova et al., 2023; Thomas, 2014). The changes in the business environment exert pressure on education structures and approaches to get workplace-ready graduates or to upskill the workforce already in service (Lang, 2023; Cornalli, 2018). There is growing awareness and demand for skill requirements to shift towards soft skills (Mitashree, 2020). The shift towards soft skill development is critical to enhance the development of social and behavioural elements rather than just technical or functional elements of supply chain management (Essex et al., 2016; Dubey and Gunasekaran, 2015).

In health supply chain systems, global advocacy for effective and efficient supply chain service provision is increasing, with country stakeholders demanding change and signalling willingness to contribute to new supply chain interventions (Mackintosh et al., 2018). Despite some successes with technical assistance to strengthen health supply chain systems in developing economies, some common gaps in the delivery models that could derail

sustainability efforts to improve supply chain skills and national systems in developing economies have been conveyed (UNICEF, 2021). These include:

- Inadequate targeting of subnational workforces, with the scale and consistency that will result in sustained capacity development for supply chain systems strengthening.
- Lack of context-specific approaches, which are often externally driven with limited participation by local institutions.
- Limited focus on building a knowledge-based system for sustainably transferring knowledge to individuals and their institutions, and a system for cultivating local knowledge.

There is an increased demand for a balanced skillset to respond to the current business environment (Cannella et al., 2018, Jordan and Bak, 2016). Briefly, supply chain skills consist of technical and soft skills, with increasing emphasis on soft skills (de Camargo Fiorini et al., 2022). These concepts will be explored in greater detail in the next sections, as they form the backbone of this research project. Reports such as the *'Workforce of the future: the competing forces shaping 2030'* have highlighted that, for example, as automation increases, the nature of jobs is changing, the workforce requires new skill sets and employers are placing emphasis on, and valuing skills such as 'creativity, innovation, imagination and design' (Price Waterhouse Coopers, 2018). As a result, developing a well-rounded workforce with a blend of both soft and technical skills is increasingly prioritised in modern supply chain management (Borner et al., 2018; Thomas, 2014).

The learning needs of supply chain professionals have evolved since the early 2000s from attaining technical skills to also acquiring soft skills that support wider deployment of organizational strategies (Borner et al., 2018; Bernon and Mena, 2013). At the same time, the learning mechanisms to develop supply chain skills have evolved to combine classroom-based

and experiential learning mechanisms (Al-Shammari, 2022; Kodzi, 2019). These learning mechanisms are presented and discussed further in subsequent chapters.

1.4. Role of entrepreneurship in supply chain management

The rapidly changing business environment has driven organisations and individuals to adapt and seize new opportunities to survive and maintain competitive advantage (Renko et al., 2015). This has elevated the importance of entrepreneurial leadership to influence supply chain adaptability and resilience (Haq and Aslam, 2023; Abdalla and Nakagawa, 2022). Entrepreneurial leadership is defined as “leadership that creates visionary scenarios that are used to assemble and mobilize a ‘supporting cast’ of participants who become committed by the vision to the discovery and exploitation of strategic value creation” (Gupta et al, 2004).

Entrepreneurial leadership is a style of leadership distinguished from other leadership styles by a focus on the recognition and exploitation of opportunities; and taking measured risk-taking to develop a novel solution to a social problem, promoting it as a self-sustaining endeavor to fulfil business goals (Ketchen and Craighead, 2020; Renko et al., 2015). Some researchers view entrepreneurial leadership as a contextualized and situated form of leadership, occurring only in settings with certain conditions, such as small and growing firms (Surie and Ashley, 2008). However, although entrepreneurial leadership represents a distinctive leadership style, recent scholars believe it is a multidimensional concept that can be reflected in any organization regardless of firm size, firm type, or context (Pauceanu et al., 2021; Renko et al., 2015).

Public policymakers have sought to foster entrepreneurial leadership to yield financial, cultural, or social benefits (Ho et al., 2018). Consequently, entrepreneurship education is highly valued in many countries and has rapidly expanded globally within higher education systems (Karlidag-Dennis et al., 2020; Zaring et al., 2019; Rae et al., 2014). Research has indicated

that entrepreneurship education programs or activities can positively influence entrepreneurial intention (Haddoud et al., 2020; Nowinski et al., 2019). A study by Cui and Bell (2022) unpacked how entrepreneurship education activity influences both entrepreneurial intention and entrepreneurship behaviour. Furthermore, the study highlighted that a behavioural entrepreneurial mindset is an effective endogenous driver of entrepreneurial intention and its subsequent behaviour. This is important because such intentionality can stimulate the supply chain workforce's engagement in entrepreneurial activity, for example, opportunity exploration in resource-constrained contexts.

Entrepreneurship education in healthcare is teaching students how to create companies, and more broadly, how to create value through medical practice, technology, and education (Lim et al., 2024). A review of entrepreneurship education in pharmacy practice and education identified the most commonly identified roles of a pharmacist entrepreneur (pharmapreneur) as innovation, developing and promoting/marketing a service, solving a problem, and benefiting society (Berg and Meyers, 2023). The most frequently identified knowledge, skills and abilities (KSA) were risk-taking, creativity/innovation, self-starter, proactivity, management, communication, and strategic planning (Nouri et al., 2020; Mattingly et al., 2019).

These trends in entrepreneurship education in pharmacy practice and education highlight how education and training practices are developing pharmacists with entrepreneurship skills to facilitate adaptation to current market requirements. However, the education and training format in terms of delivery, timing, appropriate training providers, and training content, needs to be better understood (Scahill and D'Souza et al., 2022). A study by Breen et al(2020) found the absence of elements of pharmapreneur in the pharmacy curricula in the United Kingdom and Spain to adequately prepare pharmacists to perform their role as future managers,

highlighting the lack of recognition in literature of the importance of this critical management skill in the pharmacy profession.

1.5. Problem Statement

Despite significant investments made in the past two decades to build the skills of the health supply chain workforce in developing economies, there has been a tendency to prioritise the development of technical skills (PtD, 2023a). In addition, amidst the changing business landscape and focus on the future of work that emphasises a blend of technical and soft skills in the workforce, there is limited empirical research on how soft skills are developed (Lamri and Lubart, 2023; Thomas, 2014). As a result, this research project was designed to address these gaps to provide insights from the health supply chain workforce in developing economies to further guide the strengthening of practices to develop skills in health supply chains and other sectors.

1.6. Rationale of the research project

Adopting resilience strategies has been shown to help in tackling the shortage of medicines (Yaroson et al., 2022). The training of the workforce of health supply chains in developing economies tends to emphasise technical skills over soft skills. This imbalance is not limited to health supply chains and extends to the broader health workforce (Sancho-Cantus et al., 2023).

Substantial investments are being made in developing economies to strengthen the skills of the health workforce (Okunogbe et al., 2020; WHO, 2016a). Developing skills in the health workforce in developing economies has largely focused on technical skills to bridge the perennial shortage of skilled workers (WHO, 2016b). These skill development initiatives, driven by international development partners, such as The Global Fund, World Bank, and the Vaccine Alliance (Gavi), largely concentrate on the use of in-service training approaches (Okunogbe et

al., 2020; Micah et al., 2018). As a result, the imbalance between technical and soft skills might be impacting on performance of both the workforce and health supply chain systems as a whole. In addition, this often limits the ability of the health supply chain workforce to meet current demands.

Researchers have been challenged to provide insights on how to identify, develop and use soft skills to contribute to addressing the human resource issues, that have been considered to maximise or hinder supply chain performance (Thomas, 2014). In addition, research studies have called for more empirical research on soft skills in supply chain management and suggested an in-depth examination of the different facets of soft skills (Börner et al., 2018; Karttunen, 2018). Soft skills are not simply being recognised as increasingly important for the individuals within organisations, but also the inter-organizational interplay in the management of the supply chains. Against the backdrop of increasing complexity in managing supply chains, due in part to the recent advances in technologies, some research studies that explored the need for soft skills in supply chain management have been undertaken.

Studies on soft skills reflect the diverse nature of soft skills for supply chain management (Derwik and Hellström, 2017). Specific soft skills seem to be more critical to certain employers than others, which may be a result of factors such as the nature of those organisations, their relative size, the sector they operate in and the existing competitive environment (Bak et al., 2019). Many of these studies have focused on high-income countries, particularly on private sector organisations in those countries (Bak et al., 2019; Flothmann et al., 2018a). A few studies on soft skills in supply chain management have been conducted on samples from developing economies. Studies by Dubey et al. (2018) and Dubey and Gunasekaran (2015) in India are some examples.

Furthermore, such studies have also focused on industry sectors such as manufacturing (particularly automotive, textile, and electronics), construction and maritime (Derwik and Hellstrom, 2017). Other studies have been devoted to skills in small and medium-sized enterprise (SME) supply chains (Jayawarna et al., 2006; Macpherson and Wilson, 2003). This may impede the generalisation of the findings to the public sector in developing economies due to issues of industry specificity and country/regional differences driven by a variety of socioeconomic, cultural, political, and organisational issues (Al Mehrzi and Singh, 2016).

As highlighted earlier in the chapter, health supply chain systems in developing economies are different from other industries and sectors that have been previously studied. In addition to their fragility, developing economies are prone to extreme weather events, and political and security instabilities that can negatively impact the reliability of supply chain infrastructure reliability, increasing the likelihood of supply chain disruptions (Ahmad et al., 2016; Ezrow and Frantz, 2013). Secondly, developing economies are characterised by a high burden of diseases, such as HIV/AIDS, tuberculosis, and malaria (Bhutta et al., 2014). Additionally, the diversity of cultures and the variety of stakeholders in health supply chains in developing economies may lead to different soft skill requirements. Many developing economies receive support from multiple development partners to fund and implement health supply chain strengthening activities. This also brings political aspects of ownership and power imbalances in donor-recipient relations (Hasselskog, 2022; O'Brien and Evans, 2017). The health supply chain workforce has to continuously handle the political aspects of ownership and power imbalance.

Whilst supply chain studies in high-income countries and other industrial sectors provide some valuable insights that may be relevant in developing economies, it is challenging to establish that the skill requirements of the health supply chain workforce in developing economies match those required in high-income countries and other industrial sectors. Academic research in

health supply chain management has rarely focused on the crucial process of developing supply chain managers capable of managing the diverse challenges within health supply chain systems in developing economies.

Osher et al. (2020) and Worthman (2010) indicate that ecological contexts shape learning and development of skills. Dynamic and reciprocal interactions between the individual and their contexts and culture are key drivers to the acquisition of a skill (George et al., 2015; Mills, 2014). The development of supply chain skills for the health supply chain workforce in developing economies is exposed to dynamic ecological contexts. Given the dearth of studies on soft skills in the supply chain workforce in developing economies, this research project examined the levels of awareness and perceptions of the health supply workforce on the role soft skills play in enabling supply chains to operate effectively in these resource-challenged contexts.

1.7. Definition of key terms

1.7.1. *Technical skills*

Technical skills refer to specialised knowledge or ability that enables an individual to perform specific duties or tasks, in a professional environment (Shah et al., 2020; Mageto and Luke, 2020). Technical skills are teachable and can be developed through pedagogical methods such as self-study, in-class training, and work experience (Yan et al., 2018). These skills, which are attributed to cognitive intelligence, tend to be industry-specific and differ from job to job (Tsey et al., 2018; Levasseur, 2013). In health supply chain management, these capacities consist of operational aspects of supply chain management that ensure that the health products are delivered from manufacturers to the consumers, and include domains such as procurement, inventory management, logistics, and warehousing (Van Weele, 2010).

1.7.2. *Non-technical skills*

As explained in section 1.2, non-technical skills are also sometimes referred to as soft skills. The term ‘soft skills’ can be traced back to the United States military in the 1970s following the creation of a regulation (*called “Systems Engineering of Training” (CON Reg 350-100-1*)) that provided a foundation for designing training courses to cover job-related skills, not involving machines but involving people and paper, for example inspecting things/troops, supervising people, preparing reports, or designing structures (Whitmore, 1972). In their conclusion of a survey on dimensions of soft skills within military schools, Whitmore and Fry (1974) defined them as important abilities in a job that involves minimal interaction with machines and has broad applications in the workplace.

The use of the term "soft skills" has evolved significantly since it was first introduced in the US military. This term is now widely used across various scientific and social science domains. The terminology used to describe soft skills varies depending on geographical location and discipline. For instance, in the United Kingdom, people often use terms like "life skills," "core skills," and "key skills" to refer to soft skills. In Australia and New Zealand, terms such as "employability skills" or "generic skills" are used. Meanwhile, in the United States, "basic skills" and "necessary skills" are preferred when referring to soft skills (Cornalli, 2018).

In different subject disciplines, different terms are used to describe soft skills. (In the medical field, for example, people refer to soft skills as "non-technical skills."(Ashour et al., 2021; Bannon et al., 2020; McClelland, 2015). Meanwhile, in education and business research, "transferable skills" is the preferred term for non-technical skills. (Olsen et al., 2019; Sinche et al., 2017; Chadha, 2006). In the social sciences, people often use terms like "social skills," "people skills," and "interpersonal skills" to refer to soft skills. (Wyant et al., 2018; Gustavsen, 2017). All of these terms relate to a set of qualities, other than technical skills, which are necessary for work and other life situations.

Soft skills are essential for job success, regardless of profession (Lazarus, 2013). They are generic and transferable and encompass many different social skills, including human, conceptual, leadership, and interpersonal skills. (Anthony and Garner, 2016; Weber et al., 2009). According to Levasseur (2013), soft skills are manifestations of emotional intelligence. They consist of abilities and attributes that relate to personality, attitudes, behaviours, motivation, and other aspects of human interaction (Pellegrino and Hilton, 2012; Muzio and Fisher, 2009).

Soft skills refer to a combination of abilities and attitudes that individuals possess to identify and express themselves (intrapersonal), understand and relate to others (interpersonal), and respond to daily situations (Gilar-Corbi et al., 2019; Serrat, 2017; Srivastava, 2013). The foundation of these skills are human qualities such as intuition, creativity, passion, responsibility, kindness, courage, and self-awareness (Tsey et al., 2018). Gilar-Corbi et al. (2019); Serrat (2017) and Srivastava (2013) suggest that soft skills are essential for success in both work and life. As a result, the lack of soft skills can limit an individual's ability to get hired or perform well in their job. Similarly, Wheeler (2016,) argued employers "*hire people for their hard skills, but they end up firing people for their lack of soft skills"* (pg.29). The definition of soft skills for this research is drawn from Gilar-Corbi et al. (2019), Srivastava (2013), and Pellegrino and Hilton (2012) and I define them as a combination of abilities and attitudes that enable people to deal with situations in their social and work environments.

1.7.3. *Health supply chain workforce*

The health supply chain workforce refers to all personnel with a core responsibility for managing activities related to the flow of health products from the point of origin, typically a supplier or central, regional, or district storage points, to service delivery points, usually a health facility (Bruno et al., 2018). This group of the workforce includes personnel that are an integral part of the health workforce, such as pharmacists, pharmacy technicians, pharmacy

assistants and medical logisticians (Cometto et al., 2014). However, the health supply chain workforce incorporates non-medical supply chain personnel, including supply chain managers, data managers, and warehouse and transport personnel with a particular focus or specialisation on health supply chains (Seifman et al., 2013).

It is unclear if any distinction has been made regarding the different soft skill requirements for medical and non-medical supply chain personnel. As emphasised in section 1.4.2, soft skills are generic and can be transferable to different situations, regardless of the technical skills that one possesses. This makes the development of these soft skills a key enabler to sustainable and productive employment.

1.7.4. *Skill development*

Skills development is generally used to refer to the process of acquiring and improving knowledge and capabilities of individuals through all levels of learning and training, occurring in formal, non-formal, informal and on-the-job settings (Fergusson, 2022; Sakamoto, 2019). This includes reskilling and/or upskilling the workforce to be ready for the future of work (Li, 2022). Skills development is an integral part of lifelong learning and is a key enabler of productive employment that ensures the workforce keeps up with the ever-changing demands of a competitive labour market (International Labour Organisation (ILO), 2021, ILO and Organisation of Economic Co-operation and Development (OECD), 2018).

As a result, skill development may be recognized as a prerequisite for sustainability because it is a critical component of achieving the SDGs. Specifically, SDG 4, ‘Quality Education’ and SDG 8, ‘Decent Work and Economic Growth’, promote skill development to enable individuals to be in full employment and productively engaged in livelihoods (UN, 2023). The acquisition of such capabilities depends on many factors, including a quality lifelong learning system and a supportive learning environment (Fergusson, 2022).

1.7.5. *Developing economies*

According to the World Bank, countries can be classified into four income groups according to their Gross National Income (GNI) per capita, an indicator used as a standard measure of the economic development status of a country (World Bank, 2023). Using 2022 figures, low-income countries have a GNI per capita of US$ 1,135 or less. Lower middle-income countries are economies with a GNI per capita between US$1,136 and US$4,465 and upper middle-income economies have a GNI per capita between $4,466 and $13,845. Countries with a GNI of $13,846 or more are high-income economies. For the remainder of this thesis, low- and middle-income economies (LMICs) are referred to as developing economies.

1.8. Research aim and objectives

This research project aimed to '*critically investigate the determinants of the development of soft skills for the health supply chain workforce in developing economies'*. The specific objectives of this aim were to:

1) Critically review and synthesise available literature on soft skills considered important for supply chain practice.
2) Assess the impact of learning and work-related practices to develop the skills of the health supply chain workforce on health supply chain performance.
3) Identify soft skills required by employers of the health supply chain workforce.
4) Examine the level of consensus (or not) regarding the perceived importance of soft skills for health supply chain practice.
5) Examine relationships of antecedents and consequences of the development of soft skills.
6) Identify facilitators and barriers to the development of soft skills in developing economies.

1.9. Scope and boundary of the thesis

Firstly, the nature and intention of the research project were exploratory and limited to the development of soft skills, building on research gaps identified in the literature that are centred on the identification, development and utilisation of soft skills in supply chain management. Secondly, due to the criticality of public health systems in developing economies, the project focused on health supply chains in these contexts. Given the current and future work practices and strategies, these boundaries shaped the scope of this thesis to enable the investigation of soft skills required for health supply chain practice and their development.

1.10. Novelty and contribution of the project to knowledge and practice

Insights from this research project will contribute to theory and practice on organisational behaviour, leadership and management in the field of supply chain management. The research project provides an in-depth understanding of the soft skills required for health supply chain practice in developing economies, as well as evaluating perceptions on the effectiveness of current learning approaches, that will add value to the limited literature available in these contexts. In addition, the research insights will support and enhance current approaches to health supply chain education, recruitment, and research programmes, which are expected to advance the goal of improving health supply chain performance in developing economies. The insights on the development of soft skills in developing economies will also augment current interventions being deployed by implementing partners delivering technical assistance to build the skills capacity of the health supply chain workforce in developing economies. This investigation could be used for other professions, beyond the supply chain, to enhance the development of soft skills.

1.11. Structure of the thesis

Following this introductory chapter, the thesis has nine other chapters covering the literature review, methodology, findings, discussion, and conclusion of the research project. A brief synopsis of each of these chapters is provided below:

Chapter Two: This chapter provides a critical review of available literature on soft skills requirements for supply chain practice. In addition, the chapter presents the results of the assessment of the impact of learning and work-related practices directed at developing the skills of the health supply chain workforce in developing economies.

Chapter Three: This chapter critically analyses the underlying assumptions of different theories that underpin soft skill development and concludes by proposing a conceptual framework for this research project, which was used to organise, analyse and interpret the data collected.

Chapter Four: In this chapter, the journey of this research is outlined. A critical review of the research paradigms applicable to this investigation is summarised. The details of the primary data-gathering methods selected for the four studies are described, together with the rationale for their selection. The four studies are: Study 1, job advertisement analysis; Study 2, a modified Delphi survey; Study 3, a cross-sectional survey; and Study 4, semi-structured interviews.

Chapter Five: This chapter provides the empirical analysis of findings from Study 1, focusing on the soft skills that employers require when recruiting the health supply chain workforce in developing economies. The chapter begins with a descriptive analysis of the job advertisements collected over six months and then shifts to the results of the extraction of soft skills. The chapter then moves to the analysis of the salience of the soft skills by job level, region and country income status.

Chapter Six: This chapter presents and discusses the findings of Study 2. The chapter starts with a descriptive analysis of the panel of the Delphi survey. The chapter then moves to discuss the prioritisation and consensus (or not) on critical soft skills for health supply chain practice,

and perceptions of the panel on the significance of learning mechanisms to develop soft skills in developing economies.

Chapter Seven: In this chapter, the results from a cross-sectional survey of the health supply chain workforce's insights on soft skill development, which was the focus of Study 3. Similar to the other studies that are part of this project, the chapter begins with a descriptive analysis of the profile of the participants and shifts to provide the analysis of the data about the test of the hypotheses and correlation analysis of study covariates.

Chapter Eight: This chapter presents and discusses the findings of Study 4. The chapter begins with an overview of the research participants and an outline of the thematic analysis of the soft skill development experiences and contexts. The chapter then moves to discuss the themes generated by the researcher from the qualitative data.

Chapter Nine: A consolidated discussion of the findings of the primary data from the four studies and the secondary data from the literature review is presented. The chapter begins with a discussion of the soft skills required for health supply chain practice in developing economies. The chapter moves to discourse on the soft skill development constructs before looking at the facilitators and barriers of soft skill development in developing economies.

Chapter Ten: In the concluding chapter, a collective summary of the research along with the implications of the findings on theory, managerial practices, policy and research are presented. This includes the implication of the findings on health supply chain strengthening efforts in developing economies. The chapter then moves to describe the strengths and limitations of the research project.

CHAPTER TWO: SOFT SKILLS FOR SUPPLY CHAIN PRACTICE AND LEARNING PRACTICES

2.1. Introduction

Enhancing technical and soft skills among the workforce has become a significant priority for policymakers, educational stakeholders and organisations providing services on the frontline (ILO, 2021; UN, 2023). In recent times, there has been a growing realization of the significance of soft skills in various domains. The "*soft skill revolution*" has witnessed a surge in the desire to cultivate these abilities, as organizations have become more conscious of their worth at the workplace. (Lamri and Lubart, 2023). Soft skill development is particularly important in health supply chains where performance has remained suboptimal.

Consequently, two systematic literature reviews that matched the research aim were conducted. The basis for conducting the two reviews was to ensure a balanced and critical view of 1) soft skill requirements considered for supply chain practice and, 2) learning and work-related practices directed to the skill development of the health supply workforce, which are related to research objectives 1 and 2, as described in section 1.6. Both reviews were conducted independently of each other and guided the design and conduct of subsequent phases of the research project. To this end, this chapter addresses the following questions to understand current trends and knowledge gaps:

1) Which soft skills have been identified as important for supply chain practice?
2) What approaches have been used to develop skills of the health supply chain workforce in developing economies and how well have they worked?

First, this chapter critically discusses the nature of soft skills, including how soft skills have been classified in literature. Section 2.3 discusses the existing graduate skill frameworks. Section 2.4 looks at methods used to identify and analyse the secondary data from published literature for the two reviews. Section 2.5. provides a meta-analysis of the soft skills that are

currently considered important for supply chain practice. The chapter then moves to disentangle the concepts of training, learning and development in section 2.6. This is followed by an analysis of data on the impact of learning and work-related practices directed to the development of skills of the health supply chain workforce in developing economies in section 2.7. The contribution of the reviews to existing knowledge is discussed in section 2.8. The chapter concludes with a summary in section 2.9.

2.2. Nature of soft skills

Although several definitions of soft skills exist in the literature, they use different terms, drawn from multiple scientific and social science disciplines, as expressed in section 1.4.2, they describe similar concepts (Robles, 2012; Andrews and Higson, 2008; Klaus, 2007; Goleman, 1998). For example, several definitions highlight that soft skills are reinforced by human attributes such as intuition, creativity, passion, responsibility and kindness (Gilar-Corbi et al., 2019; Tsey et al., 2018; Serrat, 2017; Anthony and Garner, 2016; Weber et al., 2009). This is further supported by Pellegrino and Hilton (2012) and Muzio and Fisher (2009) who emphasise that soft skills consist of abilities and attributes that relate to personality, attitudes, behaviours, motivation, and other aspects of human interaction.

Yet, it seems there is no clear consensus on a universal definition of soft skills. Numerous definitions take different semantic variations (Cornalli, 2018). Over the years, researchers have undertaken to define job-related skills and their importance to different disciplines, which has resulted in the use of multiple terms, such as *employability skills, life skills, transferable skills, generic skills and non-technical skills*, when referring to soft skills. This reflects a clear indication of a lack of convergence when referring to the concept of soft skills. Some scholars have identified soft skills mainly based on their effects. Heckman and Kautz (2012) highlight the value of soft skills in the labour market and emphasise that "*soft skills predict success in life*" (p.451). Similarly, Lazarus (2013) contends that people need to have soft skills to succeed

in work and life. In addition, Robles (2012) also focused on the outcomes: "*Soft skills are the intangible, non-technical, personality-specific skills that determine one's strengths as a leader, facilitator, mediator, and negotiator*" (p.457).

Some researchers characterise soft skills by identifying them with other attributes or traits. The association between soft skills and intelligence has been widely published. For example, according to Levasseur (2013), while technical skills are measured by the intelligence quotient (IQ), soft skills are linked to emotional intelligence (EI). In other words, possessing soft skills such as communication, teamwork, and adaptability can be just as crucial as having technical skills in today's job market. Nevertheless, intelligence is a multidimensional concept and scholars such as Gardner (1983) and Sternberg (1998) advocate that intelligence should not be reduced to a single overarching construct. Gardner (1983) first identified seven distinct intelligences, and the intelligence types are now considered to be at least eight (Nelson, 1998). Sternberg (1998) argues that people possess three independent abilities: analytic (i.e., judging, comparing, contrasting, etc.), creative (i.e., inventing, discovering, imaging, etc.), and practical (i.e., applying, implementing, using, etc). In addition, measurement of traits is problematic, as measurements are often calibrated on measured behaviour and the behaviours used can be influenced by incentives and other traits (Heckman and Kautz (2012). The lack of a standard definition or systematic approach to measuring and assessing these skills poses a challenge when attempting to review and compare them (Rasipuram and Jayagopi, 2020; Robles, 2012).

Soft skills have also been equated to social skills (Livesey, 2017; Wheeler, 2016; Anthony and Garner, 2016; Carneiro et al., 2007). This implies that soft skills encompass the ability of people to identify and express themselves; understand and relate to others; and respond to daily situations (Gilar-Corbi et al., 2019; Serrat, 2017; Srivastava, 2013). This emphasises that soft skills are connected and represent a combination of cognitive, interpersonal, intellectual, and practical abilities that are constantly evolving. (Haselberger et al., 2012). Although some critics,

such as Derwik and Hellström (2017) and Haselberger et al. (2012) have opined that soft skills are not distinguishable because they are strongly connected and interrelated to individual traits. Several scholars, including Whetten and Cameron (2014), Sangari and Razmi (2015), and Hurrell et al. (2012) have tried to make systematic differences between soft skills and proposed classifications.

2.2.1 Classification of soft skills

In general, numerous classifications of soft skills that exist in the literature indicate a lack of a universally agreed framework to classify soft skills and this has resulted in multiple reference criteria being used in research studies. Despite the variety of the classifications, they are all undeniably valuable to the current research, providing systematic and rational approaches that serve as useful tools to organise soft skills. From the soft skills classifications identified in the current literature, two groups of soft skill classifications can be considered, and these are presented in Table 2.1 below.

Table 2.1: Soft skills classifications

Enumeration of descriptive soft skills	Soft skill types
1) **WHO Life Skills**: critical skills individuals were expected to possess as an outcome of educational programs at schools. (WHO, 1996)	1) **Two-type taxonomy**: managerial and cultural (Sangari and Razmi, 2015); intrapersonal and interpersonal (Hurrell et al., 2012); cognitive and social (Flin et al, 2008)
2) **OECD program:** soft skills for lifelong learning. (OECD, 2001):	2) **Three-type taxonomy**: relational, managerial, and behavioural (Derwik and Hellstrom, 2017).
3) **European Union**: soft skills for lifelong learning. (Hozjan, 2009).	3) **Five-type taxonomy**: behavioural, controllable, developable, interrelated, and paradoxical (Whetten and Cameron, 2014).

Enumeration of descriptive soft skills	Soft skill types
4) **Soft skills for safety-critical occupations** (Flin et al, 2008; Shields and Flin, 2013; Flin and Maran, 2015).	*No explicit subdivision*

The first group of soft skill classifications focus on the enumeration of descriptive soft skill elements that individuals were required to possess to effectively perform their duties. For example, in the early nineties, the WHO paved the way in categorising soft skills and identified life skills that were critical for individuals to possess as an outcome of educational programs at schools (WHO,1996). These life skills were identified as *decision-making; problem-solving, creative thinking; critical thinking; communication skills; interpersonal skills; self-awareness; empathy; coping with emotions; and coping with stress*. Building on the work by WHO, a similar set of key soft skills for lifelong learning was proposed by other key global stakeholders, such as the OECD program, *Definition and Selection of Competencies: Theoretical and Conceptual Foundation* (DeSeCo) which was launched in 1997, and European Union's soft skills for lifelong learning, which was launched in 2000 (Hozjan, 2009; Rychen and Salganik, 2001; OECD, 2001).

These programs guided countries to strengthen skills that individuals require to be able to meet the challenges of the increasingly complex business environment. While the classifications of soft skills in this cluster directly provide the list of soft skills needed to perform effectively, the list of soft skill elements is not exhaustive and is prone to repetitions as similar soft skills will have the same meaning, e.g., adaptability or flexibility (Strang, 2023). In addition, Thomas (2017) argued that these soft skills are context-dependent, such as the nature of the work performed. Equally, Flin and Maran (2015) concluded that soft skills must be carefully specified for a given profession and task set. However, using the type of soft skill elements in this group of soft skill classifications provides an opportunity to create a main list that can be used to identify and rank individual soft skills by profession, sector, industry geography or a

combination of these. This approach has been used in studies by Derwik et al. (2016), Muzio et al (2007) and Giunipero et al. (2006) to analyse soft skills requirements for the supply chain workforce.

To address some of the limitations of the classifications in the first group of soft skill classifications described above, several scholars have clustered soft skills into types. For example, Sangari and Razmi (2015) proposed a classification of soft skills according to *managerial and cultural* constructs. Other researchers also opted for a two-type approach.) Hurrell et al. (2012) categorised soft skills as *interpersonal* and *intrapersonal* abilities that help people excel in specific social situations. In addition, Flin et al. (2008) use *cognitive* and *social* as the main types of soft skills.

In parallel, Whetten and Cameron (2014) classified soft skills into five types: *behavioural, controllable, developable, interrelated and paradoxica*l. Behavioural *constructs* are set a of observable skills that a person exhibits. *Controllable* elements can be intentionally demonstrated, practised, improved, or contained by individuals themselves. Furthermore, soft skills can be *developed* through feedback and practice. The skills also overlap and support each other (i.e., *interrelated*), providing flexibility in managing diverse situations. Lastly, these skills can be a combination of opposing orientations, such as being nurturing and competitive at the same time.

In addition, Derwik and Hellstrom (2017) classified competencies in supply chain management into four constructs: *relational, managerial, behavioural and functional*. Three of these dimensional constructs are associated with soft skills: *relational,* which deals with relations between all possible stakeholders, such as workers, managers, customers, suppliers and partners; *managerial,* which relates to more general management aspects including resource management and implementation of new business structures; and *behavioural*, that relate to

built-in characteristics and attitudes tied to the stakeholder. The fourth construct relates to technical skills at both individual and organisational levels. These *functional* skills are related to existing supply chain business functions and company processes. Flin et al (2008) developed a soft skill taxonomy for safety-critical occupations, consisting of seven different soft skills: situational awareness, decision-making, communication, teamwork, leadership, stress management, and coping with fatigue.

The second group of soft skill classifications demonstrates that soft skill constructs are multidimensional. This augments the view that soft skills are complex and helps to explain the reason there is no consensus on the definition and classification of the concept within the research community (Iorio et al., 2022; Borner et al., 2018; Derwik and Hellstrom, 2017). With an increasing focus on research of soft skills that has been highlighted by Börner et al. (2018) and Thomas (2014), these classifications are useful systematic research tools that require continuous revision and expansion to reflect the current business environment and practices.

Therefore, for this research, the three dimensions (relational, managerial, behavioural) from the four dimensions proposed in the taxonomy by Derwik and Hellstrom (2017) were selected and provided a matrix that was used to classify the soft skills identified in this research project. The functional dimension was excluded as it focuses on technical skills, which are not in the scope of this research project. These three dimensions were selected over the others because these were considered adequate to cover the wide range of soft skills for the health supply chains. Although criticism can be made that overlap and interconnections can exist between the dimensions, the features of the dimensions are adequately distinct to be considered as stand-alone dimensions. It is worth noting that a dimension of soft skills is not defined by any specific soft skill element, but rather by a combination of soft skill elements.

A matrix of soft skill constructs for a particular industrial sector and/or geography, such as the health supply chains in developing economies, facilitates the investigation of any association between the soft skill constructs and contextual attributes. Health supply chains in developing economies can benefit from such insights to further strengthen the design of interventions to enhance the skills of the workforce.

2.3. Graduate skills frameworks

The I4.0 revolution represents a significant technological shift that is rapidly changing the business environment (Mudzar and Chew, 2022). This is reshaping the way firms operate and the way the workforce collaborates (Mahajan et al., 2022). This era of an evolving business environment has put pressure on higher education systems to plan and prepare graduates to be employment-ready and meet market expectations (Robson, 2023). The graduates' ability to successfully navigate the job market is increasingly emphasised as a critical measure of the contribution of higher education systems, and the individual financial returns on degrees (Cheng et al., 2022). As a result, ensuring higher education institutions provide a steady supply of 'work-ready' graduates, equipped with the skills demanded by employers, has become a significant driver of higher education policy (Robson, 2023).

Over time, several employability models have been developed across various disciplines to bridge the gap between higher education and industry requirements (Pauceanu et al., 2020). This underscores the critical need to cultivate employability skills among graduates and these models offer robust frameworks and guidelines for integrating essential KSA into educational curricula, thereby significantly enhancing graduates' readiness for the world of work (Quinlan and Renninger, 2022). These models incorporate imperative constructs such as generic skills (GS), discipline-specific skills (DSS), work-integrated learning (WIL) and emotional intelligence (EI). Table 2.2 summarises some relevant models from different disciplines and a list of the various dimensions covered in the models.

Table 2.2: Employability models

Model	Dimensions Covered							Reference
	GS	DSS	SK	WIL	EI	External factors	Personal circumstances	
DOTS Model	X	X	X	X	X			Law and Watts (1977)
Heuristic Model	X					X	X	Fugate and Ashforth (2004)
Orientation Process Model	X	X	X	X				Van Dam (2004)
Employability Framework	X					X	X	McQuaid and Lindsay (2005
USEM Model	X	X	X		X			Yorke and Knight (2006)
Career EDGE Model	X	X	X	X	X			Pool and Sewell (2007)
Conceptual Model	X	X	X	X	X			Bridgstock (2009)
Psychological Career Resources Model	X	X	X		X			Coetzee and Beukes (2010)
Graduate Employability Model	X	X	X		X			Bezuidenhout (2011)

Source: Aliu et al. (2024)

Other frameworks include the Graduate Recruitment Bureau's graduate skills which include four domains: *self-reliance skills, general skills, people skills and specialist skills* (Graduate Recruitment Bureau, 2024). In the field of health supply chain management, the General Pharmaceutical Council (2021) in the United Kingdom outlines leadership and management; person-centred care and collaboration; professional practice; and education and research as the domains of learning outcomes that the student/trainee pharmacist is expected to achieve the required level of competence.

The concept of graduate employability is being adopted in developing economies as higher education programs globally shift towards competency-based education to redefine the employability of graduates in terms of behaviours that meet market needs (Gulled, 2023; FIP, 2020). For example, staff and students expressed the need for entrepreneurial knowledge and skills; and a more 'patient-oriented pharmacy' as part of the transformation of the pharmacy programme in Kenya (Ruparelia et al., 2021). A study in Nigeria concluded there is still much to do to offer graduates the right support to help them compete, gain employment and thrive in the job market (Okolie et al., 2020). Specifically, the study highlighted the inadequacy of measures in health education programs to teach generic skills. In addition, students had difficulties understanding the exact meaning of generic skills such as lifelong learning skills, interpersonal skills, leadership skills, integrity and professional ethics skills, and information management skills among others, but had a good understanding of some generic skills such as creative and critical thinking skills, negotiation skills and teamwork skills.

2.4. Methods used for the literature reviews

The methods used for the systematic search and review of the literature for the two systematic reviews were drawn from previous systematic reviews on supply chain skills, such as Karttunen (2018) and Derwik and Hellstrom (2017) and were also informed by the guidelines for systematic reviews (Petticrew and Roberts, 2006). As the reviews were aimed to extract the

important soft skill elements reported from contemporary academic literature and assess the learning and work-related practices directed to the skill development of the health supply workforce, the literature search covered the period between January 2000 and December 2022.

2.4.1. Systematic literature search

Six electronic databases were searched namely, CINAHL, Medline, SCOPUS, PsychINFO, International Pharmaceutical Abstracts, and Social Sciences Citation. A combination of search strings was used to identify relevant articles. In addition, the following approaches were also used to identify additional articles:

a) bibliographies of previous systematic reviews and other related papers.
b) direct contact with selected colleagues, leading on the subject matter to request for unpublished studies and reports.
c) hand search of key journals with a focus on human resources, supply chain management, organisational behaviour, learning and development.

Tables 2.3 and 2.4 show search/index terms that were used for the review of soft skill requirements for supply chain practice and the review of learning and work-related practices directed to the skill development of the workforce, respectively.

Table 2.3: Search strings for review of soft skill requirements for supply chain practice

S1: ti,ab (“soft skill*” OR “non-technical skill*” OR “life skill*” OR “generic skill*” OR “transferable skill*” OR “employability skill*” OR “social skill*” OR “people skill*” OR “interpersonal skill*” OR “emotional intelligence*”)
S2: ti,ab (“supply chain*” OR “logistics*” OR “procurement*” OR “purchasing*” OR “distribution*” OR “warehousing*” OR “transport*”)
S3: ti,ab (“worker” OR “profession*” OR “practitioner*” OR “workforce” OR “employ* OR “personnel”)

S4: ti,ab (“belief*” OR “perception*” OR “view*” OR “experience*” OR “opinion*” OR “attitude*” OR “value*” OR “behav*”)

The search strings for the review of soft skills for supply chain practice were divided into four and were related to alternative terms for ‘soft skill’, ‘supply chain’, ‘workforce’ and ‘perception’. The search strings for the review of learning and work-related practices directed to skill development were divided into five and were related to alternative terms for ‘workforce’, ‘skill’, ‘supply chain’, ‘health product’ and performance measures.

Table 2.4: Search strings for review of learning and work-related practices directed to skill development

S1	ti, ab (health work* OR health profession* health care profession* healthcare profession* OR health practitioner* OR health employ* OR healthcare provider OR health care provider OR pharmac* OR health aid* OR nurse* OR nursing assist* OR nurse aid* OR medical doctor OR community health work* OR medical assist* OR medical logist* OR health personnel OR village health work* OR community health aid* OR allied health personnel OR paramedical personnel OR medical staff)
S2	ti,ab (skill* OR train* OR learn* OR competenc*)
S3	ti,ab (supply chain* OR health product manage* OR inventory manage* OR health commod manage*)
S4	ti,ab (stock out* OR stock availab* OR medicine use* OR health product use* OR data report* OR adherence* OR wast* OR expir*)
S5	ti, ab (health product* OR essential medic* OR medical supplies OR health supplies OR vaccine* OR drugs)

2.4.2. Data screening: inclusion and exclusion criteria

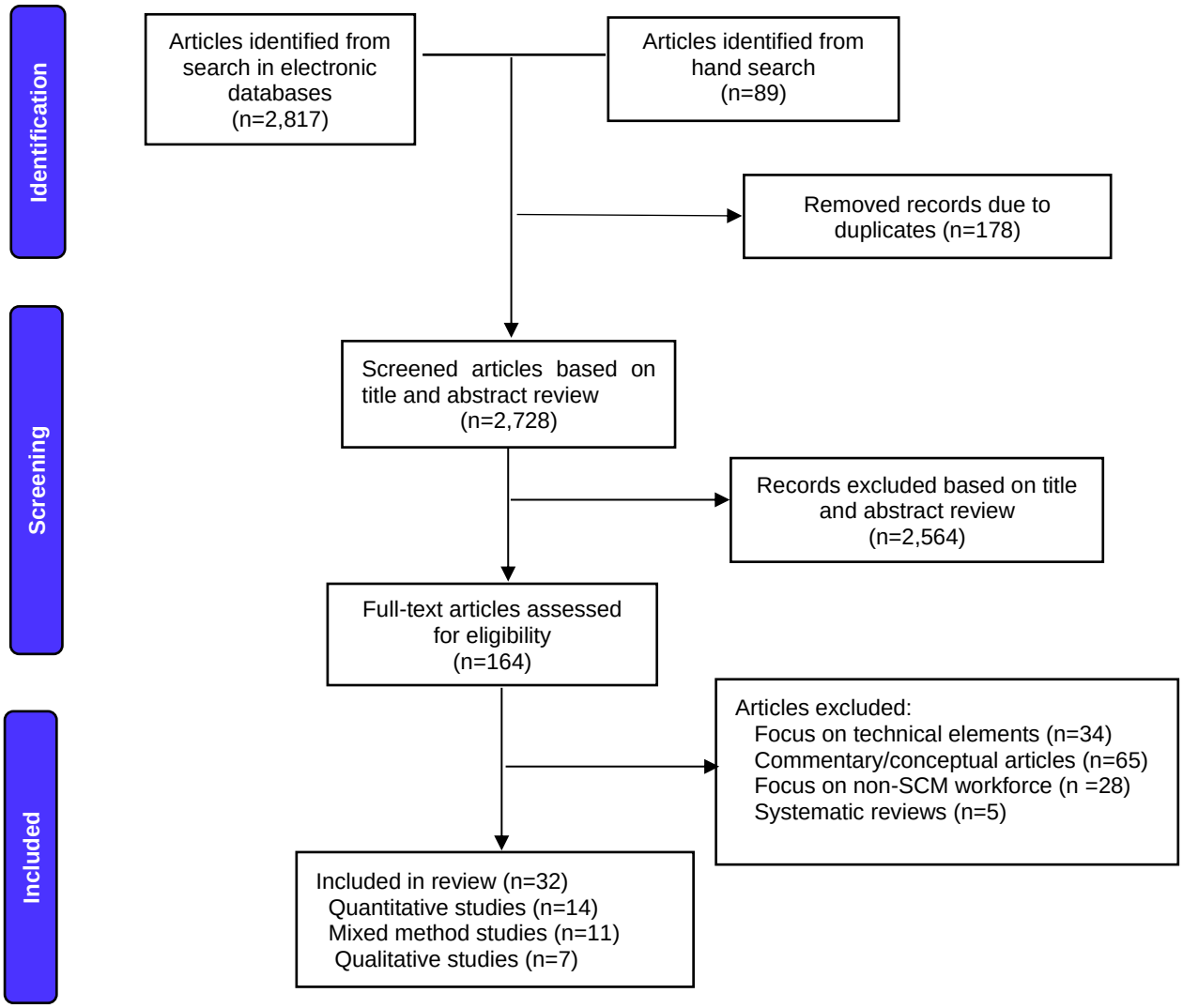
All the titles and abstracts of the identified articles were screened against the defined inclusion and exclusion criteria for each review, shown in Table 2.5.

Table 2.5: Eligibility criteria used to screen identified articles

Soft skills for supply chain practice	Work-related practices directed to skill development
Focus on empirical study, quantitative and/or qualitative, on reported perceptions of soft skill requirements for supply chain management from any industrial sector.	The study setting was a developing economy, as defined by the World Bank (2023) and described in section 1.5.5.
No restriction on the dates of publication of the studies was applied.	Involved any public health facility-based health worker, community health workers, pharmacists, storekeepers; and shopkeepers selling medicines.
Only articles published in English	Any study with a pre-service or in-service learning intervention with at least 1 component that seeks to develop, enhance and/or maintain health workers' skills to manage health products.
No data	Studies with at least one "primary" outcome related to the management of health products and supplies and with one of the following study designs: a. Randomized controlled before-and-after trials. b. Non-randomized controlled before-and-after trials. c. Randomized controlled post-only trials. d. Interrupted time series designs with at least 3 data points before and after the intervention.
No data	Include a primary outcome measure: i) on-shelf availability of health products (or proxy) and/or ii) timeliness of routine logistics data reporting (or proxy) OR a secondary measure: i) wastage rate (expiries/damages); and/or ii) adherence to pre-defined stock levels for facility type; and/or iii) adherence to defined supply chain management guidelines and/or operating procedures.
No data	No restriction on the dates of publication of the studies was applied.
No data	Only articles published in English

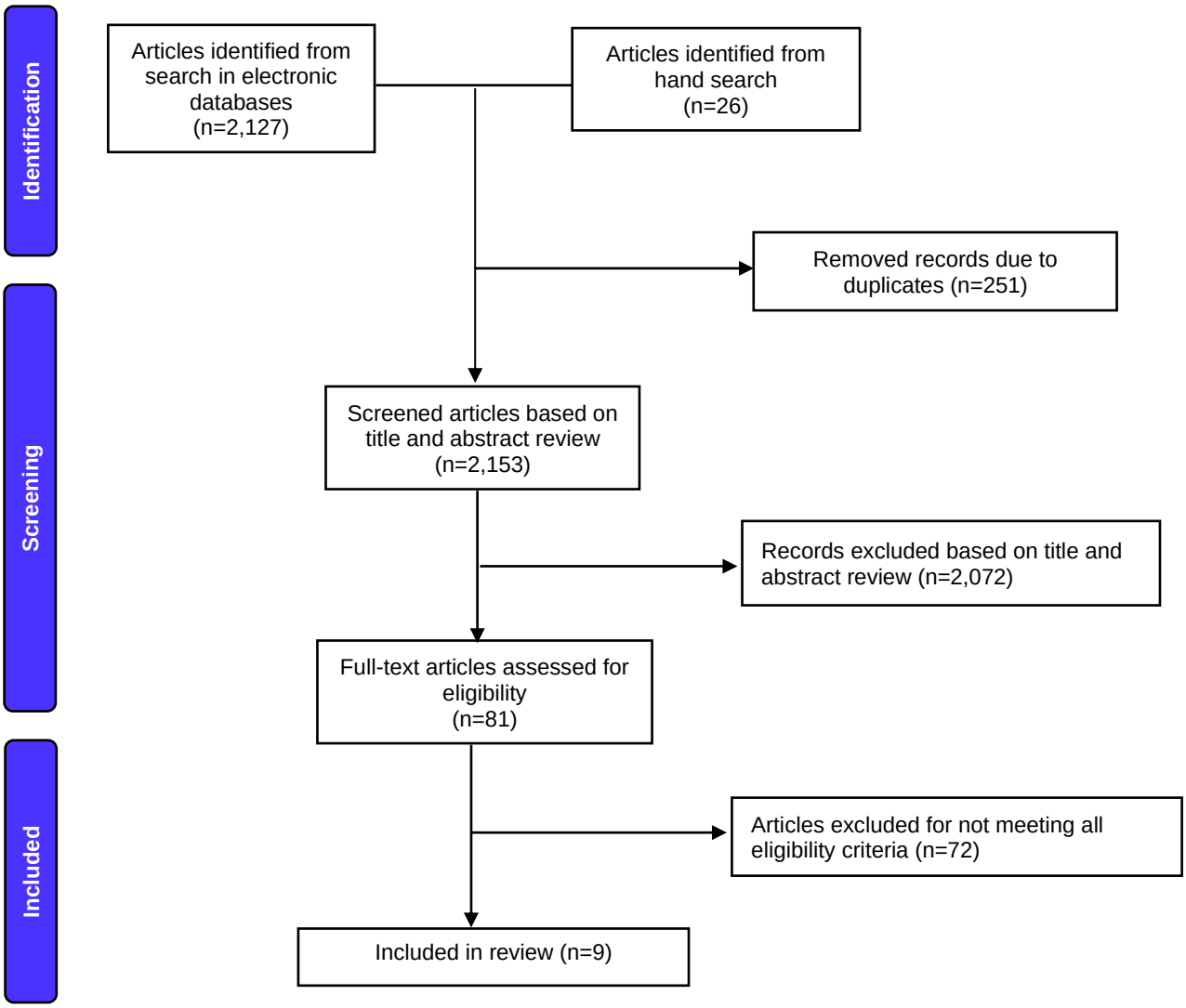
For the review of soft skills in supply chain practice, the initial search identified 2,728, excluding duplicates, which were screened based on titles and abstracts, and irrelevant articles were removed. A total of 164 articles remained for full-text review, using the inclusion and exclusion criteria. In the end, thirty-two articles were identified, from twenty-two scholarly journals between 2001 and 2024 which met the inclusion criteria (see Figure 2.1). The articles include fourteen quantitative studies, seven qualitative studies and eleven studies that employed a mixed methods approach.

Figure 2.1: Flow chart for articles on review of soft skills for supply chain practice



For the review of learning and work-related practices directed to the skill development of the workforce. The initial search identified 2,153 excluding duplicates, which were screened based on titles and abstracts and irrelevant articles were removed. A total of 81 articles remained for full-text review, using the eligibility criteria. In the end, nine articles were identified, that met the inclusion criteria (see Figure 2.2).

Figure 2.2: Flow chart for articles on review of learning and work-related practices directed to the skill development of the workforce



2.4.3. Data extraction and analysis

Data from each review was extracted separately using a standardised data collection tool. The common data that was extracted include the author(s); year of publication; study title; study aims; study methods; and participants. For the review on soft skills for supply chain practice, the additional data extracted included the soft skill elements reported in each article. The additional data was extracted for the outcome measures. QSR NVivo Pro 12 was used to organise and analyse the data from qualitative and mixed-method studies.

The quantitative data from the review of learning and work-related practices was analysed using the established approach that was outlined by Rowe et al. (2019). The calculation and analysis of effect sizes were as follows:

1) The effect sizes for dichotomous outcomes:

   Effect size = $(\%POST - \%PRE)_{intervention} - (\%POST - \%PRE)_{reference}$

2) If there was no reference study group, but there was a pre-and post-intervention measurement:

   Effect size = $(\%POST - \%PRE)_{intervention}$

3) If there were no baseline measurements, but there was a reference group:

   Effect size = $(\%POST)_{intervention} - (\%POST)_{reference}$

The effect sizes for outcomes that were a percentage for each subject and multiple observations were summarised as a mean percentage. The effect size for continuous outcomes, but bounded (e.g., knowledge score from 0 to 50), was summarized as a mean score. The mean score was converted to a percentage by dividing the mean score by the maximum possible score. IBM SPPS 29 was used for quantitative data analysis to generate a general understanding of the impact of interventions on learning and work-related practices directed to develop the skills of the workforce.

2.4. Soft skills in current supply chain practice

The need to address health supply chain workforce issues is not new, but the COVID-19 pandemic revitalised efforts to strengthen the skills of the workforce (Linnander et al., 2022; van Hoek et al., 2020). This has propelled these efforts to the top of the agenda of countries towards achieving the SDGs in developing and developed economies (Ziemann et al., 2023; van Hoek et al., 2020). Previously, Hohenstein et al. (2014) highlighted a growing focus on the supply chain workforce, related to the acquisition of KSA, which includes technical and soft skills. The focus on KSA in supply chain management is anticipated to continue and the prominence of KSA is expected to evolve and grow (Bals et al., 2019).

The evolution of KSA is complemented by continuous adaptation by the supply chain workforce to integrate emergent political, economic, cultural, and social issues (Wilson and Barbat, 2015). Within the KSA spectrum, Bernon and Mena (2013) observed that the training needs of the supply chain workforce have advanced from simply acquiring technical skills to also obtaining soft skills that support the implementation of strategic initiatives. Thus, a significant commitment to continuous learning for the supply chain workforce, at the individual level, is required to develop, enhance and maintain the necessary technical and soft skills (Thomas, 2014; Christopher, 2012).

As highlighted in Chapter One, there is a growing body of literature emphasizing the importance of soft skills in modern supply chains (ILO, 2019; PwC, 2018). Possession of critical soft skills is a contributory factor in supply chain performance (Caputo et al., 2019, Bak et al., 2019). The growth in the importance of soft skills has also been stressed in pharmaceutical supply chains. For example, a review by Ashour et al (2021) focused on the role of soft skills in community pharmacy practice and identified five soft skills that are important for community pharmacists to possess (situational awareness, decision-making, leadership, task management, communication and teamwork). In addition, a study by Breen et al. (2020) found

a lack of recognition of the importance of management skills (leadership, people management, communication and organisation) among UK and Spanish pharmacists. However, gaps in how to identify, develop and utilise soft skills to address supply chain workforce issues that can maximise performance remain (Thomas, 2014).

Literature reviews on soft skills for the supply chain workforce have identified some limitations. Karttunen (2018) emphasised that the current literature overlooks position-specific factors and the relationship between work context and workforce skills. In addition, there are also some limitations in terms of the examination of multiple industries at once (e.g., manufacturing and services), which restricts the ability to deduce industry-specific effects on skills. Furthermore, Derwik and Hellstrom (2017) noted that there was a paucity of research that analyses how soft skills were developed; limited research on the potential relations and transfers between the levels of analysis, with few articles involving more than one level of analysis.

Therefore, to facilitate the identification of soft skills relevant to health supply chain practice, it is essential to understand the soft skills that have been published in the literature. To this end, a systematic search of available literature was conducted to identify and examine current literature on the supply chain workforce's perceptions of the soft skills important for supply chain practice across different industrial sectors. This addresses objective 1 of the research project to critically review and synthesise available literature on soft skills considered important for supply chain practice.

2.4.1. Descriptive analysis of literature on soft skills for supply chain practice

The literature search identified thirty-two articles that met the defined eligibility criteria. Overall, all the identified quantitative, qualitative and mixed methods studies were considered robust concerning the methodological criteria that were applied, as described in section 2.3.

Geographical coverage

The geographical coverage of available studies that explored the views on the importance of soft skills in supply chain practice is summarised in Table 2.6. The thirty-two studies that were included in this analysis were heterogeneous, covering participants from thirty-eight countries. However, out of the thirty-eight countries, only a third of the countries of the study countries were developing economies, as per the World Bank (2023) classification of country economies. While the majority of studies focused on participants in Europe, North America, South America, Asia, and Australia, only one study focused on the supply chain workforce in sub-Saharan Africa was identified and included in this review. This highlights the scarcity of research studies on the soft skills of the supply chain workforce in these contexts.

Table 2.6: Geographical coverage of studies

Country of focus	Count	Reference(s)
Australia	3	Prajogo and Sohal (2013); Thai (2012); Sohal (2013)
Canada	1	Shou and Wang (2017)
China	2	Shou and Wang (2017); Rahman et al. (2012);
German	3	Flothmann et al. (2018b); Kotzab et al. (2018); Bolsche et al. (2013)
India	3	Dubey et al. (2018); Shou and Wang (2017); Dubey and Gunasekaran (2015);
Indonesia	1	Hsu et al. (2011)
Italy	1	Paolucci et al. (2021)
Malaysia	3	Wahab et al. (2024); Shou and Wang (2017); Hsu et al. (2011)

Country of focus	Count	Reference(s)
Philippines	1	Hsu et al. (2011)
Singapore	2	Shou and Wang (2017); Thai and Yeo (2015)
South Africa	1	Allden et al. (2018)
South Korea	1	Thai and Yeo (2015)
Sweden	1	Derwik et al. (2016)
Taiwan	1	Wu et al.(2013)
Thailand	1	Hsu et al. (2011)
United Kingdom	4	Breen et al. (2020); Bak et al. (2019); Shou and Wang (2017); Irwin and Weidmann (2015);
USA	11	Fantozzi et al., 2024 ; Keller et al. (2020); Dean and East (2019); Shou and Wang (2017); Essex et al. (2016); Barnes and Liao (2012); Giunipero et al. (2006); Giunipero et al. (2005); Myers et al. (2004); Gammelgaard and Larson (2001); Giunipero and Pearcy (2000)
Vietnam	1	Hsu et al. (2011)
Multiple European countries (unspecified)	3	Beske-Janssen et al. (2023); Schulze et al. (2019) ; Bals et al. (2019)

Level of managerial expertise

In terms of level of expertise, about two-thirds of the participants were supply chain managers and executives, with only a third representing the workforce at the operational level. This highlights the scarcity of studies on soft skills in the supply chain workforce in these contexts.

Industrial sector coverage

The industrial sectors covered by the studies included in the analysis are summarised in Table 2.7. The majority of the studies (61%) had participants covering multiple industrial sectors that included manufacturing, telecommunications, airline, pharmaceutical, automotive, and

industrial equipment- transportation, construction, textile, rubber, plastics, and fast-moving consumer goods.

Table 2.7: Industrial sector coverage of studies

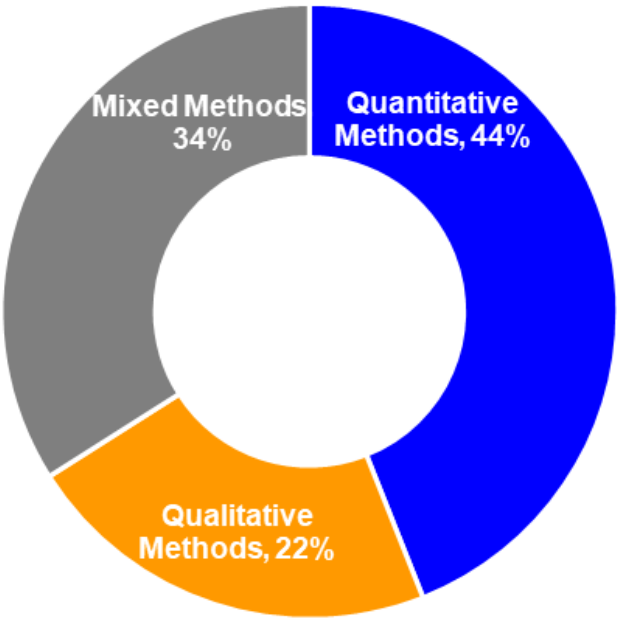
Industry sector of focus	Count	Reference(s)
Maritime	1	Thai and Yeo (2015)
Healthcare	2	Irwin and Weidmann (2015), Breen et al. (2020)
Manufacturing	3	Paolucci et al. (2021) ; Rahman et al. (2012); Hsu et al. (2012)
Transportation/Logistics	6	Dubey et al. (2018); Thai (2012); Bölsche et al. (2013); Dean and East (2019); Allden et al. (2018); Gammelgaard and Larson (2001)
Multiple	21	Fantozzi et al., 2024; Wahab et al. (2024); Beske-Janssen et al. (2023); Bals et al. (2019); Flothmann et al. (2018b); Essex et al. (2016); Barnes and Liao (2012); Dubey and Gunasekaran (2015); Myers et al. (2004); Prajogo and Sohal (2012); Shou and Wang (2017); Kotzab et al. (2018); Guinipero and Pearcy (2000); Schulze et al. (2019); Derwik et al. (2016); Giunipero et al. (2006); Wu et al. (2013); Bak et al. (2019); Giunipero et al. (2005); Sohal (2013); Keller et al. (2020)

Only two of the thirty-two studies included in the review (6.25%) explicitly focused on the healthcare sector. In these studies, Breen et al. (2020) focused on the recognition of management skills within the pharmacy profession, and the pivotal role pharmacists play in addressing present and future healthcare challenges. Irwin and Weidmann (2015) investigated the use of soft skills by community and hospital pharmacists.

Coverage of study designs

Figure 2.3 shows the distribution of the study designs used in studies included in analysing soft skills considered important for supply chain practice. Out of the 32 studies, 44% (n=14), 22% (n=7) and 34% (n=11) used quantitative, qualitative and mixed-method designs, respectively.

Figure 2.3: Distribution of study designs in reviewed literature on soft skills in supply chain practice



All fourteen quantitative studies had a cross-sectional study design. One of the quantitative studies adopted an experimental adaptive choice-based conjoint analysis that focused on the identification of the requisite soft skills and perceptions of supply chain professionals towards their relative importance for supply chain performance. Two studies analysed job advertisements for supply chain professionals to understand the attitudes and beliefs of hiring managers about the soft skills they consider important (Shou and Wang, 2017; Kotzab et al., 2018). The number of respondents varied from 41 to 243, with response rates ranging from 10.8 per cent to 70 per cent. The studies that analysed supply chain job advertisements had sample sizes of 832 and 900, respectively.

The majority (4 out of 7) of the qualitative studies employed semi-structured interviews as their study design (Dean and East, 2019; Schulze et al., 2019; Bals et al., 2019; Allden et al., 2018). One study used focus group meetings (Giunipero et al., 2006); one analysed content from job advertisements (Wahab et al., 2024) and one study employed observations and unstructured interviews (Derwik et al., 2016). All but two studies that applied a mixed methods design used cross-sectional surveys and semi-structured interviews. Of the remaining studies, one combined focus group meetings and a cross-sectional survey (Giunipero et al., 2005) and the other combined a world café, a Delphi survey and interviews (Beske-Janssen et al., 2023).

The descriptive analysis of the studies included in the review shows a lack of empirical studies on soft skills for supply chain practice in developing economies. The composition of the sample is skewed towards managers and executives, with diminished inclusion of operational-level cadres. Regarding the research design of the studies included in this review, the results indicate that the cross-sectional design (95%) was the most adopted study design in quantitative and mixed methods research studies on soft skills for supply chain practice.

2.4.2. Meta-analysis of soft skills important for supply chain practice

The studies that had a quantitative component were reviewed and provided insights on soft skills considered to be important for supply chain practice and performance by the supply chain workforce. The studies use different scale ratings and lengths to rate the soft skills that are considered important for supply chain management. Table 2.8 summarises the range of the Likert scale lengths and total number of participants across these studies.

Table 2.8: Range of scale ratings and number of participants

Likert Scale Length	No of Studies	Total number of participants	Reference
0 (none to 9 (very high)	2	142	Rahman et al. (2012); Gammelgaard and Larson (2001)
1 (not important) to 5 (most important)	3	311	Wu et al. (2013) ; Thai (2012); Giunipero et al., 2005)
1 (not important) to 5 (very important)	1	90	Guinipero and Pearcy (2000)
1 (not important) to 7 (most important)	1	120	Bak et al. (2019)
1 (not significant) to 5 (critical)	2	257	Prajogo and Sohal (2013); Sohal (2013)
1 (strongly disagree) to 5 (strongly agree)	3	503	Paolucci et al 2021; Thai and Yeo (2015); Barnes and Liao (2012); Myer et al. (2004)
1 (strongly disagree) to 7 (strongly agree)	1	142	Essex et al. (2016)
Total	**13**	**1565**	

The aggregation process involved three steps. First, the list of soft skill variables from the quantitative studies was classified and standardised, as the authors used slightly different wording for the same soft skills. Second, the means of all the soft skill variables were normalized to a seven-point scale (1 = not important at all, 7 = very important. After those two steps, an initial list of 120 soft skill variables, extracted from the quantitative studies, converged to 19 soft skill categories As the third aggregation step, the soft skill categories were classified by applying the dimensional matrix described in section 2.2.1. Table 2.9 summarises the aggregated mean scores of the relative importance of 19 soft skill categories. Based on analysis of the normalised mean scores of the scale ratings, the ranking of the aggregated mean scores shows that *teamwork, analytical ability, conflict management, negotiation,*

strategic thinking, problem-solving ability, enthusiasm, time management, flexibility and self-management were considered to be top ten important soft skills.

Table 2.9: Meta-analysis of soft skill constructs

Soft Skill Category	Dimension	Frequency	Aggregated Mean¥	Std Dev	Std Error
Teamwork	Relational	10	6.12	0.263	0.083
Analytical Ability	Behavioural	2	6.07	0.422	0.298
Conflict Management	Managerial	2	5.99	0.236	0.167
Negotiation	Relational	8	5.92	0.325	0.115
Strategic Thinking	Managerial	4	5.90	0.349	0.083
Problem-Solving	Behavioural	11	5.88	0.476	0.143
Enthusiasm	Behavioural	4	5.88	0.336	0.168
Time Management	Behavioural	6	5.86	0.349	0.142
Flexibility	Behavioural	3	5.82	0.251	0.145
Self-Management	Behavioural	6	5.81	0.273	0.111
Leadership	Behavioural	13	5.81	0.387	0.107
Communication	Relational	16	5.75	0.549	0.137
Change Management	Managerial	8	5.75	0.330	0.117
Entrepreneurial mindset	Managerial	3	5.57	0.092	0.053
Creativity	Behavioural	2	5.50	0.272	0.192
Relationship Management	Relational	9	5.49	0.752	0.251
Cultural Awareness	Relational	4	5.32	0.406	0.203
Multilingual	Relational	4	4.82	1.164	0.582
Compliance	Behavioural	2	4.77	0.011	0.008

¥Scale: 1= not important at all, 7= most important

The meta-analysis shows that a diverse set of soft skills is required for supply chain practice and supports findings from earlier systematic reviews which identified similar soft skills as important for effective supply chain performance (Ashour et al., 2021; Karttunen, 2018; Derwik

and Hellström, 2017). Soft skills have been indicated to dominate the skills the supply chain workforce uses in practice daily (Derwik et al., 2016). A strategic mindset, supported by teamwork and communication is considered key to driving the strategic role of managers (Beske-Janssen et al., 2023; Dean and East, 2019; Schulze et al., 2019; Allden et al., 2018; Giunipero et al., 2006). Equally, an entrepreneurial mindset is considered to affect performance indirectly and supply chain managers who act more entrepreneurially are prone to possess abilities that allow flexibility (Hsu et al., 2011; Giunipero et al., 2005). The supply chain workforce often multitasks due to a high degree of fragmentation of work situations, and as a result, utilisation of a combination of soft skills in practice is essential to create synergies (Derwik et al., 2016).

In addition, Bak et al (2019) highlighted that a changing supply chain landscape encourages the acquisition and development of key soft skills. The emergence of Industry 4.0, driven by advances in information and digital technologies, offers new opportunities and challenges for supply chain management (Azzi et al., 2019). This development has implications for the relative importance and possession of specific soft skills required by the supply chain workforce. At its peak, the recent global COVID-19 pandemic was characterised by lockdowns, encompassing national orders to stay at home/work from home, curfews, quarantine protocols and other social restrictions (Yu et al., 2022; Pujawan and Bah, 2022). Lessons from the COVID-19 pandemic, together with the globalisation of business markets, have intensified the need for digitisation of supply chain processes for individuals and organisations (Mishra et al., 2023, Reza et al., 2022). This encourages the supply chain workforce to develop and possess a spectrum of soft skill elements related to emotional intelligence, such as self-awareness, self-control, empathy and social skills to sustain business relationships (Mishra et al., 2023). As a result, elevated levels of emotional intelligence (*perceiving and understanding emotions*) and assisting subordinates to manage emotions within the workplace are being recognised to help create a more positive workplace (Keller et al., 2020).

2.4.3. Insights on learning mechanisms

The studies shed some insights on learning mechanisms being used in practice to develop soft skills by the supply chain workforce. On-the-job (in-service) training methods, such as coaching, role-play, and simulation, using a combination of group and individual approaches, are identified as essential to improving soft skills (Dean and East, 2019). In this process, organisational experience is often tacit but considered to play a crucial role in developing a competent supply chain workforce. Nonetheless, current approaches used to develop the supply chain skills of undergraduates at learning institutions are considered to be misaligned to requirements in practice. Wu et al. (2013) and Sohal et al. (2013) noted that supply chain curricula at universities are mismatched to the requirements needed in practice. As a result, the supply chain workforce is not able to fully use and apply their skills in practice. This indicates the need to bridge the critical gaps in the development of supply chain skills, including soft skills, to meet the current business environment requirements.

The next section will take an in-depth look at the concept of learning from general literature. This is followed by an assessment of the impact of learning and work-related practices directed to the development of skills of the health supply chain workforce in developing economies, in line with objective 2 of the research project.

2.5. Disentangling concepts of training, learning and development

One of the key challenges identified in the literature is that the terms “training”, “development” and “learning” are interrelated and often used interchangeably (Masadeh, 2012). Generally, training, learning and development approaches are often used, in both developing and developed economies, to keep the workforce’s knowledge and skills up to date (Mlambo et al., 2021; Ceschi et al., 2021). In turn, these approaches have been attributed to improving workforce performance (Yiman, 2022; Jehanzeb and Bashir, 2013); and improving basic service delivery (Mpofu and Hlatywayo, 2015). However, due to the confusion surrounding the

use of “training”, “development” and “learning” in human resources literature, it is necessary to disentangle the meanings of these concepts to elucidate the associated activities and desired outcomes for workforce performance. Workforce performance is defined as the individual behaviour, related to what people do and can be observed, that generates value for the organisation (Lopez-Cabarcos et al., 2022).

2.5.1. Training

Workforce training is associated with on-the-job skills acquired for a particular role. McLeod and King (1996) refer to training as “*any activity or course, either formal or informal (e.g., on-the-job) which has helped you to acquire the knowledge and skills to do your job*” (p.25). Dermol and Cater (2013) added that training is an intervention that ‘*leads to desired changes in behaviour”* (p.330). Researchers have argued this assertion that training “*leads to changes in behaviour*” because elements such as attitudes are challenging to measure, and training alone is not enough to bring substantial long-term changes in attitude (Wills, 1994). Therefore, training is considered to be a process of acquiring new knowledge and behaviours as a result of practice, study, or experience (Salas et al., 2012).

2.5.2. Development

According to McCauley and Hezlett (2002), employee development involves “*the expansion of an individual's capacity to function effectively in his or her present or future job and work organisation*” (p.314). Development covers a wide array of activities including formal education, coaching, and job experiences (Noe et al., 2014). The term development has been used to mean the same thing as ‘training’ (Masadeh, 2012). Development points to the issue of expanding one’s potential through conscious and unconscious learning processes (Jayatilleke and Mackie, 2013). Unlike training, it is not concerned with the uniformity of learning outcomes but focuses on life-long learning and improving job performance by enhancing the workforce’s abilities (Neimeyer and Taylor, 2014).

2.5.3. Learning

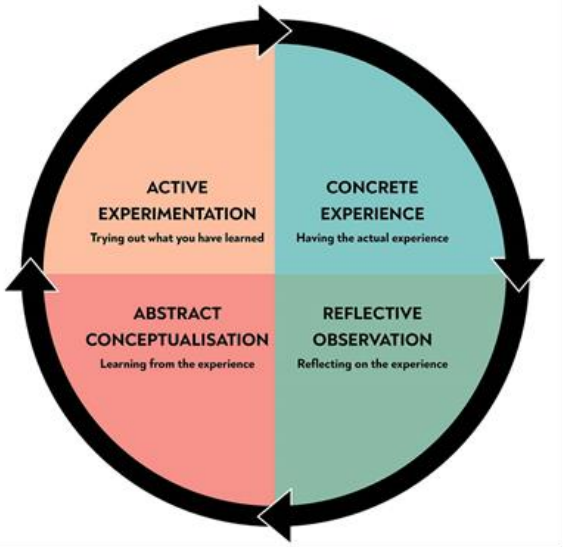
It is important to note that learning is undoubtedly a holistic process that encompasses both training and development. It is not merely a single event, but rather an ongoing process of acquiring knowledge, skills, and experience, which is why it is essential to approach it with the right mindset and attitude. (Masadeh, 2012). It is associated with professional development in continuous mode, both formally and informally (Hegney et al., 2010). According to Sloman (2005), learning is a process that is directed by oneself and is based on work, which ultimately leads to an increase in adaptability. This process is considered to be a lifelong journey that may not always be planned or intentional, in comparison to training, as stated by Garavan et al. (1999). It is a desired outcome of training (Salas et al., 2012).

The continuous nature of learning in informal settings may result in an unstructured process. As a result, learning is often conducted during day-to-day interactions with colleagues at the workplace (Olsen and Tikkanen, 2018; Weber, 2013). This allows some flexibility in the design and implementation of the learning process due to the mixed delivery process that can be used, depending on the context of the learning environment (Urhanne, 2020; Kember et al., 2020). In formal, planned, and structured learning, learners are typically separated from their regular work to participate in lectures, discussions, and other instructional activities. However, both formal and informal learning processes can take place in the workplace, and learners can benefit from the expertise that is already available and easily accessible (Crans et al., 2021). While learners have control over their learning, managers often play a role in facilitating the learning process by providing resources and support (Choi and Jacobs, 2011). This is because managers can facilitate the learning process by enabling the learning environment by creating time and space for the learners (Mlambo et al., 2021).

Therefore, for the rest of the thesis, the term ‘learning’ will be used to refer to all activities associated with the training and development of the skills of the workforce. Illeris (2002)

describes learning as consisting of cognitive, emotional and social dimensions. Jayatilleke and Mackie (2013), highlight that in practice, the cognitive aspects are most easily measured through assessments or performance, while the emotional and social aspects may be less easily captured. Further to this, learning is assumed to take place in the form of a cycle, as shown in Figure 2.4.

Figure 2.4: Four stages of Kolb's learning cycle



Source: Kolb et al., 1975

The cycle of learning comprises four elements: concrete experience, observation and reflection, formation of abstract concepts and testing in new situations (Kolb et al., 1975). The learning cycle can begin at any of the stages and is connected to the mechanisms that are used during pre-service and in-service, which are critically assessed in section 2.6.2. Vince (1998) argued that each of the learning stages should not be weighed equally, in terms of time and importance. The next section examines the impact of learning and work practices in health supply chains in developing economies.

2.6. Impact of learning and work-related practices on health supply chain performance

The contemporary global supply chain challenges offer opportunities for educational institutions to develop sustainable learning practices for the discipline of supply chain management (Salinas-Navarro et al., 2022). The belief in sustainability is important for educational institutions, as it sets the necessary curricular requirements to educate students in alignment with the current SDGs, particularly SDG 4 on Quality Education (SDG 4.7) to ensure that students acquire the knowledge and skills needed to promote long-term sustainable development and performance (Mori et al., 2019; UN, 2016). The learning experiences of the workforce need to go beyond technical skills, to integrate the development of the right soft skills (OECD, 2019; World Economic Forum, 2023). McCune (2021) adds that there is a need to engage learners with relevant, interesting, and motivating learning activities to improve the effectiveness of their learning performance.

This section addresses objective 2, i.e., to assess the impact of learning and work-related practices directed to the development of skills of the health supply chain workforce and their impact on health supply chain performance. This tackles the second research question, outlined in section 2.1: what approaches have been used to develop skills and how well have they worked? To this end, it is essential to first understand the background of learning and work-related practices to the development of workforce skills.

2.6.1. Formal and Informal learning practices

The learning practices used to develop the skills of pre-service students and at the workplace have been conceptualised as either formal or informal learning (Tillman et al., 2019; Svensson et al, 2004). Formal learning comprises planned activities designed to prepare individuals to acquire a specific set of knowledge and skills (Choi and Jacobs, 2011). Examples include didactic classrooms, online courses or workshops (Perier et al., 2022; Ligozat et al., 2018; Allen and Seaman, 2016).

Informal learning consists of learning through everyday practices, in non-educational settings and is often initiated by individuals on their own (Malcolm et al., 2003; Marsick and Volpe, 1999). Informal learning relates to experiential learning, "*a process through which a learner constructs knowledge, skills, and value from direct experiences*" (Jacobs, 1999, p.51). Informal learning is also associated with other terms, such as practice-based learning, project-oriented learning, and problem-based learning (Vasan et al., 2017; Govranos and Newton, 2014). In other words, informal learning at the workplace is embedded in the work and is characterized by the use of work-related encounters, relationships and interactions with peers, colleagues, and superiors, as well as opportunities for receiving feedback (Crans et al., 2021).

There have been arguments and a lack of agreement on the boundaries between formal and informal learning. There is a solid disposition to recognize formal and informal learning as separate, resulting in a polarisation between them, with advocates of the informal denigrating the formal, and vice versa (Malcolm et al., 2003). However, both forms of learning are regarded to be intricately interrelated and there have been concerted efforts to integrate informal and formal learning and they have become an important part of work-related learning practices (Cha et al., 2020; Decius et al., 2019; Svensson et al, 2004; Malcolm et al., 2003). Consequently, individual learning in the workplace occurs through a dynamic interplay between formal and informal learning. Therefore, it is difficult to imagine one form being successful without the other. (Sambrook, 2005; Svensson et al., 2004). Studies by Burns et al. (2005) and Enos et al. (2003) demonstrate the crucial role of informal learning in the workplace. These studies suggest that most of the knowledge required for employees to perform their job duties can be acquired informally. These findings do not imply that formal learning is useless but rather emphasize the need to integrate both formal and informal learning to maximize employee development benefits.

The points above demonstrate the social nature of learning. As such, the workplace context in which learning takes place can influence whether employees engage in learning (Crans et al., 2021). The interrelationships and effects of formal and informal learning at the workplace can only be properly understood if the learning is examined in relation to the wider contexts in which it takes place, including the learning environment and the type of engagements learners can undertake (Salinas-Navarro et al., 2022; Malcolm et al., 2003). Furthermore, Ellinger et al. (2015) argue that contextual factors, such as values, norms, and learning orientation play a critical role in the acquired attitudes and characteristics tied to the individual that impact the development of supply chain skills. This makes the embedding of learning through experience, through experiential approaches, more relevant in the context of current efforts to prepare the workforce for the future of work (Li, 2022; Schwartz et al., 2017).

Experiential learning can be interpreted in several ways. One interpretation focuses on learners gaining field experience through full-time placements or internships (Babigumira et al., 2017; Curkovic and Fernandez, 2016; Vesper et al., 2010). Within the context of health supply chain management, this involves pre-service students going for placements at public and private organisations involved in various activities in the spectrum of supply chain management of health commodities. This approach has been criticised for restricting pre-service students mostly to a single organisation, which typically has its own unique set of culture, practices, the market for the services it offers and an idiosyncratic set of competitive priorities (Gartner, 2014). While context is present in this singular setting, more generalizable principles and important variations between organisations are opaque to the pre-service students. In contrast, experiencing multiple facilities during placements enriches the students' perspectives of intra-and inter-organisational distinctions and synergies to the foundational courses (Brymer and Newman, 2016).

A recent dimension of experiential learning focuses on simulations or the use of games as a pedagogical tool in the learning process to develop supply chain skills (Song et al., 2021; Chuang, 2020; Webb et al., 2014). An advantage of simulations or games is that they allow learners to participate in actual virtual explorations in situations where safety and security concerns may hinder on-site access (Lukosch and Comes, 2019) or in specialised areas that would otherwise be impossible, risky to do or costly to set up for learning purposes in real life (Yao et al., 2020; Rahim et al., 2012). Moreover, virtual simulations and games allow distance learners to experience learning tools that mimic real-world situations (Yao et al., 2020).

Although simulations and games are helpful in educational situations, they have been criticised by learners for lack of realism (Bardudeen et al., 2010). Furthermore, simulations and games for experiential learning have been criticised for lack of authenticity that could distract learners from experiencing learning (Le et al., 2015). However, it is worth noting that evidence on the impact of learning and development initiatives in organisations is generally limited and there are various challenges in researching this subject. One challenge is that numerous factors will shape or contribute to improved performance (Mikołajczyk, 2022; Bozer and Jones, 2018; Lee and Lee, 2018).

2.6.2. Pre-service and in-service learning practices

The World Health Organisation broadly categorised the learning mechanisms to develop workforce skills into pre-service and in-service (WHO, 2022). Despite widespread use, a large systematic review of the effectiveness of multiple learning strategies (e.g., group training, self-study, and peer-to-peer training) in healthcare systems in developing economies found that its effects on health workforce performance varied, from -19.9 to 60.8 per cent (median: 10.3, IPR: 6.1-20.7) (Rowe et al., 2018). These learning mechanisms are also being implemented to develop health supply chain skills in many developing economies (Nicol et al., 2019; WHO, 2016b; Adekola and Adelanwa, 2014). However, evidence reviews on health system

strengthening by Witter et al. (2022) identified limited evidence formally linking investments related to supply chain learning mechanisms to improved access to health services or better outcomes. The following section critically examines the impact of pre-service and in-service learning mechanisms to develop the skills of the health supply chain workforce in developing economies. A detailed description of the methods used to identify, screen papers, extract, and analyse the data from the relevant studies has been outlined in section 2.4.

A. Pre-service learning

Pre-service learning mechanisms (PSL) refer to any structured learning activity that takes place before and as a prerequisite for employment in a service setting (WHO, 2016b). These learning approaches occur before the workforce qualifies as professionals and focus on building specialised knowledge and skills and include didactic classroom-based learning at individual higher education institutions, regional training initiatives among various education institutions and distance learning, among others.

University education offers the highest level of formal qualifications in a subject area, leading to the award of a degree. In many countries, post-secondary education is offered through vocational education and training, leading to the award of diplomas and certificates. These formal education levels have predominantly been used to acquire technical skills across many subject areas. However, the misalignment of current curricula to develop supply chain graduates to requirements in practice has been highlighted by Wu et al. (2013) and Sohal et al. (2013). Many developing economies have been introducing health supply chain learning strategies at higher education institutions (Sarley et al., 2010; Motomoke et al., 2010). In Pakistan, Ghana, Rwanda and Tanzania, stand-alone pre-service curricula on health supply chain have been developed and implemented, which provides credit hours and leads to certification (Nina and Motomoke, 2016).

A cost analysis of stand-alone pre-service mechanisms has shown that providing supply chain training to prospective supply chain personnel (graduating students) was significantly more cost-effective than providing it to health facility staff already in service (Berhe et al., 2014). However, a limitation of standalone pre-service mechanisms is the sustainability of the curriculum or program in case of changes in school leadership or significant shifts in the funding landscape (WHO, 2023a). Most of the standalone pre-service mechanisms are funded through donor funding rather than domestic funding from the national governments (Itiola and Agu, 2018). As a result, due to the cyclic donor funding and prioritisation, it is difficult to obtain assurances on the long-term sustainability of stand-alone pre-service initiatives. On the other hand, the universities in Zambia and Liberia have been able to fully integrate the supply chain content into existing School of Pharmacy courses, which ensures sustainability (Nina and Motomoke, 2016; Matowe and Kolawole, 2014).

Another mechanism that has been used to bridge the skill gap in developing economies through pre-service learning (PSL) is the establishment of a network of Regional Training Reference Centres (RTRC), with a central coordinating body and locations in sub-regions (Brossette et al., 2011). RTRCs bring together universities, training centres and research organisations to conduct skill gap analysis; develop comprehensive training materials; and training of health workers on health supply chain management. RTRCs have been an effective and novel skills-building intervention approach for health supply chain management in Kenya, Rwanda, Tanzania and Uganda (Matowe et al., 2008). While RTRCs have significant benefits including a reduction in donor costs due to cost recovering mechanisms, the creation of local opportunities for the health supply chain workforce and fostering a culture of entrepreneurship, they have some limitations. These include a lack of adequate marketing plans to ensure sufficient enrolment, ensuring ongoing quality control of the courses a severely understaffed academic system, and overburdening health supply chain academic staff (Matowe et al., 2008).

Distance learning is another cost-effective mechanism, and evidence shows that it can be useful for acquiring new skills, as well as refreshing and updating existing knowledge. In this digital age, virtual learning centres can serve as an information exchange, expanding or supplementing content to focus on building the technical knowledge and skills in health supply chain management of the health workforce (Brossette et al., 2011). However, limited access to electricity and the internet are some issues that may compromise the application of distance learning as an intervention. The world is experiencing a global energy crisis due to a complex web of geopolitical issues that are causing prices for natural gas, oil and coal to soar (United Nations Industrial Development Organisation (UNIDO), 2022). The electricity situation in developing economies is dire. For example, a recent joint report by WHO, World Bank and Sustainable Energy for All, highlighted that more than 1 in 10 health facilities in South Asia and sub-Saharan African countries do not have access to electricity, while half of the health facilities in sub-Saharan Africa have unreliable power (WHO, 2023b).

The causal linkage pathway of access to electricity and improvement in education outcomes is widely published in the literature and potential mechanisms include an extension of an effective school day, allowing flexible study, and increased use of electrical devices and digital working aids (Sule et al., 2022; Rahman and Alam, 2021). Evidence from a systematic review on the effects of access to electricity interventions on socioeconomic outcomes in developing economies shows that electricity access interventions had a positive, although small effect (0.05 standardised mean differences) on the pooled education outcomes, such as enrolment, study time, years of schooling (Moore et al., 2020). In addition, despite improved internet penetration in developing economies in the last decade, there are still significant lags in integrating the Internet into learning (Korkmaz et al., 2022). Besides, there is unequal access to technologies used in online education and unequal access to data and connectivity, and the cost of internet access is beyond the reach of many people (Faturoti, 2022; Cullinan et al., 2021; Ramani, 2015).

B. In-service learning

In-service learning mechanisms (ISL) refer to any structured learning activity for persons already employed in a service setting (WHO, 2016b). It is extensively used as a process to refresh, maintain, and update technical knowledge and skills required to implement processes specific to the position and keep pace with continuing changes in policy and practice (WHO, 2015). In-service learning, through work placements or internships, is often the first professional work experience for students or new graduates and may offer the best opportunity to develop both technical and soft skills (Nichol et al., 2019).

Approaches to strengthening skills in health settings through in-service learning in developing economies have taken a variety of forms, the most common being traditional, didactic, group, or cascade-style training held outside the workplace (Vasan et al., 2017). In-service learning mechanisms that utilise adult learning principles, including on-the-job training, mentoring and feedback, supportive supervision and follow-up offer opportunities to bridge skill gaps for those already in-service and have been shown to increase job satisfaction and health worker motivation (Bryan et al., 2009).

In addition, distance learning also creates networks at the central, regional and international levels and can also help the supply chain workforce retain their skills and join virtual communities, where members can serve as technical resources for one another (Brossette et al., 2011). An example of a health supply chain management community is the International Association of Public Health Logisticians (IAPHL), established in 2007 and has grown over the years and now has a membership of about 8,000 people from nearly 147 countries, who share information and network virtually (IAPHL, 2023). The challenges with distance learning that were highlighted earlier in this section still apply to in-service learning mechanisms.

Although available evidence on studies on in-service learning mechanisms used in health systems has been considered low-quality because many studies had a high risk of bias, the marginal effect of in-service learning mechanisms, when added to other strategy components (medians ranging from –7.3 to 3.7 per cent), was smaller than the effect of in-service training when compared with a no-intervention reference group (Rowe et al., 2021).

In-service learning mechanisms that have been deployed in health supply chain systems in developing economies take different structures and serve distinct functions to those used in the wider health systems. They are identified using various terms, but they are broadly categorised as supportive supervision; mentoring and coaching (Avortri et al., 2019; Ward et al., 2019; Vasan et al., 2017). The section below provides an analysis of the impact of in-service learning on health supply chain performance:

i. *Supportive supervision (SS)*

Supportive supervision visits to health facilities offer an opportunity to implement such training approaches (Tegegne et al., 2018; Bailey et al., 2016). However, in developing economies supportive supervision visits have traditionally focused on reviewing the use of resources, such as finances, information, and health commodities, and delivery of health services in a brief period with infrequent follow-up (Djibuti et al., 2009). The evidence on realising and sustaining envisaged benefits from supportive supervision is mixed and in many low-income countries, supervision mechanisms are considered to have low coverage, are irregular, unsupportive, and demotivating (Avortri et al., 2019). Table 2.10 presents the effects of strategies incorporating supportive supervision on supply chain performance indicators, using on-shelf availability (OSA) and submission of logistics reports.

Table 2.10: Effects of supportive supervision on health supply chain performance

Intervention group	No. of studies	OSA MES[§] (IPR; range)	Logistics Reporting MES[§] (IPR; range)	Study Countries	References
Group in-service training plus SS plus mentoring	1	-2.4 (N/A; N/A)	-27.1 (N/A; N/A)	Zambia	Biemba et al. (2020)
Group in-service training plus SS	4	8.0 (0.42; -27.1 to 25.0)	N/A	Uganda, Ethiopia, Zimbabwe Guinea	Yongho et al. (2022); Kisakye et al.(2017); Chandani et al.(2014); Trap et al.(2001)

[§]Median Effect Sizes (MES), calculated as the intervention arm improvement minus reference arm improvement.

N/A, not applicable

Five eligible studies of supportive supervision mechanisms to improve health supply chain performance among the health workforce were found. In Zambia, there was no difference between the intervention and control arms in terms of the availability of integrated community case management (ICCM) tracer health products on the day of the survey visit or reported stock-outs during the month before the survey or submission of logistics reports by mobile phone (Biemba et al., 2020). The prevalence ratio for on-shelf availability of tracer ICCM health products ranged from 0.93 to 1.11 (median= 1.04). The prevalence ratio for the submission of logistics reports was 33.6 (95% CI: 8.8 to 128.5). There was no statistically significant effect of mobile health-enhanced supportive supervision and mentoring on health supply chain performance indicators. For studies on group in-service training combined with supportive supervision in Uganda, Ethiopia, Zimbabwe and Guinea, when compared with the control arms, the median performance improvement ranged from -27.1 per cent to 25 per cent (Yongho et al., 2022; Kisakye et al., 2017; Chandani et al., 2014; Trap et al., 2001).

ii. Mentoring

Mentorship is a flexible teaching and learning approach that serves the specific objectives of the health worker and health care service (Arnesson and Albinsson, 2017). Most in-service mentoring interventions implemented in healthcare settings were developed to strengthen clinical care, particularly maternal and neonatal care, promote evidence-based practices, promote retention, support new cadres, and develop leaders (Hoover et al., 2020). Although a review of mentoring approaches identified a shortage of publications on the implementation of mentorship programs in developing economies, the available evidence supports the assertion that effective mentorship contributes to the improvement of certain quality of care outcomes, including appropriate prescription and administration of health products (Schwerdtle et al., 2017). Table 2.11 presents the effects of strategies incorporating mentoring on health supply chain performance indicators.

Table 2.11: Effects of mentoring models on health supply chain performance

Intervention group	No of studies	No Expired Products MES[§], (IPR; range)	Equipment Functionality MES[§] (IPR; range)	Study Countries	References
Group in-service training plus mentoring	2	30.0 (N/A; N/A)	14.0 (N/A; N/A)	Cambodia Uganda	Horvath et al. (2022); Oshabaheebwa et al.(2020)

[§]Effect sizes calculated as the intervention arm improvement minus reference arm improvement. N/A, not applicable

Two eligible studies of mentoring strategies to improve health supply chain performance among the health workforce were found and showed a positive change. In Cambodia, observation of the expiry of health products showed a +30 per cent change in no expired health products after the mentoring intervention (Horvath et al., 2022). Medical equipment in good working condition and use (n=202 pieces) in seven regional blood banks in Uganda showed a

+14 per cent points change in the intervention group, while the improvement recorded in the second group was slower, with +7 per cent points over one year (Oshabaheebwa et al., 2020). The equipment in the intervention group was three times more likely to be in good working condition and use, with an odds ratio of 3.2 (95% CI: 1.49 to 6.83).

An international partnership model, to improve antimicrobial stewardship has been implemented in Ghana, Tanzania, Uganda and Zambia (Kerr et al., 2021). This has facilitated pharmacist-led interventions in Ghana that helped to improve access to national antimicrobial prescribing guidelines and improved compliance with policy from 18% to 70% for patients with pneumonia.

iii. *Coaching*

Coaching is the least known and studied approach to health worker performance and quality improvement (Vasan et al., 2017). Coaching is defined as a process of helping individuals through some form of facilitation where a 'coach' attempts to induce change in the trainees to enhance performance in particular areas (DiGirolamo and Tkach, 2019). Coaching shares some specific attributes with mentoring, but it remains distinctly different in approach. Vasan et al. (2017) argue that coaching facilitates learning by enhancing the trainee's behavioural change through self-awareness and/or by achieving higher levels of skill performance, whereas mentoring is grounded on a stable, longitudinal, and dyadic relationship where an experienced individual fosters a mentee using his/her superior professional and social experience, knowledge, and connections to advance the overall development of the mentee.

The coaching style of leadership is associated with delegation and elevated levels of trust in employees. Coaching leaders encourage risk-taking, and entrepreneurship and emphasise employee learning and development to deal with challenging tasks (Srinivasan et al., 2021). Despite low levels of coaching behaviour, significant positive associations were found between

coaching behaviour, supply workforce job satisfaction and supervisors' perceptions of their subordinates' job-related performance (Ellinger et al., 2005).

2.7. Contribution of the consolidated review to the existing body of knowledge

The combined review of soft skills requirements for supply chain practice and the impact of learning and work-related practices in health supply chain management adds to the existing body of knowledge on soft skills for the supply chain workforce and identifies some research gaps, which were explored further as part of this research project. First, the review shows a paucity of research studies on the soft skills of the health supply chain workforce in developing economies. The dynamic interaction between formal and informal learning mechanisms and the wider context of the workplace within which individual learning is taking place has been highlighted to be a key consideration (Salinas-Navarro et al., 2022, Ellinger et al., 2015). There is a need to extend the scope of understanding the soft skills of the supply chain workforce in the context of public health systems in developing economies. Health supply chain systems in developing economies are widely recognized to be complex and challenging to manage (WHO, 2018). These supply chains remain fragile with sub-optimal performance, which inevitably hurts the reliable provision of health products and services in such countries (Chow et al., 2018; Ewen et al., 2017; Mukasa et al., 2017).

Second, empirical studies that examine the development and application of soft skills required for performance in practice are limited. Rahman et al. (2012) applied an importance-expertise matrix analysis to identify soft skills that need further development among logistics professionals in China. Derwik and Hellstrom (2017) highlighted that competence in supply chain management is not specified by any skill element in isolation but rather by a combination of elements. Thus, understanding the appropriate soft skill combinations needed in supply chain practice is required. This could enhance the development of appropriate supply chain

learning curricula to meet current and future requirements in the respective business environments.

Third, there is limited understanding of the development of soft skills for the supply chain workforce. Extant literature has focused on evaluating soft skills requirements for effective performance but there is little analysis of how these soft skills were developed in the current business contexts. Studies by Rahman et al. (2012), Essex et al. (2016) and Thai (2012) highlight the need to focus on the development of soft skills of individuals in the supply chain workforce to prepare them to face future challenges. In addition, there is less focus on understanding the effects of factors, such as gender and socio-cultural, on the development of soft skills. This is critical because of the diversity of the workforce in today's business environment (Saxena, 2014). A heterogeneous workforce can be considered a strength to enhance productivity if managed properly. But it can also be a big challenge for management. As a result, there is a need to enrich the understanding of different insights of the supply chain workforce that can influence the design of tailored interventions to facilitate a better person-job fit.

Fourth, the review of the impact of learning and work-related practices on developing the skills of the health supply chain workforce in developing economies highlighted the deficiency of studies that focus on soft skills. None of the studies that were identified and met the eligibility criteria evaluated the effects of soft skill development on health supply chain outcomes. Therefore, there is a need to evaluate the effects of learning mechanisms on soft skill development.

Lastly, it is observed that the studies reviewed are not overly clear on insights regarding the relationships between soft skills and the work environment factors. The work environment variables are helpful in the analysis and explaining observed structures in the data. The current

global business environment is facing significant shifts due to socioeconomic, institutional, political, and cultural diversity and the sustainability of supply chains (Govindan et al., 2020). Although Flothmann et al. (2018b) identified a limited ability to explain the different preference types and relative importance of technical and soft skills with observable variables and suggested that these might be driven by unobserved variables, there is a need to further explore and analyse a variety of covariates on soft skills insights of the supply chain workforce.

2.8. Chapter summary

In summary, the review of soft skills required for supply chain practice supports previous findings, which identified similar soft skills requirements for effective supply chain performance. However, the literature review has shown that there is a compelling case to explore the development of soft skills in the health supply chain workforce in developing economies. Whilst, the synthesis of data shows the soft skill requirements for supply chain practice, there is a lack of studies that reflect the insights of the supply chain workforce in developing economies, specifically in the health sector. In addition, the majority of the studies on soft skills for supply chain management focus on managers and executives. The use of soft skills in supply chain practice is not limited to those in management roles.

The evidence on the effects of learning and work-related practices to enhance the skills of the health supply chain workforce and influence supply chain outcomes in developing economies is mixed. From the studies analysed, supportive supervision mechanisms had no statistically significant impact on the health supply chain performance indicators. Although mentoring mechanisms showed a positive effect on health supply chain performance, few studies empirically assess the effect of mentoring programs in health supply chain management. Similarly, coaching mechanisms are also least studied, but despite the low levels of assessment of coaching mechanisms, significant positive associations have been found between coaching behaviour, supply workforce job satisfaction and perceptions of the

workforce's job-related performance. These learning and work-related practices to develop the skills of the workforce have to be examined in the wider contexts in which it takes place.

From the deliberations above and considering the social nature of learning at the workplace, there is a need to understand the development of the soft skills of the health supply chain workforce, in relation to all hierarchical levels and the working environment. This is important to respond to current and future requirements of the workplace. In addition, this will also be essential to improve the establishment of training and development needs of the supply chain workforce to facilitate a better person-job fit. Thus, this research project focused on the contribution of learning mechanisms in the development of soft skills within the social, economic and cultural contexts of the health supply chains in developing economies. Before outlining the methodology used for studies 1-4, the next chapter looks at the theory and conceptual framework that guided the investigation.

CHAPTER THREE: THEORY AND DEVELOPMENT OF THE CONCEPTUAL FRAMEWORK

3.1. Introduction

Research on soft skills is drifting towards more contextualised approaches to adapt and integrate soft skills to emergent political, economic, cultural and social elements (Wilson and Barbat, 2015). The primary focus of studies on soft skills has been on the identification and assessment of soft skills that are considered important for effective performance in different sectors, predominantly in Western and non-health supply chain contexts (Karttunen, 2018; Flothmann et al., 2018b, Derwik and Hellström, 2017). Researchers and practitioners have been urged to explore combinations of soft skills that work in supply chain practice; relationships between soft skills and contextual factors; and insights into the soft skill development process (Rahman et al., 2012; Essex et al., 2016; Thomas, 2014; Thai, 2012).

Critically reviewing the assessment and development of soft skills requires an understanding of the theoretical foundation in the field of soft skills and establishing an appropriate conceptual framework to guide the research project. Theory development can draw on several established theories. This project focused on the analysis of soft skill development at the individual level, which helps to explain how different factors interact to shape learner behaviour and the use of soft skills (Gibb, 2014).

The boundaries and elements of soft skills development are gaining increased attention in recent studies, particularly concerning the different environments that influence the set of predictors and outcomes). The previous chapter has highlighted some of the existing graduate skills frameworks that include skills dimensions, external factors and personal circumstances. OECD (2001) proposed a framework for skills, in general, that includes cognitive, intrapersonal, and interpersonal factors. The framework by Lamri and Lubart (2023) extends

the framework of the generic skills by asserting that all skills, whether technical or soft, can be understood in terms of five distinct components:

- knowledge, which includes internal knowledge, such as memory and external knowledge, such as job-related knowledge.
- active cognition, involving analysis of the environment and the context to form decisions and opinions.
- conation, describing preference, motivation and volitional components of behaviour. It includes the drive to act, i.e., “will” or “willingness” to act.
- affection, which is the ability to empathize with and manage feelings to build relationships with others.
- sensory-motor abilities, which refer to the ability to control and coordinate movement.

Similarly, other studies highlight the importance of cognitive, affective, and behavioural processes in the development and application of both technical and soft skills (Soto et al., 2022; Parlamis and Monnot, 2019. However, at the individual level, there are multiple theories which attempt to model or explain the different facets of skills. Examples include theories of decision-making, such as subjective expected utility, heuristics theory, attribution theory and game theory (Grabisch et al., 2023; Aliev, 2013; Gigerenzer and Gaissmaier, 2011); theories of teamwork, such as Tuckman’s model (Tuckman et al., 1977) or leadership theories, such as the great man theory, trait theory and behaviourist theories, (Kenney et al., 1996; Greenwood, 1996).

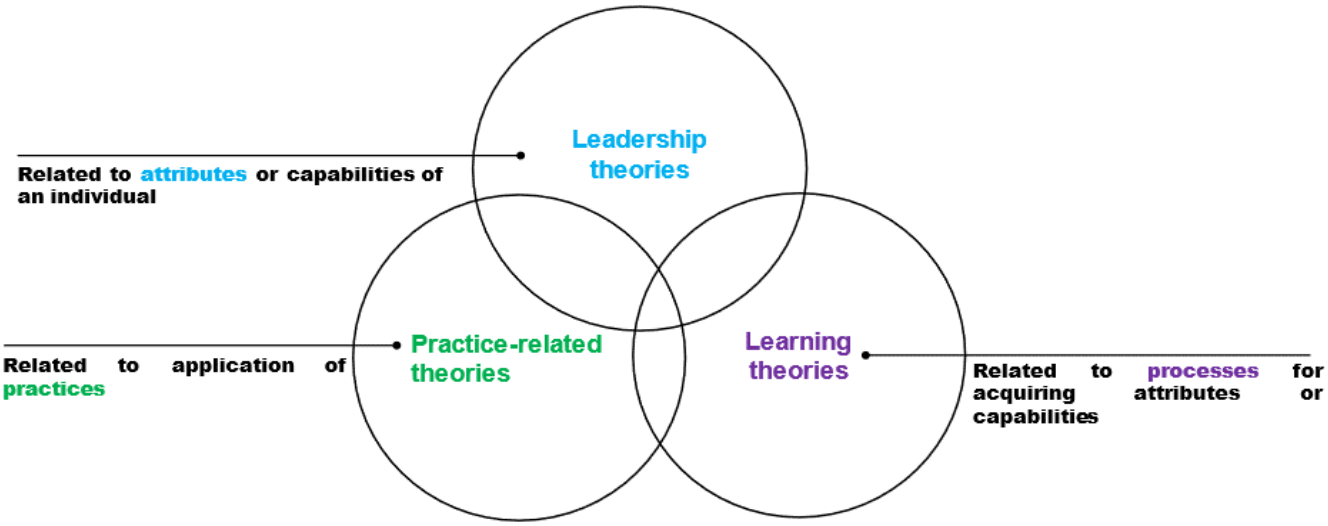
However, to date, there is a dearth of empirical studies that explore the interactions between the development and use of different soft skill components and contextual factors. This research project addresses this research gap, through empirically testing the validity of the relationship of different soft skill development constructs. This chapter lays the foundation for the methodology outlined in the next chapter, by critically analysing the underlying

assumptions of different theories that underpin soft skill development and concludes by proposing a conceptual framework that was used to guide this research project.

It is worth emphasizing that some of the theories that are linked to soft skill development are intimately related as they look at key attributes, processes to develop the key attributes and application in practice. Therefore, to facilitate an understanding of the theoretical landscape in the soft skills field, the theories have been selected on the basis that they focus on the individual level instead of group, team or organisational levels. As a result, organisational resource-related theories, such as the resource-based view (RBV) (Barney, 1991), knowledge-based view (KBV) (Grant, 1996) and dynamic capability view (DCV) (Teece, 1997) have been excluded in this analysis. This is because organisational resource-related theories seek to explain how the tangible and intangible resources, or capabilities of an organisation determine performance (Bag et al., 2021; Mikalef and Gupta, 2021). In addition, although the workforce is part of the organisational resources that play a key role in building competitive advantage by creating value and improving firm performance, different internal resources contribute to the creation of an organisation's competitive advantage (Amaya et al., 2022).

The theories used to develop the project conceptual framework are grouped into leadership theories, learning theories and practice-related theories (Figure 3.1). These theories were selected based on their focus on the attributes or capabilities of an individual, processes for acquiring attributes or capabilities, and application of practices in specific contexts. A combination of features from these groups of theories was considered to provide a platform to develop a robust conceptual framework to understand the development of soft skills of the health supply chain workforce in developing countries.

Figure 3.1: Groups of theories used to develop the project conceptual framework



First, leadership theories were considered appropriate as they encapsulate the collaborative nature of relationships with peers, colleagues and superiors, grounded on the shared values of people working together, that leads to collective action to effect positive change (Kumar et al., 2014). Second, learning theories capture the different dimensions of the learning processes that are needed to develop attributes or capabilities required to perform adequately which were discussed in Chapter Two. Third, Crans et al. (2021) allude to the potential influence of the workplace context on whether employees engage in learning. As a result, practice-based theories are useful as they capture how day-to-day activities influence performance. Each of these three groups is discussed in turn in the following sections.

3.2. Leadership theories

Leadership theories enable the investigation of the characteristics of leaders and how they influence followers and team performance. They have been applied to research studies on soft skills by Sriruecha and Bruajan (2017) and Crosbie (2005). However, there is a wide range of leadership theories, both traditional and contemporary. Table 3.1 below summarizes the main leadership theories and how they fit into understanding soft skills development.

Table 3.1: Key assumptions of leadership theories

Leadership Theory	Key Assumptions	References
Traits Theory (also known as the "Great Man Theory")	Based on the belief that some rare individuals are exceptional people, with innate qualities, that make them different from non-leaders lead. The use of the term 'man' was intentional since until the latter part of the twentieth century leadership was thought of as a concept which is primarily male, military and Western.	Northouse (2021); Northouse (2019); Antonakis and Day (2018)
Behaviourist Theories	Concentrate on what leaders do rather than their qualities. Different patterns of behaviour are observed and categorised as 'styles of leadership'	Northouse (2021); Allen (1998)
Contingency theories (also referred to as situational leadership**)**	These theories assume that the behaviour of a leader varies from one situation to another. Thus, effective leaders use different leadership styles depending on the situation and followers. Three parameters are key: behaviour, context and the need.	Villoria (2016); Goldsmith et al (2002)
Process-oriented Leadership Theory	These theories focus on process and include servant leadership, principal-centred leadership and charismatic leadership. These theories suggest that the work of leaders is to contribute to the well-being of others with a focus on some form of social responsibility.	Fischer et al. (2017); Nawaz and Khan (2016)
Transformational Leadership Theory	This approach emphasises the importance of the relationship between the leader and followers, focusing on their values to impact performance. This is derived from a form of 'contract' through which the leader delivers such things as rewards or recognition in return for the commitment or loyalty of the followers.	Northouse (2021); Asrar-ul-Haq and Anwar (2018)

Leadership Theory	Key Assumptions	References
Transactional Theory	Focuses on social exchange to facilitate impact on the performance of employees towards established goals.	Northouse (2021); Asrar-ul-Haq and Anwar (2018)

Leadership theories are relevant to the research project on soft skills as they facilitate the identification of desirable attributes or capabilities of an individual (Benmira and Agboola, 2021). Concerning supply chain management in healthcare, these attributes relate to the soft skills that enable effective end-to-end management of health products. Leadership theories facilitate the identification of attributes of an ideal and effective supply chain leader and their behaviours. This is relevant to research on soft skill development as it helps set the key attributes and behaviours that are ideal for supply chain management. In addition, they may facilitate multilevel studies to understand the relationship(s) between a leader's soft skills and followers' performance. Leadership theories that focus on social relationships between leaders and followers; and behaviours/styles in different contexts towards achieving established goals seem relevant to the project of soft skill development, as they relate to the social nature of learning at the workplace that was reflected in Chapter Two.

However, the use of leadership theories to understand the development of soft skills has some drawbacks. Firstly, theories such as traits and behaviourist theories that focus on the ideal attributes and behaviours of leaders may set unrealistic and unattainable expectations, may be possessed by an exceptional group of individuals and may not reflect the work environment of the rest of the workforce. Yet, soft skills are individual attributes required for all individuals across organizational levels. Put differently, soft skills and their effect on work outcomes go beyond individuals in managerial positions. Secondly, leadership theories focus on the leader and the influence of leaders on followers (Uhl-Bien et al., 2014). Lastly, leadership theories do not assess how these skills develop within leaders. As a result, the points above limit the use of leadership theories, such as traits and behaviourist, in understanding soft skill development.

Literature in leadership theory is extensive and continues to evolve (Benmira and Agboola, 2021). The traits and behavioural theories are now very outdated and have been replaced by more complex theories, for example, transformational, leader-member exchange, authentic, servant etc.

3.3. Learning theories

Illeris (2002) highlighted that in general, a good theory of lifelong learning addresses the cognitive, emotional and social dimensions of learning. These dimensions are needed to fully understand the qualities of a learner, who is required to perform adequately and flexibly in both routine and uncommon situations. The learning theories in this group include the widely accepted theories of learning: behaviourist, constructivism, cognitivism, and humanism (Gandhi and Mukherji, 2023; Kwon and Silva, 2020).

3.3.1. Behaviourism

According to the theory of behaviourism, learning occurs by linking stimuli and responses (Kwon and Silva, 2020; Zhou and Brown, 2017). Behaviourism is rooted in three basic assumptions: observable actions, the environment under which the behaviours are performed, and the reinforcement of desired behaviours, which is central to the learning process (Gandhi and Mukherji, 2023; Torre et al., 2006). For example, a change in performance is evident after the learning process, and the outcome is measured in terms of being able to demonstrate a specific new behaviour.

Behaviourism is useful to this research project on soft skill development as it facilitates the construction of learning objectives or the designing of aptitude-based curricula. The behavioural objectives allow the learner to know exactly what skills or behaviours will be learned, the contexts or conditions under which it will be performed, and the criteria with which it will be evaluated. By delineating learning objectives in this way, the level of ability that is

expected for each element enables interrogation of relationships of skills acquired, contexts, application and outcomes. Although behaviourism has been widely studied, behaviourists continue to struggle to find consensus on the definition of behaviourism and identify who were the true behaviourists (Mills, 1988). This theory has also been criticised. One of the drawbacks of behaviourism is the lack of focus on cognitive skills. The theory emphasises observable behaviours and external stimuli. As a result, it overlooks what might occur in people's minds (Weegar and Pacis, 2012). In addition, the effect of the environment in shaping the behaviour of a human is not taken into consideration. Behaviourists were only interested in behavioural responses to test stimuli (Zhou and Brown, 2017). In so doing, behaviourism oversimplifies the complexity of human learning; moderates the role of the learner in the learning process; disregards the learner's cognitive skills and emotions. (Abramson, 2013; Weegar and Pacis, 2012). The latter is important in soft skill development, so it makes this theory not useful to this project.

3.3.2. Constructivism

In contrast to the beliefs of behaviourism, constructivism views learning as a search for meaning. While behaviourism would continue to look at the content to be learned and the influence of the environment upon that learning, a constructivist would be more interested in knowing how the learner is attempting to construct meaning (Bada and Olusegun, 2015; Narayan et al., 2013). Thus, constructivism is premised on the assumption that individuals learn by constructing new ideas, and an understanding of the world is based on prior knowledge and experiences (Gandhi and Mukherji, 2023).

Vygotsky (1978) introduced the social constructivist theory that proposed that learning and knowledge are created through social interactions and processes and are not considered to be the result of individual experiences. Vygotsky believed that as the learner confronts a new idea, a mediator, or a more knowledgeable person, would help the learner construct cognitive

connections between what they experience and prior knowledge (Palincsar, 1998). Bandura's social learning theory extended the earlier learning theories and proposed that human behaviour is substantially learned through mediated models (Bandura,1985).

Constructivism emphasizes the internal thinking of the learner but makes no assumptions on how concepts will be employed or how the connections will be made. Since the basis of learning at the workplace is placed on making connections, with peers, colleagues and superiors, and generating new ideas and capabilities from prior knowledge, these mental representations are very subjective, and each learner will have a unique construction of knowledge (Gandi and Mukherji, 2023). Thus, constructivism is particularly relevant in the research project on the development of soft skills due to the complexity and rapid transitions in supply chain management, driven by technological advances, labour market changes, and an increasingly competitive environment (Crick and Crick, 2020; Kiseľáková et al., 2019; Liu et al., 2019).

3.3.3. Cognitivism

Cognitivism is grounded in the work of Jean Piaget (Piaget, 1976), which acknowledges that development precedes learning and suggests that humans are unable to automatically understand and use information that they have been given. This is because humans need to "construct" their knowledge through prior individual experiences to enable them to create mental images. Although the theories of Vygotsky and Piaget are similar about how learners learn, Vygotsky placed more emphasis on the importance of the social contexts of learning. The role of the teacher differs in both Vygotsky's and Piaget's theories. The teacher is a central figure in learning according to Vygotsky's theory. Whereas in Piaget's theory, the teacher plays a limited role. The nexus between the need for learners to understand and use the information they are given and the importance of the social context of learning strengthens the relevance of cognitivism in research on soft skill development.

3.3.4. Connectivism

Connectivism is grounded in the view that learning is a result of connections formed between individuals, as well as their roles, hobbies, and other aspects of life. Therefore, learning is the ability to navigate and construct these networks. It extends Piaget's theory of cognitivism, but under connectivism, learning does not reside only with the individual, instead extends to a network of individuals, i.e., a "community of practice" (Corbett and Spinello, 2020). This relates to the social nature of learning at the workplace reflected in Chapter Two. Informal learning through everyday practices, in non-educational settings, is often initiated by the learners, as pointed out by Malcolm et al. (2003) and Marsick and Volpe (1999) and connects with the theory of connectivism.

3.3.5. Humanism

This theory suggests that learning is a natural desire, centred on human values, interests, capacities, needs, worth, and dignity with the ultimate goal of achieving self-actualization (Madsen and Wilson, 2012). The humanistic approach is closely related to constructivism and emphasizes the freedom and autonomy of learners. It connects the ability to learn with the fulfilment of other needs, building on Maslow's (Maslow, 1943) hierarchy of needs and the perceived utility of the knowledge to the learner (Conner, 2012). Since humanism assumes that the desire to learn is innate and aimed towards the ultimate goal of self-actualization, the motivation must come from the learner. This is particularly relevant in informal learning at the workplace, where the learner leads and initiates the process of learning based on the experiences they confront in their everyday work (Choi and Jacobs, 2011). Thus, the interaction between the individual and the social environment implies a relation of mutuality that is dynamic. The learning theories outlined above point towards the importance of the work environment where the learning and the social interactions and the motivation of the individual to learn (Adams, 2007; Palincsar, 1998). This makes learning theories a better fit than

leadership theories for the project on soft skills' antecedents and consequences for several reasons.

Firstly, learning theories help to achieve the research project's aim '*to critically investigate the determinants of the development of soft skills for the health supply chain workforce in developing economies* by focusing on individuals and how they interact with other elements within their environment. This facilitates understanding of the influence of differences in the work environment contexts towards the development of soft skills that are driven by institutional, political, cultural and socioeconomic issues, as highlighted by Al Mehrzi and Singh (2016). Besides, the individual is the unit of analysis for this project, and this makes constructivism, connectivism and humanism relevant to understanding insights into the development of soft skills.

Secondly, the social constructivist learning theories involve an interchange between social interaction and active learning through experience. They focus on the individual and how each constructs and applies knowledge (behaviours and practices) in a social environment (Amineh and Asl, 2015; Thomas et al., 2014). As highlighted in Chapter Two, in-service learning mechanisms, through work placements, and internships, are often the first professional work experience for students or new graduates and offer the best opportunity to develop both technical and soft skills (Nichol et al., 2019). As a result, in-service learning mechanisms offer a social learning environment, where a community of health practitioners, support the health supply chain workforce to continue to actively learn, construct and re-construct knowledge through interactions, engagement, and communication. This enables the health supply chain workforce to acquire and apply skills within their work environment through active inquiry and collaboration, construct meaning and provide solutions to real-world issues.

Thirdly, constructivism, connectivism and humanism suggest that learners will build their understanding and knowledge of the world through their experiences and their reflections on those experiences. For example, during the experiential learning cycle, a learner responds to an experience by processing and interpreting new information through assimilation or accommodation. As a result, these learning theories enrich the understanding of soft skill development by focusing on individuals, the unit of analysis for this project. Furthermore, the diversity of cultures and stakeholders in health supply chains in developing economies makes them more appropriate to use constructivism, connectivism and humanism in exploring the development of soft skills required by the health supply chain workforce. They enrich the understanding of the development of a wide range of soft skills due to multiple donors and implementing partners that fund and implement health supply chain strengthening activities in most developing economies, respectively. However, attribution of observations to particular cultures or stakeholders may be a challenge.

3.4. Practice-based theories

Distinct from the learning and leadership theories, which have been discussed above, the practice-related theories focus on the day-to-day activities, processes and practices in specific contexts about work performance. They are a departure from attributes or behaviour of an individual or process of learning that are captured under the leadership and learning theories, respectively. Practice-based theories complement the leadership and learning theories by focusing on the influences of the work environment, practices and performance.

3.4.1. Practice-based view

The practice-based view (PBV), proposed by Bromiley and Rau (2014), is an alternative to the RBV (Barney, 1991). It is a relatively new perspective in the area of management research. Practices are described as “a specified activity or set of activities that many firms might execute” (Bromiley and Rau, 2014). The PBV assumes that the small day-to-day activities of

any organisation influence its performance. It focuses on common practices and performance. In health supply chain terms, these practices include the day-to-day interactions with internal colleagues, and external stakeholders (donors, implementing partners, suppliers and policymakers) that enable the workforce to deliver medicines and other health products to the population within communities. In addition, these day-to-day interactions in organisations play a critical role in fostering managerial practices which significantly influence an organisation's performance (Karplus et al., 2021; Parameswar et al., 2021). However, some researchers, such as Jarzabkowski et al. (2016) have criticised the PBV for limiting its focus to practices. By focusing on the "what" practices are used, it minimizes the implications of "who" is engaged in the practices and "how" the practices are carried out. In addition, Rouleau (2013) highlighted that there is little consensus on what is "practice" or about how the concept is used in management research. As a result, there is a risk of misattributing performance differentials (Jarzabkowski et al., 2016). Rouleau (2013) highlights how practices can be viewed as managerial actions, a set of tools, knowledge, organisational resources and part of global discourse. These different views of practice influence each other to provide a collective process to understand the development of soft skills in real-life situations. By focusing on the adoption of a set of imitable practices (e.g. practices derived from the implementation of soft skill development approaches at the workplace), PBV offers an approach that explains the variation in organisations' performance.

3.4.2. Contingency theory

Sousa and Voss (2008) suggest that with maturity in operations management processes, research on practices moves from validation of the value of the practices to understanding the contextual conditions under which they are effective, which represents practice contingency research. According to contingency theory, organizational processes and structure should adapt to suit the context it is operating to achieve improved performance (Donaldson, 2006). Arora and Gigras (2018) argue that health supply chain operations aim to continuously

maintain the health of the population through effective and efficient delivery of medicines and other health products for the prevention, diagnosis and treatment of diseases. In this context, it is critical to keep in mind that while ensuring the delivery of health products and services to the population at health facilities, the health supply chain workforce should consider the local environment. Examples of local environmental issues include a mix of implementing partners supporting different initiatives, the level of complexity of the health supply chain structure and incentives for the supply chain workforce.

Both the practice-based view and contingency theory are relevant to the project of soft skill development, as they enable a link to the relationship between practices about learning of the individuals, and the work, organisational and social practices. Health supply chain skills, both technical and soft skills, need to align with both the organisational context (structure and culture) and the socio-economic contingency factors (Salam and Khan, 2020). Hence, following the tenets of contingency theory and the practice-based view, one can assert that investigating the practices of development of soft skills, under different social and work environment contexts, may provide invaluable insights to further improve service delivery and performance. As highlighted in Chapter One, this was the focus of this research project, with a specific focus on the health supply chain workforce in developing economies.

3.5. Conceptual framework for soft skill development

As highlighted in the sections above, research on soft skill development can be conceptualised through the theoretical lens of leadership, learning and practice-based theories. Each group of theories offers merits and demerits in the investigation of soft skill development, and these have been highlighted in the respective sections above.

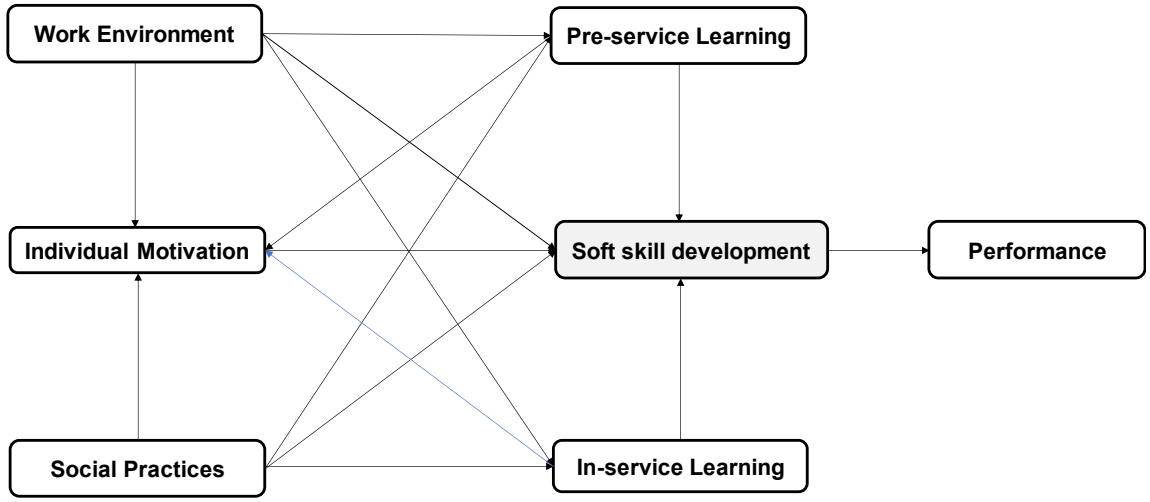
As a result, to address these gaps, the conceptual framework for this research project, depicted in Figure 3.2 and described below, combines tenets of humanistic, practice-based and

contingency theories. While these theories are intimately related, they offer a balance of views that were considered suitable for understanding the development of soft skills. This is important because both learning and practice-based theories provide three key elements that provide a foundation for understanding the development of soft skills in the contexts of health supply chains in developing economies. First, the consequence of both groups of theories is to influence a positive change in performance. The suboptimal performance of health supply chains in developing economies has been highlighted in publications by Chow et al. (2018), Ewen et al. (2017) and Mukasa et al. (2017). The effects of learning and work-related practices to enhance the skills of the health supply chain workforce on performance, which is presented in section 2.8, highlighted a mixed picture. These learning and work-related practices need to be examined in the wider contexts in which they take place and this study's conceptual framework integrates the learning mechanisms commonly used to develop skills in health supply chains in developing economies (i.e. PSL and ISL).

Second, the two groups of theories combine an emphasis on individual learning and the effect of day-to-day activities, processes and practices in specific contexts on work performance. The literature review highlighted that learning at the workplace is essential to keep the workforce's knowledge and skills up to date and improve performance (Yiman, 2022; Mlambo et al., 2021; Ceschi et al., 2021, Mpofu and Hlatywayo, 2015).

Third, the importance of the environment to the learning process was emphasised by Salinas-Navarro et al. (2022), Ferguson et al. (2022) and Mlambo et al. (2021). The practice-based view and contingency theory place emphasise the influences of the work environment and day-to-day practices on performance. Thus, the practice-based view and contingency theory extend the aspects of the work environment to support the dimensions of learning that are outlined in the learning theories.

Figure 3.2: Conceptual framework for soft skill development



As a result of the three key elements above, both learning and practice-based theories were considered to provide a robust theoretical foundation to support the formulation of appropriate hypotheses related to the development of soft skills, outlined in Chapter Four. In addition, they also provide a framework to guide the critical analysis of the relationships of elements from the primary data collected to address research objectives 3 to 6, outlined in Chapter One.

As highlighted above, the proposed conceptual framework builds on the literature review presented in Chapter 2 and seeks to expand the current knowledge on the development of soft skills by understanding how the constructs of soft skills relate to each other. Each of the different elements of the conceptual framework is critically discussed below. First, the conceptual framework assumed that an individual, i.e., the health supply workforce in the context of this research, as the unit of analysis, interacts with their context (social factors and organisational variables) and learning processes and practices to acquire soft skills required for effective job performance. This has gained increasing importance in the management literature due to pressures to gain a competitive advantage in an increasingly dynamic work environment, characterised by acute resource constraints and challenging operating health supply chain contexts (Alabi et al., 2023; Frisch et al., 2021; Hennekam, 2016). As indicated

in the introduction chapter, these soft skills consist of abilities and attributes that relate to personality, attitudes and behaviours (Pellegrino and Hilton, 2012; Muzio and Fisher, 2009).

Secondly, as presented in section 2.6, the extant literature emphasises the learning practices commonly used to develop the skills of the health supply chains in developing economies. These form the second component of the conceptual framework and are presented as pre-service and in-service (WHO, 2022; Nicol et al., 2019; Tillman et al., 2019). The learning practices represent a defined activity or set of activities that various organisations in similar contexts should execute to achieve the desired skill development of the workforce and performance. There is no need for exclusivity in an organisation adopting these practices to achieve operational improvements. The assumption is that these practices are exchangeable within the industry sector and all the workforce and organisation will experience performance improvement.

Third, the humanistic theory of learning assumes that the desire to learn is innate and aimed towards the ultimate goal of self-actualization (Madsen and Wilson, 2012). This implies that the motivation to learn must come from the learner and leads to the third component of the conceptual framework. (Choi and Jacobs, 2011) stressed that the control of learning, in both formal and informal learning processes at the workplace, is in the hands of the learners. Lans et al. (2015) and Baird (2014) argue that an individual's knowledge, skills, and experience facilitate a link between individual and organizational outcomes. Building on this argument, scholars such as Sonderegger et al. (2021), advocated that the characteristics of an individual, including personality, abilities, and knowledge provide the internal motivation or attitude towards supply chain tasks. The concept of 'attitude' has been extensively studied. Ajzen (2001); Eagly and Chaiken (1993); and Fishbein and Ajzen (1975) highlighted three different components of attitude: *cognitive, affective, and behavioural*. These three constructs of attitude capture the construct of individual motivation to learn. Concerning this research project, the

cognitive aspect refers to the health supply chain workforce's need to understand the soft skills required to perform in work situations. The *affective* aspect relates to the health supply chain workforce's need to feel good about the soft skills they possess. The *behavioural* aspect occurs when the health supply chain workforce attempts to use the soft skills, they possess in work practices. These aspects tie in with assumptions outlined in the learning theories of cognitivism, constructivism, connectivism and humanism, presented in section 3.3.

Fourth, the constructs of individual motivation, learning mechanisms and work-related practices to develop the skills of the workforce have to be examined in the wider contexts in which it takes place (Salinas-Navarro et al., 2022; Ellinger et al., 2015). These contextual factors are captured in the proposed conceptual framework. Social practices influence the habits, culture and behaviours of the workforce, which they bring to the work environment. The social practices include political, economic, cultural and other social variables that play a critical role in the acquired attributes and attitudes tied to the individual and influence the development of supply chain skills (Osher et al, 2020; Ellinger et al, 2015). In addition, the work environment consists of dimensions related to organisational variables, including organisational processes, organisational structure and organisational culture (Lans et al., 2015; Baird, 2014). Both social practices and work environments have been shown to influence the performance of supply chain systems (Appiah et al., 2021; George et al., 2015; Mills, 2014). These contextual factors tie to day-to-day activities, processes and practices that have been judged to influence performance, as stated in the practice-based theories, presented in section 3.4.

Fifth, in this conceptual framework, the acquisition of soft skills is considered an output of the workforce, which refers to the ability of individuals to do something well, i.e., *what a worker can do* (Sonderegger et al., 2021). As highlighted by Flin and Maran (2015), these soft skills must be carefully specified for a given profession and task set. In section 2.4, a set of soft skills for supply chain practices is extracted from extant literature and presented. These are

integrated into the conceptual framework to represent a preliminary list of soft skills to investigate soft skill development in health supply chains in developing economies. These soft skills align with the employability skills required to prepare graduates to be employment-ready and meet market expectations, in terms of productivity and performance (Robson, 2023). Furthermore, the development of soft skills influences supply chain performance, adding the last component of the conceptual framework.

The proposed conceptual framework is distinctive in several ways: First, it challenges and extends research on the development of soft skills by emphasizing the importance of learning and work-related practices, both pre-service and in-service, in developing economy contexts. Secondly, there are limited studies that test the relationships of antecedents, moderators and outcomes of soft skill development. Therefore, in this research project, the relationships of individual motivation, social practices, work environment factors and learning mechanisms in the process of soft skill development.

Thirdly, based on studies on soft skills in supply chain management, researchers, such as Börner et al. (2018); Karttunen (2018); and Thomas (2014) have also called for a shift in soft skills research studies from ‘what are the key soft skills’ to ‘how soft skills are developed’ and ‘why it happens’. As a result, this research project identified key constructs from the review of current literature on soft skills, learning practices and theories linked to skill development to propose a conceptual framework that guided the collection and analysis of relevant data to address the research aim and objectives. These key constructs, i.e. individual motivation, learning mechanisms, social practices and the work environment are postulated to influence the development of soft skills and in turn performance.

3.6. Chapter summary

In this chapter, relevant contributions by researchers were reviewed to understand the underlying theories to the development of skills and their relevance to the research project of soft skill development. A combination of humanistic, practice-based view and contingency theories are used to help clarify the rationale of the proposed conceptual framework to explore and analyse the development of soft skills required for the health supply chain workforce in developing economies.

As part of the collaborative process of individual learning and work-related learning practices, social practices, work environment, learning mechanisms and motivation of the individual were identified as analytical constructs in the development of soft skills. Therefore, as contextualised in everyday work-related practices, the development of soft skills is an explanatory concept. The next chapter discusses the research methodology that was implemented to achieve the research objectives outlined in Chapter One.

CHAPTER FOUR: RESEARCH METHODOLOGY

4.1. Introduction

The research process involves gathering thoughts, data, and knowledge to address a query or improve on existing knowledge (Bhaskar and Manjuladevi, 2016). This process encompasses using systematic and scientific approaches, tools, or study methods (Saunders et al., 2019a). The research process is enhanced by the background in which the research takes place, based on the experiences and behaviours of participants in their 'naturally situated' contexts (Mielke et al., 2022). Therefore, the research aimed to '*critically investigate the determinants of the development of soft skills for the health supply chain workforce in developing economies*'.

Overall, the research project is principally exploratory and examines primary data from public health sector settings in developing economies. This chapter explains the approach used to respond to the "what", "why", and "how" questions leading to the use of methods and tools of investigation or analysis. The methods for the review and analysis of the secondary data have already been presented in Chapter Two. The research design and the research strategy are presented in sections 4.2 and 4.3, respectively. This is followed by the justification of the research approaches that were taken for the four studies that were conducted are presented in sections 4.4. to 4.7. Issues related to research ethics that were considered for this research are outlined in section 4.8. The steps that were taken to safeguard the research robustness, and rigour and minimise biases are laid out in section 4.9.

4.2. Research design

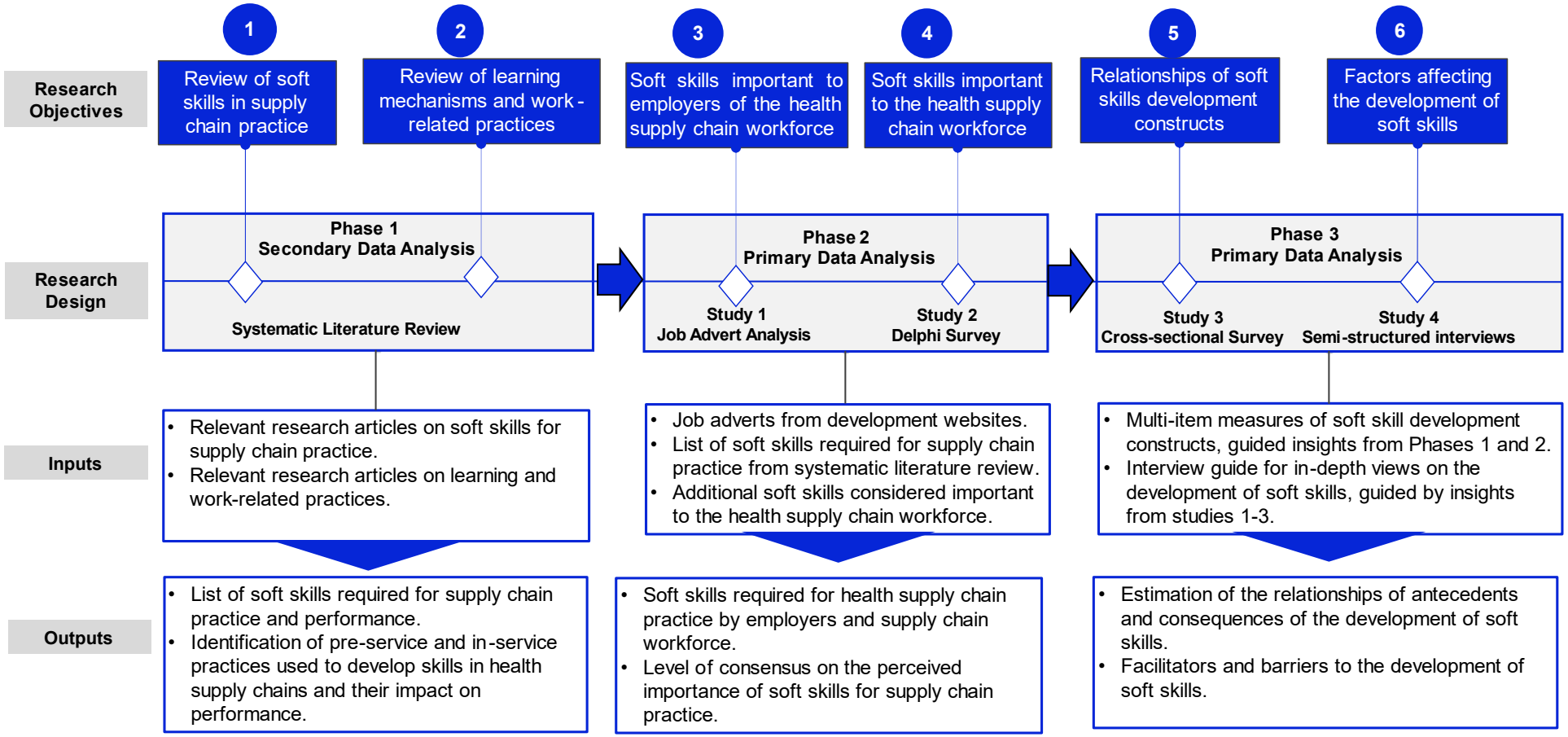
Saunders et al (2019a) suggested that a thoughtful and reliable set of assumptions will establish a trustworthy research philosophy, which will reinforce the selection of methodological approaches research strategy, data collection and analysis procedures. As a result, the philosophical considerations directed the methodology used in this research project, which then influenced the choice of research methods. The research project was designed to

be conducted in three distinct and sequential phases. A summary of the research design is presented in Figure 4.1. The following sections outline the research design process that was adopted for this research project.

4.2.1. Philosophical considerations

Research philosophy describes a set of basic beliefs and assumptions that guide the design and execution of a research study and presents different ways of understanding scientific research (Saunders et al., 2019b). The philosophical paradigm of the researcher heavily influences the methods chosen to address the research questions (Hathcoat et al., 2019). Fossey et al., 2002 referred to a paradigm as "*a system of ideas, or world view, used by a community of researchers to generate knowledge*" (p.718). A paradigm provides a metaphysical construct associated with specific philosophical assumptions that describe a researcher's view of reality. As such, it provides a tool to identify one's worldview. Within academia, there is strong consensus on four sets of philosophical assumptions that are most relevant to defining a paradigm in a research context (Clark, 1998; Guba and Lincoln, 2005). Hence, the choice of a research methodology is intuitively shaped by the research paradigm adopted by the researcher and provides the foundation upon which the research design is built (Sekeran and Bougie, 2016).

Figure 4.1: Overview of research phases



Three philosophical views related to what reality/knowledge, impacts the direction of all research studies, have been described in the literature: (1) Ontology relates to the nature of reality and the nature of existence and what exists (Hathcoat et al., 2019); (2) Epistemology focuses on the nature, limitations, and justification of human knowledge (Hathcoat et al., 2019); and (3) Axiology relates to the role of values, beliefs and ethics of the research (Creswell, 2013). These philosophical paradigms relate to accepted scientific frameworks used in research and Table 4.1 summarises the key features of the paradigms.

Table 4.1: Features of philosophical paradigms

	Positivism	Interpretivism	Pragmatism
Ontology	• Naïve realism. • Discovery of the true reality is near impossible.	• Relativism • Multiple realities. • 'Lived experiences' through the medium of language and culture • Socially constructed view of reality	• Reality arises out of practical, useful actions, situations, and consequences.
Epistemology	• Absolute reality can only be approximated. Truth and meaning reside within an object and are independent of human subjectivity. • Validity comes from peers, not participants.	• Reality is co-created in multiple ways. • Emphasis on people's stories, insights, feelings, and interests • Worldview is shaped by the different experiences of people's interactions.	• Reality is constructed through the application of multiple methods that reflect both deductive (objective) evidence and inductive (subjective) evidence.
Axiology	• Need for rigour, precision, logical reasoning and attention to evidence required. • Researchers' biases need to be controlled and not expressed in a study design.	• Values need to be interrogated. • Researchers are part of what is being observed. • Subjective knowledge • Contribution of observer key to research	• Values are critically discussed that reflect both the researchers' and the participants' views.

Sources: adapted from Saunders et al. (2019b)

The positivist philosophy posits that ideas and social structures exist independently of human beings and does not consider the role of individuals in creating social reality. For the positivist researcher, *realism* relates to what is empirically verifiable and measurable (Bhaskar, 2008). This philosophical viewpoint assumes that all constructs that are being studied should be empirically provable and represented by meaningful symbols, typically numbers. An investigation from a positivistic perspective strives to methodically seek an explanation, estimates and predictions in the discovery of new information in natural settings (Anderson and Starnawska, 2008).

The empirical study of soft skill development cannot be complete without consideration of the interactions of the reality of people and opportunities within a specific context. The social nature of learning at the workplace has been alluded to in Chapter Two. The workplace context and interaction with colleagues, peers and superiors have been suggested to influence how employees engage in learning (Crans et al., 2021). The interrelationships and effects of learning mechanisms at the workplace can only be properly understood if the learning is examined in relation to the wider contexts in which it takes place, including the learning environment and the type of engagements learners can undertake (Salinas-Navarro et al., 2022; Malcolm et al., 2003).

The study of connections between individuals and social phenomena through personal reflections of individuals rather than through observable behaviour is referred to as social constructionism (Lindgren and Packendorff, 2009). Social constructionism asserts that the existence of the world, independent of human thoughts and perceptions, is not a reality (Creswell, 2013). The social constructionism paradigm rests on the philosophical assumption that knowledge is in the denotations individuals make and is acquired through individuals talking about their meanings (Creswell, 1998). In other words, social constructionism improves

our understanding of the social interactions between individuals in addition to the attributes of their social environment.

Employing a social constructionist lens to soft skill development at the workplace, one can see soft skill development as a process that an individual has to go through that combines the learner, his/her work environment context, and learning mechanisms within certain circumstances (Olsen and Tikkanen, 2018; Ellinger et al., 2015). Thus, social constructionism implies that skill development at the workplace is positioned and created in the social connections between individual learners and the environments they operate.

Due to the exploratory nature of this project, the researcher adopted interpretivism as the favoured philosophical approach. There is no singular view of the health supply chain workforce's experiences in the development of soft skills as suggested by the positivist philosophical paradigm. Ontologically, the reality of the development of soft skills at the workplace comes from practical, deliberate actions taken by the individual learners in their contexts. From an epistemology perspective, the way of understanding and explaining the reality of the development of soft skills is best constructed through the application of multiple methods that reflect both objective and subjective evidence.

In summary, following the examination of the three worldview perspectives, the interpretive philosophical approach represents the research paradigm that best suits this project because it focuses on the lived experiences of the individual health supply chain workforce and recognises the multiple socially constructed realities of the health supply chain workforce's experiences within the boundaries of their work environment and social contexts.

4.2.2. Research methodology

Research methodology is the systematic process of finding and analysing knowledge. It refers to the designs or models of inquiry that provide specific direction for procedures in research (Creswell, 2013). There are predominantly two research methodologies: quantitative and qualitative.

Quantitative research focuses on the collection of numerical data that can be analysed through mathematical-based methods, usually to test a hypothesis (Bloomfield and Fisher, 2019). This typically results in acceptance or rejection of the null hypothesis. In contrast, qualitative research refers to inductive, holistic, subjective and process-oriented approaches to understand, interpret, and describe a phenomenon or to develop hypotheses, as well as further investigate and understand quantitative data (Moser and Korstjens, 2017; Creswell, 2013). It is a systematic, subjective approach used to describe life experiences and give them meaning (Aspers and Corte, 2019).

Quantitative and qualitative methodologies are viewed as complementary and can be combined within one study, as part of a mixed methods strategy (Creswell, 2013). Mixed method research "*combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for breadth and depth of understanding and corroboration*" (Johnson et al., 2007, p.123). Table 4.2 summarises the key characteristics of quantitative and qualitative methods.

Table 4.2: Main features of quantitative and qualitative research approaches

Characteristic	Qualitative	Quantitative
Purpose	Focuses on providing a complete, detailed and rich description of the research topic.	To quantify, classify, count, construct and test statistical models in an attempt to explain what is observed.
Design	May be planned or emerge as the study unfolds.	All aspects of the study are designed carefully before data are collected.
Sample	Tend to be small sample sizes.	Tend to be large sample sizes.
Data collection	The researcher is the data-gathering instrument.	The researcher uses tools (e.g., questionnaires, and equipment) to collect data.
Data type	Data are in the form of words (interviews), pictures (videos) or objects (artefacts).	Data is in the form of numbers.

Sources: adapted from Stuckey (2013) and Creswell (2013).

The quantitative approach uses figures or statistics to respond to the "how much" or "how many" questions of a phenomenon. In contrast, the qualitative approach mainly uses textual data to answer a phenomenon's "what" and "why" questions. The quantitative approach is a deductive process that allows movement from a broad scale to a more precise position. Deductive reasoning is a form of valid reasoning where new information or conclusions are developed by connecting data and evidence which must be accurate (Johnson-Laird, 2010). On the other hand, the qualitative approach is mainly regarded as an inductive process. In this bottom-up approach, inductive reasoning is concentrated on evidence amassed from people's daily experiences and perceptions rather than facts (Hayes and Heit, 2018). It focuses on the transfer from specific observations to wider views and theories.

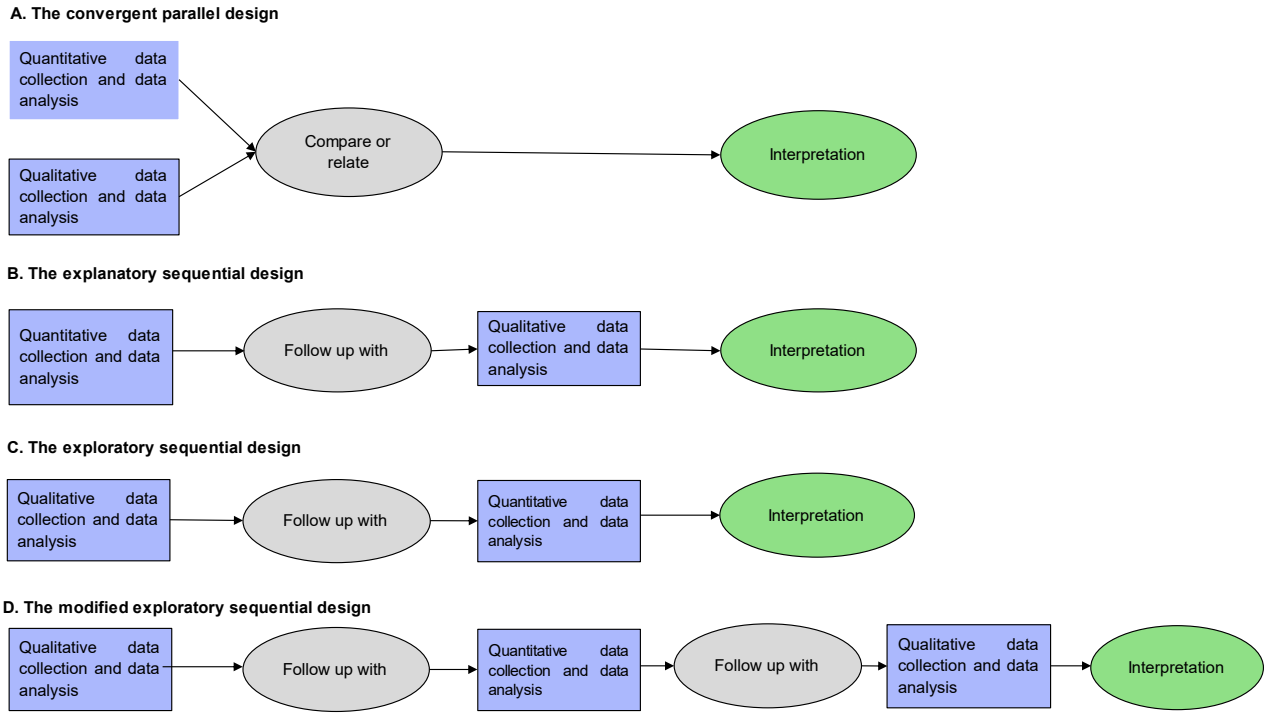
Given the deficiency of empirical studies on soft skill development of the health supply chain workforce in developing economies, as highlighted in Chapter Two, a research design focused on the use of both quantitative and qualitative data-gathering procedures (i.e., mixed methods)

was considered essential. Mixed methods research integrates quantitative and qualitative approaches within a single study or a set of closely related studies (Creswell and Plano-Clark, 2018; Johnson et al., 2007). This was considered for several reasons. First, a mixed methods research design allows complementarity or concurrent examination of various facets of a phenomenon through two or more related investigations. Second, it allows the use of one investigation to inform a subsequent investigation within one research project. Third, the phenomenon of soft skill development is dynamic and complex, relevant variables are not easy to identify.

The core mixed-method research designs that have been considered to be practical are convergent parallel design, explanatory sequential design, and exploratory sequential design Creswell and Plano-Clark (2018). These are illustrated in Figure 4.2. This project adopted a modified exploratory sequential design, that involved a qualitative analysis of soft skills required for health supply chain practice. This was followed by a quantitative analysis of participants' perceptions of soft skills development. An additional qualitative phase was included to seek the views of the health supply chain workforce on barriers and facilitators of soft skills development in developing economies.

Therefore, this project drew on a mixed methods research methodology design, that involved the participation of the health supply chain workforce in developing economies as research participants. The rationale for the mixed method approach is based on the call for more empirical data on soft skill development in real-life settings (Thomas, 2014). A review of the literature on soft skills for supply chain practice (Chapter Two) has exposed the paucity of studies in the context of developing economies and the public health sector. Practically, using the mixed method approach helps to understand and augment the opinions of the health supply chain workforce on soft skill development activities and processes in developing economies.

Figure 4.2: Mixed method research designs



Source: adapted from Schoonenboom and Johnson (2017)

4.3. Research strategy

A research strategy is a comprehensive plan of action that guides the researcher towards achieving the intended research outcomes and objectives (Saunders et al., 2019a; Bell et al., 2022). According to Harding (2018), a research design strategy is a practical plan that outlines the methods to be used based on the chosen methodological approach for the research, be it qualitative, quantitative, or both. The design should incorporate aspects like sampling techniques, data collection, and data analysis. The subsequent sections provide an in-depth breakdown of the activities employed in collecting and analysing the primary data for this project.

4.4. Study 1: job advertisement analysis

The first study was a job advertisement analysis which was conducted to address research objective 3- *to identify the soft skills required by employers of the health supply chain workforce*. The analysis of job advertisements was adopted for the health supply chain

workforce in developing economies because it has been used by Flothmann et al. (2018b); Shou and Wang (2017); and Rosetti and Doley (2010) to identify and characterise key skills required of supply chain workforce. Thus, the analysis of health supply chain job advertisements adopted the approach that has been used in these studies.

4.4.1. Study 1 design

Chipulu et al. (2013) provided an outline of a two-stage approach they adopted for analysing job advertisements in their study of project manager skills. Their approach was adopted by Shou and Wang (2017) in their investigation of skills for supply chain managers. The design of this study was guided by the mixed methods approach used in these two studies to identify the soft skills required by employers in the health supply chain workforce in different health-related organisations located in developing economies. Both Chipulu et al. (2013) and Shou and Wang (2017) contend that prior studies on management skills could be prone to self-selection and non-response bias as they have typically been undertaken using questionnaires, and they argue that a study of job advertisements removes this potential for bias. A similar stance was taken for this study.

4.4.2. Data collection

Following Chipulu et al. 's (2013) approach, multiple data sources were used to locate a set of job advertisements to avoid potential bias stemming from reliance on a single source. The following job search websites, which focus on international development and public health sector roles, were used to identify job advertisements for the health supply chain workforce in developing economies:

- Development Aid Jobs: https://www.developmentaid.org/#!/jobs/search
- Devex: https://www.devex.com/jobs/search
- DevNet Jobs: https://www.devnetjobs.org
- Relief web: https://reliefweb.int/jobs

- United Nations Jobs: https://unjobs.org

The websites were searched using the following broad terms in the advertisements: ‘health’ OR ‘medicine’ OR ‘laboratory’ OR ‘diagnostic’; AND ‘supply chain’. Within these broad terms, professional role titles, such as logistics, procurement and distribution were used during the screening process. To minimise duplicates, data was collected every four weeks for six months between June and November 2020. The job titles, advertising organisation and date of posting were first scanned, and all potentially relevant online job advertisements were downloaded.

Four focal eligibility criteria were used in the selection of job advertisements for analysis:

a) The job advertisement focused on health supply chain management.
b) The job advertisement was a consultancy or full-time position with a duration of at least six months. The rationale was to exclude short-term consultancies.
c) The job location indicated in the job advertisement was a developing economy, as defined by the World Bank (2023) or involved frequent travel to developing economies and/or close collaboration with the health supply chain workforce in a developing economy (ies) if the job location was in a high-income country.
d) The job advertisement was published in the English language. This was due to the limitations of time and resources required to translate non-English job advertisements.

To maintain a clear focus on the health supply chain workforce, job advertisements focusing on humanitarian supply chain management focusing on food aid, shelter, water, sanitation, and hygiene were excluded. The initial search generated a sample of 629 job advertisements. After removing duplicates appearing on multiple job search websites, and job advertisements not meeting the eligibility criteria, the final dataset comprised 222 advertisements. Key identifiers for each job advertisement were recorded, including employer; job title, country/countries of work or to be covered, as part of the scope of work; and job level. Using

the minimum years of work experience specified in each job advertisement, the job levels were categorised as follows: junior, less than 3 years; mid-level, 3-9 years; senior, 10-20+ years. These categories were chosen to differentiate the level of responsibility an employee is expected to hold in the workplace (Piccolo et al., 2010).

4.4.3. Data analysis

QSR NVivo Pro 12 was used to conduct the first phase of the analysis, namely the qualitative analysis of each job advertisement to identify the soft skills specified in each one. For each job advertisement, the full job description was copied into NVivo and a keyword or phrase, representing a soft skill, was coded if it appeared in an advertisement. Following Chipulu et al. (2013), initial coding was conducted on a pilot sample of 50 job advertisements to identify common keywords. These were then used to code the full set of 222 advertisements. A total of 80 keywords were identified (with varying frequencies) in the pilot dataset. Concept similarity analysis was used to note keywords representing similar soft skills, but which were expressed using different terminology, and these were merged into one keyword. This resulted in a total of 32 keywords, which are presented and discussed in Chapter Five.

The second phase of analysis was designed to extract the soft skills. This involved quantitative techniques, commencing with the conversion of the textual keywords into numerical data. For each job advertisement, a keyword was recorded as ‘1’ if present and ‘0’ if absent, resulting in the creation of a matrix of 222 job advertisements each having 32 coded keywords in the form of binary variables.

The second stage was to analyse the binary matrix using dimension reduction techniques. Factor analysis was used to extract the soft skills. Factor analysis is a statistical technique that is used to look for patterns or relationships among items in a set of variables (Yong and Pearce, 2013). The principal components method of extraction and varimax rotation was performed on

the binary matrix using IBM SPSS 29. A statistically significant Bartlett's test of sphericity and a Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) score of 0.6 was considered as a minimum threshold before conducting factor analysis (Taherdoost et al., 2022).

An eigenvalue greater than one was used to determine the number of soft skill categories for extraction and factor loadings above 0.32 were considered desirable (Yong and Pearce, 2013). The factor loadings of the 32 soft skill keywords were used to qualitatively identify and provide a general description of the collective term that closely expresses the soft skills with desirable factor loadings. Multivariate techniques were used to statistically examine the relationships between the soft skills and job advertisement variables (job levels, regions, and country income groups). The results of Study 1 are reported in section 5.2.

4.5. Study 2: Delphi survey

The second study was a Delphi survey which is an established process for obtaining consensus from a panel of experts or individuals familiar with the subject through controlled feedback (Taylor, 2020). The method has been used in supply chain research to identify human resources practices that lead to organizational performance and the well-being of the workforce (Menon, 2012). Beske-Janssen et al. (2023) also used the Delphi technique to assess the competencies required to enhance procurement's contribution to innovation and sustainability. The method presents the panel with a question(s), and through a series of questionnaires, feedback is collected and reviewed to create the next round of questionnaires. Participants rank the responses, which are recategorized and presented until a consensus is reached. Some of the benefits of using the Delphi technique include that it can be completed by participants in different geographical locations at a time convenient to them, which allows for reflection and is cost-effective (Linstone and Turoff, 2002). The structured approach promotes the participation of a diverse group of participants while avoiding the issue of dominant members or manipulation, which can sometimes happen with focus groups (Drumm

et al., 2022; McMillan et al., 2016). The Delphi is not without some criticisms. The use of multiple rounds means that the process can take longer to complete than other methods, and it also asks the respondents for more participation time than other methods which can lead to attrition (Fletcher and Marchildon, 2014).

A Delphi survey was conducted to address research objective 4- *to identify the level of consensus (or not) regarding the perceived importance of soft skills for health supply chain service delivery*. The purpose of the Delphi survey was twofold. First, the Delphi survey sought to facilitate an expert discussion on the soft skills required for health supply chain practice. Thus, the survey sought to take the health supply chain workforce perspective and contribute to the identification and prioritisation of soft skills important for health supply chain practice. Second, the Delphi survey explored the health supply chain experts' insights on learning and work-related practices and their contribution to the development of soft skills in developing economies.

The Delphi technique includes three central elements: *scope, theory or framework, and format* (Beiderbeck et al., 2021). The *scope* of the Delphi survey focused on the health supply chain ecosystem in developing economies by including experts from diverse backgrounds, and organisations to acquire diverse perspectives on the soft skills required for service delivery. From a *theory or framework* perspective, the Delphi survey was guided by the conceptual framework of the study, described in Chapter Three, which is premised on a blend of learning and practice-based theories. The experiential learning model by Kolb (1984) points to *action*, *reflection*, *discussion*, and *learning* as the sequential elements of skills development. The latter was the basis for the questionnaire developed for the Delphi survey.

The *format* of a Delphi survey can either be real-time or sequential (Beiderbeck et al., 2021). A real-time format requires the participants to participate in the survey through real-time

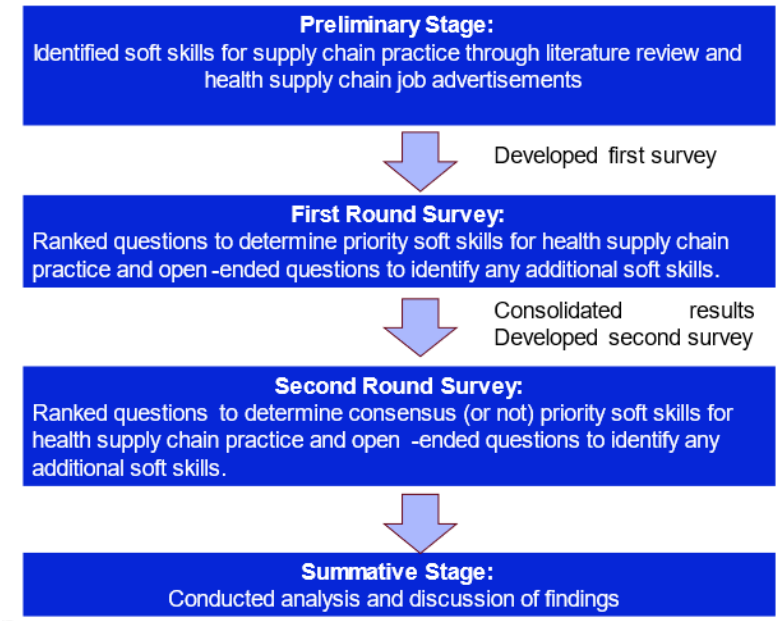
software within a short-defined timeline, often through a gathering. This is costly and the study did not have the financial resources to pursue a real-time format. In addition, it was difficult to guarantee the availability of all the selected experts within a short-defined timeline. Consequently, a sequential format was chosen as the appropriate format to ensure the wide participation of the selected experts within the resources available for this research study.

4.5.1 Study 2 design

The Delphi process was modified to include two rounds of consultation and feedback from experts to find consensus on a prioritised list of soft skills required for health supply chain practice. Figure 4.3 summarises the process that was undertaken for this study. The preliminary stage was developing the materials including the list of soft skills from the findings from the literature review of soft skills in supply chain practice; and content analysis and extraction of soft skills from the job advertisements to recruit the health supply chain workforce, described in section 2.2.

Two rounds of the survey were conducted between October and December 2022. Each round was active for four weeks. For round one of the Delphi survey, the experts were asked to rate the importance of the preliminary list of soft skills that are presented in section 5.4. In addition, the experts were asked to suggest any additional soft skills that they consider as important for health supply chain practice in developing economies. Round two focused on asking the experts to re-rate the importance of soft skills that did not meet a pre-defined consensus threshold that is described in section 4.5.3.

Figure 4.3: Modified Delphi process used to identify soft skills required for health supply chain practice



4.5.2. Data collection

Participants

The survey was premised on knowledge and/or experience of the health supply chain workforce in developing economies. Within the context of this study, an 'expert' referred to a senior manager/leader in a health supply chain management role. Two focal eligibility criteria were used in this study to select the panel experts:

a) Participants had a minimum of five years' work experience in health supply chain management, regardless of gender, occupation, and academic qualifications. A minimum of five years' work experience was considered to accommodate the workforce that had attained a sufficient level of experience to provide cross-cutting perspectives on soft skills in the field of health supply chain. This criterion assumed that duration on the job was proportional to the level of expertise. However, an argument can be made that duration on the job does not amount to attaining a level of expertise. However, considering the workforce with less than five years of experience

would require additional criteria to ascertain their level of expertise to participate in this Delphi survey. As a result, a minimum of five years' work experience was used to standardize criteria for selecting a panel considered to have sufficient experience to contribute to the Delphi survey.

b) The participant had experience working in at least two developing economies (full-time or remotely). This was to enhance the level of heterogeneity of the panel with diverse cultural experiences.

A panel of experts, working in the health supply chain was identified through non-probability sampling. These experts were accessible through social media platforms, such as LinkedIn® and Twitter®, websites of development partners and global conferences on health supply chain management. As a result, an initial list of about 100 experts was identified and they were individually invited, via email or LinkedIn, to express their interest in participating in the Delphi survey. The number of participants that participated in rounds one and two of the Delphi survey were 45 and 26, respectively. The detailed characteristics of the participants who participated in the two rounds of the Delphi survey are presented in section 6.2.

Pilot

The questionnaire was piloted with a group of four health supply chain experts, that was purposively selected based on their academic and research backgrounds and extensive experience in health supply chain practice (at least 15 years). The feedback from the pilot was used to finalise the questionnaire. The changes made following the pilot include revision of some questionnaire statements to shorten and make the clear and restructuring the flow for ease of use by prospective participants.

First round survey

Recent research has shown that data collection through digital technologies, such as the Internet and smartphones can match traditional research methods and provide alternative and efficient possibilities (Kelfve et al., 2020). *Online Survey* (Jisc, United Kingdom) was chosen as the survey tool due to its flexibility in designing complex questionnaires, ease of use and features that allow effective monitoring of responses in real-time (Ball, 2019).

The Likert scale was used because it provides a convenient way to measure unobservable constructs, which allows researchers to collect quantitative estimates of subjective traits, producing numeric data that can be summarized and visualized similarly to other quantitative data collected (South et al., 2022; Jebb et al., 2021). A researcher has to choose the best rating scale to use for their research. Taherdoost (2019) found that evaluation of different scale ratings showed higher reliability, validity and discriminating power for scales with more response categories, up to seven. However, internal consistency did not differ significantly between scales. Therefore, the seven-point Likert scale was considered appropriate compared to the other scales as it is high enough to convey more useful information without compromising information transfer.

A total of 55 participants, who accepted the invitation to participate, were asked to rate the importance of a list of ten soft skill categories, using a Likert scale of 1 (extremely unimportant) to 7 (extremely important). In addition, the participants were presented with statements on the relative level of importance of technical and soft skills; and adequacy of pre-service and in-service learning mechanisms to develop soft skills in the health supply chain workforce in developing economies, using a Likert scale of 1 (strongly disagree) to 5 (strongly agree) (see Box 4.1). The additional questions were accompanied by a request for the participants to add their qualitative comments to justify their quantitative ratings.

Box 4.1: Round 1 survey questions/statements on soft skills for health supply chain practice

1. In the current environment, how do you rate the importance of the listed soft skills for health supply chain practice in developing economies?
2. Before COVID-19, how important were the listed soft skills for health supply chain practice in developing economies?
3. Are there any additional soft skills, not listed above, that you consider important for health supply chain practice in developing economies?
4. In developing economies, development, improvement or maintenance of soft skills is given equal importance as technical skills?
5. Current pre-service curricula for health supply chain management in developing economies are adequately equipping the workforce with soft skills fit for purpose to meet requirements needed in practice.
6. Current in-service mechanisms (e.g., supportive supervision, coaching, mentoring etc) implemented in developing economies adequately equip or maintain the workforce with soft skills needed in practice.

Two reminders were sent to all participants. The first reminder was sent two weeks after the initial email, and the second reminder was sent a week after the first reminder. Both reminders included a note that asked participants who had already completed and submitted the questionnaire to ignore the reminders.

Second round survey

In November 2022, the 45 participants who took part in the first-round survey were invited to re-rate the soft skills that did not meet the pre-defined consensus threshold, and any additional soft skills consolidated from the first-round survey. A total of 26 completed the second round of the survey.

4.5.3. Data analysis

A cascaded termination logic was applied, using consensus thresholds as the first level criterion to terminate the survey, and time-related criterion (maximum of four weeks for each

round) as the second level of termination. The data was subjected to both quantitative and qualitative analyses, using IBM SPSS 29 and QSR NVivo Pro 12, respectively. The arithmetic median values and standard deviations for each Delphi statement were calculated as part of the descriptive analysis of the data. For the qualitative analysis, syntax and content analysis were performed as suggested by Förster and von der Gracht (2014). In terms of syntax, all free-text responses were labelled as either whole sentences, phrases, or catchwords. All free-text responses were coded.

The determination of consensus on the importance of soft skills was based on two criteria as guided by Linstone and Turoff (2002): the median rating of the soft skill, and the consolidated spread of rating of each soft skill, using inter-percentile ranges (IPR). A soft skill was considered important, if the median rating was 6-7, with IPR ≤ 1, uncertain, if the median was 3–5 or IPR ≥ 1; and unimportant, if the median was 1-2, with IPR ≥ 1. An IPR less than 1 was considered to represent an agreement of opinion among experts. It shows that more than 50% of scores fall within one point on the scale, which is considered an elevated level of consensus on a 7-point Likert scale (De Vet et al, 2005).

The determination of the level of consensus was based on five levels of consensus adopted from Musila et al (2011) and Mdege et al (2014), as follows: Unanimous, 100% of experts have the same ratings in one of the three ranges, i.e., 1–2; 3–5; 6–7; Strong, <100% and ≥70% of experts; Moderate, <70% and ≥60% of experts; Weak, <60% and ≥50% of experts; and None, <50% of experts. The results of Study 2 are reported in section 6.2.

4.6. Study 3: Cross-sectional survey

A cross-sectional questionnaire survey was the third study which was conducted with a diverse group of the health supply chain workforce to address research objective 5- *to examine the relationships of the antecedents and consequences of development of soft skills*. The purpose

of the cross-sectional survey was twofold. First, the survey examined a self-assessment of soft skills identified as important for health supply chain practice following the Delphi survey, described in section 4.5. Second, the survey also assessed the perception of the participants on constructs of soft skill development and their consequences: *Work Environment, Learning Mechanisms, Social Practices, Individual Motivation* and *Performance* which are depicted in the conceptual framework in section 3.5.

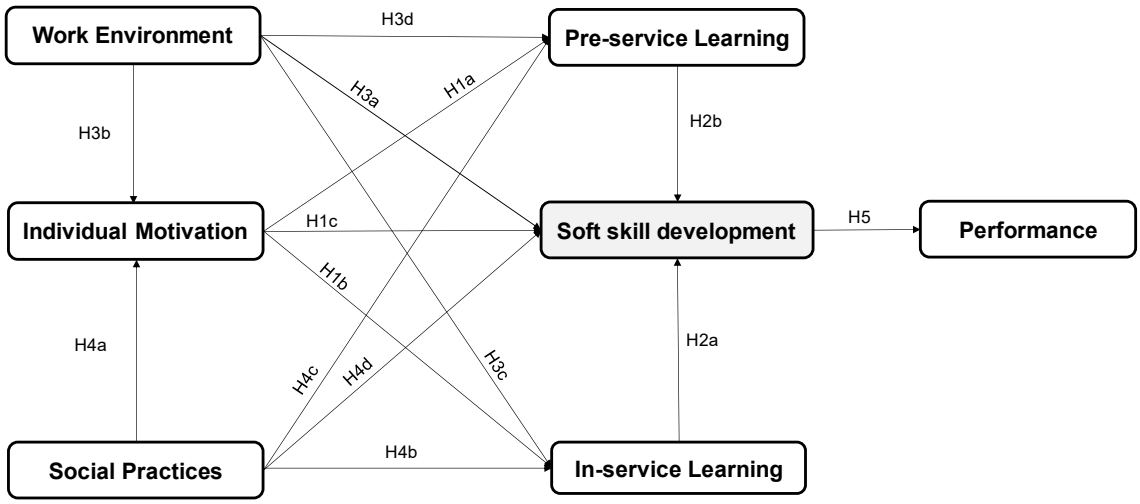
4.6.1. Study 3 design

The cross-sectional questionnaire survey was designed to estimate the unobservable constructs outlined in the conceptual framework. The following sections explain the rationale of the approach that was taken to design the cross-sectional survey.

4.6.2. Hypothesis development

Based on the conceptual framework, presented in section 3.5, I derived five hypotheses, H1a-H5 and these are shown in Figure 4.4.

Figure 4.4: Proposed hypotheses



Impact of individual motivation on learning mechanisms and soft skill development

Building on the rationale for individual motivation, in this study, I argue that individuals who are internally motivated and interested in developing their soft skills are likely to acquire and use appropriate soft skills effectively for service delivery. So, for this study, I hypothesise the following:

H1a: Individual motivation has a positive effect on in-service learning.

H1b: Individual motivation has a positive effect on pre-service learning.

H1c: Individual motivation has a positive effect on soft skill development.

Impact of learning mechanisms on soft skill development

The literature review presented in Chapter Two demonstrated that pre-service and in-service learning mechanisms have been extensively used to develop or maintain the skills of the health supply chain workforce, with some improvements in health supply chain outcomes. Therefore, for this study, I hypothesise the following:

H2a: In-service learning has a positive effect on soft skill development

H2b: Pre-service learning has a positive effect on soft skill development.

The impact of contextual factors on individual motivation, learning mechanisms and soft skill development

In recent times, supply chain disruptions, resulting from external factors, such as global crises, labour market changes and rapidly changing business environment have increased significantly (Crick and Crick, 2020; Kiseľáková et al., 2019, Cornalli, 2018). In addition to these, other external factors, such the workplace dynamics and social factors, including religious and cultural, influence the environment in which the health supply chain workforce operates and have been shown to influence the performance of supply chain systems (Appiah et al., 2021). Hennekam (2016) further argues that work environments are increasingly becoming dynamic. This is particularly enhanced in developing economies due to the fragility

of the health supply chain systems, due to political, economic and security instabilities (Ahmad et al., 2016); and the diversity of cultures and the variety of stakeholders working in health supply chains (Hasselskog, 2022).

This study postulates that contextual, contingency factors are contributory variables that play a critical role in the acquisition of attitudes and behaviours tied to the individual that influence the development and use of soft skills (Appiah et al., 2021; Ellinger et al., 2015). To this end, researchers, such as Osher et al. (2020) and Worthman (2010) have argued that ecological contexts shape learning and the development of skills. To this end, dynamic and reciprocal interactions between the individual, work environment and their social practices, such as social interactions, religion, and culture, are assumed to be key drivers to the development of soft skills (George et al., 2015; Mills, 2014). Therefore, for this study, I hypothesise the following on the impact of the work environment:

H3a: Work environment has a positive effect on soft skill development.

H3b: Work environment has a positive effect on individual motivation.

H3c: Work environment has a positive effect on in-service learning.

H3d: Work environment has a positive effect on pre-service learning.

For social practices, the following were hypothesised:

H4a: Social practices have a positive effect on individual motivation.

H4b: Social practices have a positive effect on in-service learning.

H4c: Social practices have a positive effect on the pre-service learning.

H4d: Social practices have a positive effect on soft skill development.

Impact of soft skill development on job performance

This study argues that the development of soft skills is an explanatory variable that drives job performance (Caputo et al., 2019, Bak et al., 2019). Soft skill development reflects the belief that practice-based insights on individuals' soft skill development and use help to drive the

delivery of health supply chain services that ensure health commodities in the right quantity of the right quality are available at the right place and right time (Omeh, 2023). Therefore, the study hypothesises the following:

H5: Soft skill development has a positive effect on job performance.

4.6.3. Data collection

Questionnaire

The questionnaire was designed building on the literature review presented in Chapter Two Additional literature on questionnaire design, such as Krosnick (2018) and Boparai et al. (2018) was used to guide the development of the cross-sectional survey. The comprehensive questionnaire was developed in March 2023, which sought to obtain the views of a sample of the health supply chain workforce on the soft skill development constructs and their consequences.

Multi-item measures were used to measure the constructs in the conceptual framework (see Figure 3.2). The questionnaire consisted of 49 statements on knowledge of soft skills and self-assessment of the ten soft skills that were considered as important for health supply chain practice in Studies 1 and 2. The measurement scales used for the operationalisation of the constructs are listed in Table 4.3. The seven-point Likert scale (1= strongly disagree and 7= strongly agree) was used based on the same rationale used in Study 2 and explained in section 4.5.2. The measurement scales consisted of statements on knowledge of soft skills and self-assessment of the soft skills considered important for health supply chain practice. *Individual Motivation* had five statements, covering the cognitive, affective and behavioural elements. The *Work Environment* and *Social Practices* constructs each had three statements. The learning mechanism constructs of *Pre-Service Learning* and *In-Service Learning* had a total of four statements. The ten soft skills from studies 1 and 2, were represented by 31 statements.

The performance construct was assessed using three statements. The whole questionnaire can be found in Appendix One.

Table 4.3: Scale items used for the cross-sectional survey

Construct	Items
Individual Motivation	I feel it is important that health supply chain professionals have a strong set of soft skills. In general, I feel good about the soft skills I possess. In general, I feel good about the soft skills I use for service delivery. I am planning to acquire more soft skills. I am planning to improve the use of my soft skills during service delivery.
Work Environment	I often receive support from my team to further develop my current set of soft skills on the job. I often receive support from my supervisors/managers to enhance my current set of soft skills on the job. I often receive additional training to further develop my soft skills to adapt to the prevailing business environment.
Social Practices	My social activities have encouraged the development of my soft skills more than my professional experiences. My cultural background has encouraged the development of my soft skills more than my professional experiences. My religious background has encouraged the development of my soft skills more than my professional experiences.
Learning Mechanisms	I feel pre-service training has sufficiently developed the soft skills that I need to support my current health supply chain management roles and responsibilities. My soft skills have developed more during pre-service training than through in-service training approaches. My soft skills have been improved more through mentoring than through formal pre-service training.

Construct	Items
	My soft skills have been improved more through supportive supervision than through formal pre-service training.
Entrepreneurial Mindset	At work, I often implement new processes and /or products to improve organizational performance. At work, I often generate new processes and /or products to improve organizational performance. I am willing to make an effort to identify, assess and exploit opportunities to benefit the organisation.
Communication	Most times, I communicate openly with my supervisor/manager. Most times, I communicate openly with my colleagues/team. I often give information/feedback on others' work. I often ask for information/feedback on my work.
Leadership	I usually go beyond self-interest for the good of a shared goal at my organisation. I often talk enthusiastically about what needs to be accomplished when executing a task at work. Sometimes, I spend time coaching and teaching about the supply chain processes.
Flexibility	I am willing to work in a changing work environment. I can address changing needs and preferences through innovative products and services. Sometimes, I can combine my job tasks with other unrelated job tasks.
Result-Oriented	I can get results with available resources. Sometimes, I prioritize when decisions need to be made. I often identify and manage priorities effectively.
Self-Management	I am usually aware of how I react to situations and how they impact others. I often keep disturbing emotions and impulses in check. I often see the positive aspects of things and the future.

Construct	Items
Teamwork	I often discuss with my colleague(s) opinions about how we can complete tasks. When tasks get difficult, I sometimes take longer to reach out to my colleagues/manager for assistance. I understand my role and tasks when working on team tasks with my colleague(s).
Sense of Duty	I usually take risks by participating in new practices during a changing work environment. I feel compelled to help other health supply chain professionals to do better to improve practices. I often take responsibility to ensure things are done right and comply with existing rules and policies.
Relationship Management	I usually foster positive interactions with individuals/teams. I do not think it is important to socialise with others very much. I am usually aware of how I react to situations and how they impact others.
Negotiation	When negotiating, I am usually accurate and clear in expressing my interests and needs. When negotiating, I am good at identifying common interests. I am often effective in persuading others.
Performance	It is important to me to fulfil organisational rules and procedures. I often have high expectations about producing quality work outputs. I am usually rigorous about doing a task right the first time.

Pilot

The questionnaire was piloted with a group of four health supply chain experts, based on their academic and research background; and at least 10 years' experience in health supply chain practice. This group was different from the one used in piloting the Delphi survey questionnaire, described in 4.5 The feedback from the pilot was used to review the relevance of some of the

questions and deleted duplications and those considered irrelevant. In addition, the feedback facilitated the revision wording of some questionnaire statements and, the rearrangement of the flow of the questionnaire for ease of use.

Participants

The study population for the cross-sectional survey was all health supply chain professionals in developing economies. Global platforms that offer opportunities for networking and knowledge sharing were considered the primary sources to target and reach the target population. There are free-access and subscription-only platforms that facilitate networking and knowledge sharing for the health supply workforce in developing economies (Teclemariam and Wright, 2014; Brown et al., 2014).

The IAPHL has become one of the largest, no subscription networks for the health supply workforce. The association provides a forum that promotes the professionalisation of the field of public health logistics through education and information sharing (IAPHL, 2023). The association supports the health supply chain workforce worldwide by providing a platform forum for members to network, exchange ideas, and improve skills. When the cross-sectional survey commenced in April 2023, the IAPHL network had a membership of 7,912 individuals across 147 countries.

Similarly, the People that Deliver is a network of member organisations that provides technical leadership and encourages collaboration to create a competent, supported and adequately staffed health supply chain workforce that is deployed across the public and private sectors (PtD, 2023b). Other platforms that promote networking, exchange of ideas and capacity building for the health supply chain workforce in developing economies include the South African Production and Inventory Control Society (SAPICS) and the Association for Supply Chain Management (ASCM). However, SAPICS and ASCM are subscription-only platforms.

It is worth noting that there are no restrictions to the number of platforms that a health supply chain professional can subscribe to and access to these platforms is voluntary. In most cases, people are registered on multiple platforms to address individual professional learning and development objectives. As such, it was difficult to ascertain how active the registered members are in frequently accessing and engaging on the platforms. Therefore, the IAPHL was used as the main access route for the survey because it offers a wide reach of the health supply chain workforce on a subscription-free platform that shares weekly email updates with its members. This enabled frequent reach of the survey link to potential participants. Assuming the IAPHL membership at the time of conducting the cross-sectional survey as the study population, a 95% confidence level and a 5% margin of error, the target sample size for the study was determined to be 367.

However, a review of cross-sectional surveys conducted in supply chain management research (n=229) showed that a third (32.8%) of studies rely on rather small samples (n=≤ 110), which will result in a lack of statistical power and representativeness bias (De Beuckelaer and Wagner, 2012). Proposed measures to increase sample size from the review were used for this study, including pooling data from multiple macro units, including multiple countries, and health supply chain cadres; and conducting an *ad hoc* statistical power analysis. Consequently, for this study, the target was to obtain at least 111 responses to have a sample size sufficiently large enough to have robust statistical power and representativeness, based on guidance by De Beuckelaer and Wagner (2012).

The participants for the cross-sectional survey were recruited through the IAPHL platform. The invitation was posted on the community discussion page of the IAPHL website, where recent posts are also emailed to all IAPHL members as part of the weekly updates. The invitation provided brief information about the purpose of the survey and what the participant needed to do. A copy of the invitation can be found in Appendix Two. These informative details coupled

with reassurances of confidentiality and anonymity were also included on the front page of the questionnaire (see Appendix One) and participants were asked to read the consent statements and tick the relevant boxes to confirm their consent.

Data collection tool

Similar to the rationale used its use in the Delphi survey, the Online Survey (Jisc, United Kingdom) was used as a tool for data collection. A link to the questionnaire, which was available in three languages- English, French and Spanish, was posted through the IAPHL moderated discussion platform. To maximise reach to IAPHL members, the link to the questionnaire was also shared through the health supply chain groups on social media platforms, including LinkedIn and Twitter. The data collection period was ninety days, between April and June 2023. Two reminders were sent to all participants: the first reminder was sent four weeks after the initial post on the IAPHL platform, and the second reminder was sent four weeks after the first reminder. The reminders included a note that asked participants who had already completed and submitted the questionnaire to ignore the reminders.

4.6.4. Data analysis

Structural equation modelling (SEM) was used to simultaneously model and estimate the complex relationships among the multiple dependent and independent variables. This approach was selected to address the limitations of using first-generation multivariate data analysis techniques, such as multiple regression, logistic regression, and analysis of variance. These limitations include 1) the postulation of a simple model structure, (2) requiring that all variables can be considered observable, and (3) the assumption that all variables are measured without error (Haenlein and Kaplan, 2004). Data analyses were carried out using two sequential techniques on IBM SPSS 29 and SmartPLS (v.4.0.9.9).

First, simple statistics, such as descriptive statistics were used to identify patterns and outliers of the data. An exploratory factor analysis was carried out to identify the underlying dimensions of the individual soft skill development constructs depicted in the conceptual framework proposed in section 3.5. Factor analysis requires a sample without missing values. In this investigation, missing values were dealt with through the listwise deletion method, after which, a total sample of 155 complete observations was obtained. A KMO above 0.6 was used as a threshold, as suggested by Taherdoost et al. (2022). The KMO index was determined to be 0.872, which indicates that factor analysis is adequate for analysing the sample. To simplify the factors, the Varimax orthogonal rotation was used. The sum of squared loadings was used to determine the value of a particular factor. In the present study, a factor is considered worth keeping if the sum of squared loadings is greater than one.

Second, partial least squares SEM (PLS-SEM) was selected to examine the causal-predictive nature of the constructs, focusing on explaining the variance in the conceptual framework's dependent variables (Chin et al., 2020). Four critical characteristics have been outlined by Hair et al., (2011; 2022) as relevant to the application of PLS-SEM: 1) data characteristics, (2) model characteristics, (3) model estimation, and (4) model evaluation.

PLS-SEM works efficiently with small sample sizes and complex models (Hair et al., 2011). In addition, unlike covariance-based SEM (CB-SEM), which requires normally distributed data, PLS-SEM is non-parametric and can therefore be applied in a variety of research situations (Hair et al., 2022). In terms of model characteristics, PLS-SEM handles constructs measured with single and multi-item measures, as well as complex models with many structural model relationships (Hair et al, 2022).

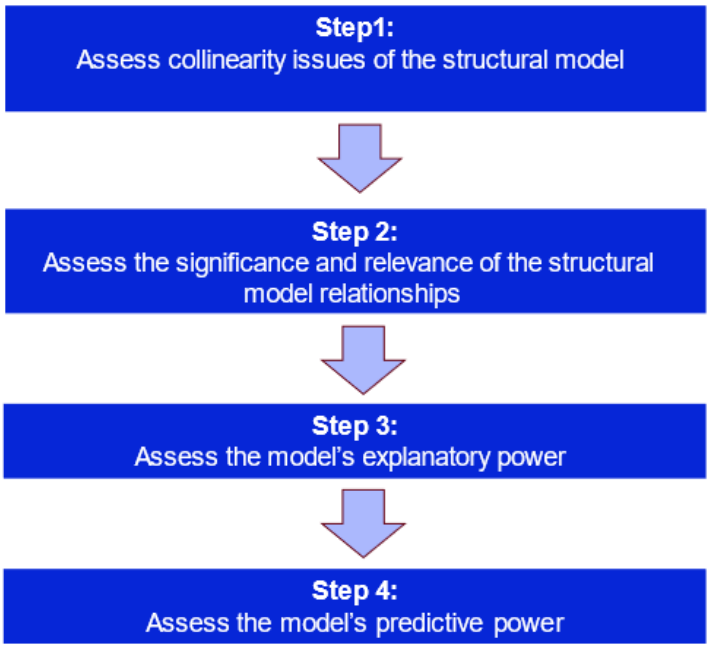
The estimation model of the PLS-SEM aims at maximizing the amount of unexplained variance in the dependent measures. PLS-SEM assumes the concepts of interest can be measured as

composites (Jöreskog and Wold, 1982). On the other hand, considers the constructs as common factors that explain the covariation between its associated indicators (Hair et al., 2022). In terms of model evaluation. The concept of model fit, as defined in CB-SEM, does not apply to PLS-SEM because of the model's different functioning principles (Hair et al., 2019).

As a result, the above criteria reflected the aim of this study and made PLS-SEM suitable to the explorative nature of this study to test a theoretical framework from a predictive perspective, detailing complex structural models, and using a small sample of 156. Different measures of reliability and validity (indicator, internal consistency, and convergent were assessed using factor loadings of the construct items (λi), Cronbach's alpha (α), and AVE, respectively. The discriminant validity of the constructs was measured using the square root of AVE and the heterotrait–monotrait ratio (HTMT) values.

To assess the structural model in PLS-SEM, the systematic, step-by-step approach to the structural model assessment outlined by Hair et al. (2021) was followed. This approach is presented in Figure 4.5. The PLS-SEM path coefficient of 500 replications was used to investigate the relationship among the constructs of the conceptual framework using SmartPLS (v.4.0.9.9).

Figure 4.5: Structural model assessment procedure



Source: Hair et al. (2021)

4.7. Study 4: semi-structured interviews

McGrath et al (2019) argue that the interview is an important data collection tool for qualitative research that has been used in multiple disciplines. Interviews are particularly used for gaining insights into an individual's subjective experiences, opinions, and motivations, as opposed to facts or behaviours (Busetto et al., 2020). Interviews were considered an ideal data collection instrument for capturing the health supply chain professionals' observations, experiences, and diverse perspectives on the development of soft skills in developing economies.

In formal and informal settings, interviews offer the research participants a platform to openly expand their views and stories on various issues and opportunities in the development of soft skills in developing economies. For example, research participants may share details of individual experiences on the development of soft skills. In qualitative research, semi-structured interviews are considered particularly useful as they provide an opportunity to explore the answers given by respondents in detail. This is achieved through probing questions

which help to generate further data or context that could be beneficial to the research aim and objectives. According to Ward and Shortt (2020), semi-structured interviews are particularly effective and are considered to be the best option for qualitative research. Therefore, to understand the extent to which soft skills are developed, semi-structured interviews were used to obtain rich qualitative data to understand the experiences of the health supply chain workforce in developing economies.

The semi-structured interviews had four primary purposes. Firstly, to assess the health supply chain workforce's understanding of what are soft skills in resource-constrained environments. Secondly, to explore the soft skills considered important for health supply chain service delivery and rationale. Thirdly, to examine the extent to which soft skills are developed among the health supply chain workforce in developing economies. Fourthly, to assess the learning practices that are used by the health supply chain workforce to develop soft skills in resource-constrained environments.

The semi-structured interviews were conducted online, using Microsoft Teams®. Follow-up calls and/or emails were used to confirm emerging themes and patterns from the interview transcripts. On average, the interview sessions lasted about an hour and were recorded. The qualitative data was transcribed manually and then structured using the QSR NVivo Pro 12. The data was analysed using 3 levels of analysis (Woolf and Silver, 2017): case-by-case, cross-case and finally, thematic analysis.

4.7.1. Study 4 design

Conducting a pilot study is more common in quantitative survey research, where questionnaires are the primary tool for data collection (Saunders et al., 2019a). However, pilot testing of interview questions is also useful in evaluating their appropriateness and making necessary adjustments before conducting the actual study. According to Saunders et al.

(2019a), pilot testing of interview themes is critical for building the researcher's competency in conducting successful interviews.

Due to the complexity of the topic of soft skill development, pre-testing and pilot testing were used sequentially. Pre-testing of the qualitative interview process and guiding questions were conducted with the second supervisor in the doctoral supervisory team. The purpose of the pre-test was to assess the flow of questions, and interviewing techniques of the researcher and gauge the duration of the interview. Part of the feedback included the incorporation of a couple of rapport-building questions, as some of the early questions were considered a bit difficult. Based on the latter, a decision was made to share the main, broad interview questions with the participants as the questions were deemed seemingly difficult requiring a bit of thought.

A purposively selected sample of two experienced health supply chain professionals was contacted in November 2023 to participate in the pilot to test the appropriateness of this study's interview themes and questions. The themes were deemed appropriate to address the aim and objectives of the research project. Both participants in the pilot commented positively on the interview experience. On average, each session lasted about an hour.

The interview schedule was designed from the review of relevant literature and the results from data analysis from previous stages of this research project, i.e., Phase 1 (employers' and health supply chain workforce's requirements of soft skills) and Phase 2 (cross-sectional survey on health supply chain workforce's perceptions on development of soft skills). Therefore, the semi-structured interviews provided additional data to explore subjective and in-depth views on the development of soft skills in developing economies. The interview guide for the study is presented in Table 4.4, together with supporting literature and the link to the research objectives. This consists of main and follow-up interview questions. The design of the

interview schedule focused on supporting the achievement of three research project objectives (i.e., objectives 2,3 and 6).

4.7.2. Data collection

Similar to other studies on soft skills (see Dean and East (2019); Schulze et al. (2019); Allden et al (2018)), a purposeful sampling method was used in this study to find and compare the perceptions of health supply chain workforce in developing economies. The focal eligibility criteria used for the qualitative interviews were similar to the ones used for the Delphi survey and described in section 4.5.2. Potential participants were identified from the pool that participated in the Delphi survey. In addition, LinkedIn was also used to identify other participants who could bring fresh perspectives on the topic.

Table 4.4: Interview guide

Research Objective	Main Question	Follow up questions	Supporting Literature
To Identify the soft skills required by employers of the health supply chain workforce.	What do you consider soft skills to be?	a. What other terms do you associate with soft skills? b. Can you provide a few examples of soft skills that you can identify? c. How do you see soft skills differing from hard/technical skills	Soft skills are considered to determine an individual's strengths as a leader, facilitator, mediator, and negotiator (Heckman and Kautz, 2012; Robles, 2012). Lazarus, 2013 posited that individuals need soft skills to succeed in work and life.
	Thinking about your experience in the health supply chain, what are the essential elements that you need to develop your soft skills?	a. Do you need different essential elements to develop the soft skills in others? b. Are the resources that you need to develop soft skills available? c. Are there similarities in the level of support for technical skills compared to soft skills? d. Are there differences in the level of support for technical skills compared to soft skills? e. What in your experience might explain any mismatch/ variation in the provision of resources for soft skill development across geographies?	Researchers have highlighted mismatches between skills, system design and industry expectations and these have been cited as contributing to the underperformance of health supply chains in developing economies (Tetteh, 2022; Yadav, 2015; Meier et al., 2023, Allden et al., 2018; Heyns and Luke, 2012). The role of the supply chain workforce has been constantly changing due to emerging political, economic, cultural, and social issues, (Wilson and Barbat, 2015). Recent global crises, including COVID-19, have led to the need for the supply chain workforce to reassess the soft skills needed to sustain business relationships (Mishra et al., 2023, Keller et al., 2020).

Research Objective	Main Question	Follow up questions	Supporting Literature
Assess the impact of learning and work-related practices directed to the development of skills of the health supply chain workforce.	To what extent do consider soft skills are being developed among the health supply chain workforce in developing economies?	a. Are you satisfied with current efforts to develop soft skills in health supply chain management? Please explain. b. Are there any differences in the development of soft skills across health supply chain cadres? c. What about differences in gender and ethnicity groups? d. d. What in your experience might explain these differences?	Current pre-service approaches that are used to develop supply chain graduates have been flagged as being misaligned to requirements in practice (Wu et al., 2013; Sohal et al., 2013).
	Can you tell me how soft skills are developed in the context you are working as a health supply chain professional?	a. What role do you consider pre-and in-service training to play in the development of soft skills? b. How well is pre-service training impacting the development of soft skills of the health supply chain workforce? c. How well are in-service training approaches impacting the development of soft skills of the health supply chain workforce? d. Are there any specific differences in the effectiveness of pre-service	

Research Objective	Main Question	Follow up questions	Supporting Literature
		and in-service training to develop soft skills?	
	Are you aware of any specific training for soft skills in health supply chain and have you been involved in some of them?	If a specific training is indicated: a. Who is providing these trainings? b. Which soft skills are being trained? c. Are these skills assessed? d. What is the coverage, e.g., in terms of countries and level of health supply chain cadres? e. In your view, how effective have these trainings been to develop soft skills? f. What is working well with these trainings for soft skills? g. What can be improved about these trainings for soft skills?	
Identify facilitators and barriers to the development of soft skills in developing economies.	What are the few factors that are working well/enabling the development of soft skills of the health supply chain workforce?	a. Can you give some examples where these factors have worked well to enable the development of soft skills? b. Are there any differences in enabling factors across cadres?	van Hoek et al. (2020) assert that acquiring and developing a talented supply chain workforce is the first phase in the execution of the strategy to transform supply chains. To minimise the workforce shortfall and address the skills mismatch, training and

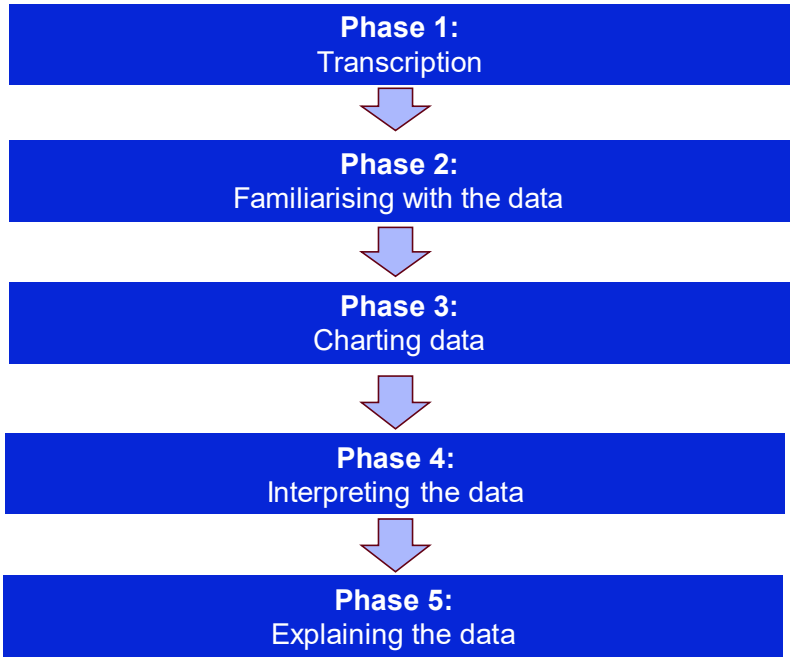
Research Objective	Main Question	Follow up questions	Supporting Literature
	What are the few factors that would make you more satisfied with the development of soft skills as a health supply chain professional?	a. Why do you think these measures will improve the development of soft skills? b. What elements are in place that can facilitate implementation of the stated factors?	development processes have been recommended to improve technical and soft skills (Barnes and Liao, 2012; Prajogo and Sohal, 2013)

All interviews were conducted in English between November 2023 and February 2024. Verbal consent was obtained at the start of the interviews. The interviews were audio-recorded (with permission) and transcribed in full, using a naturalistic approach in which every utterance is transcribed in as much detail as possible. All interviewees were allowed to review their transcripts before analysis.

4.7.3. Data analysis

Thematic analysis of the qualitative data followed a deductive approach, using five categories developed a priori. The five categories of themes were based on the literature review and findings from studies 1-3. These formed the analytical framework that was applied to focus the inquiry and identify data relevant to the research questions. The analytical framework for the semi-structured interviews is described in Chapter Seven. The study adapted the thematic analysis processes, outlined by Bingham (2023) and (Gale et al., 2013), to examine the transcripts and identify emerging sub-themes. These five phases are shown in Figure 4.6.

Figure 4.6: Phases of thematic analysis



Sources: adapted from Bingham (2023) and (Gale et al., 2013)

All the final transcripts that were reviewed by the research participants were imported into QSR NVivo Pro 12. All responses were read as a whole as part of the researcher's familiarisation of the data. Each transcript was reviewed and charted in NVivo to summarise the data against the five categories, including references to interesting or illustrative quotations. In the course of interpreting the data, inductive strategies were also used to develop short phrases that connect the findings to the analytical framework as sub-themes. The findings from all participants were then combined to make sense of them, explain and explore whether and how they converge or diverge from the literature and findings from studies 1-3. The findings of the thematic analysis are discussed in Chapter Eight.

4.8. Ethical considerations

The following ethical considerations were applied in compliance with data protection and privacy provisions outlined in the General Data Protection Regulation (GDPR) 2016/679 (EU law):

a. **Confidentiality and anonymity:** No material referring to any participant by name, designation or other information that helps identify them was collected and presented during this research project. All individual data collected was treated as confidential and was not shared. Only aggregated data is shared.
b. **Informed consent**: For all empirical data collection approaches, all participants were invited to participate in writing. The invitation included a description of the purpose of the research project, what is expected from the participants and what will happen- once they take part. The participants were asked to read the consent statements and tick the relevant boxes to confirm their consent.
c. **Ethics approval**: The research project protocol was reviewed and approved by the Ethics Review Panel of the Aberdeen Business School, Robert Gordon University.

4.9. Research robustness, rigour and biases

4.9.1. Robustness in quantitative research

Empirical observational data from a real-world phenomenon are hardly specified to produce unbiased and generalisable estimates (Neumayer and Plümper, 2017). Measures of robustness and rigour (trustworthiness) are commonly used to assess the stability and generalisability of research findings. These were applied to the primary data collected for this research project.

Internal validity, external validity and reliability are the traditional criteria that are used to test the robustness of estimates in quantitative research. The robustness test measures the stability of the estimates to alternative plausible model criteria (Neumayer and Plümper, 2017). Validity is the extent to which a concept is accurately measured (Heale and Twycross, 2015). In other words, it measures the accuracy and truth of the data being produced in terms of the concepts being investigated (Farrelly, 2013). Validity has two essential parts: internal and external.

Internal validity refers to the accuracy of the processes and data collected, while external validity concerns the generalizability of the results to the population of interest. (Kite and Whitley, 2018; Hasson and Keeney, 2011). Different approaches to determining validity include face, content, construct, criterion, concurrent, and predictive measures (Gomm, 2009). In this research project, face and content validity were employed. Face validity considers the extent to which the questionnaire embraces the concept it seeks to measure in terms of transparency or relevance. Almanasreh et al. (2019) considered content validity as the extent to which items of an assessment tool are pertinent and representative of the intended attribute for a specific evaluation goal.

Reliability refers to the consistency of the analytical procedures and results over time, including accounting for personal and research method biases that may have influenced the findings

(Noble and Smith, 2015). Internal consistency reliability was determined based on Cronbach alpha with appropriate values range. Measures of both validity and reliability were considered for quantitative data analysed in this research project. Both validity and reliability tests were applied for studies 1, 2 and 3. The results are reported in sections 5.2, 6.2 and 7.2, respectively.

4.9.2. Rigour in qualitative research

Four criteria have been proposed to assess rigour (trustworthiness) in qualitative research-dependability, credibility, conformability and transferability (Hadi and Closs, 2016). Table 4.5 describes the components of rigour in qualitative research. The table was adapted from Forero et al., 2018 by using the purpose, original strategies and the application of "the Four-Dimensions Criteria" to describe how they are used to achieve rigour in this research project.

Table 4.5: Components of rigour in qualitative research

Component of Rigour	Description
Dependability	The extent to which similar findings if the research project were repeated with the same methods etc. It is similar to a measure of reliability in quantitative research.
Credibility	Ensuring that findings are an accurate reflection of a wider reality by employing well-established approaches; providing detailed descriptions of the phenomenon under investigation; encouraging participant honesty through direct instructions, developing rapport, and giving opportunities for withdrawing from the investigation; and meeting with team members frequently for debriefing sessions and peer review.
Conformability	Relates to the basis of the findings, and the extent to which the findings have derived from data gathered rather than the biases and preconceived notions of the researcher, team etc.
Transferability	The extent to which the findings can be applied to other contexts and settings. This can be achieved by providing detailed information so that readers can judge the applicability of the findings to other contexts. This is similar to the external validity (generalisability) of findings.

Source: adapted from Forero et al., 2018.

4.9.3. Threat of research biases

Research bias refers to a systematic error introduced into research methods that distorts the measurement process and results (Sica, 2006). Understanding research bias is important for several reasons. First, bias can occur at any phase of the research and is difficult to eliminate (Pannucci and Wilkins, 2010). Second, bias can occur at each stage of the research process. Third, bias impacts on the validity and reliability of the findings (Smith and Noble, 2014). The potential for bias in quantitative, qualitative and mixed methods studies means that their findings can be misinterpreted, leading to significant consequences for practice. There are different forms of bias; the most common categories of bias are described in Table 4.6. These are adapted from Simundic (2013), by tabulating the various biases in data collection, data analysis and data interpretation.

Table 4.6: Forms of bias in research

Type of bias or error	Description
Design bias	Participants will more frequently endorse a statement than disagree, 'yes-saying'.
Evaluation apprehension	Participant anxiety may lead to giving responses which they think are expected.
Interviewer bias	The interviewer may subconsciously, or consciously, bias by appearing to hold certain values or by asking leading questions.
Non-response bias	Non-response reduces effective sample size. Differences between responders and non-responders reduce generalisability.
Recall bias	Selective memories in recalling events.
Reporting bias	Failure of the participant to reveal full information.
Sampling bias	Non-representative selection of participants.
Common methods bias	Response tendencies that raters can apply uniformly across measures.

Source: adapted from Simundic, 2013.

Researchers acknowledge that the data collected using a single-respondent survey could suffer from common method bias (Jordan and Troth, 2020; Kock, 2020; Hair et al., 2019). This

applies to Study 2 and Study 3. In these instances, the estimates of the relationship between exogenous and endogenous variables can be inflated or deflated (Antonakis et al., 2010). Following MacKenzie and Podsakoff's (2012) suggestions, some procedural remedies were implemented to reduce the undesirable effects of collecting data from a single source.

One source of common method bias is item ambiguity (Podsakoff et al., 2003), which may increase the level of difficulty in collecting relevant information. To minimise ambiguity in Study 2 and Study 3, clear and concise language was adopted. Syntax or explaining was avoided so that the respondents did not face any level of difficulty in understanding the questions. For Study 3, an assessment of the collinearity variance inflation factors (VIF) was used to check for potential common method bias, against a threshold of five (Hair et al., 2019). In addition, a conservative single factor Harman's test was also used. Harman's single-factor test is considered particularly useful in the case of single informant responses (Kock, 2020). The total variance extracted by one factor is less than 50% means there is no problem with common method bias in the data.

4.10. Chapter summary

This chapter presented the methodological process followed in conducting this research. In addition, the philosophical assumption underpinning the research design and strategy was determined. The social nature of learning at the workplace directed the interpretive philosophical lens that supports the exploratory mixed methods used in the research project. The details of the design and steps undertaken to collect and analyse the primary data for each of the four studies were presented. The chapter highlights confidentiality as the primary ethical concern for this project. The principles of data integrity and data anonymity were also pointed out as important to consider. The chapter outlined the measures taken to ensure the research is robust, rigorous, and free from biases. The following four chapters will present the findings of each of the four studies separately.

CHAPTER FIVE: STUDY ONE RESEARCH FINDINGS

5.1. Introduction

This chapter deliberates on the findings of Study 1 which focuses on the soft skills that employers prioritise when recruiting the health supply chain workforce in developing economies and addresses research objective 3. Sections 5.2 and 5.3 focus on the descriptives of the sampled job advertisements and the keywords drawn from the analysis of the data. The detailed extraction of the soft skills is explained in section 5.4. The chapter then presents the analysis of the soft skill salience in section 5.5, before the chapter summary in section 5.6.

5.2. Characteristics of sampled job advertisements

The final dataset of 222 job advertisements was diverse, both in terms of the range of countries and organisations. They were drawn from 49 developing economies and 52 organisations. A total of 27% (n=61) had a scope covering multiple countries and/or regions. Management Health for Science (MSH), Chemonics, Clinton Health Access Initiative (CHAI) and the United Nations (UN) agencies had the most job advertisements from individual organisations, with 12%, 10%, 9% and 9%, respectively. Employers with less than five job advertisements in the final sample were combined as 'Others', representing 28% of the sample analysed, and consisted of other implementing partners of major international development funders, for example, John Snow Inc (JSI), Family Health International 360 (FHI360), Partners in Health, Village Reach and World Vision International.

Two-thirds of the jobs were mid-level positions with junior-level positions accounting for 17% of the sample. Senior positions were 11% and only 6% were executive positions. Excluding jobs with a scope on multiple countries and regions; and based in high-income economies, 42% of the jobs were in low-income countries; 41% were in lower-middle-income countries and 17% were in upper-middle-income countries. About half of the jobs were in Africa, the Middle East, Europe and Asia accounted for 17%. Four per cent of the jobs were in Latin America and the Caribbean.

5.3. Descriptive analysis of keywords

Initially, a total of 80 keywords, with different frequencies of appearance in the adverts, were obtained from the dataset. Word similarity analysis was used to identify keywords representing similar concepts or meanings and these were merged into one keyword. In the end, a total of 32 keywords were obtained as described in Table 5.1. The descriptive analysis of the keywords shows that communication (oral, written, multilingualism) (67%), collaboration (49%), teamwork (41%), collaboration (49%), flexibility (34%), problem-solving (31%), and organisation skills (40%) were among the most frequently listed keywords in the advertisements.

Table 5.1: Keywords from the job advertisements

Keyword	Frequency	Sample Descriptions
Accountable	12.2%	Skilled at delegating appropriate responsibility, accountability, and decision-making authority.
Analytical	40.1%	Excellent analytical skills with the ability to make independent judgments and decisions.
Approachable	21.2%	Strong interpersonal skills with client relations and customer service experience.
Collaboration	48.6%	Demonstrated ability to work effectively across multiple partners, including donors, technical partners, and country partners.
Commitment	17.1%	Strong sense of commitment and perseverance.
Communication_multilingual	51.4%	Professional level of oral and written fluency in French and English; excellent written and verbal communication skills in English and Nepali are essential.
Communication_presentation	29.7%	Excellent writing and presentation skills in English are required.
Communication_written	75.7%	Excellent oral and written communication skills.
Communication_oral	74.3%	Excellent oral and written communication skills.
Conscientious/diligent/dutiful	14.9%	Good aptitude to follow strict rules and operational procedures when handling tasks; strong work ethic.
Creativity/Innovative	15.3%	Creative thinking with a capacity to critically assess and develop stronger solutions and processes.

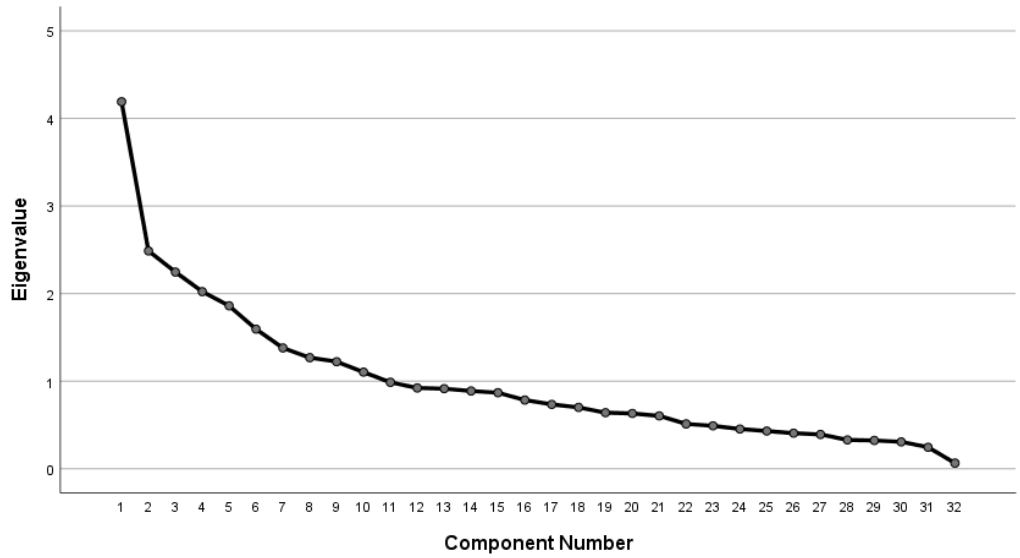
Keyword	Frequency	Sample Descriptions
Diplomacy	9.9%	High level of diplomacy and tact in dealing with a wide range of people.
Flexible/adaptive	33.8%	Ability to adapt to changing priorities.
Handle pressure/stress	20.3%	Ability to under pressure and complex contexts of management.
Initiative	11.3%	Ability to take initiative either through seeking additional related assignments.
Integrity	28.8%	Strong sense of personal integrity and understanding of confidentiality and ethics.
Leadership	33.3%	Leadership skills, including the ability to supervise, delegate, coach, and mentor both individuals and teams.
Mentoring and coaching	18.9%	Strong skills in building the capacities of others (e.g., training) & facilitation.
Motivating	14.0%	Ability to motivate, lead and work effectively with others to achieve operational objectives.
Multicultural and diversity-tolerant	29.3%	High-level capacity to work in a variety of cultural settings.
Multitask	22.1%	Ability to handle multiple tasks simultaneously.
Negotiation	11.7%	Strong negotiation skills and ability to facilitate agreement among various partners to promote the resolution of issues.
Networking	26.1%	Strong networking skills: excellent ability to build personal networks at all levels.
Organisation skills	39.6%	Strong organizational skills; excellent organizational and project management skills.
Problem-solving	30.6%	Problem-solving skills working on complex projects in a highly sensitive environment are required.
Resourceful	12.2%	Demonstrated resourcefulness.
Result-oriented	14.4%	Results-driven; solution-oriented.
Sound judgement	14.4%	Good judgment for decision making; ability to make sound judgment.
Strategic mindset	19.4%	An entrepreneurial mindset and a deep willingness to fully own and push forward the projects you are working on; a strong business acumen.
Teamwork	40.5%	Demonstrated ability to work and provide guidance in a team environment.

Keyword	Frequency	Sample Descriptions
Time management	24.8%	Good time management skills.
Work independently	26.1%	Ability to work both independently and as part of a team.

5.4. Extraction of soft skills

The keywords from each of the 222 job advertisements were analysed using dimension-reduction techniques to generate a reduced form of the original data while preserving the integrity of the original dataset. As described in section 4.4.3, the KMO test was used to measure the sampling adequacy and the obtained value of the dataset was 0.64, which confirmed that the sample size and data were adequate for factor analysis. Bartlett's test of sphericity was 1965.83 ($p<0.001$), which supported the hypothesis that all correlations, tested simultaneously, were statistically different from zero. Figure 5.1 shows the scree plot of the eigenvalues (y-axis) against the corresponding number of soft skill keywords derived from the reduced data output (x-axis). The scree plot represents a proportion of the variance in each axis or the volatility of the input variables in the direction of the eigenvector (Wendler and Gröttrup, 2016).

Figure 5.1: Scree Plot



Source: IBM SPSS 29 Output

There was no clear ‘elbow’ on the scree plot obtained, a point where an eigenvalue drops significantly below the level of the one immediately preceding it and should be a cut-off in deciding the number of soft skill categories to extract (Ledesma et al. 2015). As a result, the Kaiser criterion was used as the cut-off point, which as a rule of thumb suggests extracting all soft skill categories with an eigenvalue greater than one (Wendler and Gröttrup, 2016, Yong and Pierce, 2013). As described in section 4.4.3, the data was subjected to an exploratory factor analysis to transform the soft skill keywords into distinct and a reduced set of soft skill categories. This simplified the list of soft skill keywords to make them more interpretable by facilitating the estimation of the associations of underlying relationships of each soft skill keyword to each soft skill category. This was to enable the interpretation of the conceptual meaning of the emergent soft skill categories by qualitatively assessing the content of soft skill keywords that load strongly onto the categories. Based on the Kaiser criterion, ten soft skill categories were extracted from the 32 soft skill keywords, which represented approximately 60.6% of the variance in the keywords in the dataset based on Kaiser’s criterion of eigenvalue greater than one. The factor loadings of the, the eigenvalue and Cronbach α for each soft skill category are presented in Table 5.2.

The exploratory factor analysis shows that five out of the ten soft skill categories had a Cronbach α value above 0.6 but below 0.8, indicating moderate reliability. A generally accepted rule is that 0.6-0.7 indicates an acceptable level of reliability, and 0.8 or greater is a very good level (Ursachi et al, 2015). Soft skill categories 6, 7, 8, 9 and 10 yielded Cronbach α values below 0.6. However, research has indicated some misunderstanding of the acceptable and specific criteria for interpreting Cronbach's α values (Hoekstra et al., 2019). As a result, composite reliability (CR) was used as an additional measure to assess internal consistency reliability. Ringle et al. (2020) highlighted that Cronbach’s α is the most conservative criterion and the CR the most liberal one. The CR for all the soft skills was 0.6 and above. All the soft skills were retained. Details of each soft skill’s components are described below.

Table 5.2: Exploratory factor analysis results

Soft Skill Category	Factor Loading	Eigenvalue	% variance explained	Cumulative %	Cronbach α	CR
Soft Skill 1		4.19	13.10	13.10	0.68	0.76
Creativity/Innovative	0.73					
Sound judgement	0.66					
Multicultural and diversity awareness	0.64					
Time management	0.58					
Strategic mindset	0.48					
Soft Skill 2		2.49	7.77	20.87	0.77	0.84
Written Communication	0.92					
Oral Communication	0.92					
Presentation Communication	0.51					
Soft Skill 3		2.25	7.02	27.89	0.60	0.76
Approachable	0.79					
Commitment	0.73					
Motivating	0.71					
Collaboration	0.36					
Organization skills	0.42					
Leadership	0.34					
Soft Skill 4		2.02	6.32	34.21	0.60	0.70
Handle pressure/stress	0.67					
Analytical	0.65					
Multi-tasking	0.61					
Problem-solving	0.51					
Soft Skill 5		1.86	5.81	40.02	0.61	0.62
Initiative	0.73					
Resourceful	0.56					
Problem-solving	0.47					
Strategic mindset	0.38					
Result-oriented	0.36					
Soft Skill 6		1.59	4.98	45.00	0.56	0.72
Integrity	0.77					
Accountable	0.70					

Soft Skill Category	Factor Loading	Eigenvalue	% variance explained	Cumulative %	Cronbach α	CR
Mentoring and coaching	0.56					
Soft Skill 7		1.38	4.31	49.32	0.33	0.60
Work independently	0.77					
Teamwork	0.51					
Soft Skill 8		1.27	3.96	53.28	0.40	0.63
Multilingual	0.65					
Flexible/adaptive	0.62					
Conscientious/diligent/dutiful	0.53					
Soft Skill 9		1.22	3.82	57.10	0.32	0.61
Networking	0.72					
Organization skills	0.60					
Soft Skill 10		1.10	3.45	60.55	0.18	0.60
Negotiation	0.62					
Leadership	0.52					
Diplomacy	0.51					

The collective term for each soft skill category was generated by the researcher and the details are described below.

5.4.1. Soft skill 1: Entrepreneurial mindset

Soft skill 1 (SS1) is positively associated with several keywords, including creativity, innovation, time management, multicultural diversity awareness, sound judgement, resourceful and strategic mindset. This soft skill was labelled entrepreneurial mindset (EM). It was observed that creativity, innovation; sound judgement and multicultural diversity awareness were associated with relatively large factor loadings, above 0.6. Time management and strategic mindset had fairly modest coordinates of 0.58 and 0.48 respectively and well above the cut-off. The value of Cronbach α for SS1 was 0.7 and CR was 0.8, which indicates acceptable internal consistency reliability of the components of SS1.

This soft skill was found to reflect a mix of creativity, decision-making skills and managing in an environment characterised by diversity. These skills have been characterised as a key part of entrepreneurship (Karlsson et al., 2021; Larso and Saphiranti, 2016). Addressing the challenges in an evolving business environment requires an entrepreneurial skillset to manage the risks, drive one's internal motivation and find creative solutions to the supply chain problems (Giunipero et al., 2005). Creativity has also been highlighted as an important attribute of supply chain effectiveness (Kayakutlu and Buyikozkan, 2010). The COVID-19 pandemic has highlighted opportunities for entrepreneurial strategic management in supply chain management (Ketchen and Craighead, 2020).

5.4.2. Soft skill 2: Communication

Soft skill 2 (SS2) had high factor loadings associated with three communication skills (COMM), written, oral and presentation, 0.92, 0.92 and 0.5, respectively. This suggests that employers tend to try to recruit health supply chain professionals with adequate communication skills. Recent studies have emphasised communication as a critical soft skill required for supply chain management (Tatham et al., 2017; Jordan and Bak, 2016). Both Cronbach α and CR were 0.8, indicating good internal consistency reliability of the components of the soft skill category.

5.4.3. Soft skill 3: Leadership

The pattern of factor loadings on soft skill 3 (SS3) broadly reflects the demand for leadership (LEAD) characteristics, such as approachability, commitment, collaboration, organising and motivating. The value of Cronbach α for SS3 was 0.6 and CR was 0.8, which indicates acceptable internal consistency reliability of the components of the soft skill category. Leadership skills are likely to be critical when a health supply chain professional must manage dynamic, complex environments, characterised by rapid and unpredictable changes. Mokhtar et al. (2019) stressed that leadership skills are critical in any profession to meet organizational goals and objectives. Health supply chain professionals are expected to have adequate leadership skills.

5.4.4. Soft skill 4: Flexibility

Soft skill 4 (SS4) had keywords such as handling pressure, analytical, problem-solving, and multitasking. These variables are associated with adapting to the environment and being flexible to manage different tasks. Flexibility skills (FLX) have been identified as crucial and are associated with supply chain performance satisfaction (Menon, 2012). Flexibility skills are likely crucial when a health supply chain professional is faced with a complex working environment with rapid changes and high uncertainties. The soft skill category yielded an acceptable level of internal consistency with a Cronbach α value of 0.6 and a CR value of 0.7.

5.4.5. Soft skill 5: Result-oriented

In this soft skill category, initiative, resourcefulness and result-oriented had high factor loadings. I would argue that these keywords are associated with a willingness to get things done, getting results and being efficient with available resources. As a result, the elements in this category were labelled result-oriented (RO). Result orientation has been identified as a key individual competence that is important for supply chain effectiveness (Kayakutlu and Buyikozkan, 2010). However, the other components of this category do not appear explicitly in the current literature on soft skills for supply chain management. The soft skill category yielded an acceptable level of internal consistency reliability with a Cronbach α value of 0.6 and a CR value of 0.6.

5.4.6. Soft skill 6: Self-management

Soft skill 6 (SS6) is positively associated with integrity and accountability. These two variables are elements of self-management (SM), which were described by Goleman (1998) as being fair in analysis, reasonable in actions, never compromising integrity and being open about your feelings. These variables are also linked to positive emotions related to openness, sincerity, integrity, and humility (van Hoek et al., 2002). The soft skill category yielded an acceptable level of reliability with Cronbach α and CR values of 0.6 and 0.7, respectively.

5.4.7. Soft skill: Teamwork

Soft Skill 7 (SS7) indicated a demand for teamwork skills (TMW) and had high positive loading factors for working independently and teamwork. Although these two variables may be considered contradictory, they represent the fluidity of collaborative work in today's organisations (Benishek and Lazzara, 2019). This soft skill category embodies the concept of pseudo teams, which consist of a group of people that work independently or interdependently towards a shared goal while having permeable boundaries (West and Lyubovnikova, 2012). Teamwork is identified as a highly prioritised skill for effective supply chain management (Kumar et al., 2019). The business environment has brought about changes in job descriptions, roles, responsibilities, and employee collaboration. High autonomy, and clear boundaries, coupled with interdependence, agreed goals, specified roles and performance are key components of team and teamwork in this new era of working (Benishek and Lazzara, 2019). However, the Cronbach α value was below 0.5, but the CR had an acceptable value of 0.6, which meets the minimum threshold of internal consistency reliability.

5.4.8. Soft skill 8: Sense of duty

In this soft skill category, conscientiousness/diligence/dutifulness, adaptability, and multilingual skills were associated with high positive loading factors. It could be argued that these variables indicate a high level of commitment, persistence, compliance and agility to adapt to specific, and possibly rapidly changing working environments. By contrast to SS4, the components in soft skill 8 (SS8) are related more to responsibility and loyalty, which represents a sense of duty (SOD). The soft skill yielded a Cronbach α value below 0.6, but a CR value of 0.6, which meets the threshold of internal consistency reliability.

5.4.9. Soft skill 9: Relationship management

Networking and organisational skills had high positive factor loadings in this soft skill category. Soft Skill 9 (SS9) emphasises building relationships and managing stakeholders outside the

organisation, which resulted in the soft skill category being termed relationship management (RM). Networking skills have been highlighted as critical for supply chain effectiveness (Kayakutlu and Buyikozkan, 2010). The Cronbach α value was below 0.6 and the CR value was 0.6, which meets the minimum threshold of internal consistency reliability.

5.4.10. Soft skill 10: Negotiation

Soft skill 10 (SS10) was positively associated with negotiation, diplomacy, and leadership keywords. The soft skill was labelled negotiation (NEG) because negotiation had the highest factor loading. With the evolution of global markets and the diversity of stakeholders involved in supply chain management, this soft skill category suggests that employers tend to recruit health supply chain professionals with diplomacy and negotiation skills. While this partially links to SS3, it is a distinct soft skill that employers require. However, similar to SS7, SS8 and SS9, the Cronbach α value was below 0.6, indicating low reliability but this was superseded by a CR value (0.6) that meets the minimum threshold of internal consistency reliability.

5.5. Analysis of soft skill category salience

The original 222×32 binary matrix was converted into a new 222×10 matrix. The new matrix has the same 222 samples but with ten numerical values. A value in a certain soft skill category represents the number of keywords with large positive factor loadings (greater than 0.32) in the corresponding soft skill category. Non-parametric tests were performed using the new 222×10 matrix to compare the distributions of ten soft skill categories in different job levels, regions, and country income groups. First, the Kruskal-Wallis test was performed to compare more than two groups of independent samples, using ranked (ordinal) datasets (Chatzi and Doody, 2023). The groups from data collected for job level, region and country income status were used as groups of independent samples. Secondly, for the soft skill categories that had significant differences from the Kruskal-Wallis test, the Mann–Whitney test was then used to determine the differences between two groups of an independent variable with no specific distribution on a single ranked

scale (Okoye and Hosseini, 2024). An analysis of the salience of the soft skill categories by job level, region and country income status, using Kruskal-Wallis and Mann–Whitney tests, is described below:

5.5.1. Salience by job level

The results of the Kruskal-Wallis test are presented in Table 5.3. The results show significant differences related to job level in demand for six soft skills, i.e., entrepreneurial mindset, leadership, flexibility, self-management, teamwork, and negotiation. There was no significant difference in demand for communication, result-oriented, sense of duty and relationship management.

Table 5.3: Soft skill salience by job level

	EM	COMM	LEAD	FLX	RO	SM	TMW	SOD	RM	NEG
Junior	96.03	101.84	106.03	113.16	117.26	119.08	125.25	119.24	100.5	91
Mid-level	122.17	114.65	104.86	115.33	112.93	117.63	115.88	111.4	111.63	112.87
Senior	99.24	112.86	105.06	121.98	104.54	83.66	94.92	118.9	107.7	108.16
Executive	60.5	101.73	214.5	43.5	92	74	54	75.77	149.5	162.5
Test statistic	18.534**	1.761	52.813**	17.358**	4.268	15.890**	17.384**	5.455	6.919	15.524**

**p <0.01

The Mann–Whitney U-test of pairwise comparison of the salience of the six soft skills with significant differences in the demand by job level is presented in Table 5.4.

Table 5.4: Pairwise comparison of soft skills by job level

	Job level	Junior	Mid-level	Senior	Executive
Entrepreneurial Mindset	Junior	-	-2.431*	-0.216	-2.393*
	Mid-level		-	-1.772*	-3.524**
	Senior			-	-2.420**
	Executive				-

**p<0.01, *p<0.05

	Job level	Junior	Mid-level	Senior	Executive
Leadership	Junior	-	-0.149	-0.09	-5.909**
	Mid-level		-	0.000	-7.052**
	Senior			-	-5.236**
	Executive				-

**p<0.01, *p<0.05

	Job level	Junior	Mid-level	Senior	Executive
Flexibility	Junior	-	-0.175	-0.55	-3.559**
	Mid-level		-	-0.491	-4.083**
	Senior			-	-3.941**
	Executive				-

**p<0.01, *p<0.05

	Job level	Junior	Mid-level	Senior	Executive
Self-management	Junior	-	-0.111	-2.779**	-2.775**
	Mid-level		-	-2.886**	-2.753**
	Senior			-	0.301
	Executive				-

**p<0.01, *p<0.05

	Job level	Junior	Mid-level	Senior	Executive
Teamwork	Junior	-	0.85	-2.011*	-3.892**
	Mid-level		-	-1.632	-3.627**
	Senior			-	-2.424*
	Executive				-

**p<0.01, *p<0.05

	Job level	Junior	Mid-level	Senior	Executive
Negotiation	Junior	-	-2.08*	-1.328	-4.176*
	Mid-level		-	-0.379	-2.855
	Senior			-	-3.046
	Executive				-

**p<0.01, *p<0.05

The results indicate that junior-level and mid-level positions have a higher demand for self-management and teamwork. More emphasis is placed on an entrepreneurial mindset for mid-level

positions. Senior positions have a higher demand for flexibility elements, whereas executive positions demand leadership and negotiation skills.

5.5.2. Salience by region

Although this is an era of globalisation, the region of work is still a key factor for health supply chain management. Hence, it is of interest to examine the influence of the region of work on soft skills. The results of the Kruskal-Wallis test are presented in Table 5.5. The results show significant differences in three soft skills- sense of duty, relationship management and negotiation. The results indicate that employers attach more importance to a sense of duty for job positions in East Asia & Pacific, Middle East & North Africa regions since the median values in these regions are significantly higher compared to the other regions. For relationship management, the median values for the Middle East & North Africa; Europe & Central Asia are significantly lower than other regions, while Latin America & the Caribbean, and Sub-Saharan Africa have significantly higher values. In other words, employers emphasise relationship management skills more than their counterparts in other regions. Employers place more importance on negotiation for job positions in East Asia and Pacific, Sub-Saharan Africa, and positions with multi-regional scope.

Table 5.5: Soft skill salience by region

	EM	COMM	LEAD	FLX	RO	SM	TMW	SOD	RM	NEG
East Asia & Pacific	142.88	115.31	119.44	100.94	105.06	86.81	110.75	145.5	118.63	125.25
Europe & Central Asia	105	108.38	100.5	94.75	105.06	125.25	96.63	124.19	97.25	87.13
Latin America & Caribbean	105.72	89.89	126.83	110.28	103.61	101.78	108.78	130.72	130.5	84.33
Middle East & North Africa	126.5	108.34	126.27	100.14	112.77	119.25	113.39	139.68	78.68	84.68
South Asia	123.86	114.25	114.64	141.86	147.04	135.18	128.25	97.57	100.64	69.18
Sub-Saharan Africa	104.01	106.29	115.96	114.76	107.61	113.32	98.43	88.23	123.89	118.16

	EM	COMM	LEAD	FLX	RO	SM	TMW	SOD	RM	NEG
Multi-regional	108.02	122.46	95.83	108.87	112.44	106.64	129.23	126.21	104.34	124.43
Test statistic	**8.603**	**4.111**	**9.313**	**5.648**	**11.461**	**8.072**	**11.833**	**28.654****	**14.077***	**21.468***

*p<0.05 **p <0.01

The Mann–Whitney U-test of pairwise comparison of the salience of the six soft skills with significant differences in the demand by region is presented in Table 5.6.

Table 5.6: Pairwise comparison of soft skills by region

Sense of Duty

	East Asia & Pacific	Europe & Central Asia	Latin America & Caribbean	Middle East & North Africa	North America	South Asia	Sub-Saharan Africa	Multi-regional
East Asia & Pacific	-	0.294	0.455	0.798	-	-2.051	-3.573	-1.038
Europe & Central Asia		-	0.743	0.343	-	0.26	-1.891	-0.257
Latin America & Caribbean			-	0.535	-	0.183	-2.238	-0.055
Middle East & North Africa				-	-	-1.876	-3.621	-0.792
North America					-	-	-	-
South Asia						-	-0.464	-1.459
Sub-Saharan Africa							-	-3.713
Multi-regional								-

Relationship Management

	East Asia & Pacific	Europe & Central Asia	Latin America & Caribbean	Middle East & North Africa	North America	South Asia	Sub-Saharan Africa	Multi-regional
East Asia & Pacific	-	-0.804	-0.456	-2.147	-	-0.779	-0.308	-0.886
Europe & Central Asia		-	-1.096	-0.849	-	-0.08	-1.195	-0.369
Latin America & Caribbean			-	-2.343	-	-1.071	-0.328	-1.296
Middle East & North Africa				-	-	-1.032	-3.213	-1.953
North America					-		-	-
South Asia						-	-1.268	-0.298

Sub-Saharan Africa	-	-2.068
Multi-regional		-

Negotiation

	East Asia & Pacific	Europe & Central Asia	Latin America & Caribbean	Middle East & North Africa	North America	South Asia	Sub-Saharan Africa	Multi-regional
East Asia & Pacific	-	-1.7	-2.223	-2.223	-	-2.812	-0.448	-0.076
Europe & Central Asia		-	-0.131	-0.269	-	-1.147	-1.456	-1.771
Latin America & Caribbean			-	-0.126	-	-1.025	-1.674	-2.001
Middle East & North Africa				-	-	-0.972	-2.419	-2.772
North America					-	-	-	-
South Asia						-	-2.96	-3.317
Sub-Saharan Africa							-	-0.615
Multi-regional								-

5.5.3. Salience by country income status

With regard to the salience of the soft skills by country income status, the Kruskal-Wallis' test for the three country income groups found no significant difference in all ten soft skill categories, which indicates that despite the stark differences in country income status among the developing economies, there is no significant difference in demand for health supply chain soft skills across the developing economies.

5.6. Chapter summary

The chapter provided a detailed analysis of findings from Study 1 that addressed research objective 3. The findings identified ten soft skills that employers prioritise when recruiting a health supply chain workforce in developing economies. The findings show significant differences in the demand for six soft skills by job level (entrepreneurial mindset, leadership, flexibility, self-management, teamwork, and negotiation); and three soft skills by region (sense of duty,

relationship management, and negotiation). There were no statistically significant differences in the ten soft skills by country income group.

CHAPTER SIX: STUDY TWO RESEARCH FINDINGS

6.1. Introduction

Study 2 followed the exploratory analysis of job advertisements for the health supply chain workforce that was presented in Chapter Five. The Delphi technique approach was used to explore and understand the health supply chain workforce's requirements for soft skills, in line with research objective 4 which is outlined in section 1.6. The set of soft skills that were used to begin the iterative Delphi survey were the ten soft skill categories that emerged from the requirements of the employers of the health supply chain workforce in Study 1, described in Chapter Five. The results are segmented into five sub-sections. Section 6.2 provides a descriptive analysis of the participant recruitment and response rates. The detailed analyses of the soft skills required for health supply chain practice from the two rounds of the survey are presented in section 6.3. The internal validity of the dataset is explained in section 6.4. The qualitative insights from the Delphi panel on the effects of COVID-19 on the soft skills required for health supply chain practice are presented in section 6.5.

6.2. Participant recruitment and response rates

A total of 97 health supply chain professionals were invited to participate, 55 (56.7%) accepted the invitation and were emailed a personalized link to the first questionnaire. Out of the 55 participants, 45 completed the questionnaire over four weeks, representing an 81.8% (45/55) response rate. Each of the 45 participants received a personalized link to the Round 2 questionnaire, which was completed by 26 participants, indicating a 57% response/retention rate. Table 6.1 summarizes the overall response rates and participant characteristics for the two rounds of surveys.

Table 6.1: Participants' characteristics and response rates

		Round 1 n (%)	Round 2 n (%)
All	Response rates	45/55 (81.8%)	26/45 (57.8%)
Gender	Male	30 (68.2%)	17 (65.4%)
	Female	14 (31.8%)	9 (34.6%)
Ethnicity	Black or African American	33 (73.3%)	18 (72.0%)
	Asian	1 (2.2%)	0 (0.0%)
	White	10 (22.2%)	7 (28.0%)
	Mixed	1 (2.2%)	0 (0.0%)
Profession	Supply Chain Professional	16 (35.6%)	8 (30.8%)
	Pharmacist	20 (44.4%)	3 (11.5%)
	Pharmacist & Supply Chain Professional	7 (15.6%)	13 (50.0%)
	Medical Doctor	1 (2.2%)	1 (3.8%)
	Other	1 (2.2%)	1 (3.8%)
	Diploma	1 (2.2%)	0 (0.0%)
Qualifications	Bachelor's degree	3 (6.6%)	0 (0.0%)
	Master's degree	35 (77.8%)	21 (80.8%)
	Doctorate/PhD	4 (8.9%)	4 (15.4%)
	Other	2 (4.4%)	1 (3.8%)
Age Group	5-9 years	8 (17.8%)	3 (11.5%)
	10-14 years	5 (11.1%)	4 (15.4%)
	15-19 years	14 (31.1%)	8 (30.8%)
	20 years or more	18 (40.0%)	11 (42.3%)

6.3. Soft skills required for health supply chain practice

Table 6.2 summarizes the aggregated results of responses from the Round 1 survey. The range of the median ratings was 6 to 7, indicating the importance of the soft skill categories ranged from important to extremely important. Apart from entrepreneurial mindset, consensus was reached on 9 of the 10 soft skill categories, only leadership reached the consensus level of unanimous. The other eight soft skills had a strong level of consensus.

Table 6.2: Round 1 survey- Importance ratings of soft skills

Soft Skill Category	Sample (n)	Importance rating distribution			Median rating	IPR	Consensus classification	Consensus level
		Unimportant	Uncertain	Important				
EM	45	0%	36%	64%	6	≥ 1	Uncertain	Moderate
COMM	45	0%	2%	98%	7	≤ 1	Important	Strong
LEAD	45	0%	0%	100%	7	≤ 1	Important	Unanimous
FLX	45	0%	11%	89%	7	≤ 1	Important	Strong
RO	45	0%	2%	98%	7	≤ 1	Important	Strong
SM	45	2%	13%	84%	6	≤ 1	Important	Strong
TMW	45	0%	2%	98%	7	≤ 1	Important	Strong
SOD	45	0%	11%	89%	7	≤ 1	Important	Strong
RM	45	0%	4%	96%	7	≤ 1	Important	Strong
NEG	45	0%	9%	91%	7	≤ 1	Important	Strong

On the other hand, consensus on entrepreneurial mindset was uncertain and had a moderate level of consensus. As a result, an entrepreneurial mindset was the only soft skill category from the Round 1 survey that was put forward to the Round 2 survey.

Textual responses to the open question on additional soft skills that are considered important for health supply chain practice in developing economies were received from 35 participants. These responses provided a mix of 69 phrases and keywords, which described both technical and soft skills. Two phrases were related to software skills and information management, and these were excluded from further analysis because they were considered to be technical skills rather than soft skills, and therefore out of the scope of this study. The remaining 67 open-text responses were coded. Keywords representing similar soft skills, but which were expressed using different terminology, were merged. This resulted in a total of 49 keywords which were classified using the soft skills matrix, from the health supply chain job advertisement analysis, described in section 5.4.

Table 6.3 summarizes the classification of other soft skills from open-text responses and there were none related to the negotiation skill. Entrepreneurial mindset (7), leadership (8), flexibility (10) and self-management (10) had the most coded keywords.

Table 6.3: Classification of other soft skills from open-text responses

EM	Thinking outside the box	Perimeter (Strategic) surveillance	Systems thinking
	Willingness to change	Situation analysis	Organisational awareness
COMM	Multi-lingual	Oral	
	Written	Presentation	
LEAD	Planning	Conflict resolution	Coordination
	Mentoring	Decision-making	Advocacy
	Tactical	Prioritisation	
FLX	Multi-tasking	Risk Management	Resourceful
	Critical thinking	Adaptability to changing context	Problem-solving
	Agility	Resilience	
RO	Initiative		
SM	Honesty	Openness to criticism	Dealing with stress
	Integrity	Self-motivation	Accountability
	Candor	Empathy	Time management
	Emotional Intelligence		
TMW	Collaborative learning		
SOD	Conscientious	Dutiful	Political savvy
	Diligence	Compliant	Networking
RM	Diplomacy	Stakeholder engagement	

Members of the health supply chain workforce who participated in the round 2 survey reflected a strong level of consensus for an entrepreneurial mindset, with a median rating of 6 and an IPR of less than 1, as shown in Table 6.4.

Table 6.4: Round 2 survey- Importance of soft skills

Soft Skill Category	No. of respondents	Importance rating distribution			Median rating	IPR	Consensus classification	Consensus level
		Unimportant	Uncertain	Important				
EM	26	0%	8%	92%	6	≤ 1	Important	Strong

The results from the round 1 survey indicated that there was a strong consensus among the panel experts (78%) that soft skills are not given the same level of importance as technical skills in health chain supply chain management. In addition, most respondents (87%) highlighted that current pre-service learning mechanisms are not adequately directing the development of soft skills required of the health supply chain practice, indicating strong consensus. However, there was moderate consensus, with 60% of respondents indicating that current in-service learning mechanisms are also not adequately developing the soft skills required of the health supply chain workforce in developing economies.

6.4. Internal validity

Analysis of the data indicated good internal validity. The reliability test of the variables from the round 1 survey obtained Cronbach's α value of 0.89 ($p<0.01$). The Cronbach's α showed higher values than 0.70, indicating good reliability for each variable. Although there is no set standard size for a Delphi survey panel, the minimum number of 12 is commonly considered to be adequate to enable consensus to be reached (Vogel et al., 2019) and studies have indicated that 10–15 participants are considered adequate if the background of the Delphi participants is homogeneous (Taylor, 2020). Based on this, the number of respondents for both Round 1 (45) and Round 2 of this Delphi study (26) were above the minimum panel sizes indicated in the literature.

6.5. Effect of COVID-19 on soft skills required for health supply chain practice

Regarding experts' perceptions regarding the importance of soft skills before and since the COVID-19 pandemic, table 6.5 shows the results of the independent t-test of the paired

differences of the median importance ratings of the ten soft skill categories before and since the COVID-19 pandemic were all statistically significant ($p<0.01$).

Table 6.5: Paired differences in the importance of soft skills before and since COVID-19

Soft skill	Median of Importance Rating			Δ Consensus Level
	Pre-COVID-19	Since COVID-19	Δ Median	
EM	6	6	0	+2
COMM	7	7	0	0
LEAD	7	7	0	+1
FLX	7	6	+1	+1
RO	7	6	+1	0
SM	6	6	0	+1
TMW	7	7	0	0
SOD	7	6	+1	0
RM	7	6	+1	0
NEG	7	6	+1	0

The median ratings of flexibility, sense of duty, relationship management and negotiation increased by one, and there were no changes in the median ratings of entrepreneurial mindset, communication, leadership, result-oriented, self-management, and teamwork. The strength of the consensus also increased by two levels for an entrepreneurial mindset, from weak consensus before COVID-19 to strong since the pandemic, and by one level from strong to unanimous for leadership, and from moderate to strong for flexibility and self-management. The consensus level for communication, result-oriented, teamwork, sense of duty, relationship management, and negotiation was unchanged between the periods before and since COVID-19.

The results of the Delphi survey confirm that the ten soft skill categories, that emerged from Study 1 (analysis of job advertisements), are important for health supply chain practice. The analysis of the paired difference in the importance of soft skills before and since COVID-19 show the additional value that the health supply chain workforce now places on the importance of an entrepreneurial mindset, leadership, flexibility and self-management. The respondents provided

additional qualitative statements that reflected their perceptions of the effect of COVID-19 on the importance of soft skills for health supply chain practice. Texts from the qualitative data were categorised and indexed to reduce the amount of data that was reviewed for analysis. The key themes that emerged are described below.

Many of the respondents were of the view that COVID-19 has changed the way the health supply chain workforce operates. For example, one respondent emphasized that:

"Before COVID-19 there was a lackadaisical way of doing business. COVID-19 awakened supply chain officers." (Pharmacist).

Since the emergence of COVID-19, the relative importance placed on some soft skills required for health supply chain management in developing economies has also shifted due to the need to react to supply chain disruptions and the need to prepare for similar pandemic situations in future. One respondent commented:

"The major difference in perception of soft skills for effective health supply chain service delivery is that in the pre-COVID-19 period more focus was on cost-efficiency and more dependence on technical skills, whereas the COVID-19 times have highlighted the need for creating more resilient supply chains and this is dependent to a larger extent on soft skills." (Pharmacist).

Some respondents indicated how the changes brought by COVID-19, particularly concerning supply chain practice and work arrangements of the health supply chain workforce in developing economies have contributed towards a shift in the relative importance of the soft skills required for health supply chain management. Due to COVID-19, the expansion of remote work, and activities fostering team building, management, and supervision of goals have become even more important. They highlighted how supply chain disruptions and virtual workspaces created by the

COVID-19 pandemic have made some soft skills more important than before. For example, flexibility to allow teams to manage and prioritize their work schedules and deadlines and to work remotely is now more important than before. In addition, communication has also become more important with teams more interspersed in space and time. Relationship management and negotiation skills have become more important in procurement services as sources of supply and freight capacity have become limited.

A small minority of respondents reported that COVID-19 had not made any difference to the relative importance of the soft skills required for health supply chain service delivery. The perception of some respondents was that COVID-19 had exposed the need to address gaps in soft skills among the health supply chain workforce as part of health system strengthening and disaster preparedness, as well as building resilience and self-reliance within health supply chain systems in developing economies:

"COVID-19 has brought to light the priority to develop these competencies where they are missing rather than changed their importance." (Pharmacist).

6.6. Chapter summary

The chapter presented an analysis of the soft skills required for health supply chain practice by employers. The analysis of job advertisements of the health supply chain workforce identified a set of ten soft skill categories for health supply chain practice in developing economies. The findings highlighted that in developing economies, soft skills are lowly prioritised compared to technical skills. Despite significant investments to support pre-service and in-service learning mechanisms in developing economies, the results suggest that implementation of these programs in these contexts is not sufficiently imparting soft skills to the health supply workforce.

CHAPTER SEVEN: STUDY THREE RESEARCH FINDINGS

7.1. Introduction

This chapter builds on the outputs from Studies 1 and 2 and focuses on the relationships of antecedents and consequences of soft skill development that were examined in Study 3. Specifically, the soft skills required for health supply chain practice, identified from the job advertisement analysis (Study 1) and Delphi survey (Study 2) were inputs into Study 3. The chapter discusses the analysis of the data collected as part of Phase 3 of the research process, as described in section 4.2. This analysis addresses research objective 5, using a cross-sectional questionnaire survey to test the relationships of soft skill development constructs. Section 7.2 presents the profile of the cross-sectional survey participants. Section 7.3 discusses the descriptive data of the responses. In section 7.4, the validation of the soft skill development constructs was examined. The chapter concludes with a summary of the findings in section 7.5.

7.2. Respondent demographics

A total of 159 participants responded to the cross-sectional survey, which represents 43.3% of the target sample size. The profile of the participants is presented in Table 7.1. The majority of the participants were male (69%), with almost half of the participants in the 35-44 years age group. A total of 87% of the participants identified as Black or African American. Half of the participants identified their profession as a pharmacist and supply chain professional, 27% of the participants were supply chain professionals and 12% were pharmacists. Nearly two-thirds were holders of a master's degree, 20% had a bachelor's degree and 10% had a doctoral degree. In terms of work experience, more than half of the participants had 6-14 years of work experience. This shows that a heterogeneous group of participants responded to the cross-sectional survey.

Table 7.1: Profile of cross-sectional survey respondents

Category	Sub-Category	No of Respondents	Percentage
Gender	Male	106	69.3%
	Female	46	30.1%
	Prefer not to say	1	0.7%
Age	25-34	24	15.7%
	35-44	68	44.4%
	45-54	41	26.8%
	55-64	18	11.8%
	65 and above	2	1.3%
Ethnicity	Black or African American	131	86.8%
	Asian	10	6.6%
	White	9	6.0%
	Hispanic/Latina	1	0.7%
Profession	Pharmacist	19	12.4%
	Supply Chain Professional	41	26.8%
	Pharmacist & Supply Chain Professional	77	50.3%
	Medical Doctor	1	0.7%
	Nurse	1	0.7%
	Other	14	9.2%
Qualifications	Diploma	3	2.0%
	Bachelor's degree	30	19.6%
	Master's degree	97	63.4%
	Doctorate/PhD	15	9.8%
	Other	8	5.2%
Work Experience	Less than 5 years	21	15.1%
	6-9 years	38	27.3%
	10-14 years	39	28.1%
	15-19 years	25	18.0%
	20 years or more	16	11.5%

7.3. Descriptive analysis of responses

Table 7.2 shows the descriptive statistics of the cross-sectional survey responses, which were measured using a seven-point Likert scale (1= strongly disagree and 7= strongly agree). Overall, the range of valid responses for each item was 152-155, with an average of 154, which is 97% of the total responses received. The average rating for the questionnaire items was 6 (range: 2.8-6.5).

Table 7.2: Descriptive statistics

Construct	Items	N	Mean	Std. Deviation	Variance
Individual Motivation	In general, I feel good about the soft skills I possess.	155	5.86	1.066	1.128
	In general, I feel good about the soft skills I use for service delivery.	154	5.94	1.021	1.035
	I am planning to improve the use of my soft skills during service delivery.	155	6.22	1.164	1.151
Work Environment	I often receive support from my team to further develop my current set of soft skills on the job.	155	4.64	1.713	2.915
	I often receive support from my supervisors/managers to enhance my current set of soft skills on the job.	155	4.79	1.751	3.045
	I often receive additional training to further develop my soft skills to adapt to the prevailing business environment.	155	4.52	1.792	3.191
Social Practices	My social activities have encouraged the development of my soft skills more than my professional experiences.	155	5.03	1.539	2.354
	My cultural background has encouraged the development of my soft skills more than my professional experiences.	155	4.46	1.699	2.868

Construct	Items	N	Mean	Std. Deviation	Variance
	My religious background has encouraged the development of my soft skills more than my professional experiences.	155	4.55	1.908	3.615
Learning Mechanisms	I feel pre-service training has sufficiently developed the soft skills that I need to support my current health supply chain management roles and responsibilities.	154	4.10	1.909	3.620
	My soft skills have developed more during pre-service training than through in-service training approaches.	154	3.54	1.746	3.028
	My soft skills have been improved more through mentoring than through formal pre-service training.	155	5.09	1.572	2.456
	My soft skills have been improved more through supportive supervision than through formal pre-service training.	154	4.99	1.433	2.039
Entrepreneurial Mindset	At work, I often implement new processes and /or products to improve organizational performance.	155	5.74	1.206	1.446
	At work, I often generate new processes and /or products to improve organizational performance.	155	5.50	1.369	1.863
	I am willing to make an effort to identify, assess and exploit opportunities to benefit the organisation.	154	6.38	0.915	0.832
Communication	Most times, I communicate openly with my supervisor/manager.	154	5.89	1.191	1.410
	Most times, I communicate openly with my colleagues/team.	155	6.26	0.876	0.762
	I often give information/feedback on others' work.	155	5.78	1.077	1.152

Construct	Items	N	Mean	Std. Deviation	Variance
	I often ask for information/feedback on my work.	155	5.80	1.159	1.334
Leadership	I usually go beyond self-interest for the good of a shared goal at my organisation.	154	6.32	0.87	0.752
	I often talk enthusiastically about what needs to be accomplished when executing a task at work.	155	6.18	0.929	0.858
	Sometimes, I spend time coaching and teaching about the supply chain processes.	154	5.98	1.123	1.253
Flexibility	I am willing to work in a changing work environment.	155	6.54	0.758	0.571
	I can address changing needs and preferences through innovative products and services.	153	6.05	0.948	0.893
	Sometimes, I can combine my job tasks with other unrelated job tasks.	153	5.82	1.155	1.326
Result-Oriented	I can get results with available resources.	153	6.02	0.921	0.843
	Sometimes, I prioritize when decisions need to be made.	154	6.29	0.756	0.568
	I often identify and manage priorities effectively.	154	6.10	0.906	0.815
Self-Management	I am usually aware of how I react to situations and how they impact others.	154	6.01	0.886	0.779
	I often keep disturbing emotions and impulses in check.	154	5.57	1.176	1.375
	I often see the positive aspects of things and the future.	154	6.07	0.957	0.910
Teamwork	I often discuss with my colleague(s) opinions about how we can complete tasks.	153	6.19	0.801	0.637

Construct	Items	N	Mean	Std. Deviation	Variance
	When tasks get difficult, I sometimes take longer to reach out to my colleagues/manager for assistance.	154	3.97	1.826	3.311
	I understand my role and tasks when working on team tasks with my colleague(s).	153	6.19	0.809	0.650
Sense of Duty	I usually take risks by participating in new practices during a changing work environment.	153	5.53	1.358	1.831
	I feel compelled to help other health supply chain professionals to do better to improve practices.	152	5.99	1.274	1.612
	I often take responsibility to ensure things are done right and comply with existing rules and policies.	153	6.33	0.874	0.758
Relationship Management	I usually foster positive interactions with individuals/teams.	152	6.29	0.76	0.574
	I do not think it is important to socialise with others very much.	153	2.80	1.875	3.491
	I am usually aware of how I react to situations and how they impact others.	154	5.98	0.859	0.733
Negotiation	When negotiating, I am usually accurate and clear in expressing my interests and needs.	153	5.41	1.222	1.484
	When negotiating, I am good at identifying common interests.	153	5.84	1.029	1.052
	I am often effective in persuading others.	152	5.59	1.095	1.190
Performance	It is important to me to fulfil organisational rules and procedures.	154	6.21	0.97	0.935
	I often have high expectations about producing quality work outputs.	152	6.40	0.832	0.688
	I am usually rigorous about doing a task right the first time.	154	6.06	1.077	1.152

7.4. Validation of soft skill development constructs

7.4.1. Non-response bias and common method bias

The t-test was used to assess the non-response bias between early and late respondents. The lack of statistically significant differences among the scale items of early and late respondents demonstrated the absence of non-response bias. As discussed in section 4.5.3, the possibility of common method bias was also assessed using VIF (Kock, 2015; Hair et al., 2011; 2019) and Harman test (Kock, 2020). The values for VIF were all under five and the 33.8% cumulative average for Harman's single-factor test illustrated the absence of common methods bias.

7.4.2. Reliability and validity of measurement scales

First, exploratory factor analysis was conducted on the 49 questionnaire items developed to estimate the correlation of the six constructs of the conceptual framework- *Individual Motivation* (consisting of three different components)*, Work Environment, Social Practices, Learning Mechanisms, Soft Skill Development* (consisting of ten soft skill categories) *and Performance.* The test correlation of the constructs obtained a KMO value of 0.872 and a Bartlett's Test of Sphericity that was significant ($p<0.01$). A KMO value above 0.6 and a significant Bartlett's Test of Sphericity ($p<0.05$) indicates that the data had a substantial correlation.

Second, reliability and validity analysis were conducted to evaluate whether measures for the six constructs of the project's conceptual framework were measured in keeping with the project's intention. Hair et al. (2021) recommend indicator reliability, internal consistency reliability, convergent validity and discriminant validity as measures to assess the reliability and validity of the model constructs. The item loadings were analysed to assess how the indicator's variance is explained by its constructs. Standardized loadings over 0.70 are desirable for indicator reliability (Chin, 2009). After examining the outer loading for all latent variables, the two indicators (RM2 and TEAM2) that form the *Soft Skill Development* construct were removed because their outer loadings were less than 0.4 (Hair et al., 2022). Meanwhile, 17 scale items

were found to have loadings between 0.4 to 0.7. These were subjected to a loading relevance test to see if they should be retained in the model (Wong, 2019). Subsequently, internal consistency reliability and convergent validity were assessed against the thresholds set in the literature.

The internal consistency reliability and convergent validity were measured using the overall Cronbach α scores, CR and the AVE. As suggested by Hair et al. (2019), a Cronbach α value greater than 0.60 is considered acceptable as a minimum score in exploratory research. In addition, a CR value above 0.60 and below 0.95 is considered acceptable internal consistency reliability (Ringle et al., 2020). The Average Variance Extracted (AVE) index was used to verify the convergent validity of every construct (Hair et al., 2021 Wong, 2019). AVE shows the amount of variance explained by the construct about the variance due to error. AVE values greater than 0.50 indicate good convergent validity and point out that the construct explains 50 per cent or more of the indicators' variance that makes up the construct (Hair et al., 2022). After examination, the Cronbach α, CR and AVE scores for constructs *Individual Motivation, In-service Learning, Pre-service Learning, Social Practices, Work Environment and Performance* were above the minimum acceptable thresholds. However, the *Soft Skill Development* construct had an acceptable Cronbach α (0.948), but the CR (0.953) and AVE (0.416) indicated low levels of internal consistency reliability and convergent validity.

This situation of having Cronbach α, CR and AVE values showing different results against set thresholds is common. In a review of PLS-SEM in human resources management research, Ringle et al., (2020) highlighted that the results of these three reliability assessments usually differ, with Cronbach's α the most conservative criterion, the CR the most liberal one, and the AVE an approximately exact measure of reliability. To this end, the factor loadings of the scale items of the *Soft Skill Development* construct were revisited and 17 scale items with standardized loadings less than 0.70 were excluded from further analysis. The PLS algorithm

was re-run and Table 7.3 shows the final results of the reliability and validity values for each construct. The values of Cronbach α, CR and AVE show that the multi-item scales used to measure the latent constructs of *Individual Motivation, In-service Learning, Pre-service Learning, Social Practices, Work Environment, Soft Skill Development and Performance* measured their intended constructs. Therefore, the study's measurement of proposed antecedents and consequences of soft skill development was considered a good fit, considering sampling errors.

The guidance in conducting PLS-SEM also suggests assessing discriminant validity (Hair et al., 2021; Ringle et al., 2020). The Fornell-Lacker criterion requires that the square root of AVE for each construct should be higher than its correlation and these values should be less than 0.95 (Fornell and Lacker, 1981). As shown in Table 7.4, the values are below 0.95, reflecting that the multi-item scales used for the study measured their intended constructs. Ringle et al. (2020) highlighted that most research studies in human resource management research rely on the Fornell-Larcker criterion and cross-loadings when assessing discriminant validity. However, Henseler et al. (2015) have shown that the Fornell-Lacker criterion performs poorly in terms of revealing discriminant validity problems.

As a substitute, the HTMT criterion has been suggested. HTMT focuses on the average correlation of indicators measuring the same construct in relation to the average correlation of the indicators across constructs. Henseler et al. (2015) recommend that HTMT values should not exceed 0.90 if the path model includes conceptually similar constructs or a threshold of 0.5 if the constructs are conceptually distinct. Some of the constructs for this research are considered conceptually similar (e.g., PSL and ISL), therefore a threshold of 0.9 was selected. All constructs, except the *Soft Skill Development* construct (0.92) had HTMT values below 0.90. As suggested by Ringle et al (2020), the bootstrapping procedure was performed and determined the HTMT value for the *Soft Skill Development* construct to be statistically

significantly lower than one. Thus, the multi-item scales used for the study met the discriminant validity threshold.

Table 7.3: Reliability and validity tests (N=159)

Construct	Items	Mean	Loadings	Cronbach's α	CR	AVE
Individual Motivation				0.783**	0.876**	0.707**
IM1	In general, I feel good about the soft skills I possess.	5.86	0.879			
IM2	In general, I feel good about the soft skills I use for service delivery.	5.94	0.915			
IM3	I am planning to improve the use of my soft skills during service delivery.	6.22	0.728			
Work Environment Context				0.797**	0.882**	0.715**
WEC1	I often receive support from my team to further develop my current set of soft skills on the job.	4.64	0.881			
WEC2	I often receive support from my supervisors/managers to enhance my current set of soft skills on the job	4.79	0.891			
WEC3	I often receive additional training to further develop my soft skills to adapt to the prevailing business environment	4.52	0.762			
Social Practices				0.654**	0.835**	0.728**
SP1	My social activities have encouraged the development of my soft skills more than my professional experiences.	5.03	0.827			
SP2	My cultural background has encouraged the development of my soft skills more than my professional experiences.	4.46	0.898			
Learning Mechanisms						
PSL1	I feel pre-service training has sufficiently developed the soft skills that I need to support my current health supply chain management roles and responsibilities	4.10	0.918	0.770**	0.896**	0.813**
PSL2	My soft skills have developed more during pre-service training than through in-service training approaches	3.54	0.886			
ISL1	My soft skills have been improved more through mentoring than through formal pre-service training.	5.09	0.861	0.726**	0.879**	0.785**

Construct	Items	Mean	Loadings	Cronbach's α	CR	AVE
ISL2	My soft skills have been improved more through supportive supervision than through formal pre-service training	4.99	0.909			
Soft Skill Development				0.923**	0.935**	0.564**
SSD 1	I usually go beyond self-interest for the good of a shared goal at my organisation.	6.33	0.779			
SSD 2	I often talk enthusiastically about what needs to be accomplished when executing a task at work.	6.18	0.759			
SSD 3	I am willing to work in a changing work environment.	6.54	0.730			
SSD 4	Sometimes, I prioritize when decisions need to be made.	6.29	0.799			
SSD 5	I often identify and manage priorities effectively.	6.10	0.749			
SSD 6	I am usually aware of how I react to situations and how they impact others.	6.01	0.784			
SSD 7	I often see the positive aspects of things and the future.	6.07	0.760			
SSD 8	I often discuss with my colleague(s) opinions about how we can complete tasks.	6.33	0.745			
SSD 9	I understand my role and tasks when working on team tasks with my colleague(s).	6.19	0.728			
SSD 10	I often take responsibility to ensure things are done right and comply with existing rules and policies.	6.33	0.765			
SSD 11	I usually foster positive interactions with individuals/teams.	6.29	0.780			
SSD 12	I am usually aware of how I react to situations and how they impact others.	5.98	0.734			
Performance				0.776**	0.872**	0.700**
PERF1	It is important to me to fulfil organisational rules and procedures.	6.21	0.847			
PERF2	I often have high expectations about producing quality work outputs	6.40	0.908			
PERF3	I am usually rigorous about doing a task right the first time	6.07	0.760			

**p<0.01

Table 7.4: Discriminant validity-Fornell-Larcker criterion

	Individual Motivation	In-service Learning	Performance	Pre-service Learning	Social Practices	Soft Skill Development	Work Environment
Individual Motivation	***0.844***						
In-service Learning	0.360	***0.885***					
Performance	0.475	0.125	***0.841***				
Pre-service Learning	0.307	0.349	0.137	***0.902***			
Social Practices	0.248	0.171	0.151	0.186	***0.863***		
Soft Skill Development	0.530	0.269	0.797	0.226	0.212	***0.760***	
Work Environment	0.277	0.402	0.155	0.468	0.036	0.256	***0.847***

Notes: values in **bold** depict the Fornell-Larcker criterion for discriminant validity

7.4.3. Assessment of the structural model

First, an assessment of the potential collinearity among predictor constructs in structural model regressions was performed. Collinearity was determined not to be a problematic issue as the VIF values were all below the threshold of 5, indicating that the model estimates are not affected by high levels of collinearity (Hair et al., 2011). This also confirmed the absence of common method bias. (Hair et al., 2019; Kock, 2015).

Next, a bootstrapping routine and examination of the t-values of 500 replications were conducted to test the path coefficients' (β) significance. The PLS path coefficients and p-values for the conceptual framework, proposed in section 3.5, are reported in Table 7.5.

Table 7.5: Path coefficient estimates

Structural path	β	Std Deviation	T statistic
Individual Motivation → Inservice Learning	0.234	0.088	2.785**
Individual Motivation- → Preservice Learning	0.154	0.066	2.370*
Individual Motivation → Soft Skill Development	0.445	0.128	3.621**
In-service Learning → Soft Skill Development	0.043	0.079	0.569
Pre-service Learning → Soft Skill Development	0.014	0.095	0.027
Work Environment → Soft Skill Development	0.092	0.068	1.559
Work Environment → Individual Motivation	0.275	0.079	3.402**
Work Environment → In-service Learning	0.327	0.076	4.377**
Work Environment → Pre-service Learning	0.428	0.060	6.957**
Social Practices → Individual Motivation	0.240	0.084	2.845**
Social Practices → In-service Learning	0.103	0.079	1.248
Social Practices → Pre-service Learning	0.133	0.079	1.674
Social Practices → Soft Skill Development	0.072	0.076	1.123
Soft Skill Development → Performance	0.814	0.078	10.548**

**p<0.01; *p<0.05

In terms of relevance, path coefficients are expected to be between −1 and +1, with coefficients closer to −1 representing strong negative relationships and those closer to +1 indicating strong positive relationships (Hair et al., 2022). The results did not show any path coefficients larger than ±1 and these were considered acceptable and relevant.

Examination of the coefficient of determination (R^2) of the endogenous constructs was conducted to assess the model's in-sample predictive power (Ringle et al, 2020). The R^2 is a measure of the model's explanatory power as well as the variance explained in each of the endogenous constructs (Shmueli & Koppius, 2011). In various social science disciplines, R^2 values of 0.75, 0.50, and 0.25 are considered substantial, moderate, and weak, respectively (Hair et al., 2011). Table 7.6 shows that work environment and social practices explain nearly 15% of the variance in individual motivation (R^2= 0.153, p<0.05), which indicates their weak predictive power. In turn, the findings indicate that individual motivation has moderate predictive power and explains nearly 29% of the variance in pre-service learning (R^2= 0.228, p<0.01) and soft skill development (R^2= 0.318, p<0.05). However, individual motivation had borderline weak predictive power, which explains nearly 25% of the variance in in-service learning mechanisms (R^2= 0.251, p<0.01).

Table 7.6: R^2 values

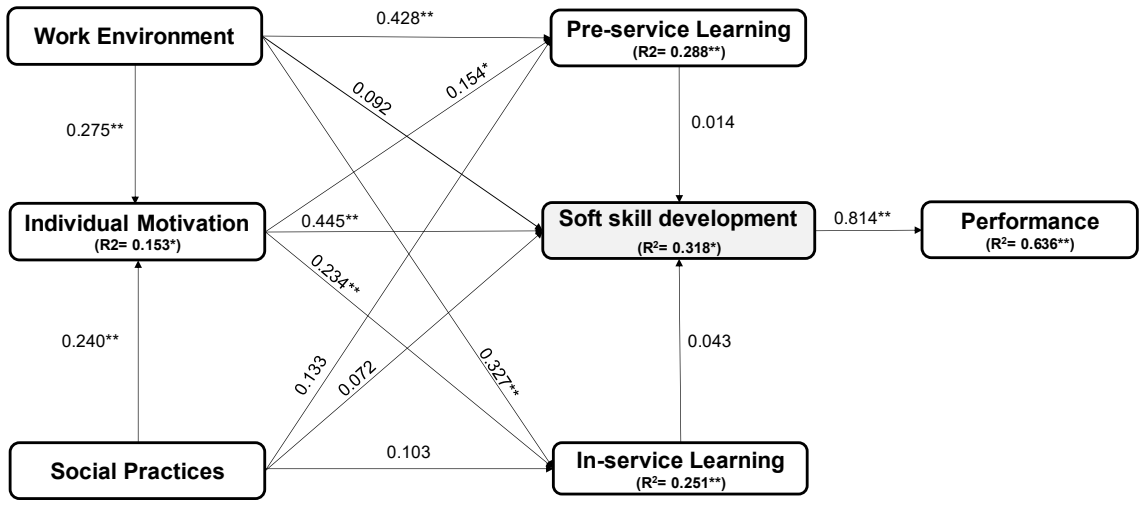
Construct	R^2	Std. Deviation	T statistics	Remark
Individual Motivation	0.153	0.053	2.104*	Weak
In-service Learning	0.251	0.075	3.166**	Weak
Performance	0.636	0.106	6.069**	Moderate
Pre-service Learning	0.288	0.054	4.962**	Moderate
Soft Skill Development	0.318	0.136	2.233*	Moderate

**p<0.01, *p<0.05

7.4.4. Hypothesis testing

The hypotheses set in section 4.6.2 were tested using the PLS-SEM bootstrapping procedure of 500 replications. As indicated in section 4.6.4, this approach was considered suitable because of its predictive nature, ability to deal with complex models and suitability for studies with small samples (Wong, 2019; Hair et al., 2019). Following the assessments of the reliability and validity of the measurement model, described in section 7.4.2, the structural model was examined to test the proposed hypotheses to address research objective 5, as outlined in section 1.6. The final model is presented in Figure 7.1, based on the hypothesis testing.

Figure 7.1: Final structural model of soft skill development



**p<0.01, *p<0.05

In terms of *Individual Motivation*, Table 7.7 shows that the analysis support H1a (Individual Motivation → In-service Learning) (β= 0.234, p<0.01), H1b (Individual Motivation → Pre-service Learning) (β= 0.154, p<0.05) and H1c (Individual Motivation → Soft Skill Development) (β= 0.445, p<0.01). An analysis of the mediating effects of *Pre-Service Learning* and *In-Service Learning* mechanisms on the Individual Motivation → Soft Skill Development path was conducted using the approach suggested by Hair et al. (2022). The results showed that the learning mechanisms had no mediation effect on the relationship between individual motivation

and soft skill development. In other words, both *Pre-Service* and *In-Service Learning* mechanisms do not govern the underlying mechanism of the relationship between individual motivation and soft skill development.

The PLS-SEM findings did not support H2a (In-service Learning → Soft Skill Development) (β = 0.043, p =0.569) and H2b (Pre-service Learning → Soft Skill Development) (β = 0.014, p =0.978). This shows that Pre-Service Learning and In-Service Learning do not significantly impact soft skill development. An analysis of the moderating effects of Pre-Service and In-Service Learning mechanisms on Individual Motivation → Soft Skill Development path was conducted. The path coefficients for Pre-Service Learning (β = -0.073, p =0.640) and In-Service Learning (β =-0.057, p =0.684) show that for both learning mechanisms, the moderating effects were statistically insignificant.

Table 7.7: Structural estimates of hypothesis testing

Hypothesis	Impact of	Impact on	β	Std. Deviation	T statistic	Supported/not supported
H1a	Individual Motivation	In-service Learning	0.234	0.088	2.785**	Supported
H1b	Individual Motivation	Pre-service Learning	0.154	0.066	2.370*	Supported
H1c	Individual Motivation	Soft Skill Development	0.445	0.128	3.621**	Supported
H2a	In-service Learning	Soft Skill Development	0.043	0.079	0.569	Not supported
H2b	Pre-service Learning	Soft Skill Development	0.014	0.095	0.027	Not supported
H3a	Work Environment	Soft Skill Development	0.092	0.068	1.559	Not supported
H3b	Work Environment	Individual Motivation	0.275	0.079	3.402**	Supported
H3c	Work Environment	In-service Learning	0.327	0.076	4.377**	Supported
H3d	Work Environment	Pre-service Learning	0.428	0.060	6.957**	Supported
H4a	Social Practices	Individual Motivation	0.240	0.084	2.845**	Supported
H4b	Social Practices	In-service Learning	0.103	0.079	1.248	Not supported
H4c	Social Practices	Pre-service Learning	0.133	0.079	1.674	Not supported
H4d	Social Practices	Soft Skill Development	0.072	0.076	1.123	Not supported
H5	Soft Skill Development	Performance	0.814	0.078	10.548**	Supported

* $p<0.05$; ** $p<0.01$.

The PLS-SEM analysis separately tested the impact of work environment and social practices on soft skill development. The findings did not support H3a (Work Environment → Soft Skill Development) (β= 0.092, p=0.120), indicating that the work environment does not directly and significantly influence soft skill development. Contrary to the finding on the impact of *Work Environment* on soft skill development, the findings supported H3b (Work Environment → Individual Motivation) (β= 0.0275, p<0.01), H3c (Work Environment → In-service Learning) (β= 0.327, p<0.01), and H3d (Work Environment → Pre-service Learning) (β= 0.428, p<0.01).

Furthermore, H4a (Social Practices → Individual Motivation) (β= 0.240, p<0.01) was supported. Together with H3b, these findings show that the *Work Environment* and *Social Practices* have an indirect effect on soft skill development, by positively and significantly impacting the *Individual Motivation* of the health supply chain workforce. Nevertheless, *Social Practices* were found not to support H4b (Social Practices → In-service Learning) (β= 0.103, p =0.213), H4c (Social Practices → Pre-service Learning) (β = 0.133, p=0.095), H4d (Social Practices → Soft Skill Development) (β= 0.072, p=0.262).. The relationship between *Soft Skill Development* and *Performance* is positive and significant (β= 0.814, p<0.01), supporting H5.

7.4.5. Correlation of the soft skill required for health supply chain practice

In phase 1 of the project, ten soft skill categories were identified through an analysis of health supply chain job advertisements in developing economies and were validated as essential for health supply chain practice through a Delphi survey. Concerning these ten soft skill categories, a Pearson correlation analysis of the participants' responses was conducted, and the results are summarised in Table 7.8. The salient observation from the correlation analysis is that all the correlations between soft skill categories were statistically significant, at p<0.01, which indicates strong inter-relationships of the soft skill categories.

Table 7.8: Correlation analysis of soft skills required for health supply chain practice

	EM	COMM	LEAD	FLX	RO	SM	TEAM	SOD	RM	NEG
EM	1									
COMM	0.518**	1								
LEAD	0.557**	0.559**	1							
FLX	0.498**	0.513**	0.607**	1						
RO	0.496**	0.552**	0.560**	0.677**	1					
SM	0.533**	0.522**	0.606**	0.581**	0.662**	1				
TEAM	0.220**	0.305**	0.302**	0.356**	0.438**	0.476**	1			
SOD	0.421**	0.487**	0.533**	0.579**	0.538**	0.516**	0.453**	1		
RM	0.347**	0.404**	0.393**	0.425**	0.407**	0.526**	0.468**	0.424**	1	
NEG	0.459**	0.535**	0.490**	0.554**	0.580**	0.495**	0.255**	0.543**	0.442**	1

** p< 0.01

7.4.6. Exploring relationships between soft skills and demographic variables

A one-way ANOVA test was used to compare the mean scores for the ten soft skill categories with the demographic variables. The null hypothesis was that there were no differences in scores. The alternative hypothesis was that there were differences in the mean scores. Table 7.9 summarizes the results of the one-way ANOVA test for the soft skill categories with the different demographic variables.

Table 7.9: Summary of one-way ANOVA test for soft skills and demographic variables

Demographic Variable	Decision
Gender	Retain the null hypothesis of no difference for all the ten soft skills.
Age	Retain the null hypothesis of no difference for all the ten soft skills.
Ethnicity	Retain the null hypothesis of no difference for all the ten soft skills.
Profession	Reject the null hypothesis of no difference for self-management ($p<0.05$). Retain the null hypothesis of no difference for all the remaining nine soft skills.
Qualifications	Retain the null hypothesis of no difference for all the ten soft skills.
Work Experience	Retain the null hypothesis of no difference for all the ten soft skills.
Prior soft skill training	Retain the null hypothesis of no difference for all the ten soft skills.

7.5. Chapter summary

This chapter showed that the reliability and validity measures of the multi-item scales used to estimate the project's conceptual framework measured their intended constructs. The chapter examined the proposed hypotheses using PLS-SEM and the findings showed significant and positive values that validated the proposition that individual motivation impacts learning mechanisms and soft skill development. In addition, the results validated the impact of the work environment on individual motivation and learning mechanisms. However, the findings did not empirically support the hypotheses on the impact of social practices on learning mechanisms and soft skill development, and the impact of learning mechanisms on soft skill development. In the end, the structural path results confirmed some of the findings from the Delphi survey results (Study 2) that current learning mechanisms were not adequately supporting the development of soft skills required for health supply chain practice in developing economies. Work environment and social practices were also shown to be significant predictors of individual motivation, and indirectly influence soft skill development and performance.

CHAPTER EIGHT: STUDY FOUR RESEARCH FINDINGS

8.1. Introduction

This chapter examines the analysis of the data collected through the semi-structured interviews with a targeted sample of the health supply chain workforce to obtain in-depth insights into the development of soft skills in developing economies. This study addresses research objective 6- *identify facilitators and barriers to the development of soft skills in developing economies*. This chapter focuses on the thematic analysis of the qualitative data on the health supply chain workforce's views, perspectives, and experiences on soft skill development.

The chapter begins by outlining the analytical framework that was used to explore the qualitative insights on soft skill development, to address additional gaps from results presented in previous chapters. Section 8.3 focuses on the characteristics of the health supply chain workforce. Section 8.4 highlights the research participants' (RP) understanding of soft skills for health supply chain practice. Section 8.5 considers views on the effects of global events on the development of soft skills among the health supply chain workforce. Section 8.6 explores the perceived effects of learning mechanisms towards the development of soft skills. This section also considers some views on the differences in the development of soft skills across health supply chain cadres. Section 8.7 focuses on enabling factors for the development of soft skills and examines some existing opportunities and key elements required to develop soft skills. Section 8.8 considers barriers to the development of soft skills in health supply chains in developing economies. Section 8.9 concludes with a summary of the chapter.

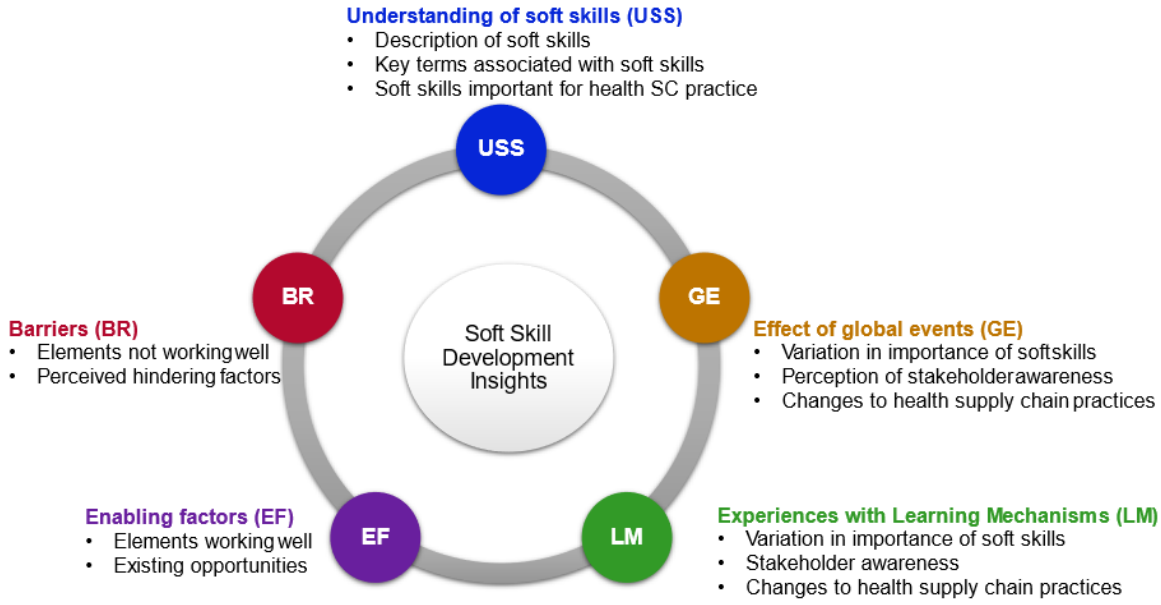
8.2. Analytical framework for soft skill development insights

The results presented in earlier chapters have examined different constructs of the conceptual framework. This includes understanding the learning and work-related practices in skill development and their contribution to the development of soft skills that were presented in

Chapter Two; the soft skills that are prioritised for health supply chain practice identified in Chapter 5 (Study 1) and Chapter Six (Study 2); and the relationship of antecedents and consequences of soft skill constructs presented in Chapter 7 (Study 3).

These results have shed light on which soft skills are required for health supply chain practice in developing economies and how well these soft skills are being developed using current learning mechanisms. However, the results do not provide explanatory insights into the "how" or "why" the outputs are the way they are. To address this, the semi-structured interviews were designed and conducted to follow up on the quantitative data from the literature review and Studies 1 to 4 to facilitate the consolidated interpretation of the findings of the research project. To guide the semi-structured interviews, Figure 8.1 depicts the five analytical constructs that emerged from the results of previous studies to help further investigate the everyday experiences of the health supply chain workforce with soft skill development in developing economies.

Figure 8.1: Framework for further analysis of soft skills development insights



First, there was consensus on the soft skills considered important for the health supply chain, but there is a need to have an in-depth understanding of why and how these soft skills are critical to their everyday practices. Second, the effects of global events, including the COVID-19 pandemic, have emerged as having critically impacted health supply chains and the everyday practices of organisations and the workforce. Therefore, the semi-structured interviews sought to understand how the effects of the global environment have changed the health supply chain practices and the development of soft skills. Third, the literature review showed mixed results on the effects of current learning mechanisms on skill development. In addition, the PSL-SEM analysis showed that PSL and ISL do not significantly impact soft skill development. As a result, there is a need to get in-depth insights into the experiences of the health supply chain workforce with learning mechanisms and the development of soft skills. Lastly, Study 3 has empirically tested the conceptual framework for soft skill development to show the relationships between learning mechanisms, individual motivation, work environment, social practices and soft skill development. However, this quantitative analysis does not elucidate the elements that are working well or not to develop the soft skills of the health supply chain workforce in their everyday practices. Thus, the analytical framework for the semi-structured interviews incorporates enablers and barriers to soft skill development, to address this gap.

8.3. Overview of the research participants

A targeted sample of 9 health supply chain professionals participated in the semi-structured interviews (see table 8.1 for the demographics). This final number of participants was reached as the researcher was not getting any new data on the inquiry domains from the participants. The decision to stop additional interviews was then taken to minimise any waste of time that would have been spent identifying and scheduling suitable slots with relevant health supply chain professionals. They all had extensive experience in developing economies, including Cote d'Ivoire, Ethiopia, Haiti, Uganda, Nigeria, Liberia, Rwanda, Sierra Leone, Sudan and

Togo. All bar one had a pharmacy background combined with supply chain management training. A third were females and the average years of experience in health supply chain practice for all research participants was 14.7 years (range: 11-18 years).

Table 8.1 Demographics of research participants

Interviewee	Code	Profession	Years of experience
1	RP1	Pharmacist and Supply Chain Professional	13 years
2	RP2	Supply Chain Professional	11 years
3	RP3	Pharmacist and Supply Chain Professional	17 years
4	RP4	Pharmacist and Supply Chain Professional	17 years
5	RP5	Pharmacist and Supply Chain Professional	18 years
6	RP6	Pharmacist and Supply Chain Professional	18 years
7	RP7	Pharmacist and Supply Chain Professional	15 years
8	RP8	Pharmacist and Supply Chain Professional	11 years
9	RP9	Pharmacist and Supply Chain Professional	12 years

The following sections analyse the valuable insights into the development of soft skills in the health supply chain workforce that were shared by research participants. Their perspectives are informed by their everyday experiences. The final sample of research participants consisted of mainly pharmacists, as they may have a higher prevalence of being in health supply chain roles due to their knowledge of and engagement with medicines. These insights have been curated and presented in five main categories, using the analytical framework, which was used to examine the transcripts, outlined in section 8.2, offering a comprehensive understanding of this topical issue. A total of eleven sub-themes emerged from the analysis

8.3. Understanding of soft skills

At the onset of the interviews, all research participants were asked to describe their understanding of soft skills about health supply chain practices in their work contexts. The sub-

themes generated from the qualitative data are associated with the personal and interpersonal nature of soft skills and their complementarity.

Sub-theme 1: Personal and interpersonal nature of soft skills

Interviewees generally attributed soft skills to personal and interpersonal abilities that allow individuals to effectively interact with each other and function effectively within the team. They represent the key skills and attitudes that are required to execute work tasks and achieve the goals of the team. Thus, soft skills are expected to play a key role in relationship management during the execution of tasks at the workplace.

A research participant expanded on the personal nature of soft skills and expressed them as abilities linked to genetics but can also be learned over time through social groups.

"*Soft skills are inbuilt skills that one gains while growing up, maybe through family lineage or family engagements, along with some other abilities that you gain along the way as you are growing. […] Soft skills are sometimes inherent, like a natural thing that one expresses or possesses."*

RP01

However, some research participants voiced several terms that they associate with soft skills, such as emotional intelligence, life skills, complementary skills, core skills, and secondary skills. This emphasises numerous expressions associated with soft skills. The research participants highlighted soft skills, such as communication, negotiation, time management, leadership, teamwork and problem-solving as critical for health supply chain practice in developing economies. These soft skills were considered important for health supply chain practices for several reasons. One of the main reasons was that there are many actors in health supply chain management, including manufacturers, procurement agents, logistics

providers, program implementers, government agencies and customers. Therefore, the complexity of navigating through different political, business and social interests requires the workforce to have effective communication, teamwork, collaboration and negotiation skills to contribute and attend to the shared goal of health supply chain service delivery. This is exemplified by one participant as follows:

"*Therefore, given the wide range of stakeholders in health supply chain management and the complex collaboration required, soft skills such as communication, teamwork, analytical and problem-solving are required*"

RP07

On the other hand, most supply chain actions and decisions were considered time-bound, requiring agility and adaptability to respond to the changing trends and contexts. This was attributed as the reasons for the importance of time management, organisational skills and problem-solving for the health supply chain workforce to be effective. The impact of any erroneous actions in the health supply chain was considered significant, leading to a huge burden and costs to the health system and the clients.

Sub-theme 2: Complementary nature of soft skills

Research participants alluded to soft skills as a complementary set of skills that are needed in health supply chain practice to deliver technical competencies. Thus, without soft skills, it is difficult to effectively express one's technical skills. This essential linkage between technical and soft skills allows the technical tasks to be translated into what is needed or expected that others can utilize. Words, such as 'ancillary', 'secondary' and 'linkage' were uttered to express the reciprocity of soft skills to technical skills to ensure the combined skills facilitate health supply chain workforce productivity.

8.5. Effects of global events on the importance of soft skills

There was a strong sense among some of the research participants that recent global events have elevated the prominence of soft skills among stakeholders in health supply chain management. Although the health supply chain workforce is required to demonstrate the use of soft skills regularly in their work, the awareness of soft skills as a requirement for effective performance was perceived to have surged as a result of the effects of COVID-19 on health supply chain practices.

"*COVID-19 exposed that soft skills are needed to manage the human resource aspects of supply chain management.*"

RP04

Examples of adaptability and agility within the supply chain were provided by one respondent. These have become especially important soft skills for supply chain practice across the globe because of the disruptions that the global events have brought have made organisations and workforce learn and prioritise these skills over others.

Sub-theme 2: Changes in ways of working

Due to the impact of COVID-19 on health supply chain management, the respondents highlighted how individuals and organisations now appreciate gaps in the soft skills of the workforce and how current ways of working have been exposed. Faced with the operational hurdles, individuals and organisations have made changes in their ways of working to maintain continuity of business amidst the COVID-19 pandemic, as exemplified by some research participants:

“COVID-19 has made us adapt to new challenges within the supply chain and has helped to understand the need for the supply chain expert to be adaptable and creative.”

RP01

One respondent explained how individuals and organisations changed ways of working was typical of human nature when we face a challenge and try to find another way to overcome the obstacles. This results in the development of resilience to keep delivering, learning and remaining relevant to keep things moving forward. As a result, the workforce is required to adapt to the work environment, and to the way they collaborate. This has made it critically important for every individual to assess their soft skills and self-aware. One of the key changes in the way of working has been the shifts in communication due to the ripple effects of the shutdowns. Individuals and organisations responded by adopting various technological tools to communicate in business, such as Microsoft Teams, Google Meet and Zoom, which continue to be routinely used post-COVID-19.

“*COVID-19 has brought innovation in how we communicate in business. People do not need to travel long distances to meet in person and most communication is through different platforms*.”

RP02

After the COVID-19 pandemic, the use of technological tools for business engagements has continued to increase. It has been particularly important for individuals and organisations to be agile throughout the different changing circumstances.

8.6. Experiences with learning mechanisms towards the development of soft skills

The analysis of the responses of the health supply chain workforce's experiences on the effects of learning mechanisms towards the development of soft skills generated three main sub-themes that are discussed below.

Sub-theme 1: Paucity of soft skills in health supply chain curricula

There is a strong perception among the majority of the research participants of the inadequacy of pre-service learning for the development of soft skills that is attributed to some of the suboptimal performance of health supply chains in developing economies. However, the importance of soft skills is realised during work practice, as the workforce is required to apply these skills. One of the reasons that were provided by the respondents on why we are having challenges with supply chain performance was scarcity of soft skills within the health supply chain workforce. They pointed out that most of the workforce has not been exposed to adequate soft skill development during the pre-service training before they get employed, yet organizations demand some level of soft skills for one to excel. One respondent expanded the reason by indicating that during pre-service, the students prioritise passing the exams and moving on to the next class, rather than focusing on the development of soft skills required for health supply chain practice that are not examined.

"*[…] in pre-service, the importance of soft skills is not well known, but during in-service you are required to apply them, and you see the importance of soft skills*. *[…]"*

RP01

The main reason attributed to the perceived inefficacy of pre-service learning to develop soft skills of the health supply chain workforce was the curricula that are considered to be unaligned with the requirements of the real world. In addition, the complexity of processes to change the curriculum requires multiple stakeholders to be consulted. One respondent outlined how in

practice you realise the inadequacy of the pre-service learning curriculum and the need to include soft skills such as entrepreneurship and leadership. However, this requires the buy-in of education gatekeepers and regulatory authorities for curriculum changes to materialise. On the contrary, one respondent indicated some efforts are being made to improve soft skills during pre-service, but these are limited to a few soft skills. There are some efforts to improve some soft skills through activities such as presentations, but this is not structured and purposely aimed at improving the soft skills.

Sub-theme 2: Individual motivation

On the other hand, one of the participants expressed that while familiarity with soft skills exists among the health supply chain workforce, constraints with individuals' motivation to learn or apply the skill in practice satisfactorily seem to be common. Engagement in specific soft skills development training activities, in many contexts, seems to be employees' initiative.

"*I feel that people know about soft skills, but people have not taken the time to either learn or practice these skills because of a couple of the supply chain bottlenecks that we have with managing integrated supply chains."*

RP03

As a result, some of the health supply chain workforce realize that gaps in soft skills can be identified during routine performance appraisals and can elicit the workforce to pursue different opportunities to enhance their soft skills through in-service learning mechanisms. Before the next appraisal, one would want to work on the soft skills highlighted as inadequate. This way, one will take the soft skill development efforts more seriously because this is a step in one's career progression path and may hinder one's growth within the organisation.

Sub-theme 3: Inequalities in access soft skill development opportunities

The perception among the research respondents is that in-service learning mechanisms have yielded positive effects in terms of the development of soft skills of the health supply chain workforce in developing economies. However, disparities in access to the opportunities to develop or enhance soft skills while in-service exist:

"Only a few people can pursue and access those opportunities to develop soft skills when in service. The special trainings have worked well, but they are mostly deficient in the soft skills and focus more on the technical skills."

RP06

8.7. Enabling factors for the development of soft skills

The research participants highlighted some key enabling factors that facilitate the development of soft skills in the health supply chain workforce in developing economies. Seven sub-themes were generated within this category and are described separately below.

Sub-theme 1: Access to supplementary training programs

Access to supplementary training programs was cited as a key enabling factor that contributed to the development of soft skills. These opportunities that are available within or outside health programs enable the workforce to further develop their soft skills and address any soft skill gaps that are noted while in practice. Some examples include the programs offered by PtD (STEP 2 program) and the Chartered Institute of Procurement and Supply (CIPS). The health supply chain workforce in developing economies is relying on these alternatives. Special training seems to be an effective way to develop soft skills. For example, professional courses offered by CIPS facilitate this, but the practical part is achieved through practice and experience at the workplace.

Conversely, participation in some of the external programs that facilitate the development of soft skills comes with a financial burden to the workforce, which compromises the scale-up of such programs among the health supply chain workforce in developing economies.

"*I think that is something that is working, but the challenge with it is it cannot go to scale. […] that means you pay money and gain a formal course to help us learn some of the soft skills."*

RP06

However, while these training programs are considered by most of the participants to be effective and contribute to the development of soft skills of the health supply chain workforce, it was pointed out that most of these programs currently focus mostly on a few soft skills, such as leadership and analytical skills. Another challenge is that the workforce is not formally assessed, and this is left to the individuals to self-assess when they apply the knowledge in practice.

On the other hand, developing economies receive extensive support from international development partners to strengthen health supply chain systems, including addressing skill gaps in the workforce. International development partners view soft skill development as an asset to both individuals and organisations. Part of the support from international development is helping to develop training materials and as well funding the implementation of training activities for the health supply chain workforce in some countries. A few respondents provided some examples of donor-supported programs that have been supportive of soft skill development in developing economies, which include several soft skills, but largely focus on technical supply chain skills:

"*I believe that to some extent international development work has helped to develop some of these critical soft skills […] there has been funding from USAID that support pre-service training*

on supply chain management at schools of pharmacy […] there is need to embed soft skills in such supply chain courses in all the training schools."

RP01

The adoption of new technologies offers prospects that enable easy access to information and resources that facilitate the scale-up of alternative training programs to further develop soft skills in the health supply chain in developing economies, as exemplified by one participant who highlighted that different technologies are being used that we can use to enhance awareness and development of the skills. While the information and resources to access the supplementary training program to enhance soft skills, some research participants expressed this is constrained by a lack of strategies to contextualise and target the development of soft skills among the health supply chain workforce. This leaves the onus to develop soft skills on the motivation of the individuals.

"*A key part of developing soft skills is to challenge the supply chain professionals to develop themselves in terms of these soft skills, which enable them to have the confidence to do their work*."

RP03

The personal motivation of the workforce enables the development of soft skills to enable one to sail through the selection process for a job, deliver on those additional tasks or responsibilities and advance their career. Furthermore, as one research participant pointed out, the number of health supply chain professionals is increasing, as this category of the workforce diversifies to incorporate individuals with pharmaceutical, logistics and supply chain credentials. This makes the job market more competitive, limiting opportunities for individuals to grow and progress in their careers. As a result, this has become a driving force for some of the health supply chain workforce to develop their soft skills.

"The zeal to improve the level of performance is a big factor to develop soft skills […] the need to compete with your colleagues within the supply chain context will be a factor that will help to increase the drive to seek knowledge and learn about additional soft skills."

RP01

Sub-theme 2: Workplace culture

The culture at the workplace can expose the health supply chain workforce to processes that enable systematic assessment of one's skills. Additionally, research participants expressed that the culture at the workplace could promote the development of soft skills, through building relationships with people, and working with teams that provide opportunities to learn from co-workers. In addition, workplace practices can also provide the right structures and systems that can facilitate coaching or mentoring. For example, working with teams can facilitate improvement in one's teamwork skills, work ethic and other skills such as time management. In addition, organisational culture structures that are in place to assess soft skills and facilitate coaching, and mentoring can help the workforce to improve and develop soft skills.

"You acquire soft skills because of work experience, you felt challenged, or you had the chance to work in an organisation that constantly has leadership goals for the workforce […] It is by going through these leadership courses that you realise the huge gap we have in how we are training people because in supply chain everything we have to do requires soft skills."

RP05

A few respondents expressed that some organisations routinely support their workforce to attend formal professional courses that enhance the development of skills. Furthermore, creating the appropriate environment that allows the workforce to practice the soft skills they learn is essential to enhance the development and growth of the workforce. This includes having peers that support the development of soft skills, facilities to take up special training within the organisation or going for formal professional courses outside the organisation. This

can be solidified if governments create opportunities for their supply chain talents to practice the soft skills that they are learning. This comes with delegation of authority for people to practice as they learn and grow to become health supply chain leaders.

The nature of the health supply chain working environment encourages the workforce to continuously improve their soft skills. The collaboration between health supply chain partners is a continuous process that exposes the workforce, especially those who are willing to learn, to situations that can help them enhance their soft skills, especially communication and leadership skills.

Sub-theme 3: Government leadership

The majority of the research participants attributed the need for strong political will and coordination, through national governments in developing economies, to drive the development of soft skills among the health supply chain workforce:

"It is necessary to have the political will, as well as the necessary drivers who consistently look at the capacity of the structures and input requirements. This requires commitment and willingness of stakeholders to make deliberate changes to some of the regulations and ensure soft skills are incorporated."

RP04

Strong political will was attributed to the existence of a relatively strong health supply chain and education structures that facilitate the development of undergraduate, postgraduate and tailored training programs in some of the developing contexts. Strong structures can drive the maturity of the health supply chain systems, facilitate awareness of the importance of soft skills and enable the implementation of structured initiatives to develop soft skills. This depends on the maturity of the level of the health supply chain system; the level of working in the

organisation; the leadership in place and the mission of the organisation. These can facilitate and encourage the incorporation of soft skill development in the organisation's initiatives.

A few respondents expressed the need for national governments to develop guidance materials to support the development of soft skills in developing economies. This can also be enhanced by having appropriate governance structures and frameworks, such as having a dedicated section tasked that support the development and assessment of soft skills among the health supply chain workforce:

"*There is a need to develop specific guidance for soft skill development in health supply chains […] identify key elements required to facilitate implementation, similar to the approach for the supply chain professionalization framework*."

RP05

Sub-theme 4: Professional and social groups

The research participants highlighted *the soft skill development path is not straight.* Professional groups provide an opportunity that bring the health supply chain workforce together. In addition, p*articipation in community activities can enable the workforce to learn some soft skills as opposed to attending formal training.* The interaction of the health supply chain workforce from different geographies and various levels of experience facilitates socialisation and the exchange of information on skill development. Equally, social groups are important and offer opportunities for the workforce to develop their soft skills, such as communication. These points were exemplified by the following response:

"*IAPHL brings people together to network and connect, globally and locally through different chapters. The platform is for people to develop relationship management and communication."*

RP03

8.8. Barriers to the development of soft skills

First, the majority of research participants bemoaned the lack of systematic and structured processes for the development of soft skills of the health supply chain workforce in developing economies, as typified by one respondent below:

"*Soft skills are not developed in a very structured or formal way, but experientially, I think more can be done because most people acquire these soft skills just by experience […] there is no deliberate, concerted effort to develop these skills, especially among junior experts*."

RP02

The research participants emphasised the lack of pre-service learning curricula as the main barrier to supporting the development of soft skills in health supply chain management in developing economies. The need to update the curricula for health supply chain workforce training is a game changer for the majority of the research participants:

"*If we are going to have a quantum change in soft skill development, we need to update training curricula to include key soft skills […] that means we have to identify the key soft skills and engage the appropriate people in charge of the curricula*."

RP06

Secondly, a research participant suggested that lack of advocacy to key decision-makers is an underlying issue in addressing the prioritisation of soft skills and driving the necessary changes to ensure the curriculum meets the requirements of the current practices. Thirdly, a few participants highlighted a lack of awareness among the health supply chain workforce, particularly those in senior positions, as a barrier to the development of soft skills in developing economies. A response from one research participant exemplifies this point:

"*The awareness is not there really, those who are in senior positions do not think they have a professional or moral duty to carry the junior professionals and mentor them on key soft skills while going through their career path."*

RP02

Fourth, the key decision makers who advocate and focus on technical skills content in health supply chain curricula are the same ones who are expected to drive changes to integrate soft skills in new and alternative programs. Lastly, in the context of developing economies, inadequate infrastructure is hindering learning initiatives to further develop the soft skills among the health supply chain workforce. In many instances, there is poor or non-existent internet connectivity, especially in remote areas. Where there is internet connectivity, the operational costs to access data bundles are high.

8.9. Chapter summary

This chapter shows that the health supply chain workforce values the mutuality of soft skills to technical skills to facilitate health supply chain workforce productivity. Recent global events, such as COVID-19, have uplifted the level of awareness of soft skills as a key requirement for effective workforce performance. The changes in the ways of working, such as during communication and collaboration, to maintain business continuity were also identified as part of the effects of global events on the importance of soft skills.

The chapter also investigated the enablers of the development of soft skills in developing economies that the health supply chain workforce perceives. The availability of supplementary programs on the market that focus on soft skills makes it easy to access options to develop soft skills in-service. At the organisation level, creating a workplace culture that enables systematic skill assessments and promotes learning and development is key to creating an appropriate environment that allows the workforce to practice the soft skills they learn.

Similarly, national government leadership was identified as a key element to facilitate the advocacy and resource mobilisation for soft skill development.

In this chapter, the potential barriers to soft skill development were raised. Lack of pre-service learning curricula is perceived to hinder the systematic development of soft skills of the health supply chain workforce in developing economies. As a result, any material change in the development of soft skills for health supply chain practices is contingent upon curricula that integrate technical and soft skills.

CHAPTER NINE: DISCUSSION OF RESEARCH FINDINGS

9.1. Introduction

This project has gained valuable insights into the development of soft skills in the health supply chain workforce of developing economies. The findings are categorised into two principal areas: one related to the soft skills that are necessary for health supply chain practices, and the other related to the relationship between the constructs of soft skill development. The main new findings that will be discussed in this chapter include:

- The identification of ten soft skill categories that are required for health supply chain practice in developing economies, including the identification of a sense of duty, result-oriented and flexibility that employers and the workforce prioritise as critical.
- The elevation in the importance of soft skills required for health supply chain practice since the COVID-19 pandemic.
- The limited exposure to soft skill development during pre-service learning
- A holistic framework for soft skill development in health supply chains, building on preliminary testing of a conceptual model and the identified enabling factors and barriers.

First, Chapters Five (Study 1) and Six (Study 2) provided results of the investigation into the soft skills required by employers for supply chain practice; and how job level, country income levels and region affect the soft skills required for health chain practice. The health supply chain participants confirmed the ten soft skill categories that are required for health supply chain practice. The current learning mechanisms within health supply chain management in developing economies are considered to be insufficient to support the development of soft skills in the workforce.

To complement the exploration of the soft skills required for health supply chain practice, Chapter Seven (Study 3) provided the research participants' views on multi-item measures

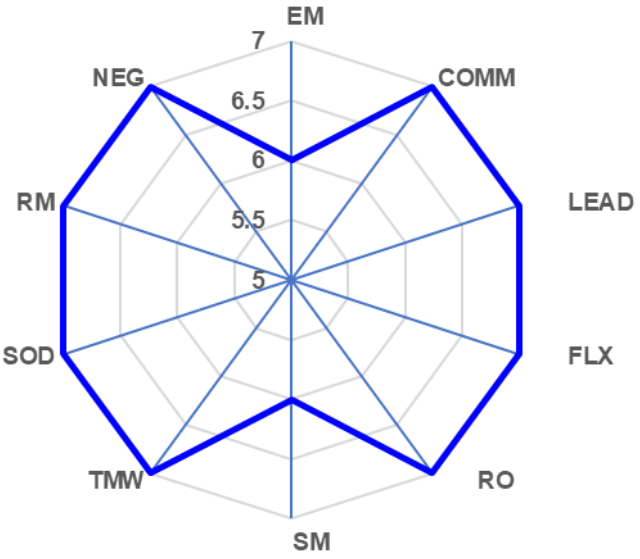
that were used to measure the soft development constructs- *Individual Motivation, Pre-service Learning, In-service Learning, Work Environment, Social Practices, Soft Skill Development and Performance.* Structural Equation Modelling preliminarily tested the relationships of the soft skill development constructs to confirm (or not) the hypotheses that were outlined in Chapter Four. The insights of the health supply chain workforce towards the future of soft skill development for health supply chain practice are presented. As such, how the health supply chain workforce interacts with their contextual settings and learning mechanisms being utilised to develop soft skills are understood.

In the following sections, there will be a discursive analysis of the findings regarding the soft skills essential for health supply chain practice in a resource-constrained context. This discussion seeks to further dissect and understand which soft skills are necessary, the process for their development, and how these findings relate to existing literature.

9.2 Soft skills required for health supply chain practice

Studies 1 and 2 explored the soft skills required for health supply chain practice to address research objectives 3 and 4. The consolidated analysis from these two studies converged at ten soft skill categories, depicted in a spider diagram in Figure 9.1, similar to the research work by Bak et al., 2019. The figure highlights the distribution of the average scores of the ten soft skill categories based on the results of Study 2. The results show that there is the highest emphasis for 8 of 10 soft skill categories (COMM, LEAD, FLX, RO, TMW, SOD, RM, NEG), indicating these as the most important soft skill categories in health supply chain practice in developing economies. Entrepreneurial mindset and self-management were indicated as strongly important. Together, the ten soft skill categories indicate their significant role in current health supply chain practice in developing economies.

Figure 9.1: Soft skills required for health supply chain practice[1]



First, the findings indicated that employers require a wide range of soft skills from potential health supply chain professionals in developing economies, highlighting their importance for recruitment in today's job market. The project is one of the first to empirically investigate the soft skills required for health supply chain practice in developing economies, moving beyond previous studies that have mostly focused on developed countries. This project adds to this body of literature by focusing on the demand for soft skills in developing economies' health supply chain sector.

The findings provide new insights that have identified the soft skills needed to address the people issues that have been stressed by Thomas (2014) as important for maximizing supply chain performance. Contrary to results from other studies, this project in developing economies identified a sense of duty, result-oriented and flexibility, as emerging soft skill categories that employers and the workforce prioritise as critical to health supply chain practice in developing economies. These soft skills have not commonly been indicated in previous studies. This

[1] EM= Entrepreneurial Mindset, COMM= Communication, LEAD= Leadership, FLX= Flexibility, RO= Result-Oriented, SM= Self-Management, TMW= Teamwork, SOD=Sense of Duty, RM= Relationship Management, NEG=Negotiation.

finding may reflect the specific context and current demands of the health supply chain sector in developing economies where resources are constrained. This necessitates organisations to work within very tight budgets; and in which political instabilities and associated challenges require employees to have demonstrated a strong commitment to their employer, dedication to the duties they are required to undertake, and flexibility to cope with an ever-changing work environment. The managerial implications and use of the ten soft skill categories are discussed in Chapter 10.

The research project extends previous academic work and also presents new insights that will help guide further research in this area. Specifically, previous studies on the analysis of job adverts for supply chain professionals have focused on both technical and soft skills; have concentrated on developed countries (Kotzab et al, 2018) and have mostly been undertaken in the manufacturing and service industries (Shou and Wang, 2017; Kotzab et al, 2018). The findings align with recent studies by Beske-Janssen et al. (2023) and Bals et al. (2019) that identified soft skills related to the ten soft skill categories that were considered important for health supply chains in developing economies. These include soft skills related to strategic thinking, negotiation, communication, teamwork, relationship management, leadership, and creativity. These findings support results from previous systematic reviews and the PtD Supply Chain Professionalisation Framework, which identified these soft skills as important for effective supply chain performance (PtD, 2023c, Ashour et al., 2021; Karttunen, 2018; Derwik and Hellström, 2017).

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Wilson and Barbat (2015) pointed to the changing role of the supply chain workforce, and the need to constantly adapt to emerging political, economic, cultural, and social issues. Adapting to the changing political, economic, cultural, and social environment is more challenging in developing economies due to the complexity and fragility of health supply chain systems (Ahmad et al., 2016; Ezrow and Frantz, 2013). Insights from the semi-structured interviews

with the health supply chain participants in Study 4 reinforced the importance of soft skills, such as communication, teamwork, collaboration and negotiation, that were revealed in Studies 1 and 2, on the complexity of managing multiple stakeholders' interests with the health supply chain space in developing economies. The findings of this project relating to soft skills associated with flexibility, result orientation and sense of duty seem to reflect the challenging context in which health supply chain professionals have to operate in developing economies. The PtD professionalisation framework lists 'professional and ethical values' and 'resilience and ability to manage stress', which are related to the sense of duty and flexibility, respectively (PtD, 2023c). Therefore, the project findings extend the PtD competency framework, which was developed in 2015, by providing a narrow and focused set of soft skill categories that both employers and the health supply chain workforce prioritise for practice.

Second, the project findings shed new insights into the shift in the importance of soft skills required for health supply chain practice since the outbreak of COVID-19. The findings indicated that COVID-19 has elevated the importance of soft skills required in health supply chains in developing economies. There was strong and moderate consensus among the panel experts in Study 2 that current pre-service and in-service learning mechanisms were not adequately developing the soft skills required of the health supply chain workforce in developing economies, respectively. This finding is of significant importance to supply chain practices because the lessons from the COVID-19 pandemic have underlined the need to prepare for a future of highly dynamic situations, characterized by both unprecedented competition and cooperation (Harland et al., 2021). The Study 2 findings show that the COVID-19 pandemic has boosted the need to close the gaps in soft skill development that have previously been stressed by researchers such as Dubey et al. (2022), Stuns and Heaslip (2019), Börner et al. (2018) and Thomas (2014).

9.2.1 Extent of the adequacy of learning mechanisms to develop soft skills

The project findings underlined that soft skills are lowly prioritised compared to technical skills in supply chain management and support recent studies (Dubey et al., 2022; Karttunen, 2018; Balcar, 2016). The most unexpected finding, in Study 2, is that there was a strong consensus that pre-service learning mechanisms do not adequately impart soft skills compared to only a moderate consensus for in-service learning mechanisms. This was reiterated by research participants in Study 4, who attributed the challenges with health supply chain performance in developing economies to scarcity of soft skills among the health supply chain workforce and limited exposure to soft skill development during pre-service learning. This is of interest because many developing economies have been introducing stand-alone or integrated initiatives for pre-service learning mechanisms (Nina and Motomoke, 2016, Berhe et al., 2014, Matowe and Kolawole, 2014).

This new insight raises a lot of questions about the value of current pre-service learning mechanisms to prepare the health supply chain workforce for the current business environment. An underlying issue that is certainly of great interest to soft skill development that emerged during the interviews is the loci of soft skills in supply chain curricula. Many scholars have highlighted the misalignment of current curricula to develop supply chain graduates to requirements in practice, for instance, Stek (2022), Wu et al. (2013) and Sohal et al. (2013). My findings from Studies 2 to 4 add to this observation by distinguishing the perceptions of the adequacy of pre-service and in-service learning mechanisms. This finding was validated by the structural path results, which rejected the hypotheses that current pre-service and in-service learning mechanisms adequately support the development of soft skills required for health supply chain practice in developing economies.

The findings above are critical in the context of significant financial investments in health supply chain workforce initiatives that the major funders continue to support developing economies.

A recent analysis of investments in human resources for supply chain management by GAVI, The Global Fund and USAID at the country level for the 2017- 2020 period shows that out of a total of US$131 million, 83% of the total budget was allocated to skill development (PtD, 2023d). Yet, the return on investment seems to be low, and this calls for further consideration. This is based on evidence of incongruities between skills, system design and practice expectations, which have been cited as significant contributors to the underperformance of health supply chains in developing economies (Tetteh, 2022; Meier et al., 2023; Yadav, 2015; Allden et al., 2018). This demands revision of the design and evaluation of implementation modalities.

9.2.2. Salience of soft skills required for health supply chain practice

First, to a statistically significant extent, the analysis of the employers' requirements in Study 1 strongly shows that employers differentiate and attach importance to six of the ten soft skills: *entrepreneurial mindset, leadership, flexibility, self-management, teamwork, and negotiation*. In contrast, the demand for communication, result-oriented, sense of duty and relationship management did not show any evidence that the result was not plausibly due to random chance yield. Specifically, self-management and teamwork are given more emphasis for junior and mid-level positions compared with senior and executive positions. Typically, junior and mid-level positions are more involved in operational and tactical tasks, respectively (Gunasekaran et al., 2004), and it seems reasonable that employers will require them to have skills in the areas of cooperation, collaboration, reliability, and responsibility to support the achievement of organisational goals and objectives.

The findings of Study 1 indicated that the health supply chain workforce in mid-level positions is expected to possess entrepreneurial skills. This seems to be at odds with the conclusions of a study by Mishra and Misra (2017), in which it is suggested that entrepreneurial skills must only be present in the members of the top management to lead their organizations to do

extremely well. The focus of their study was on entrepreneurial leadership, in which senior employees seek opportunities to make the organization perform well (Renko et al., 2015) and provide overall strategic direction to steer organisations towards organisational goals and objectives. Findings from this exploratory project in health supply chains in developing economies suggest that it is not enough to have entrepreneurial skills confined to the senior health supply chain workforce. Instead, employers of health supply chain workforce in developing economies also require the workforce in mid-level positions to possess entrepreneurial skills within their sphere of influence at the tactical and operational levels.

Secondly, the non-parametric test results in Study 1 show that employers of the health supply chain workforce in different regions may attach different importance to three of the ten soft skills: *sense of duty, relationship management, and negotiation*. Specifically, jobs in East Asia & Pacific, Middle East & North Africa regions emphasise a sense of duty compared to the other regions. Employers may use management culture and style stereotypes, based on available literature, in different regions to prepare job advertisements. For example, the management style of the Japanese is known to emphasize commitment, cooperation, honesty and mutual loyalty between the firm and its employees (Hirasaka et al, 2021; England, 1983). Similarly, a study of diverse aspects of the national and organizational cultures of 61 countries revealed that Chinese business leaders rated 'respecting ethical norms', 'patriotism, national pride' and 'honour, face, reputation' as crucial factors (Hofstede, 2004).

However, the validity of generalising management philosophies and practices across geographical regions as diverse as Asia and the Pacific is debatable and should perhaps be approached with caution. A critical review of studies on management cultures and practices by Minkov and Blagoev (2014) concluded, for example, that while there are some shared characteristics in management cultures and styles in a few Asian countries, generalisations about Asian management cultures and styles within the region should be avoided. These

results also supported the structural path analysis of the project's conceptual framework, which did not find empirical support for the direct impact of social practices and work environment on the development of soft skills in developing economies.

Third, jobs in Latin America & the Caribbean, and Sub-Saharan Africa emphasise relationship management. Negotiation is in high demand for job positions with multi-regional scope in East Asia and Pacific, and Sub-Saharan Africa. The emphasis on these two soft skills in these regions could be due to the dispersion of supply chains in new global markets, diverse sourcing activities and the involvement of multiple stakeholders all of which increase complexity in the management of supply chains. Most developing economies, for example, receive simultaneous financial and technical assistance from multiple funders/donors, through different forms of partnerships, to support health system development initiatives. This may include firms, corporations, civil society, and private philanthropists that are actors in public-private partnerships and take part in joint public-private decision-making processes, on complex health problems to achieve universal health coverage (Joudyian et al., 2021).

Fourth, the country's income group was a factor that was considered to influence the soft skills required of the health supply chain workforce in developing economies. The non-parametric test results showed there was no significant difference in all ten soft skills across the country income groups, which is consistent with findings from the study by Shou and Wang (2017). This could be due to the rapid evolution of global health supply chains. Nowadays, the health supply chain workforce in developing economies regularly interacts and collaborates with global partners, located in various locations with relative ease. This has been further intensified following the emergence of COVID-19 and has continued to be part of current work practices.

9.3. Validation of soft skill development constructs

This research project focused on preliminarily testing the role of individual motivation, contextual factors, and learning mechanisms in developing soft skills and performance. The PLS-SEM analysis addresses the lack of empirical analysis in the extant literature on the relationships between the antecedents and consequences of the development of soft skills in health supply chain practice. The interest in examining the relationships of the antecedents of soft skill development and their consequences was triggered by three key facets of skills development in health supply chain management in developing economies. Firstly, substantial investments are being made in health supply chain systems to address the perennial skills gaps, largely focusing on technical skills, to achieve goal development goals (PtD, 2023d; WHO, 2022; Okunogbe et al., 2020). Yet, the performance of health supply chains in developing economies continues to be sub-optimal (Yadav, 2015).

Secondly, changes in the business environment are increasing the demand for a balanced skillset of the supply chain workforce to meet the requirements of work practices (Cannella, 2018; Cornalli, 2018; Jordan and Bak, 2016). This demand has been amplified by recent global events, including the COVID-19 pandemic, which has reinforced the need to adapt and build resilient supply chains to tackle medicine shortages (Yaroson et al., 2022; Martin-Blanco et al., 2022; Crick and Crick, 2020). Thirdly, existing studies on soft skills have largely focused on developed economies and highlight that supply chain curricula at universities are misaligned to requirements in practice (Wu et al., 2013; Sohal et al., 2013). Motivation of the individual and contextual factors have been highlighted as critical to learning.

As discussed earlier, this research project proposed that work environment, social practices, learning mechanisms and individual motivation impact the development of soft skills of the health supply chain workforce in developing economies and ultimately performance. These constructs were conceptualised into a framework that guided the conduct of this project, as

discussed in Chapter 3. The results of Study 3 paint interesting insights into the associations and interactions among the variables of work environment, social practices, learning mechanisms, individual motivation, soft skill development and performance.

9.3.1. Individual motivation and soft skill development

The research findings reflected that individual motivation significantly, positively and directly impacts the development of soft skills. This finding aligns with studies that highlighted learning as innate and the drive to learn is in the hands of the learners (Madsen and Wilson, 2012; Choi and Jacobs, 2011). This demonstrates individual motivation as an antecedent of soft skill development.

9.3.2. Learning mechanisms and soft skill development

Pre-service and in-service learning mechanisms have been highlighted in the literature as the mechanisms that are being utilised in practice to develop workforce skills (WHO, 2022). The review of the impact of learning mechanisms on health supply chain outcomes, described in section 2.5.2 demonstrated that pre-service learning interventions were cost-effective and positively impacted health supply chain outcomes (Berhe et al., 2014; Matowe et al., 2008). Supportive supervision was reported to have low coverage, irregular and showed no statistical significance (Avorti et al., 2019). On the other, effective mentorship was found to contribute to the improvement of health supply chain outcomes (Hovarth et al., 2022; Schwerdtle et al., 2017). Therefore, although the literature review highlighted some mixed results on the impact of *Pre-Service Learning* and *In-Service Learning* mechanisms on health supply chain outcomes, the hypothesised relationship between learning mechanisms and the development of soft skills in the health supply workforce was rejected by the analysis in Study 3.

The structural path results confirm some of the findings described in Chapter Six. The Delphi survey results flagged low prioritisation of soft skills and exposed that current pre-service and

in-service learning mechanisms were not sufficiently supporting the development of soft skills required for health supply chain practice in developing economies. This implies that current pre-service and in-service learning mechanisms did not have a significant impact on the development of soft skills of the health supply chain workforce. Therefore, more efforts should be considered to redesign the current learning mechanisms of the health supply chain workforce in developing economies to ensure impactful soft skill development. This may emanate from the significant focus on technical skills rather than soft skills that has been highlighted by WHO (2016b). The motivation of the international development partners that are driving the skill development initiatives is mainly to address the skill gaps in developing economies, arising from the perennial shortage of skilled workers.

9.3.3. Work environment, social practices and soft skill development

The wider contexts in which learning occurs have been argued to influence whether employees engage in learning and the effects of learning practices (Crans et al., 2021; Salinas-Navarro et al., 2022; Ellinger et al., 2015). The findings from the PLS-SEM analysis of the impact of work environment and social practices on soft skill development lend weight to the claim that the work practices embedded in everyday work processes influence the individual motivation to learn and the learning processes (Crans et al., 2021, Cha et al., 2020; Decius et al., 2019; Malcolm et al., 2003; Marsick and Volpe, 1999).

The findings establish work environment and social practices as significant predictors of individual motivation and indirectly impact soft skill development and performance. The findings support the assertion that organizational environment and socioeconomic contingency factors should adapt to suit the context it is operating to achieve improved performance (Donaldson, 2006). Similarly, due to the peculiarity of health supply chains, consideration of the local environment facilitates the delivery of health products and services to the population at health facilities (Salam and Khan, 2020; Arora and Gigras, 2018). This lends weight to the

body of evidence that work practices embedded in everyday practices influence individual learning. These findings extend the findings by Osher et al. (2020) and Ellinger et al. (2015) that indicated that social practices, including political, economic, cultural and other social variables, play a critical role in the acquisition of attributes and attitudes tied to the individual and influence the development of skills by indicating that this effect is indirect through the motivation of the individual to develop the skills.

9.3.4. Soft skill development and performance

The results showed that soft skill development influenced supply chain performance. It follows the argument that the collective skills of the supply chain workforce are a key contributor to the competitive advantage of organisations (Davis, 2017; Ellinger et al., 2015). The finding on the relationship between soft skill development and performance empirically supports the findings by Caputo et al., 2019, and Bak et al., 2019 that possession of critical soft skills is a contributory factor to supply chain performance. This finding validates the assertion that the collective knowledge, skills, and abilities of the supply chain workforce are key differentiators that contribute to the competitive advantage for supply chain organisations, particularly in the presently everchanging business environment (Davis, 2017).

9.4. Towards the future development of soft skills for health supply chain practice

Available evidence from studies 1-4 indicates gaps and opportunities in soft skill development for health supply chain practice in developing economies. Some of these elements have been discussed in earlier sections of this chapter. In Study 4, the insights of the health supply chain workforce on facilitators and barriers towards development of the soft skills in health supply chains in developing economies were further probed.

First, harnessing professional groups presents low-risk, high-yield opportunities that individuals and organisations can utilise systematically to raise awareness of soft skills and

encourage the workforce to exchange knowledge on soft skills. Professional platforms, such as IAPHL, ASCM and SAPICS have large followership of the health supply chain workforce in developing economies and proffer online learning and development resources that can be used to systematically enhance the development of soft skills of the health supply chain workforce (IAPHL, 2023; ASCM, 2024; SAPICS, 2024).

On a professional level, the project findings indicate that the health supply chain workforce in developing economies is motivated to obtain new skills and higher qualifications as they enable them to close skill gaps and progress in their career growth. However, the costs of some of the certifications and independent soft skills courses were emphasised as a financial burden to individuals, especially students and early career health supply chain professionals. Personal challenges (e.g. finance, employment and family), and academic and institutional challenges (e.g. workload and time constraints) have been highlighted by other health professionals in developing economies (Sengane and Havenga, 2018). Donors and implementing partners supporting health supply chain strengthening efforts in developing economies could incentivise and support the health supply chain workforce to develop soft and technical skills, potentially through cost-sharing mechanisms.

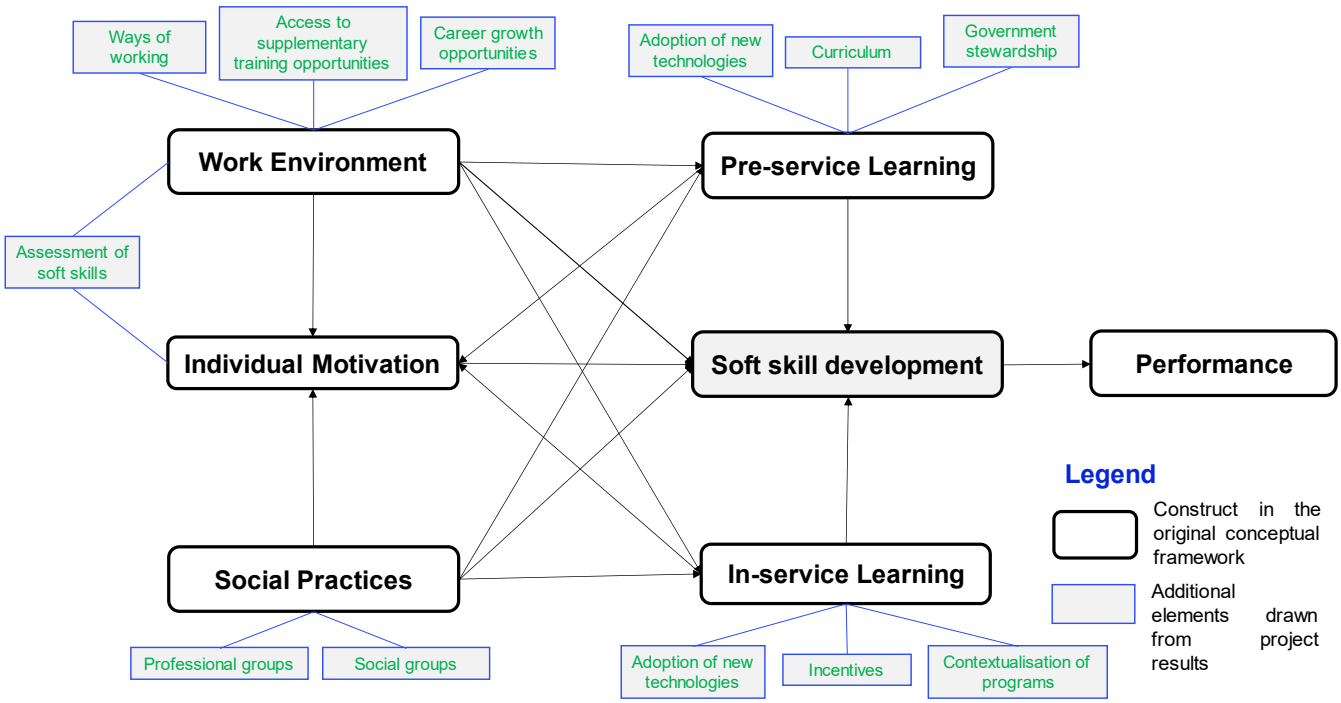
Second, strong governance structures and leadership by national governments are needed to facilitate coordination and advocacy with donors, implementers, regulators and educators. This enables sustainable learning practices for health supply chain management to ensure alignment with SDG 4 and meet the expectations of the workforce and industry (Salinas-Navarro et al., 2022; McCune, 2021; Mori et al., 2019). Third, at the organisational level, investment in creating a workplace environment that encourages soft skill development through in-house human resource practices, such as performance appraisals and personal development is mutually beneficial to the workforce and the organisation. Findings from Study 3 provide statistical evidence that supports the need to invest in a positive work environment

that encourages soft skill development. Other publications have alluded to the creation of value by the workforce, as an organisational resource, to improve firm performance and contribute to the firm's competitive advantage (Amaya et al., 2022, Davis, 2017; Ellinger et al., 2015).

However, the paucity of soft skill components in supply chain curricula is one of the main barriers affecting the systematic development of soft skills for health supply chain practice in developing economies, as discussed in section 9.2.1. Additional themes on the barriers to the development of soft skills in health supply chain management that were identified in Study 4 include lack of advocacy to key decision-makers and lack of awareness among the health supply chain workforce. These barriers can be linked to national government governance and strong leadership to promote, educate and incentivise different stakeholders on soft skill development within the health supply chain networks, as part of building resilient health supply chains. The dominance of a neoliberal paradigm, powerful private sector interests, and constraints associated with policymaking processes have been highlighted as some of the underlying issues in public health advocacy strategies to influence policy agenda (Townsend et al., 2023).

Building on the project findings, the conceptual framework, depicted in section 3.5, is updated to integrate the key elements that emerged from the collected data. This is presented in Figure 9.2. The additional elements that have been raised from the results expand the original constructs for soft skill development that were guided by the literature review. The updated conceptual framework reflects the key elements that should guide soft skill development in health supply chain practice.

Figure 9.2: Updated conceptual framework for soft skill development in health supply chain management



9.5. Chapter summary

This chapter provided a detailed discussion of the research findings and analysis across the four studies and positions within the existing literature. The research project has provided a set of soft skills required of the health supply chain workforce in developing economies for work practices and performance. Sense of duty, result-oriented and flexibility, which have not commonly been indicated in previous studies were part of the ten soft skills identified by employers and the health supply chain workforce as critical for health supply chain practice in developing economies. This reflects the soft skills demanded from the health supply chain workforce in developing economies, where resources are constrained. Despite significant investments in the health supply chain workforce by development partners, the chapter also discussed the unexpectedly low prioritisation of soft skills, compared to technical skills, and the inadequacy of learning mechanisms to support the development of soft skills in developing economies.

The views of the health supply chain workforce on the development of soft skills in developing economies were presented using the guiding lens of a combination of humanistic, practice-based and contingency theories as exploratory and analytical concepts. The project's findings illustrate the individual motivation of the learner as a critical and direct contributor to soft skill development on the one hand and the indirect effects of work environment and social factors to motivate the learner. The inadequacy of learning mechanisms on soft skill development also emerged from the analysis and validated prior findings. The enabling factors and barriers towards the future development of soft skills for health supply chain practice, focusing on the individual, organisational and policy level were articulated.

CHAPTER TEN: CONCLUSION AND RECOMMENDATIONS

10.1 Introduction

The overall aim of this research project was to critically investigate the determinants of the development of soft skills for the health supply chain workforce in developing economies. The soft skills required for supply chain practice and the impact of learning and work-related practices in health supply chains were discussed in Chapter Two. The theory and development of the conceptual framework were discussed in Chapter Three, while the methodological approach was detailed in Chapter Four. The research findings from studies 1-4 were presented in Chapters Five to Eight, and a critical discussion of the research findings was deliberated in Chapter Nine.

This chapter concludes the thesis by expressing how the findings addressed the research project objectives that were laid out in Chapter One. Secondly, the original contributions of the research findings to knowledge, management, policy, and health supply chain practice are presented. Thirdly, the chapter reflects on the limitations of the investigation and suggests recommendations for possible directions for future research.

10.2 Addressing research objectives

The demand for soft skills among the workforce has become critical to ensure the workforce has a balanced skillset to meet the requirements of the current business environment. However, research has highlighted the misalignment of skills to requirements in practice. In health supply chains in developing economies, there is evidence of misalignment between the investments in the health supply chain workforce and performance. The research problem for this project was premised on the tendency to prioritise the development of technical skills and limited empirical research on how soft skills are developed.

Given the changing ways of working, limited research on soft skills in developing economies and the calls for research to understand the development of soft skills, this project, therefore, sought to explore and examine the soft skills required for health supply chain practice to understand the processes of their development in developing economies. The health supply chain workforce in developing economies was chosen to generate empirical data to address some gaps in knowledge on soft skills and their development. The main goal of the project was to critically investigate the determinants of the development of soft skills for the health supply chain workforce in the context of developing economies. Subsequently, the project pursued to address six objectives to understand insights into soft skill development in health supply chain systems. A summary of how each objective was addressed is presented in the following subsections.

10.2.1 Summary of research objective one

A growing body of literature emphasises the importance of soft skills in modern supply chains, a contributory factor to supply chain performance and firms' competitive advantage (Amaya et al., 2022; ILO, 2019; Caputo et al., 2019). To facilitate the identification of soft skills relevant to health supply chain practice, the project sought to understand the soft skills that have been published in the literature. As a result, research objective 1 sought to address the research question: which soft skills have been identified as important for supply chain practice? To address this research question, a systematic search of available literature was conducted to identify, critically review and synthesise available literature on soft skills for supply chain practice.

A review of the literature revealed that most of the studies focused on non-health sectors, with limited insights into contexts of developing economies and operational-level workforce. A meta-analysis identified 27 soft skills required for supply chain practice. Ranking of the aggregated mean scores of soft skills revealed the top ten soft skills: teamwork, analytical

ability, conflict management, negotiation, strategic thinking, problem-solving ability, enthusiasm, time management, flexibility and self-management. The meta-analysis of soft skills provides a practical reference point to investigate the prioritisation of soft skills required in other areas of practice. For this project, the output of the meta-analysis served as the initial list for the health supply chain workforce to consider in determining consensus on which soft skills are required for health supply chain practice.

These findings contribute to the ongoing discourse in the field of the supply chain, to adapt to the changing business environment, particularly with the emergence of I4.0/5.0 (Polakova et al., 2023; Azzi et al., 2019). This offers new opportunities and reinforces the supply chain workforce to acquire and develop the critical soft skills that align with current business practices, drawing on lessons from the COVID-19 pandemic and other recent global events that are significantly impacting global supply chains (Mishra et al., 2023, Reza et al., 2022. Therefore, addressing research objective one provided original contributions to further understand soft skills considered important for supply chain practice and research gaps that can facilitate the investigation of additional insights to support improved practices.

10.2.2 Summary of research objective two

Available evidence on health system strengthening shows that there is limited evidence formally linking investments related to supply chain learning mechanisms to improved access to health services or better outcomes Witter et al. (2022). Research objective two sought to address this gap through the research questions: what approaches have been used to develop skills of the health supply chain workforce in developing economies and how well have they worked? To address these research questions, a systematic search of available literature was conducted, and a synthesis of the findings provided an understanding of the effects of learning and work-related practices used to develop skills in health supply chains in developing economies on health supply chain performance.

First, the review demonstrated the social nature of learning. Individual learning at the workplace takes place through the dynamic interaction of the different learning mechanisms. As such, the workplace context in which learning occurs can influence whether employees engage in learning (Crans et al., 2021). In addition, the review highlighted that interrelationships and effects of learning mechanisms at the workplace can be properly understood once they are examined in the wider contexts in which they occur. This is more relevant in the context of current efforts to prepare the workforce for the future of work (Li, 2022; Schwartz et al., 2017).

Secondly, the review showed mixed results on the effects of learning and work-related practices to enhance the skills of the health supply chain workforce on supply chain outcomes. This analysis is an original contribution to the body of knowledge on skill development in health supply chain management in development economies. Many developing economies have been introducing stand-alone or integrated initiatives for pre-service learning mechanisms to strengthen or maintain the skills of the health supply chain, with some studies highlighting the cost-effectiveness of stand-alone pre-service learning and in-service learning mechanisms to develop the skills of the health facility staff already in service (Berhe et al., 2014). However, pre-service learning mechanisms are mostly funded through donors rather than domestic funding from the national governments, compromising the long-term sustainability of these initiatives (WHO, 2023a; Itiola and Agu, 2018). Distance learning was also found to offer another cost-effective mechanism that is useful for acquiring or maintaining skills (Brossette et al., 2011). However, in this digital age, limited access to electricity due to the ongoing global energy crisis and the internet are some issues that may compromise the application of distance learning, especially in developing economies (WHO, 2023b; UNIDO, 2022). These findings reinforced the need to examine learning and work-related practices about the wider contexts in which they take place and supported the development of the conceptual framework that guided studies 1-4.

10.2.3 Summary of research objective three

Research objective three sought to identify the soft skills required by employers of the health supply chain workforce. A precedent for investigating employer requirements for workforce skills using the approach of supply chain job advertisements is exemplified in the research by Kotzab et al. (2018), Shou and Wang (2017), and Rossetti and Dooley (2010). These studies examined supply chain job advertisements across multiple industrial sectors in a range of countries. A similar approach was used in Study 1 to identify soft skills for health supply chain practice by focusing on the employers' requirements.

The exploratory analysis of health supply chain workforce job advertisements identified ten soft skill categories that employers prioritise when recruiting the health supply chain workforce. These ten soft skill categories provide a matrix of the soft skills that reflect what is required for health supply chain practice in developing economies. Together with the outputs from the meta-analysis addressed in research objective two, these ten soft skill categories shed new insights that relate to the contexts of health supply chains in developing economies and facilitated the further investigation of the development of soft skills required for health supply chain practice.

10.2.4 Summary of research objective four

As a follow-up to the analysis of health supply chain job advertisements, a Delphi survey was conducted in Study 2 to address this research objective by examining the level of consensus (or not) regarding the perceived importance of soft skills for health supply chain practice.

The panel of experts reached a consensus that the ten soft skill categories, identified from the job advertisements (Study 1) were important for health supply chain practice in developing economies. There was a unanimous level of consensus on leadership and there was a strong level of consensus on the entrepreneurial mindset, communication, flexibility, result-oriented,

self-management, teamwork, sense of duty, relationship management, and negotiation. The results also revealed there was a strong consensus that soft skills are not afforded the same level of importance as technical skills and current learning mechanisms are not adequately addressing the development of soft skills required of the health supply chain workforce. The findings also highlighted new insights on how COVID-19 has elevated the importance of soft skills in health supply chain management in developing economies, particularly entrepreneurial mindset, leadership, flexibility and self-management.

10.2.5 Summary of research objective five

For research objective five, PLS-SEM was used on questionnaire data from Study 3 to examine the relationships of antecedents and consequences of the development of the soft skills that had already been identified. The results demonstrated good reliability and validity. Significant and positive values were observed and validated the hypotheses that individual motivation impacts learning mechanisms and soft skill development. Similarly, the results supported the hypothesis that the impact of work environment on individual motivation and learning mechanisms. However, the findings did not empirically support the hypotheses on the impact of social practices on learning mechanisms and soft skill development, and the impact of learning mechanisms on soft skill development.

In the end, the final structural path confirmed the finding from the Delphi survey results (Study 2) that current learning mechanisms were not adequately supporting the development of soft skills required for health supply chain practice in developing economies. Work environment and social practices were also shown to be significant predictors of individual motivation, thereby indirectly influencing soft skill development and performance. The results contribute original evidence to the body of knowledge on soft skill development by providing an empirical analysis to show the relationships between antecedents and consequences, building on a conceptual framework that was outlined in section 3.5.

10.2.6 Summary of research objective six

Semi-structured interviews in Study 4 were conducted with a targeted sample of the health supply chain workforce in developing economies to identify facilitators and barriers to the development of soft skills in developing economies. The findings provided insights that supported findings from Studies 1-3 and shed new light on the rationale for the importance of some of the soft skills that are important for health supply chain practice. In addition, the qualitative insights generated themes on the enablers (e.g. workplace culture, harnessing professional groups and government leadership) and barriers (e.g. paucity of soft skill components in supply chain curricula) towards the future of soft skills development in health supply chain practice. The analytical framework that was used to further analyse insights on soft skills development is an original contribution to understanding the enablers and barriers to soft skills development from a point of view of everyday practices.

In totality, these project findings from the research objectives above have implications for theory and practice, as well as offering some new directions for future research on soft skill development. Börner et al. (2018); Karttunen (2018) and Thomas (2014) called for more empirical research on soft skills in supply chain management and suggested an in-depth examination of the different facets of soft skill development. In response, this research project has provided some empirical evidence to understand the relationships of the different facets of soft skill development.

10.3 Theoretical implications

Theoretically, this project extends the literature on soft skill development. The role of the individual in the learning process is well discussed in the literature (Madsen and Wilson, 2012; Choi and Jacobs, 2011). What was less understood was the role of contextual factors and current learning mechanisms for the development of soft skills. The project's findings contribute original insights to enhance understanding of this area using the theoretical lens of humanistic,

practice-based view and contingency theory. Firstly, it provides empirical evidence of the contribution of individual motivation to the development of soft skills. The findings also strengthen the argument that the drive to learn is inherent in individuals, learning is in individuals' control in the pursuit of the goal of self-actualisation.

Secondly, the project focused on how work environment and social factors, as distinct practices impact the development of soft skills of the health supply chain workforce. The work environment and social practices have been conceptualised as contingent factors (Salam and Khan, 2020). However, the findings show that work environment and social factors do not have a direct impact on the development of soft skills. Instead, both significantly and positively affect the motivation of the learner. The project revealed ways of working, access to supplementary training and career growth opportunities as practices/elements that are critical in the work environment to the development of soft skills. In addition, harnessing professional and social groups- offers practical opportunities to develop soft skills of the workforce. This shows work environment and social practices as indirect, supporting facets to soft skill development. They are enablers that facilitate the motivation of the individuals to learn and develop their soft skills.

Thirdly, the findings extend the debate on the adequacy of learning mechanisms in developing soft skills by showing their contribution to the development of the skills required for work practices, especially in complex, dynamic supply chain settings. The inadequacy of learning to develop soft skills in the health supply chain in developing economies was highlighted in the Delphi survey, with a majority of respondents indicating that pre-service and in-service learning mechanisms are not sufficiently enabling the development of soft skills in the health supply chain workforce. This was triangulated through the SEM analysis of the cross-sectional survey data. The SEM results led to the rejection of the hypothesis that pre-service and in-service learning mechanisms positively impact soft skill development. This finding aligns with the findings by Wu et al. (2013) and Sohal et al. (2013) which indicated that supply chain curricula

at universities are misaligned to requirements in practice. These results provide original insights for health supply chains in developing economies, where donors are providing significant investments towards strengthening technical skills with the expectation of improving performance. These findings raise questions on the effectiveness of current learning mechanisms to have a workforce ready for market requirements. The conceptual framework developed for the research project and outlined in Chapter Three, developed based on insights from the literature review was useful in guiding the collection and analysis of data from the four studies to address the project research aim and objectives. The conceptual framework was preliminarily tested and is an original contribution to theory and can be used by other researchers to guide further studies on soft skill development.

10.4 Managerial, policy and practice implications

The research project offers some useful directions for policy and practice. Firstly, the key actors in health supply chain management in developing economies, including donors, policymakers, health supply chain managers, implementing partners and the health supply chain workforce, must appreciate the importance of soft skills to performance. Specifically, ten soft skills have emerged as critical to the employers and health supply chain workforce following an iterative research process. These soft skills provide a valuable reference point that can be used by employers and managers to guide recruitment policies and practices. Hence, these findings provide an evidence base for key actors led by donors and implementing partners in health supply chain management in developing economies to prioritise attention and investments towards systematic development of these soft skills. In addition, the identified ten soft skill categories could be useful in practice to serve as a self-assessment tool to identify skill development gaps and needs of the workforce. The PtD should coordinate efforts to make a self-assessment tool for soft skills, as part of the health supply chain management professionalisation framework (PtD, 2023c).

Second, the findings show that employers attach different levels of importance to the ten soft skills when recruiting for different job levels. Six soft skills showed significant statistical differences, suggesting that health supply chain practitioners and implementers of health supply chain training projects should consider job-level specificity when designing programs to develop, enhance or maintain the skills of the health supply chain workforce in developing economies. Although the findings indicate that there was no significant difference in the ten soft skills by country income group, locality was a key factor influencing the salience for three soft skills- sense of duty, relationship management and negotiation. This suggests that regional contextual factors, such as socio-cultural specificity, and work environment practices, may be impacting the soft skill salience. This could be a useful area that researchers can further explore to gain deeper insights into the specific country's regional attributes that impact the soft skills required and their development. Managers should consider jo-level specificity and regional factors, such as cultural nuances when developing job requirements and skill development programs.

Thirdly, coupled with findings that individual motivation, work environment and social practices are desirable elements for soft skill development in developing economies, this project suggests that health supply chain managers and policymakers need to focus on creating a suitable work environment to promote the motivation of the health supply chain workforce. Health supply chain managers should encourage the health supply chain workforce to capitalise on the wider, cross-disciplinary professional groups for inspiration. This should enable the acquisition and development of soft skills that have been considered important for health supply chain practice in developing economies. This effort should be led by IAPHL to facilitate promotion, education and advocacy efforts of donors, implementing partners and national health supply chain policy makers using existing health supply chain professional groups and coalitions, such as the PtD, IAPHL, ASCM and SAPICS, that receive funding support from key donors.

Lastly, the findings identified that current pre-service and in-service learning mechanisms are not significantly impacting on development of soft skills. Key to this are the curricula of health supply chain management. To the best of my knowledge, there is scarce information that shows an analysis of which soft skills are included in the curricula of the health supply chain management in developing economies and how they match with the requirements of practice. Yadav (2015) indicated mismatch between skill and system design is a key root cause of the underperformance of health supply chains in developing economies. This leads to a mismatch between theory and reality. As an initial step, it would be useful for health supply chain actors, including policymakers, practitioners and academics in developing economies to consider reviewing and revising the curricula of health supply chain management to facilitate the integration of the soft skills that are considered important for practice.

The PtD should call for targeted and focused discussions on this area, for example as part of future PtD Global Indaba on human resources for supply chain management. The Supply Chain Leaders Forum is bringing key representatives from national governments as part of a collaboration framework that will support developing economies to transition effectively to a country-led approach whilst meeting healthcare challenges (PtD, 2024). A future-ready workforce is one of the six key enablers that countries and donors can leverage for investment and coordination.

Health supply chain managers should actively embrace the development of soft skills through the development and implementation of policies that explicitly include soft skills. The various implementation challenges that health supply chains in developing economies face need to be acknowledged. They recruit people based on the quality that is available in their local contexts to address perennial gaps, that are compounded by high attrition. This often leads to a limited pool of candidates that the health supply chain managers can choose from and possibly hinders the selection of the workforce that meets the soft skill requirements indicated in the job

advertisements. To mitigate these issues, key donors, such as USAID, The Global Fund and GAVI need to work with implementation partners and policymakers to advocate for the importance of the development of soft skills in the health supply chain workforce. This means that during funding requests or budgeting for investments in supply chain strengthening, donors should encourage disaggregation of budgets, and track investments in soft skills development and their effectiveness in the realisation of a workforce ready for the prevailing business environment.

10.5 Limitations and directions for future research

It is important to recognise that every research project has its limitations, and this project is no exception. However, it is these limitations that pave the way for further research and exploration, making them an invaluable part of the process. Thus, this section embraces these limitations and uses them to drive future endeavours. First, the project's questionnaire survey and semi-structured interviews may have been affected by social desirability bias, where respondents may tend to provide responses that they believe will make them look good. Future studies could collect data from multiple sources to challenge, test and triangulate the robustness of the project's conceptual framework. Adoption and assessment of soft skills in routine human resource practices in health supply chains in developing economies would help to refine and improve tools that can be adopted as industry-based best practices. Empirical research on the latter in developing economies could help provide lessons that could be adopted by health supply chain actors.

Secondly, the work environment and social practices constructs of the conceptual framework had a limited scope. The work environment focused on organisation structure and processes, while religion and culture were the elements assigned to social practices. A strand of research, grounded in interpretivism philosophy that focuses on other components of the work environment, such as social interactions, work culture, support and recognition would be useful

to explore further the beliefs, values and lived experiences of the health supply chain workforce about work environment, social practices and soft skill development. This could further expand understanding of factors that influence the development of soft skills.

Third, the inadequacy of learning mechanisms to develop soft skills requires some reflection and consideration to revise them to ensure alignment with market requirements. Therefore, research that focuses on the evaluation of the effectiveness of the inclusion of systematic soft skill development as part of pre-service and in-service learning would be useful and contribute to a body of knowledge. This includes the use of robust methodological approaches, including randomised control trials to generate evidence for supply chain practice. A longitudinal study of the soft development of naïve health supply chain workforce transitioning from pre-service training into full-time health supply chain practice would provide rich insights into the development of soft skills as the health supply chain workforce progresses with the careers following university/college. There is also an interesting opportunity to focus on the adoption of modern technologies in the development of soft skills that is worthy of further investigation in the contexts of developing economies.

Fourth, the research project did not derive hard evidence about which soft skills are directly contributing to health supply chain performance. The project relied on self-reporting on perceptions of soft skills and their influence on performance. Similarly, the robust methodological approaches recommended above could be useful to test the soft skills that directly contribute to performance in health supply chains.

Lastly, there were some limitations in accessing and obtaining appropriate samples for the four studies. Studies 1 and 2 were conducted at the height of the COVID-19 pandemic. During this period, most employers and health supply chain managers focussed their attention on maintaining business continuity and minimising the impact of the pandemic on the operations

of their organisations. As a result, job advertisements that could have been published and included in Study 1 could have been put on hold. At the same time, the availability of health supply chain managers to participate in Study 2 could have been compromised. Although the sample sizes for both studies were deemed appropriate and sufficient for analysis, a larger sample of job advertisements could have enhanced heterogeneity for example by including job advertisements that were not published online. Respondents to the cross-sectional survey and targeted sample for the semi-structured interviews were mostly pharmacists and so not representative of all health supply chain professionals, although they have a higher prevalence of being in supply chain roles due to their knowledge of and engagement with medicines.

Despite having the questionnaire for Study 3 in English, French and Spanish, no responses in Spanish were obtained. Participants in Spanish-speaking developing contexts may have opted to respond to the questionnaire in English or French. Therefore, the questionnaire could have included prefilled questions on the participant's job location and developing economies supported. In addition, it may be useful to compare and validate insights from Spanish-speaking developing economies with the findings from this investigation.

This has been the first attempt to scope out the soft skills that are required for health supply chain practice in developing economies and the factors that influence their development. It is hoped that this work provides a solid foundation for the next stage of research on this important topic.

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APPENDIX ONE: CROSS-SECTIONAL SURVEY QUESTIONNAIRE

Introduction

Thank you for participating in this survey, designed to collect data for our research at Robert Gordon University, Aberdeen. The objective of the cross-sectional survey is to understand the knowledge, beliefs, and attitudes of health supply chain professionals towards soft skills development in developing economies (low- and middle-income countries).

The survey should take about 30 to 40 minutes. Your participation is important to us, and your time is much appreciated. Data are provided for research purposes; All information collected will be anonymous without any attempt to identify individual responses. If you have any questions or concerns about the questionnaire, please contact the principal investigator, Stanley Chindove, at s.chindove@rgu.ac.uk or the principal supervisor, Professor Heather Fulford, at h.fulford@rgu.ac.uk.

Thank you very much for your ideas.

Stanley Chindove

Participant Consent

Please note that this survey is anonymous. By participating in the survey, you agree to the following:

- I voluntarily consent to participate in this study and understand that I may decline to answer questions. Please note that you will not be able to withdraw your responses once you have submitted the survey.
- I understand that participating in this study involves completing a survey questionnaire. Personal information collected about me that can identify me, such as my name or place of residence, will not be shared beyond the study team.

- My words can be quoted in publications, reports, web pages, and other research results.
- I authorize the use of the anonymized (anonymized) data I provide for future research and learning.
- I confirm that I have read, understood, and agreed to participate in this survey.

Statements related to knowledge of, and perceptions of the development of soft skills

Response statements: 1(strongly disagree) and 7(strongly agree)

1. In general, I feel good about the soft skills I possess.
2. In general, I feel good about the soft skills I use for service delivery.
3. I am planning to improve the use of my soft skills during service delivery.
4. I often receive support from my team to further develop my current set of soft skills on the job.
5. I often receive support from my supervisors/managers to enhance my current set of soft skills on the job.
6. I often receive additional training to further develop my soft skills to adapt to the prevailing business environment.
7. My social activities have encouraged the development of my soft skills more than my professional experience.
8. My cultural background has encouraged the development of my soft skills more than my professional experience.
9. My religious background has encouraged the development of my soft skills more than my professional experience.
10. I feel pre-service training has sufficiently developed the soft skills that I need to support my current health supply chain management roles and responsibilities.
11. My soft skills have developed more during pre-service training than through in-service training approaches.

12. My soft skills have been improved more through mentoring than through formal pre-service training.
13. My soft skills have been improved more through supportive supervision than through formal pre-service training.
14. At work, I often implement new processes and /or products to improve organizational performance.
15. At work, I often generate new processes and /or products to improve organizational performance.
16. I am willing to make an effort to identify, assess and exploit opportunities to benefit the organization.
17. Most times, I communicate openly with my supervisor/manager.
18. Most times, I communicate openly with my colleagues/team.
19. I often give information/feedback on others' work.
20. I often ask for information/feedback on my work.
21. I usually go beyond self-interest for the good of a shared goal at my organization.
22. I often talk enthusiastically about what needs to be accomplished when executing a task at work.
23. Sometimes, I spend time mentoring and teaching about the supply chain processes.
24. I am willing to work in a changing work environment.
25. I can address changing needs and preferences through innovative products and services.
26. Sometimes, I can combine my job tasks with other unrelated job tasks.
27. I can get results with available resources.
28. Sometimes, I prioritize when decisions need to be made.
29. I often identify and manage priorities effectively.
30. I am usually aware of how I react to situations and how that impacts others.
31. I often keep disturbing emotions and impulses in check.

32. I often see the positive aspects of things and the future.
33. I often discuss with my colleague(s) opinions about how we can complete tasks.
34. When tasks get difficult, I sometimes take longer to reach out to my colleagues/manager for assistance.
35. I understand my role and tasks when working on a team task with my colleague(s).
36. I usually take risks by participating in new practices during a changing work environment.
37. I feel compelled to help other health supply chain professionals to do better to improve practices.
38. I often take responsibility to ensure things are done right and comply with existing rules and policies.
39. I usually foster positive interactions with individuals/teams.
40. I do not think it is important to socialize with others very much.
41. I am usually aware of how I react to situations and how that impacts others.
42. When negotiating, I am usually accurate and clear in expressing my interests and needs.
43. When negotiating, I am good at identifying common interests.
44. I am often effective in persuading others
45. It is important to me to fulfil organizational rules and procedures.
46. I often have high expectations about producing quality work outputs.
47. I am usually rigorous about doing a task right the first time.
48. Please feel free to add any additional comments or insights you may have on the development of soft skills in developing economies.
49. What gender do you identify with?
    a. Male
    b. Female
    c. Non-binary

d. Prefer not to say

50. What is your age group?

a. 18-24

b. 25-34

c. 35-44

d. 45-54

e. 55-64

f. 65 or over

51. Choose an option that best describes your ethnic group or background.

a. Black or African American

b. Asian

c. White

d. Mixed

e. Hispanic/Latina

f. Native Hawaiian/Pacific Islander

52. Indicate an option that best describes your profession.

a. Pharmacist

b. Supply Chain Professional

c. Pharmacist & Supply Chain Professional

d. Medical Doctor

e. Nurse

f. Other

g. Indicate Other

53. What is your highest academic qualification?

a. Diploma

b. Bachelor's degree

c. Master's degree

d. Doctorate/PhD

e. Other

f. Indicate Other

54. How many years have you been working in the health supply chain management sector?

    a. Less than 5 years

    b. 10-14 years

    c. 15-19 years

    d. 20 years or more

55. I have received specialized training on soft skills through the following programs:

    a. Strategic Training Executive Programme (STEP 1.0)

    b. Strategic Training Executive Programme (STEP 2.0)

    c. None (I have not received any specialized training on soft skills)

    d. Other

    e. Indicator Other

Final page

Thank you for taking the time to complete our survey on soft skills development. Your response has been submitted. If you have questions or concerns about the questionnaire, please contact the principal investigator, Stanley Chindove, at s.chindove@rgu.ac.uk or the principal supervisor, Prof. Heather Fulford, at h.fulford@rgu.ac.uk

APPENDIX TWO: CROSS-SECTIONAL SURVEY INVITATION

Dear IAPHL Members,

I am a doctoral student at Aberdeen Business School, Robert Gordon University, UK. I am researching to understand the health supply chain professionals' development of soft skills (non-technical skills) critical for health supply chain service delivery in developing economies (low- and middle-income countries). I invite you to complete a cross-sectional survey to share your views and experiences on soft skills. The questionnaire is anticipated to take 30-40mins and the link is available below:

English version:https://robertgordonuniversity.onlinesurveys.ac.uk/cross-sectional-survey-development-of-soft-skills-for-hea-2

French version : https://robertgordonuniversity.onlinesurveys.ac.uk/enquete-transversale-developpement-des-competences-gener

Spanish version: https://robertgordonuniversity.onlinesurveys.ac.uk/encuesta-transversal-desarrollo-de-habilidades-blandas-pa

The link will be available until 30th June 2023 (18.00 British Summer Time). Please feel free to share this with your networks and members of the IAPHL country chapters. Thank you for taking the time to participate in this cross-sectional survey.

Kind Regards,

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