Managing, structuring and scaling innovation in international organizations

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MANAGING, STRUCTURING AND SCALING INNOVATION IN INTERNATIONAL ORGANIZATIONS

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La Faculté d'économie et de management, sur préavis du jury, a autorisé l'impression de la présente thèse, sans entendre, par-là, émettre aucune opinion sur les propositions qui s'y trouvent énoncées et qui n'engagent que la responsabilité de leur auteur.

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1 Contents

2 Introduction

2.1 Innovation in International Organizations

Organizations from all sectors struggle to remain relevant and avoid stagnation. While market forces can increase the speed of change in the private sector and business, those forces do not exist in the public and non-profit sectors. Because of this, many organizations in these sectors have been allowed to function in antiquated ways for too long. As the world has grown increasingly interconnected, technology has raised expectations and increased transparency – amplifying the issue. Today, large non-profit organizations such as the United Nations (UN) are facing a myriad of pressures from the public, their own employees, donors, and beneficiaries to update the way they address their missions and how they work. These agencies' work is critical to addressing the world's most pressing humanitarian and developmental needs but they have only recently started to understand that reform cannot happen just from the top but must also be driven by the people working within. These organizations are actively trying to create an environment where change can blossom and to create the space to let it grow. My dissertation looks at the phenomenon of how change is starting to happen in these organizations and how innovation can be the driver for reform. It applies existing managerial theories to a new context and builds theory where necessary to explain the ways in which the UN is starting to revamp and renew itself from within by embracing innovation.

Innovation has been recognized as a driver for organizations to achieve their objectives and create efficiencies in today's technologically changing world. Academic research has addressed managing disruptive innovation and the organizational challenge of embedding innovation into companies (Burgelman, 1984; Dushnitsky, 2012). The research stream has also focused on general impact metrics for measuring innovation outcomes, governance, and the tensions arising from responsible innovation. Responsible innovation means to innovate in a way that addresses the ethical and societal concerns of constituencies, developing "innovation with society and innovation for society" (Owen et al., 2012; Stilgoe et al., 2013) – to do good, but also do no harm. For the most part, innovation research has focused on analyzing the for-profit sector with a strong attention to manufacturing and technological contexts. This means that many of the theories generated within this research stream may

not be applicable to the non-profit sector, which differs in its goals and resourcing models. This suggests that our understanding of the creation of innovation, the organizing challenges, and the impact it makes may yet be incomplete.

The nonprofit context includes international organizations such as the UN agencies, which are key global players in addressing the grand challenges. The grand challenges are global problems that can plausibly be addressed through coordinated and collaborative effort (George et al., 2016). The objective of the UN agencies is social impact to address the grand challenges – rather than making profit. Social impact is defined as the effect of an activity on a community and the well-being of individuals and families. In the case of the UN agencies, this includes the effect on their beneficiaries and is often measured in the number of lives saved or improved. While the studies on addressing grand challenges explain that wicked global problems such as hunger and poverty can be alleviated through coordinated cross-sectoral efforts (Ferraro et al., 2015), this literature stream does not give fine grained detail into the mechanisms by which these challenges can be solved and the roles that different actors within the ecosystem need to play to create greatest impact.

Finally, the digital transformation literature explains that organizations can be transformed through integrating innovative digital solutions into their operating models to broaden and deepen their value proposition (Matt et al., 2015). But to date, this literature stream has not addressed larger managerial and strategic issues when the digital solutions are not seeking to generate revenue - when the ultimate goal is not efficiency - but rather seeking to do good. In addition, this literature stream's level of analysis resides primarily at the individual firm value chain level rather than examining the potential global ecosystem benefits of scaling digital solutions which is important to note as the UN agencies are embedded in complex global ecosystems.

While all organizations face calls for periodic renewal, there has been a particular public outcry and donor push to make the UN more efficient and effective. The UN agencies need to update themselves to deal with public pressure and decreasing funding (Weiss, 2016) while continuing to address their grand challenges missions (Ferraro et al., 2015; George et al., 2016). But these international organizations are struggling to generate innovative approaches and are usually characterized as bureaucratic, slow and ineffective. Several waves of reform have tried to induce a more

entrepreneurial spirit. As Weiss and Carayannis (2017) state, *"The bottom line was clear: dramatic changes are imperative both at headquarters (HQ) and in the field if the world organization is to respond to the twenty-first century's complex threats."* While these organizations have started to experiment with innovative approaches, to date little is known about the phenomenon and management researchers have not yet accompanied these agencies' recent endeavors.

Based on the gaps in current academic thinking to explain the salient phenomenon of managing, structuring and scaling innovation in international organizations, this dissertation studies whether and how innovation can be the force to transform these organizations and help them solve the grand challenges in a technologically evolving world. It aims to answer the broader question of *how do the processes of managing, structuring and scaling innovation impact international organizations and the fulfillment of their missions?*

2.2 Theoretical Motivations

This research addresses the intersection between three major literature streams: innovation, managing grand challenges, and digital transformation. Each literature stream opens a different perspective level and gap. This section will highlight the interdisciplinary nature of this phenomenon driven dissertation and the academic discussions to which it contributes.

In the innovation literature, theory suggests that organizations can renew themselves by developing capabilities and effectiveness (Doughterty, 1992; Tushman et al., 2002; Tidd and Bessant, 2020). One stream highlights the potential for renewal through intrapreneurship, entrepreneurial initiatives originating from within the organization (Burgelman, 1983; Birkinshaw and Ridderstrale, 1999; Birkinshaw, 2000). These activities often give rise to specific organizational tensions. While research in strategy and entrepreneurship has shown that established organizations can overcome the tensions arising from their innovation activities, such as profit tensions in corporate intrapreneurship (cf. Burgelman, 1983; Ireland et al., 2009) or institutional tensions in social intrapreneurship (cf. Alt and Geradts, 2019; Davis and White, 2015; Tracey and Stott, 2017), these studies have focused almost exclusively on for-profit firms where ideas from organizational units at the periphery are integrated into strategy making (Ghoshal and Bartlett, 1990; Birkinshaw and Hood, 1998; Ambos et al., 2010).

In contrast, nonprofit organizations, such as the international organizations, have social objectives instead of profit at the core of their missions, meaning they need to innovate responsibly, which results in different tensions (Brand and Blok, 2019; Stahl and Sully de Luque, 2014; Voegtlin and Scherer, 2017). The key challenge for these organizations is to move beyond one-off initiatives and to cultivate a capability for responsible innovation, which would allow them to address their missions in new ways, continuously. To date, however, the responsible innovation literature has clearly defined neither responsible innovation capability nor how to achieve it (Blok and Lemmens, 2015; Davies and Horst, 2015; Lubberink et al., 2017).

Despite still being a new phenomenon in the UN, with the first Office of Innovation founded in 2006 by UNICEF, dedicated innovation teams increasingly play a role in accelerating innovation. There have been recent efforts to classify different forms or organizational models (Dacin et al., 2011; Tracy and Stott, 2017; Kistruck and Beamish, 2010), but to date we lack a systematic categorization of the types of activities innovation units perform, how they add value and evolve over time. While research has addressed innovation teams and processes in internationally dispersed corporations (Cantwell and Mudambi, 2005; Monteiro and Birkinshaw, 2017; Decreton et al., 2018) these have not been contextualized to the international organizations. All organizations, in all industries, struggle with organizing innovation and academic theories on the processes by which these new ways of organizing can nurture innovation are scarce. One increasingly common approach to innovation in established organizations is the use of dedicated *innovation units* such as a skunkworks, corporate venturing units, scouting units or special taskforces (Burgelman, 1984; Dushnitsky, 2012; Monteiro and Birkinshaw, 2017), placed outside the normal flow of value-adding activities as a way of overcoming the organizational obstacles that hinder innovation. However, the track record of innovation units in delivering on their objectives and staying in operation is mostly poor (Burgelman and Valikangas, 2004; Hill and Birkinshaw, 2012). One reason for these mixed outcomes is that it is hard to establish defined metrics to track their progress and outputs. It is often argued that these units are not just developing tangible technologies or products, they are also building relationships, developing capabilities and changing mindsets; and yet these aspects of their achievements are frequently neglected because they are so hard to evaluate (Hill and Birkinshaw, 2008; Karim and

Kaul, 2015; Mudambi and Swift, 2014). To date, the innovation literature has neither addressed the challenges of organizing innovation in the nonprofit context, the scaling processes, or established ways in which to measure success and impact (both of initiatives and units) when revenue cannot be used as proxy.

The literature on managing the grand challenges has shown the explicit link between management and addressing the Sustainable Development Goals (SDGs) by the 2030 deadline (George et al., 2016). The SDGs, developed in 2015 in a collaborative bottom-up effort that included business and other stakeholders but led by the UN agencies, are a collection of seventeen interlinked global goals designed to be a *blueprint to achieve a better and more sustainable future for all*. The emerging literature stream on this topic has given rise to new academic research on cross-sectoral collaboration around the world's most pressing topics such as climate change (Howard-Grenville et al., 2014) and societal resilience (van der Vegt et al., 2015). But to date, this literature has not fully delivered the multiple goals and agendas of the actors involved in solving these challenges, and how they can effectively work together, overcoming multilevel organizational complexities and goals differences. In particular, this literature has largely examined the role of the MNC in addressing the SDGs (Wang et al., 2016) and has not tackled the role of creating a more effective UN for aiding in implementation actions. The UN is a central actor in solving development problems, which can be labelled as "wicked problems" with complex properties that make them difficult to define and impossible to find optimal solutions for. This applies to poverty, climate change, or migration (Churchman, 1967; Rittel and Webber, 1973; George et at., 2016), where the root causes may be multiple, entangled, and socially and culturally embedded. In addition to a deep understanding of the local conditions, scale is particularly important for development contexts, since the needs are for so many, and are pressing (Seelos and Mair, 2013; Oborn et al., 2019; Busch and Barkema, 2020). The rise of ubiquitous innovative technological solutions could provide a mechanism to reach more people and create greater impact globally, but to date the grand challenges literature has not addressed the intersection with technological innovation in-depth and what role the UN agencies need to play in using technology to solve the grand challenges.

The digital transformation literature has shown that digital solutions can impact an

organization's value chain but have not addressed how these solutions scale and the role of business ecosystems. Prior management literature primarily looked at international replication of products and processes from a single-MNC perspective (Jonsson and Foss, 2011; Szulanski and Jensen, 2006; Kostova and Roth, 2002) but recent developments related to the internationalization of digital solutions have shown the importance of business ecosystems (Parente et al., 2019; Ganco et al., 2020). Business ecosystems are networks of organizations and individuals that co-evolve capabilities and align their investments to create additional value and/or improve efficiency (Williamson and De Meyer, 2012; Adner, 2017; Moore, 1993; Iansiti and Levien, 2004). Digital solutions - defined as those that are fundamentally reshaping traditional business strategy to make it modular, distributed, cross-functional (Bharadwaj et al., 2013) - are embedded in configurations of actors and internationalizing such ecosystems has proven extremely challenging (Nambisan et al., 2019; Li et al., 2019). Many digital technologies and digitally enabled enterprises not only depend on scale for their economic viability but are themselves based on network effects (Oborn et al., 2019) and have large data requirements, e.g. for machine learning (Brynjolfsson and McAfee, 2014), so that scaling becomes imperative (Bharadwaj et al., 2013; Monaghan et al., 2020). Scaling in management literature mostly involves an anchor firm with internal technological capabilities that sets up relationships with host market firms or other profit-motivated actors (Parente et al., 2019), while digital solutions are often characterized as "distributed innovations" (Oborne et al., 2019) and thus require a more explicit definition of the roles involved in the ecosystem configuration beyond the anchor firm (Dedehayir et al., 2018). Yet, the literature to date mentions little about how digital solutions build their ecosystems and adapt them when scaling across different locations. This stream has still not defined the fine-grained detail on what roles ecosystem actors have in the scaling process (Nambisan et al., 2019; Li et al., 2019). Our lack of understanding is even more severe when digital solutions seek to address development contexts and are led by UN agencies.

To summarize, there is a gap in the overlaps between three distinct literature streams: organizing and managing innovation in nonprofit contexts; understanding the multilevel implementation issues in solving the grand challenges through scaling digital solutions and the impact

this can have on the broader organizational value proposition. This presents a gap for examining these processes at three levels: the initiative, the organization and the ecosystem. At the initiative level, intrapreneurship, entrepreneurship from within the organization, may provide a powerful mechanism to transform and rejuvenate these organizations, but evidence and theorizing on this phenomenon are scarce particularly when combining it with the need of certain organizations to not only innovate but to also do so responsibly (Voegtlin and Scherer, 2017). At the organizational level, the UN agencies are starting to experiment with different types of innovation units but transferring management practices from the for-profit sector is not always easy as these units face different pressures, development paths, and impact metrics. At the ecosystem level, the role of the UN as a global actor is well established, but its role as part of a broader business ecosystem when scaling technology to solve the grand challenges is still in the process of being determined.

2.3 Dissertation Overview

Based on these theoretical gaps, this dissertation comprises three papers focusing on managing innovation in the international organizations from three viewpoints: initiative level, organizational level, and ecosystem level. At the initiative level, this research examines the renewal and impact potential of bottom-up intrapreneurial initiatives in a responsible innovation environment (Nakamitsu, 2019; Voegtlin and Scherer, 2017) and builds on this discussion to identify the impact of different scaling mechanisms. At the organizational level, I take a longitudinal approach to provide a broader perspective on how to organize or structure innovation internally within organizations (Burgelman, 1984; Dushnitsky, 2012; Monteiro and Birkinshaw, 2017) and the relational value that these units can provide (Dyer and Singh, 1998; Nahapiet and Ghoshal, 1998). And at the ecosystem level, this research analyzes the roles that global players take on when scaling frontier technology solutions, particularly digital solutions and how these lead to digital transformation to add to the emerging stream of literature on business ecosystems (Parente et al., 2019; Ganco et al., 2020).

All three papers combine a strong theoretical foundation with an applied qualitative empirical project. The first chapter is based on a paper coauthored with Prof. Tina Ambos (University of Geneva) and focuses on the initiative level of managing innovation. This paper was published at the Journal of

Management Studies in May 2021. Previous versions of this paper were nominated for Best Paper at the Strategic Management Society Special Conference in Oslo in 2018 and Finalist for Best Paper in the Technology and Innovation Management Division at the Academy of Management Conference in 2019. The second chapter focuses on structuring innovation and is based on a paper coauthored with Prof. Tina Ambos (University of Geneva) and Prof. Julian Birkinshaw (London Business School). It analyzes how innovation units can create value for organizations and how these evolve over time. This paper is being prepared for submission in June 2021 to Organization Science. And the third chapter is on scaling innovation. It is based on a paper coauthored with Prof. Tina Ambos (University of Geneva) and Prof. Ted Tschang (University of Singapore) and focuses on the business ecosystem roles and configurations when scaling frontier technology innovation. This paper received a Revise and Resubmit at the Journal of International Business Studies in early 2021 and was resubmitted in May 2021. The following section presents a brief overview of each chapter's subject matter.

The first study focuses primarily on the intrapreneurial initiatives that arise bottom-up in international organizations and how these can impact the organization as they scale. Responsible innovation to address grand societal challenges has become the raison d'être of international organizations. Although these entities are established to act responsibly, they struggle to innovate. Acknowledging the tensions of this unique context, this study applies an inductive research methodology drawing on eight case studies of intrapreneurial initiatives in socially oriented organizations. The initiatives originated in country offices and scaled either organically (country-by-country) or strategically (via headquarters). This distinguishes two ways that the initiatives mitigate different responsible innovation tensions to foster competence development, structural alignment, and mission stretch. The findings add to the literatures on responsible innovation and intrapreneurship in large, complex organizations by uncovering the boundary conditions of nonprofit intrapreneurship, its tensions, and its scaling processes. This study builds theory that intrapreneurial initiatives can foster digital transformation and contribute to the development of an organizational capability for responsible innovation via organizational imprinting.

In the second study, I take an organizational view to examine how innovation activities are

structured in international organizations. Organizations establish innovation units to support their innovation activities, but little is known about the value creation roles of such units beyond innovation "outputs," such as new products and services, and how these evolve over time. Drawing on the specific context of four UN agencies, this qualitative case research investigates *how innovation units build relational value*, that is the set of relationships and the resources embedded in them that help the organization achieve its objectives. By taking an activity-based view, the analysis shows how different activities create specific relational value and result in four distinct orientations: "Capacity Building", "Interunit Linking", "Ecosystem Building" and "Stakeholder Linking". My study provides a novel view on innovation units that emphasizes the development of intangibles through interunit and interorganizational relationships with a view to creating value that is not owned by any one party. The findings show that units oscillate between these linking and building orientations as well as internal and external activities over time, suggesting that units' mandates are not set-in stone. On the contrary, the ability to change mandates enables the unit to be more successful, particularly in resource scarce or complex environments. These insights provide a novel and integrative perspective on the way success and value creation of a unit can be viewed.

Finally, in the third study, I take an ecosystem perspective on scaling innovation to highlight the need for developing an ecosystem of partners when scaling frontier technology initiatives globally – especially when the driver of the initiative is not an MNC but a socially oriented organization. This paper contributes to the literature on international scaling of digital technology by examining the replication and adaptation of digital solutions addressing wicked problems. The method is qualitative case study-based and analyzes how four digital solutions, driven by UN agencies, build and adapt their ecosystems when scaling internationally. These solutions use artificial intelligence, blockchain, and geospatial mapping, and are embedded in networks of partners comprising ecosystems. My analysis on the evolution of these ecosystems during the international scaling process, uncovers the shifting nature of ecosystem roles as solutions are adapted to different regions; as well as the specific components that comprise the digital solutions including the digital technology, the ecosystem, and the application. Further, the findings indicate that some of the ecosystem configurations remain stable while others show high "ecosystem versatility," the degree of change in the ecosystem in each new implementation of the

digital solution. Building on these insights, I derive a framework of four different types of scaling which vary in their ecosystem versatility and local adaptation of the application. This study adds to the broader literature on replication and adaptation of digital solutions during their international scaling.

2.3.1 Datasets and Terminology

The three papers in this dissertation were based on qualitative interview and observation data from global UN agencies. The project started in 2017 as an exercise to understand if social intrapreneurship existed in the UN. This led me to develop a large database on all the initiatives that I could find and reaching out to the invovled organizations to understand the processes through which these initiatives were born. As the dissertation was phenomenon driven, I choose a qualitative research method to best build initial theory on the topic. The data was self-selected based on access.

The initial data collection process and interviews showed the importance of scaling and laid the foundations for the first paper. As I continued the data collection, I saw the increasing differentiation in the way the organizations treated frontier technology initiatives as well as the importance of the emerging innovation units in these organizations. This led me to conduct further interviews around two new themes, 1) innovation structures and how these evolved; and 2) the interplay between technology and scaling as well as the ecosystems of stakeholders involved in this process. The interviews on innovation units led to the second paper on structuring innovation. And the interviews building further on the topics of scaling led to the third paper on scaling digital solutions.

The difference between initiatives and digital solutions is that initiatives are broader snapshot descriptions of projects while digital solutions are more focused and specifically based on their digital characteristics. I was also able to collect much more fine-grained data on their scaling processes and this is where the two datasets differ: on the depth, longitudinal process-based nature of the data. The key difference between the two studies was the shift in perspective from initiatives and to a focus on a different unit of analysis: the ecosystem. In line with the broader view taken in the first article, I use the term *grand challenges* to describe the goals that the UN agencies are addressing through their work. As the third article is more specific, I use the term *wicked problems* (ex. hunger, poverty) to better illustrate what the digital solutions are trying to solve.

2.3.2 Summary

To summarize, the three parts of this dissertation answer calls to understand the true impact of innovation as a driver for reform in the UN agencies. It explores the impact of non-profit intrapreneurship; the roles and fine-grained details of business ecosystems when scaling digital solutions; and the value created by innovation units – all within the understudied context of the international organizations. The rest of this dissertation is structured accordingly: the first chapter examines how to manage innovation initiatives; the second looks at organizing innovation and how this creates value; and the third chapter analyzes the scaling processes of technology innovation from an ecosystem perspective. The dissertation concludes with a general discussion on the contributions and limitations of this work.

3 Building Responsible Innovation in International Organizations through Intrapreneurship

3.1 Introduction

Grand challenges are complex problems with closely intertwined technological and social elements which require innovative solutions (Ferraro et al., 2015; George, Howard-Grenville et al., 2016). Much of the burden of addressing these challenges rests with international organizations, such as the United Nations (UN), which aim to act responsibly by pursuing their social missions but face increasing pressure to foster innovation for greater impact (Nakamitsu, 2019; Voegtlin and Scherer, 2017). Innovation in this context means developing new products or processes to serve the organizations' beneficiaries and to address grand challenges more effectively, such as by developing new ways to grow food in slum areas, giving refugees access to high-quality education, or predicting migration patterns. But innovation is particularly difficult for international organizations because of their elaborate political processes for decision-making, accountability, and risk-minimization, which aim to avoid harm (Grant, 2015; McGreal, 2019; Weiss, 2016).

This duality between the need to create greater impact for social needs and to preserve established organizational rules and processes (Brand and Blok, 2019) creates specific responsible innovation tensions in international organizations. The key challenge is to cultivate a capability for responsible innovation, which would allow these organizations to address their missions in new ways, continuously. To develop this capability, international organizations must reinvent their organizational systems, including their cultures and identities, competences and processes, and structures and governance systems (Kistruck and Beamish, 2010; Seelos and Mair, 2013; Tracey and Stott, 2017; Voegtlin and Scherer, 2017). To date, however, the responsible innovation literature has clearly defined neither responsible innovation capability nor how to achieve it (Blok and Lemmens, 2015; Davies and Horst, 2015; Lubberink et al., 2017).

While research in strategy and entrepreneurship has shown that established organizations can overcome the tensions arising from their innovation activities, such as profit tensions in corporate

intrapreneurship (cf. Burgelman, 1983; Ireland et al., 2009) or institutional tensions in social intrapreneurship (cf. Alt and Geradts, 2019; Davis and White, 2015; Tracey and Stott, 2017), these studies have focused almost exclusively on for-profit firms. In contrast, nonprofit organizations, such as international organizations, have social objectives instead of profit at the core of their missions, putting the core tension of responsible innovation between "doing good" and "doing no harm" (Brand and Blok, 2019; Stahl and Sully de Luque, 2014; Voegtlin and Scherer, 2017) at the forefront. In addition to providing an ideal context for studying responsible innovation, international organizations are central actors in international collaboration, humanitarian aid, economic development and environmental protection. Yet, their contribution to addressing grand challenges will depend on their ability to renew and reinvent their organizational models (Weiss and Daws, 2007) and develop responsible innovation capability. This motivates our research question: How does intrapreneurship contribute to the development of responsible innovation capability in international organizations?

We chose an inductive design to develop new insights and concepts in this unique setting (Bamberger and Pratt, 2010) and focus on the "extreme cases" (Siggelkow, 2007) of intrapreneurial innovations in international organizations. Scholars have recently stressed that inductive methods are particularly useful for this purpose address "grand challenges (Edmondson and McManus, 2007; Eisenhardt et al., 2016). This study draws on unique data from eight case studies from five of the largest UN organizations to analyze how intrapreneurial initiatives help foster responsible innovation.

The contributions to the literature are threefold. First, we advance the conceptual development of responsible innovation literature by identifying an organizational capability for responsible innovation (Owen et al., 2012; Seelos and Mair, 2013; Stilgoe et al., 2013; Voegtlin and Scherer, 2017) that manifests in competence development, structural alignment, and mission stretch. Second, by extending the literature on for-profit intrapreneurship in large, complex organizations (Burgelman, 1983; Birkinshaw, 1997; Kistruck and Beamish, 2010; Raisch and Tushman, 2016) to the specific socially oriented contingencies of international organizations, we define nonprofit intrapreneurship and characterize its tensions, scaling patterns, and outcomes. Specifically, we show how different intrapreneurial scaling mechanisms mitigate concrete tensions in the organization between "doing good" and "doing no harm". Finally, our finding that compared with initiatives that

scale from country to country, initiatives that scale through headquarters lead to a systemic organizational imprinting (Marquis and Tilcsik, 2013) and a greater impact on an organization's responsible innovation capability extends the theoretical discussion that nonprofit intrapreneurship, particularly initiatives that scale through headquarters and are digital solutions, can foster organizational learning for digital transformation (Christensen et al., 2006; Hess et al., 2016; Nadkarni and Prügl, 2020) and provides an important insight about how international organizations can achieve greater impact from responsible innovation.

The rest of this chapter will start with the theoretical background section, followed by the methodology and data analysis, a description of the findings, the theoretical development section with propositions and theoretical model, discussion and will end with limitations and conclusion.

3.2 Theoretical Background

3.2.1 Responsible Innovation in the Context of International Organizations

International organizations are nonprofit organizations governed and funded by member states. Most prominent are the organizations of the UN, whose overall mission is "to save succeeding generations from the scourge of war, … to reaffirm faith in fundamental human rights, … to establish conditions under which justice and respect … can be maintained, and to promote social progress and better standards of life in larger freedom" (UN, 1945). Even though international organizations are central actors in international relations and their missions are closely tied to addressing the "grand challenges", management research has yet to explore these organizations' role in responsible innovation. While some studies examined partnerships with business or nongovernmental organizations (NGOs) (Doh et al., 2018; Link, 2006) and the importance of international governance for responsible innovation (Scherer and Voegtlin, 2020; Voegtlin and Scherer, 2017), our understanding of such organizations' general management challenges is thin.

Importantly, international organizations aim to "do good" (Markman et al., 2016; Markman et al., 2019; Stahl and Sully de Luque, 2014), by addressing social needs, but also to "do no harm" (Voegtlin and Scherer, 2017), by following established rules and processes. Although the UN

organizations are committed to responsible innovation, they struggle to meet this goal (Grant, 2015; McGreal, 2019; Weiss, 2016; Weiss and Carayannis, 2017). In effect, they must innovate in a way that addresses the ethical and societal concerns of their constituencies, developing "innovation with society and innovation for society" (Owen et al., 2012; Stilgoe et al., 2013). In turn, by democratizing innovation and evolving systems to engage their beneficiaries (Owen et al., 2013; Macnaghten et al., 2014), and by iteratively testing their new innovations and service-delivery approaches with the individuals they serve (Stilgoe et al., 2013), these organizations are practicing responsible innovation (Lubberink et al., 2017).

The concept of responsible innovation originates in the science and technology development literature (Burget et al., 2017) and was recently introduced to the management discussion (Voegtlin and Scherer, 2017). Most studies in this research stream have focused on the for-profit sector, with an emphasis on decreasing harm through governance of responsible innovation (Owen et al., 2013; Ribeiro et al., 2017; Stilgoe et al., 2013) rather than on creating greater impact. Hence, we know little about responsible innovation from the standpoint of nonprofits (Blok and Lemmens, 2015) that incorporate ethical principles and social goals while seeking to increase the impact of their core activities through innovation. To meet the challenge of building continuous innovation rather than "one-hit wonders" (Seelos and Mair, 2013), organizations require certain routines and capabilities to address the complexity of responsible innovation (Ketata et al., 2015; Seebode et al., 2012; Voegtlin and Scherer 2017).

To fill this void, this study takes an organizational-level, knowledge-based approach to conceptualize responsible innovation as a capability that is part of a complex organizational system. In line with Sciascia et al.'s (2009) conceptualization of corporate entrepreneurship as an organizational capability, this paper views a capability for responsible innovation as an assemblage of routines and processes allowing an organization to systematically recognize and exploit opportunities – while pursuing social goals and doing no harm. The latter includes the organization's responsibility vis-à-vis member states, partners, donors, employees, and beneficiaries, while the former includes addressing grand challenges. Under this view, responsible innovation capability assumes the existence

of reliable organizational-level processes aimed at replicating responsible innovation over time (Carnes and Ireland, 2013; Salvato and Rerup, 2011; Seelos and Mair, 2013).

3.2.2 Intrapreneurship as a Mechanism for Organizational Renewal

Management theory holds that intrapreneurship – entrepreneurial behavior in established organizations – is an important lever of innovation and organizational change (Burgelman, 1983; Shane and Venkataraman, 2000). Research on intrapreneurship has traditionally focused on how companies manage profit tensions through the structural differentiation between and integration of new initiatives and core business (Raisch and Tushman 2016; Tushman et al., 2002). Corporate intrapreneurship initiatives create intentions and behaviors that differ from traditional practice (Antoncic and Hisrich, 2003) and often result in wide-ranging changes to organizational capabilities (Birkinshaw and Hood, 1998), roles (Ambos et al., 2010), and management mechanisms (O'Brien et al., 2019).

While most studies focus on for-profit initiatives, a nascent stream of literature addresses how "social intrapreneurship" can be achieved in established for-profit companies. Tracey and Stott (2017, p. 53) define social intrapreneurship as "the process of addressing social challenges from inside established organizations" and posit that social intrapreneurship "creates change by leveraging the resources and capabilities of established organizations". They focus on how such companies balance the tensions between social and commercial goals (Battilana and Dorado 2010; Halme et al., 2012; Ambos et al., 2020) and issue-selling of social initiatives (Alt and Craig, 2016; Alt and Geradts, 2019). A few researchers have studied such social intrapreneurial initiatives in MNCs (e.g., Bode et al., 2015; Davis and White, 2015) but have not focused on the international growth and scaling of these initiatives. A notable exception is Kistruck and Beamish's (2010, p. 736) work, which finds such initiatives to be "more complex, path-dependent and embedded than traditionally theorized". Overall, social initiatives in for-profit corporations often target differentiation advantages, reputational benefits, and learning opportunities (Scherer and Palazzo, 2011), acknowledging that these activities are peripheral rather than core to the business.

Some research attempts to understand how social innovation and intrapreneurship happen in the public sector (Bason, 2016; World Economic Forum and Wyman, 2016) and how initiatives scale

in that context (Mulgan et al., 2007; Westley and Antadze, 2010). However, we know surprisingly little about the development and necessary organizational conditions of socially focused intrapreneurship in nonprofits (Tracey and Stott, 2017) and the international scaling potential across globally dispersed organizations (Dacin et al., 2011; Zahra et al., 2009), such as international organizations.

In summary, the intrapreneurship literature provides rich insights into entrepreneurial activities within established organizations and has largely addressed for-profit firms (Alt and Craig, 2016; Tracey and Stott, 2017). Consistent with this focus, scholarly attention has centered on profit tensions, which arise between new initiatives and core business operations (Ambos et al., 2020; Besharov and Smith, 2014; Hahn et al., 2010). In nonprofits, however, profit is not an objective and the tension is between "doing good" and "doing no harm". Moreover, the core activities pursue social goals, which means that new initiatives must be explored and directly embedded in core operations (Battilana and Dorado, 2010). Consequently, findings from corporate and social intrapreneurship literatures are not directly transferable to nonprofits, such as international organizations with different organizational structures and processes (Barnett and Finnemore, 1999). This particularly concerns the role of headquarters and international replication potential (Birkinshaw et al., 2017; Raisch and Tushman, 2016; Szulanski, 1996). Therefore, addressing these research gaps in international organizations which face the tension between "doing good" and "doing no harm" can help understand how intrapreneurship as a renewal mechanism can contribute to the development of responsible innovation capability.

3.3 Methodology

3.3.1 Research Context

This research explores innovative intrapreneurial initiatives originating from the country offices of five prominent UN agencies, providing an extreme case for studying the phenomenon of responsible innovation. These agencies differ in their principles vis-à-vis internationally dispersed for-profit organizations (MNCs) as well as other organizations that engage in social innovation, such as social enterprises or smaller NGOs. Their configurations can be described as the *combination* of three factors:

(1) not-for-profit, socially oriented missions; (2) political and bureaucratic procedures; and (3) a large, internationally dispersed organization.

First, their social missions result in clear organizational priorities and rigidities. Because international organizations are resourced by member states and other donors to address specific mandates and sustain the organization, donor funds usually cannot be used for risk-intensive investments or entrepreneurial ideas. Second, international organizations are based on procedural and normative rules, and their staff are tasked with the creation, implementation, and interpretation of substantive rules (Alvarez, 2005), which provide safeguards against harm but also slow down implementation through multiple gatekeeping processes. The organizational model also has implications for the relationship between headquarters and country offices as well as between country offices. As opposed to "ownership" and flexible coordination and control that headquarters exercise on subsidiaries in MNCs, headquarters of international organizations are bound by rules and procedures and have little leeway in resourcing and control matters. Third, unlike other entities that engage in social innovation (Dacin et al., 2011; Tracey et al., 2011), international organizations have a global presence (e.g., 80 countries for one focal organization, 134 for another). As for MNCs, this makes global integration and scaling possible, but it also poses managerial challenges (cf. Doz and Prahalad, 1991). The combination of these three factors ensures that operating by following the international organization's mandates, rules, and processes makes it difficult to foster responsible innovation.

3.3.2 Research Design and Sample

This study employs an inductive research design to capture emergent insights as a basis for theory-building (Miles and Huberman, 1994; Yin, 1994). Case-study research is particularly well suited to exploring complex phenomena such as grand challenges, examining processes, and explaining how certain actions yield specific outcomes (Edmondson and McManus, 2007; Eisenhardt et al., 2016; George and Bennett, 2005; Yin, 2017). The study draws on unique data from large, well-established, globally dispersed international organizations with clearly defined mandates and beneficiaries in the humanitarian and development sector. An important feature is its focus on initiatives within a complex,

global organization, rather than on the individual entre-/intrapreneur (Kistruck and Beamish, 2010; Mair and Marti, 2006; Tracey and Stott, 2017).

We spent two years actively researching eight case studies of initiatives to analyze the contingencies of intrapreneurship and explore how these initiatives help foster responsible innovation. Because intrapreneurial initiatives are a rare phenomenon in international organizations, the first step was to identify initiatives emerging bottom-up from country offices and then scaling to different parts of the organization. We applied the following criteria to identify such cases: they needed to (1) address grand challenge problems with novel products or processes to serve the beneficiaries (rather than to improve internal efficiencies); (2) be started in an intrapreneurial process by country offices (vs. headquarters) tapping into opportunities in their local environments (Birkinshaw, 1997; Rugman and Verbeke, 2001); and (3) be in the scaling phase, meaning implemented in at least two locations, to compare their development and analyze the implications for responsible innovation.

Reflecting the recent push towards digital innovation in the UN (2018), some initiatives employed complex frontier technology (such as blockchain and artificial intelligence [AI]); others used more traditional technology innovation (hardware). To contrast initiatives of different technological complexity, we negotiated access to collect in-depth data of eight initiatives: four product innovations and four digital solutions. These eight initiatives were together being implemented in 71 countries.

Product Innovations involve a specific hardware tool to enhance the delivery of a certain service. This type of initiative reflects the classic case of a new tangible product. For example, *P-Grow* provides hydroponic pumps and growing equipment to desolate communities (deserts or slums) to enable them to grow their own food. This initiative began in the country office in Peru where the organization's beneficiaries were unable to gain access to fresh vegetables because of high prices and allowed people to grow vegetables in small spaces such as apartment hallways and rooftops. It later scaled to refugee camps in North African deserts, enabling refugees to grow fodder for livestock.

P-Moto places radios and speakers on the backs of motorcycles to provide necessary and timely information to sprawling refugee camps where people may speak different languages or

dialects. The initiative was ideated in a refugee camp in Africa by an organization member working in the camp who had heard of a similar initiative elsewhere. She used local equipment to develop her own version; eventually it scaled to large refugee camps in neighboring countries.

P-Yarn provides female entrepreneurs a machine that facilitates extraction of yarn from an endemic plant, resulting in efficiency and health benefits. This initiative was developed in close collaboration with a group of local engineering students in a developing Asian country. The tool was eventually broadly scaled within that country and established international collaborations.

P-Edu provides tablets, internet, and pre-loaded curriculum in a box to classrooms in refugee camps. The innovation was ideated in close collaboration with a global telecom provider and enabled the organization to provide curriculum and up-to-date education to refugee children. The initiative was scaled to refugee camps across four countries.

Digital Solutions are based on complex technologies – chatbots, geospatial mapping, AI, and blockchain. They require high data intensity, meaning large multiple types of data processed in real time. For example, *S-Voice* has developed chatbots that speak to users in the field, answer questions to empower youth participation, with a personality tailored to the user's context. The solution was initially developed as an SMS-based platform to help poll communities about subjects considered taboo. The organization continued developing this tool to be accessible from other platforms, such as social media, and to connect to people in new ways. It has now scaled to 68 countries.

S-Cash allows people in refugee camps, using iris scans as identification where possible, to receive cash-based transfers via blockchain. The blockchain tool increases the transparency and efficiency of such transfers, bypassing often corrupt third parties in developing countries. The solution has scaled to refugee camps in two other countries and has seen great uptake during the COVID-19 pandemic.

S-Movement uses AI, machine learning algorithms based on the specific country context, to map and predict the displacement of people around the globe. The solution was developed in collaboration with an African country's government and scaled throughout that country.

S-Map uses geospatial mapping to model populations in countries that lack readily available access to this data, to provide policymaking and decision-making power to governments. The tool has scaled to 20 countries.

3.3.3 Data Collection

We gained preferential access to key decision-makers in the headquarters of the focal organizations as well as intrapreneurs working in the country offices, such as in Nepal, Pakistan, and Kenya. First, we interviewed numerous stakeholders to understand the context and how intrapreneurship happens in international organizations. Next, we conducted 39 interviews as part of a systematic collection of data on the evolution of the eight case studies. These interviews were semi-structured to allow for deep inquiry (Rubin and Rubin, 2011) and conducted with individuals directly involved in the initiative, including respondents in the country offices, internal and external stakeholders, and members of innovation teams and headquarters. Respondents were asked about (1) how innovation is defined in the organization; (2) the innovation project, including its origin and evolution; (3) the stakeholders involved and the interviewee's role; (4) the diffusion of knowledge and ideas generated by the initiative; and (5) its outcomes, social impact, and other contributions. The research team then wrote up case studies and validated insights and perspectives with different organizational actors. A research team member also participated in an innovation boot camp that showcased several of these initiatives. During the 24 months of data collection, the team returned frequently to many people involved in the initiatives to monitor project development and to clarify open questions. Data was collected on each case until saturation.

In addition to following the initiatives for two years, the researchers drew on some retrospective accounts. The reliance on multiple informants, several of whom covered the entire evolution of the initiatives, aimed to reduce potential retrospective biases, confirming information across several sources (Golden, 1992; Leonard-Barton, 1990). The team validated insights with secondary data (websites, annual reports, press releases, and internal publications). They also participated in a series of meetings and workshops concerned with innovation in international

organizations and used these observations for data triangulation (Jick, 1979). Table 2.1 summarizes the data sources and characteristics of the eight case studies.

Table 2.1: Initiatives and Data Sources

Initiative Characteristics	***Product Food***	***Product Edu***	***Product Moto***	***Product Yarn***	***Solution Movement***	***Solution Voice***	***Solution Cash***	***Solution Map***
Description	Hydroponic pumps to grow food in difficult conditions	Sets with pre-loaded curriculum for refugee camps	Radio broadcast via mobile delivery (on moto)	Machine for simplified and safer extraction of yarn	Predictive analysis AI platform to predict population movements	Citizen and youth engagement platform	Blockchain technology to deliver payments in refugee camp	Geospatial data for population mapping
Launch Year	2016	2014	2014	2016	2017	2011	2017	2018
Locations	South America, Africa – 2 countries	Global – 4 countries	Uganda, South Sudan	Nepal	Somalia	Global – 68 countries	Middle East, Asia – 2 countries	Global – 10 countries
Technology	Hydroponic pump, solar panels, app for training	Hardware plus app	Loudspeaker, USB, and moto	Machine	AI	SMS platform; chatbot	Blockchain	Geospatial mapping tech
Reach	3k people reached	31 refugee camps	4 refugee settlements	22 districts reached	18 regions mapped	11 million users	over 800k refugees reached	10 countries mapped
Humanitarian Impact	Allows refugees and vulnerable communities to grow food	Provides connected education for refugee camps	Connects remote villages to receive news and vital information	Supports female entrepreneurs and yarn extraction ecosystem	Helps organizations prepare for refugee crisis situations	Helps understand local problems and empowers communities	Increases ease, ability to pay for food	Supports informed decision-making in low- and middle-income countries
Interviews								
Initiative Champion or Innovation Lead	2	3	2	1	2	4	3	2
Other Internal Stakeholders	3	2	2	3	3	2	3	2
Secondary Sources								
Observations	2				1		2	
Annual Reports	6	5	6	4	5	4	6	2
Press Releases	10	1	3	5	3	10	1	8	3	3
Presentations	4				2	1	2	

3.4 Data Analysis

To understand whether and how intrapreneurship builds responsible innovation capability in international organizations, we analyzed the initiative's evolution from ideation to scaling and identified several patterns (Raisch and Tushman, 2016). The goal was to gain insights into the initiative's value proposition and activity structure as well as the enablers and obstacles in the distinct – and novel – context of international organizations (Bamberger and Pratt, 2010; Welch et al., 2011).

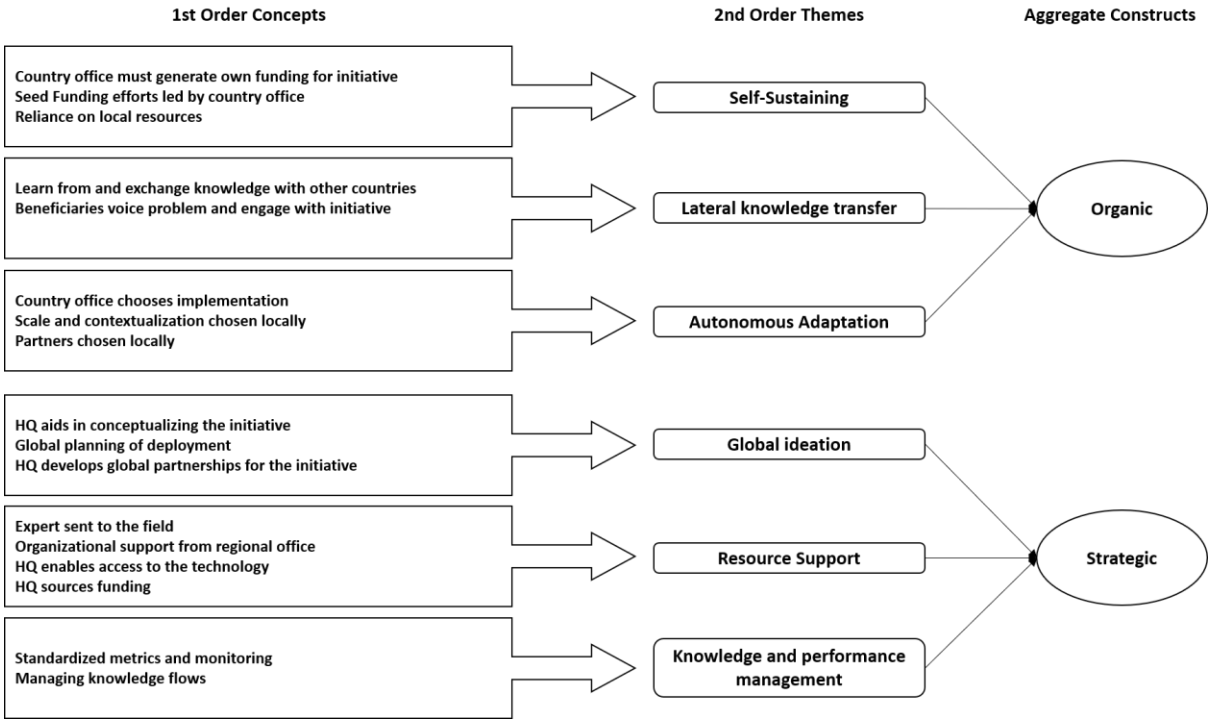
We coded each interview separately, probing the processes of initiative evolution and outcomes (Miles and Huberman, 1994). By iterating among empirical themes, and between the themes and relevant literature, the analyses moved from first-order codes of organizational evidence to second-order conceptual categories (Gioia et al., 2013). The analysis was concerned with understanding the cases commonalities (George and Bennett, 2005) to provide a firmer grounding of the emerging theory (Eisenhardt, 1989; Eisenhardt and Graebner, 2007). We used pattern-matching techniques to compare the trajectories of the intrapreneurial initiatives across cases and to explore dimensions for distinguishing between them.

Next, we plotted the different outcomes across the types of initiatives in the sample, which revealed specific patterns emerging from the covariance of initiative type, its scaling mechanism, and its contribution to organizational capability for responsible innovation. New insights were contrasted with extant literature on responsible innovation and intrapreneurship to highlight the details of the context and to allow for theory-building.

3.4.1 Scaling Mechanisms

The first emergent insight came from analyzing scaling activities and processes as an initiative was being developed and expanded to new locations. This analysis focused on the activities and stakeholders that assisted the scaling process. Using inductive coding (Gioia et al., 2013), we identified second-order themes reflecting the aggregate constructs of the mechanisms behind scaling. Consistent with recent literature on scaling innovation within organizations, the key emerging dimensions showed how organizations support the scaling process can vary. Similar to the “horizontal” and “vertical” scaling mechanisms found in research on corporate initiatives (Raisch and Tushman, 2016) and findings in the public sector (Mulgan et al., 2007; Westley and Antadze, 2010) suggesting that initiatives scaled through either “high” or “low” organizational control, we find that international organizations’ initiatives are scaled from country to country either in an ad-hoc manner (organically) or through the direction and planning of headquarters (strategically). Figure 2.1 provides an overview of the data structure, and Appendix 9.1 lists representative quotes.

Figure 2.1: Data Structure of Scaling Mechanisms



Organically scaling initiatives are developed and diffused fully in country offices – without central support from headquarters or a mandated innovation team – identified by second-order themes as self-sustaining, with lateral knowledge transfer, and autonomous adaptation. These themes signify that the country office is generating its own funding and partnerships for the initiative; that knowledge is sourced from one country to the other, reacting to local demands rather than through a centralized coordination mechanism in headquarters; *and* that ideas are contextualized locally – often significantly adapted and extended by the recipient countries. Signaling responsible innovation all the way through diffusion, organically scaling initiatives in nonprofits undergo specific funding processes that include more stakeholders than in the private sector (i.e., governments, local NGOs and organizations, and multiple private-sector donors). In addition, individual country offices determine the implementation of these initiatives based on concrete beneficiary needs in that country.

In contrast, *strategically scaling* initiatives are assisted in the process of development and international implementation by headquarters and central processes – identified by second-order themes of global ideation, resource support, and knowledge and performance management. Such scaling is centrally coordinated. Decisions about where and how to deploy the initiative are taken with

a global perspective on needs and partnership building; headquarters provides not only funding but also human resources, technology and administrative assistance; *and* there are systematic knowledge repositories as well as global metrics and tools for monitoring the initiative. We found that strategically scaling initiatives in nonprofit context develop global partnerships (between public-sector governments and private-sector companies that may not work together on other issues). These initiatives require more rigid approaches to data management and ethics around data-sharing because they often address sensitive personal information about vulnerable individuals.

3.4.2 Responsible Innovation Capability

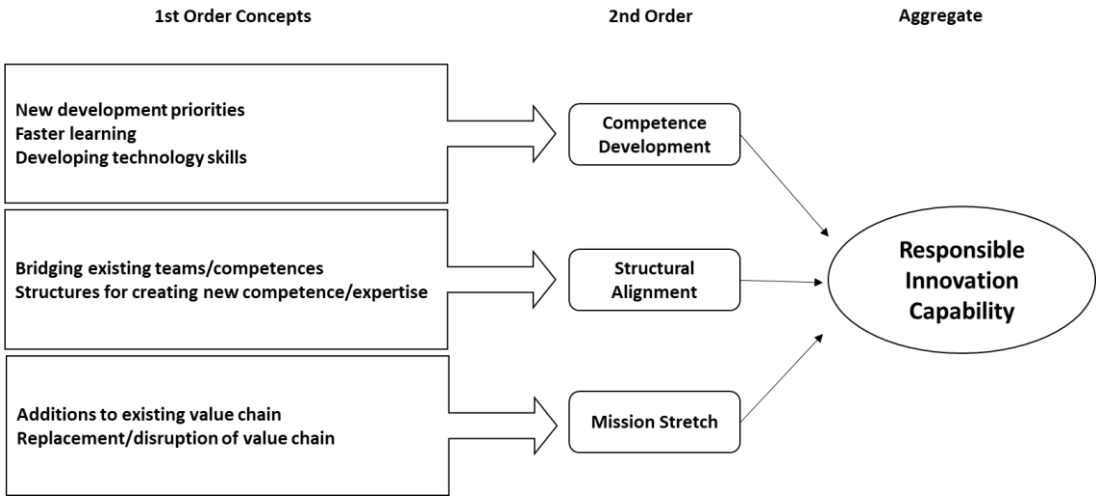
To understand the contribution of the intrapreneurial initiatives to the international organization's responsible innovation capability development, we coded the existence of organizational-level processes aimed at replicating responsible innovation over time (Carnes and Ireland, 2013; Salvato and Rerup, 2011; Seelos and Mair, 2013). While all initiatives resulted in an innovative product or process scaled to at least two locations as well as certain humanitarian impacts on beneficiaries (as described in Table 2.1), not all readily showed signs of a wider effect on the organization. Where such effects were apparent, we coded the initiatives' distinct outcomes for the organizations' responsible innovation capability. Through iterative analyses of these implications, we identified three dimensions of such capability.

1. Competence development emerged as a clear consequence of the initiatives (Ketata et al., 2015; Seebode et al., 2012). This often included the addition of technology-related competences, but also building new skill sets, training programs, and methodologies for work. While all initiatives contributed somewhat to competence development in the unit or team where it was hosted, we only coded new competence development at the international organization's level.

2. Structural alignment reflects the changes in the organization's internal structure, whereby new structures were established to allow for cross-unit exchange and the creation of expert centers to align with the new opportunities the initiative created. Many initiatives enhanced interunit collaboration and work across traditional silos, an important element of innovative organizations (Guston, 2012; Kistruck and Beamish, 2010).

3. Mission stretch emerged as the more surprising theme from the research. Some initiatives ultimately showed an impact on the organization's overall mission and future direction by either extending or substituting its traditional activities. While intrapreneurial initiatives are often claimed to have a transformative effect on the wider organization (Birkinshaw and Hood, 1998; Burgelman, 1983), prior empirical evidence of how initiatives affect the organization's overall value proposition is rare. Figure 2.2 provides an overview of the data structure and Appendix 9.2 lists representative quotes.

Figure 2.2: Data Structure of Responsible Innovation Capability



3.5 Findings

3.5.1 The Grand Challenge Environment of Intrapreneurial Initiatives

Our analysis showed that pressures on organizations to address the interlinked grand challenges and to contextualize innovation were important characteristics of their environment. All initiatives began by addressing general and globally widespread challenges in local communities or country offices (Table 2.1). Although contextualization was important, scaling the initiatives was imperative to organizations' ability to work effectively and address their global mandates. This created a tension, observed in all our cases, between local intrapreneurs and the need to address broader global problems. For example, cash assistance and emerging digital opportunities empowered vulnerable households to meet their essential needs, as a field staff person involved in the *S-Cash* initiative said:

> *[We] recognized the need for a neutral platform that would tackle some of these challenges around issues of potential financial risk in certain contexts, instability of banks and telecommunications providers in conflict situations or insecure states, transfer fees and customer privacy. It was an interconnected issue.*

Similarly, the *S-Map* initiative aimed at "providing census data for war torn countries where full-fledged census was not possible." This initiative was initially piloted in Afghanistan, but the team "quickly saw the need in many more countries."

The diversity of institutional and cultural environments made deep contextualization of the initiative vital. A key decision-maker involved with *P-Food* explained: "You can have an innovation in mind, but if you bring something that doesn't solve a local problem and you don't localize or adapt it, it won't work." Another example of contextualization comes from the *S-Movement* initiative, which sent an AI programmer to refugee camps to understand the specific context and critical variables needed for the predictive analytics model:

> *It's all about context, Silicon Valley data scientists are far away from the reality and the ethical problems data [present] in an unequal world. Trying to explain the complexity of this world with a few models and some datasets are too limited in the [humanitarian] sector.*

In general, our interviews highlighted the ability to be 'on the ground' to contextualize an innovation as particularly crucial. As the initiative champion of *P-Food* explained, "If you want to help an innovation grow, you have to be on the ground. We have someone continually pushing the project locally." Furthermore, we heard from an initiative champion at *S-Map* that:

> *as a UN agency and as a lead in the field, we have the greatest potential to lead that work and take ownership. We integrate local people to make sure the initiative is sustainable and push for greater impact outside of the scope.*

Next, we describe how the different scaling mechanisms developed in this context.

3.5.2 Organically Scaling

Organically scaling refers to the diffusion of an initiative from one country to another in a bottom-up, self-sustaining process involving lateral knowledge transfer and autonomous adaptation. *S-Voice* showcases this scaling mechanism.

S-Voice, which empowers youth participation using chatbots, launched in a country office in Africa in 2011 as an SMS tool to help poll local communities about taboo topics. The idea champion

overcame several obstacles to pioneer the solution, including developing the technology backbone for the tool, "partner[ing] with mobile networks providers who would give [the organization] a discount on the mobile service," and making sure the team was on board and understood the initiative's benefits. Through persistence, he developed these partnerships in one country with one mobile provider and established a small team locally. The country office worked closely with the local government to implement the tool. The initiative champion explained: "After the initial pilot, [the initiative] scaled quickly. … other country offices saw the benefits of being able to use the anonymous and completely transparent polling tool." Furthermore, as explained by the Initiative Champion:

> *There is no top-down push to implement [this initiative] from [our organization]. Each country office needs to make the push for the tool and to generate their own funding – such as seeking funding from donors.*

As the initiative scaled globally (to 68 countries by 2021), new locations usually first identified an unmet data collection need, and then implemented the initiative to address that need. In Pakistan, for example,

> *the government had established menstrual hygiene facilities but there was no follow-up as to whether these were being used. We needed [the initiative] to understand the true statistics about the issue because we were focused on a topic considered taboo and we had heard about the use of the anonymous polling tool from other offices.* (Initiative champion, *S-Voice*)

The *S-Voice* initiative is a typical example of *autonomous adaptation*, where the country office selected the partners locally and chose how to deploy the initiative: "[This initiative] is embedded in the activities of that country; usually it sits under the communications team locally." Countries deploying *S-Voice* employ on average one staff person to work on the initiative full-time, while countries with greater scale/use of the tool employ more people (e.g., Pakistan, 3; Nigeria, 4; Brazil, 4), but the country offices determine these resources. In addition, each country determines which local challenge the tool will help it tackle, innovating responsibly on the ground by customizing its application:

> *In Italy, for example, the tool is used on a smaller scale. It is made accessible to migrants from Cameroon to build a community and share information easily. The tool was activated in*

Guatemala after the volcano to better understand where the damage was and to spread information about the danger.

A main barrier to organically scaling initiatives was the speed of decision-making at headquarters. These processes were slow by design, established to ensure that no actions had unintended consequences. As the innovation lead at *S-Voice* organization explained, "The internal challenges and culture are a hindrance."

Country offices often needed to move quickly to obtain necessary data or to react to an urgent local development and had insufficient time for those processes. By organically scaling, from country office to country office, these initiatives could bypass the headquarters slow-moving decision-making processes (e.g., no need to develop new policies, global partnership signatures). Yet even though the initiatives were flying under the radar with headquarters, they were still influenced by local organizational safeguards, which maintained conscious efforts to avoid harm. The key principles of an organization were still pursued by its global locations. Furthermore, in all cases of organically scaling, because of proximity to the end user, the initiative's contextualization was aided by its beneficiaries. For example, the *P-Moto* initiative was developed not just by the refugee-camp leader but also by several camp residents who understood how to best address the problem.

3.5.3 Strategically Scaling

Strategically scaling is characterized by the greater role of headquarters in terms of resource support, global ideation processes, and knowledge and performance management. For example, *P-Food*, the innovative hydroponic growing kits for growing vegetables in inhospitable environments, began in 2016, "when the Peruvian Country Office approached the [innovation team] to ask if they could use hydroponic growing to improve the access to fresh food for the slum population outside of Lima" (innovation lead, *P-Food*).

The headquarters' innovation team became involved when they invited the main innovators from the Peruvian office to Munich to participate in a "boot camp". As the innovation lead described, "We wanted to see the potential to create a successful concept and to have impact on a larger, more sustainable scale." The innovation team not only provided funding and technical know-how for (parts

of) the *P-Food* project but also allocated human resources with specific skillsets to go into the field and work alongside the country office to implement and localize the initiative. To scale *P-Food*, a member of the innovation team visited Peru for the first six months of the implementation and then the refugee camp in Northern Africa when it scaled there.

The scaling of *P-Food* was facilitated through *global ideation processes* to develop partnerships and create know-how for hydroponic growing systems. An innovation-team member explained the importance of developing a broad global network of experts for full scaling of the initiative:

> *We worked with [a beneficiary in the field], experts from [large academic institution], [large international organization] and [international NGO] to overcome key technical challenges to bring the solution to scale. It wouldn't work if it weren't for the good team and network.*

Once the *P-Food* initiative proved successful in allowing access to fresh vegetables for people living in the slums of Peru, the innovation team began to think about which other country office could benefit from this technology. It then scaled strategically and contextualized to Chad to support Sudanese refugees living in the Sahel Zone in harsh conditions. It also scaled to South Darfur and to refugee camps in Northern Kenya, where the focus was on vegetables, not fodder for livestock.

In addition to the headquarters choosing strategically where to scale the innovation, some requests for it came from country offices directly. For example, the Algerian country office asked whether hydroponics could solve their fodder-growing problem. The team, having acquired expertise through the Peruvian implementation, began by bringing a high-tech hydroponic growing container to the camp to test it and to explore certain questions: "Can we use the local water that's available in the wells, which is very salty? What seeds are available locally?" As the innovation lead explained, democratizing the innovation's development was incredibly important to the team, particularly to ensuring that implementing the tool brought no harm to users' daily lives. The team had seen other organizations introduce innovations to the refugee camps that were unsustainable over the long term, used only temporarily, prevented the refugee population from becoming self-sufficient. Therefore, the team's focus was to avoid creating unintentional dependence through their innovations:

> *Together with one of the refugees, who had been in the camp since he was eight years old but been able to study agricultural engineering in Syria and Libya, [we] started to develop a localized version of the tool.*

Knowledge and metrics were important for the organization to measure the initiative's success. The innovation lead explained: "Sometimes we take the high-tech version, but it still needs to be localized." This involves not only managing knowledge flows but also globally standardized metrics. As *P-Food* scaled from one region in Northern Africa to another, the centralized innovation team shared its knowledge about the tool and its previous deployments directly with that new region. As the innovation lead commented:

> *Country offices work jointly with the [innovation team]. There is a lot of monitoring and follow-up that needs to be done on a daily basis while we ensure knowledge sharing between countries and see what is the best fit for the model.*

In comparison to organically scaling initiatives, strategically scaling initiatives often addressed the resourcing rules of the organization and the multi-stakeholder internal decision-making requirements established to give multiple gatekeepers the buy-in and involve all donors in the process, as explained by the innovation lead where *S-Movement* was housed:

> *Resourcing innovation and allocating funds to it is something that is troubling given the way our organization is funded. Initiatives can lead to failure and measuring resulting learnings in a way that can be expressed to donors is often difficult at best, if not impossible.*

3.5.4 Evidence of Responsible Innovation Capability

While all initiatives had humanitarian impacts and influenced the respective country offices, the extent of their implications at the organizational level varied significantly. This research uncovered how intrapreneurship can develop a capability for responsible innovation, which is not just about increasing the number of successful innovation projects in an organization. It involves changing or renewing how the organization functions. Our analysis surfaced three ways in which intrapreneurial initiatives contributed to their organization's responsible innovation capability: some led to the development of organization-level skills and competencies; some led to a change in internal structure to align them with the innovation processes; and some had deeper transformational effects on the entire value proposition of the organization – an extension of its mission. While these can all be vital for building a capability for responsible innovation in international organizations, different initiatives had

different effects.

Products that scaled strategically developed new, organization-wide competencies and structures. For example, *P-Food* saw the organization approach specialists in hydroponic growing to understand the process and technicalities. The organization then internalized this competence in new ways of growing food and tested different technologies to best localize these initiatives as cost-efficiently as possible, experimenting with different materials, cost levels, sizes, and product complexity. The initiative champion explained: "Between March and December 2017, we developed and tested over 50 different size and style replicas of the local unit throughout the camp." These tests involved partnerships that led to invaluable learnings and new competencies in the organization. Based on this experience, the international organization created a center of excellence, a new structure, to help disseminate knowledge and continue developing the initiative.

The same pattern emerged in *P-Edu*, which provide pre-loaded curriculum on tablets to refugee classrooms, which created avenues for improving refugee-camp education through technology. As an innovation-team member explained, "It's had an impact on our education strategy. Connected learning is clearly a big chunk of what we do now." Both *P-Edu* and *P-Food* forced their respective organizations to develop new data-management and technology competencies. This led to either the creation of a new structure (such as new teams) or the bridging of existing teams. *P-Edu* strategically scaled and was assisted by the organization's innovation team, but as the initiative developed, it was transferred to the education team – effectively creating a new work direction there and temporarily bridging the teams. This was a big challenge, as the innovation lead describes, "This took six months of just getting the budget shifted across, because no one wants to be accountable for things." The case shows that the consequences of initiatives were not always welcome in organizations.

In turn, products that scaled organically did not result in organization-level changes to competencies, structures, or missions. These initiatives were powerful innovations for the beneficiaries in the field and often greatly changed their lives and influenced policy but had no wide-ranging consequences for the international organization. For example, *P-Moto,* which organized

broadcasting radios on the backs of motorcycles, was designed to reach about 14,500 refugees in one camp alone and provide marginalized communities vital information and news. Despite its success, there is no evidence of significant developments of organizational competencies, structures, or the mission from that project.

The most pronounced contributions to organizations' responsible innovation capability came from the four initiatives providing digital solutions. For example, while the mission of the organization hosting *S-Cash* is "to end hunger and poverty," it is assuming a much broader role than delivering food and building resilience in communities through its innovations. Thanks to *S-Cash*, this organization is now better serving its mission by more effectively, transparently, and cheaply delivering cash-based aid to those most in need. It is playing a role that would naturally fit under the value chain of a fintech or development bank, as the money moves directly from the organization's wallet to refugees at the point of delivery. Indeed, by expanding its activities to address all aspects of cash transfers from data management to technology, the organization is positioning itself as a platform for aid delivery. As explained by the innovation-team member:

> *We are saving fees by not using the banks. Before we had to create many bank accounts, but now we go through a virtual wallet. The money goes directly to the beneficiary. [Now] we do not have to put money up front to unstable entities. We control the data and we have real-time consolidation.*

Importantly, regardless of the scaling mechanism, digital solutions not only build new competences and structures but also have deeper transformational effects on an organization's entire value proposition – either by adding to the existing value chain or by disrupting and replacing current activities – leading to "mission stretch." Initiatives using complex and data-intensive technology required that the organization develop new technological competencies and build their own back-end data systems, to accommodate and internalize the novel solutions involved. Because of the sensitive nature of the data, often such development could not be outsourced to partners, so the organization developed new competencies as a result.

These cases also show the crucial role of data for decision-making in large organizations. For example, the initiative champion of *S-Cash* explained that the next step is building partnerships with

other organizations, with two already under development, to expand the initiative and create a joint platform: “Blockchain could be a shared platform for the whole UN. It will be a shared truth. A platform of trust.” This case provides evidence that – beyond the goal of increasing efficiency for cash-based transfers – it has effectively created a mechanism that might change not only how this organization works but also how the entire UN system works together more transparently.

A similar impact can be seen on the organization hosting *S-Voice*, an organically scaling initiative that provides a chatbot-enabled tool to poll communities. In terms of competencies and structures, *S-Voice* led the organization to hire former tech and digital consultants to help understand how to use different channels to better reach digital natives, resulting in the installation of a three-person global team, which helps disseminate knowledge between country offices. This initiative also had a significant impact on the organization’s priorities for development and resourcing: “Prioritizing innovations has shifted dramatically at the headquarters level” (innovation champion, *S-Voice*). Moreover, by implementing chatbots to converse with people directly, the organization of *S-Voice* is moving beyond its original mission “to help children”. The tool’s success has led the organization to act more like a technological partner for NGOs and a data provider for governments to help augment their decision-making and prioritization:

> *We purposefully chose to keep the tool unbranded so that a partner could “own it”. Over 350 partners are involved globally, including government, nongovernment, private sector, schools, universities, and youth networks. We don’t want to be closed in our own bubble.*

The pattern of these findings is portrayed in Appendix 9.3. To conclude, although all initiatives delivered humanitarian impact to their beneficiaries, organically scaling product innovations showed no obvious contribution to the organization’s responsible innovation capability, whereas strategically scaling products – by forcing the organization to internalize new skill sets and expertise while creating new or bridging existing teams – showed strong evidence of competence development and structural alignment. In addition, digital solutions, both organically and strategically scaling, showed evidence of all three dimensions of responsible innovation capability. Furthermore, there was evidence that these initiatives were not only setting the stage for further initiatives but were

directly creating new initiatives. For example, the scaling of *S-Map*, and the technical learning there, led to the direct creation of two new initiatives. The team lead observed on one new project,

> *[S-Map] has also led to the development of another project called [name] which collects census data in one place and disseminates, maps it. This new initiative is being developed and enabled by geospatial mapping. [S-Map] has enabled this initiative just by aligning for use-case development. This platform will further build capacity at a country level. We are merging two work streams here and it's a big value-added.*

3.6 Theory Development

The findings present powerful examples of how international organizations can innovate and build a responsible innovation capability through intrapreneurial initiatives. This process involves different elements of organizational learning and transformation (Seelos and Mair, 2013; Zollo and Winter, 2002): from competence development and structural alignment to mission stretch. All represent lasting changes that are not easily reversible, pointing to the deep organizational embeddedness of a responsible innovation capability. The most striking evidence of this transformation is in the cases of mission stretch which highlight an organization's willingness and ability to respond to normative pressures for creating greater social impact (Durand et al., 2019) and to develop practices that would lead to a sustained capability for responsible innovation. Hence, in this paper, we are effectively answering calls in the responsible innovation literature to better understand the implementation of responsible innovation (Owen et al., 2013; Scherer and Voegtlin, 2020).

While all intrapreneurial initiatives studied in this paper aimed to "do good," they also "did no harm" because of the highly bureaucratic processes (Voegtlin and Scherer, 2017) implemented by the international organization. As a member of the innovation unit at *S-Voice* stated, "Do no harm is one of our principles of innovation" because innovators need to listen to all users (including marginalized ones). Furthermore, for certain initiatives, such as *P-Food*, the end user – a refugee from the camp where the tool would be scaled – was an active member of the development team, verifying that the innovation did not create dependency but instead created resilience.

Our study explored how intrapreneurship contributes to responsible innovation capability in a unique organizational context characterized by complex relationships between country offices mandated to address local needs and the headquarters of international organizations. All eight cases

show how responsible innovation tensions ("to do good while doing no harm") are addressed in the scaling of intrapreneurial initiatives. We define this specific type of intrapreneurship as "nonprofit intrapreneurship," contrasting it with concepts of corporate and social intrapreneurship.

3.6.1 Tensions of Responsible Innovation

When innovating, international organizations need to address the central tension of responsible innovation: doing good (creating social impacts) while doing no harm (operating within the organizational safeguards that protect these organizations' social mission and global legitimacy). This "responsible innovation tension" distinguishes nonprofit intrapreneurship from corporate intrapreneurship (cf. Burgelman, 1983; Ireland et al., 2009), which attends to profit tensions between core and peripheral activities, and social intrapreneurship (cf. Alt and Geradts, 2019; Tracey and Stott, 2017), which addresses social-commercial tensions. We next discuss how the two scaling mechanisms identified in this study propel initiatives forward by mitigating specific aspects of this responsible innovation tension.

3.6.1.1 How Organically Scaling Initiatives Mitigate Responsible Innovation Tensions

A key finding of our study is that nonprofit intrapreneurial initiatives develop responsible innovation capability in international organizations using two different types of scaling. We found it surprising that despite the hierarchical and bureaucratic organizational structure, and lack of incentives, several intrapreneurial initiatives developed in the country offices of international organizations by scaling organically (without headquarters' involvement). As described above, international organizations are intrinsically risk averse. Being "owned" and financed by member states with donations to address their mission, these organizations are not allowed to allocate funds to experimental initiatives or to take risks required for innovation (Graham, 2017). In addition, their partner-selection process is rigorous and often relies on their founding values and principles (Buse and Waxman, 2001). While these principles are designed to "do no harm," they create the key tension in the organizations' efforts to develop new initiatives to "do good".

We find that initiatives driven by innovators drawing parallels strong champions (Day, 1994), who were intrinsically motivated to pursue their projects with a view to "change the world" rather than to seek organizational rewards ("do good"), addressed the constraints of risk-averse organizations by avoiding the bottlenecks and finding work-around solutions, even if these included clashing directly with the organization's value-based principles. As shown in the cases of *P-Yarn* and *P-Moto*, they found alternative funding sources by connecting with local nontraditional donors and collaborated closely with peer units. In other words, to scale, these initiatives had to increase field collaboration and augment individual decision-making. Such scaling empowers intrapreneurs to use their contextual knowledge and direct beneficiary engagement to enact impact.

While intrapreneurship in multinational for-profit organizations is also associated with risk-taking and rule-breaking (Ambos et al., 2010; Birkinshaw and Ridderstråle, 1999), the motivation of nonprofit intrapreneurs in international organizations, as we observed, can be described as genuinely and radically addressing social issues for the beneficiary rather than seeking organizational rewards and recognition (see also Kistruck and Beamish, 2010; Mair and Marti, 2006). This difference has been discussed in the literature comparing managers and entrepreneurs (Chen et al., 1998; Zhao and Seibert, 2006). We find that despite being embedded in large, complex organizations with clear responsibilities, initiative champions follow the "entrepreneurial" model rather than the "managerial".

Therefore, organically scaling initiatives mitigate the tensions between, on one hand, the risk-averse organization that aims to "do no harm" and, on the other hand, the intrapreneurial individuals navigating this environment and developing creative solutions to deliver greater impact for the beneficiary to "do good." This leads to the following proposition:

> P1: Organically scaling intrapreneurial initiatives mitigate the responsible innovation tensions of risk-averse organizations ("do no harm") and socially driven intrapreneurs ("do good").

3.6.1.2 How Strategically Scaling Initiatives Mitigate Responsible Innovation Tensions

Centralized organizations are characterized by multi-stakeholder decision-making processes aimed at creating a governance structure that decreases any negative effects of their activities (Scherer and Voegtlin, 2020). These hierarchical and centralized structures present organizational safeguards to protect accountability and responsibility ("do no harm") by establishing a clear organizational structure

and distributing resources via headquarters. Yet, it is well known that the resulting hierarchy and centralization stifle innovative idea generation (Keum and See, 2017).

We find that while the emergence of innovation units that facilitate and support intrapreneurial initiatives ("do good") has supported the growth of intrapreneurial innovations, it also amplified the responsible innovation tensions in international organizations. Although structurally connected to the headquarters, these units often establish a parallel culture of agility. Frequently, these innovation teams are built informally, with a strong focus on experimenting with different innovation-management approaches as well as design thinking, human-centered design, and agile methodology (Kistruck and Beamish, 2010; Tracey and Stott, 2017) which are not prominent topics in the traditional UN system.

All international organizations in our sample had innovation units, but these were not always used for scaling (such as in the case of *P-Moto*). However, all strategically scaling initiatives were assisted by such units. These units provided the right conditions for overcoming the problematics of a deeply centralized structure. In contrast to organically scaling initiatives, strategically scaling initiatives used innovation units to disseminate knowledge. This allowed them to broadcast the key learnings across the international organization, and to increase trust and transparency, however, it also exposed them to the scrutiny of central processes. Consequently, strategically scaling initiatives successfully navigated the tensions between the demands of central organization and the unconventional practices of these innovation units.

Compared with the corporate sector, innovation units in international organizations are tiny, frugal outfits (Bloom and Faulkner, 2016). Their role is to facilitate innovation by providing resources, pooling knowledge, and connecting internal and external partners (Amezcua et al., 2013; Cohen et al., 2019) rather than to innovate themselves. Our findings show that strategically scaling initiatives continue to flourish throughout the globally distributed outposts of the organization and allow the innovation unit to showcase its impact. Indeed, strategically scaling initiatives mitigate the tensions between the centralized, top-down-managed organization that aims to "do no harm" and the emerging agile innovation teams to amplify the best practices and enable greater impact – "do good." This leads

to the following proposition:

> P2: Strategically scaling intrapreneurial initiatives mitigate the responsible innovation tensions of central, bureaucratic organizations ("do no harm") and emerging innovation teams ("do good").

3.6.2 Imprinting Responsible Innovation

Our findings show that organically scaling product innovations have a lower impact on the organizations' responsible innovation capability than strategically scaling initiatives. We propose that imprinting is the mechanism that enables strategically scaling initiatives to have this increased impact (Marquis and Tilcsik, 2013; Stinchcombe, 1965). Research found that characteristics of an organization's founding period are imprinted on the organization and persist over time. Marquis and Tilcsik (2013, p. 223) suggest that "in some situations, as the environment changes, significant countervailing pressures may push organizations to diverge from the imprints they carry." Such environment changes for international organizations are characterized by the pressures to innovate in a digital world, the public criticism of their ability to efficiently address their mandates, and decreased funding by state actors (including the threat this poses to their existence).

When organizations undergo a sensitive period of change – such as the transitions seen in international organizations today – new features can become imprinted. The old traces are not swept away when new layers form; instead, complex sets of "layered features, practices, and ideas" build up (Cooper et al., 2000, p. 118). Our findings align with this theoretical thinking by showing that in this sensitive period, organizations are imprinting new learnings from initiatives not only to continue addressing their mandates to solve the world's most pressing problems but also to develop a capability for addressing this mandate in a new way.

Furthermore, as innovation scales and improves, it usually does so through incremental changes and fine-tuning that build deep organizational routines and competencies that enable an organization to innovate continuously. As Seelos and Mair (2013, p. 13) put it: "Innovation thus becomes the new mainstream, and thereby an organization has changed in some important manner." Scholars have noted that organizations develop "routines" for these activities and that these behavioral patterns gradually become embedded and reinforced in policies, structures and processes (Arrow,

1962; Ketata et al. 2015; Nelson and Winter, 1982). In our study these routines and the resulting capabilities are represented by organization-wide competence development, structural alignment, and mission stretch. Through the process of scaling, the intrapreneurial initiatives examined in this paper integrate new knowledge that establishes a learning process within the organization (Zollo and Winter, 2002). On one hand, they break down bureaucratic barriers to innovation by lubricating past institutional bottlenecks; on the other hand, they develop a culture that indicates to individuals working within the organization that their innovative ideas will be heard and supported.

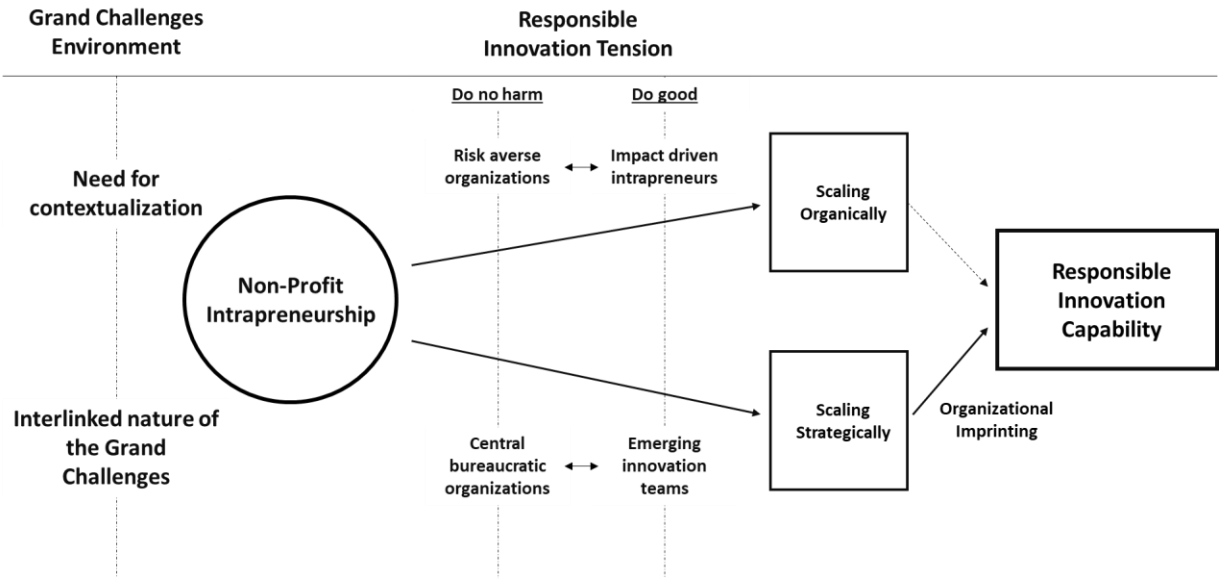
Strategically scaling initiatives, as opposed to organically scaling ones, involve multiple hierarchical levels of the organization and allow for greater "imprinting" of the new competencies, structures and activities that compose the responsible innovation capability. In other words, strategically scaling initiatives result in new competencies and structures which act as a mechanism to imprint responsible innovation capability on organizations, while organically scaling initiatives do not have the same effect. This can be observed in organizations having several scaling initiatives and continuing to develop further innovation more rapidly. For example, the scaling of *S-Map* led to the birth of two new large-scale initiatives within that organization that build on the satellite-mapping competencies developed in *S-Map* as well as the structural developments that occurred through its scaling process. Similarly, *P-Edu* led to a wide range of experimentation from the new work stream on connected education. Based on these insights, due to organizational imprinting we propose the following:

> P3: Strategically scaling intrapreneurial initiatives contribute to an organization's capability for responsible innovation more than organically scaling intrapreneurial initiatives.

The theoretical model (Figure 3) portrays the relationships described in these propositions. Nonprofit intrapreneurship in international organizations happens in an environment with globally intertwined grand challenges, which increases pressure for global scaling as well as a need for deep local contextualization. In this environment, initiatives scale either organically or strategically, thereby mitigating distinct responsible innovation tensions. Organically scaling initiatives address the tension between risk-averse organizations and socially driven entrepreneurs, whereas strategically scaling initiatives address the tension between central, bureaucratic organizations and emerging innovation

units. Finally, strategically scaling initiatives contribute to responsible innovation capability via organizational imprinting. Figure 2.3 shows the Theoretical Model.

Figure 2.3: Theoretical Model



3.7 Discussion

Addressing the question of how socially oriented international organizations can "do good" and "do no harm", this research uncovers the mechanisms of nonprofit intrapreneurship for building a responsible innovation capability. It makes three contributions to the literatures on responsible innovation and intrapreneurship and provides avenues for further research.

First, adding to the conceptual development of responsible innovation literature (Owen et al., 2012; Seelos and Mair, 2013; Stilgoe et al., 2013; Voegtlin and Scherer, 2017), our research uncovers an organizational capability necessary for responsible innovation which manifests in competence development, structural alignment and mission stretch. This capability is particularly crucial in the specific context of international organizations, as they face the task of addressing the grand challenges in a world that is radically changing through digitalization, increased demand for transparency, and the need to collaborate across borders and sectors (Bloom and Faulkner, 2016; Ferraro et al., 2015; George et al., 2016). It is likely that such a capability is also relevant to other socially oriented organizations facing similar responsible innovation tensions (Stahl and Sully de Luque., 2014;

Voegtlin and Scherer, 2017) at the core of their mission, such as NGOs, some public-sector organizations, and public–private partnerships. Extending these insights to other organizations, it is important to first identify their key tensions (Ambos et al., 2020). We find that two specific mechanisms of nonprofit intrapreneurship – organically scaling and strategically scaling initiatives – contribute to responsible innovation capability by addressing concrete aspects of responsible innovation tensions. This leads to revamping deep-seated practices as the organization moves towards the substantive conformity to normative pressures (Durand et al., 2019).

Second, these insights link the responsible innovation literature to intrapreneurship. They complement our understanding of intrapreneurship in large, complex for-profit organizations (Burgelman, 1983; Birkinshaw, 1997; Kistruck and Beamish, 2010; Raisch and Tushman, 2016) by characterizing the tensions, scaling patterns and outcomes of nonprofit intrapreneurship. Contrasting nonprofit intrapreneurship in international organizations with the literature on corporate and social entrepreneurship provides important boundary conditions for understanding "nonprofit intrapreneurship". Table 2.2 gives an overview, which may also serve as a research agenda for further investigations. The most notable difference is that nonprofit intrapreneurship addresses responsible innovation tensions (instead of profit or institutional tensions) and that the key theoretical mechanism is learning and transformation (instead of structural or institutional change).

Table 2.2: The Literature Landscape Positioning Nonprofit Intrapreneurship

	Corporate Intrapreneurship	Social Intrapreneurship*	Non-Profit Intrapreneurship
Theoretical foundations	**Entrepreneurship + Strategy**	**Entrepreneurship + Institutional theory**	Entrepreneurship + Responsible innovation
Innovation objectives	A set of practices to create new profitable initiatives inside companies; competitive advantage, economic gain (c.f. Burgelman, 1983, Birkinshaw, 2000)	A set of practices to create new social initiatives inside for-profit organizations (Alt and Geradts, 2019; Wry and Haugh, 2018) Also, hybrid objectives, reputation, competitive advantage (e.f. Scherer and Palazzo, 2011)	A set of practices to create new social initiatives inside non-profit organizations; Social improvement; ability to serve organization's mission and create greater impact
Nature of innovation	Private good (Antoncic and Hisrich, 2003)	Private and Public good with social purpose (Alt and Craig 2016; Halme et al., 2012)	Public good character
Pressures for Global Scaling	Global standardization, economies of scale (Doz and Prahalad, 1991; Raisch and Tushman, 2016)	Replication in different context (Seelos and Mair, 2013 ; Zahra et al., 2009)	Globally intertwined grand challenges
Pressures for Contextualization	Adapt to differences in customer needs, institutional differences (Bartlett and Ghoshal, 1989; Doz et al., 2001)	Vision to change the social system but often locally embedded (Mair and Marti, 2006; Mair et al., 2016)	Strong field presence and understanding of beneficiaries needs; include local players in project for greater impact and sustainability
Resourcing of innovation	Corporate funds (Burgelman, 1983; Birkinshaw, 1997; Raisch and Tushman, 2016)	Corporate funds (Alt and Craig, 2016; Tracey and Stott, 2017)	Donor funds, partnerships – often not available for innovative projects; need for different funding mechanisms
Incentives for intrapreneurs	Mandate extension, fiefdom-building (Birkinshaw and Hood, 1998; Ambos et al., 2010; Taggart, 1997)	Organizational recognition (Alt and Craig, 2016)	Societal change; Absence of organizational rewards
Role of intrapreneurs	"Managers" (Zhao and Seibert, 2006)	"Change makers" (Battilana, 2006; Wry and York, 2017	Socially-driven and entrepreneurial champions; seek community recognition
Role of innovation unit/team	Do innovation (cf. Abbey and Dickson, 1983).	Issue selling and resourcing (Alt and Geradts, 2019; Alt and Craig, 2016)	Facilitate and support innovation
Key tension	Between long-term profit objectives and core businesses' short-term profit objectives; (O'Reilly and Tushman, 2013; Raisch and Tushman, 2016)	Between social objectives (peripheral to strategy) and core businesses' profit objectives; (Battilana and Dorado, 2010; Hahn et al., 2010; Smith and Besharov, 2017)	Between "doing good" (social impact) and "doing no harm" (organizational safeguards) at the core of the social mission
Key theoretical mechanisms	Structural differentiation and integration	Institutional navigating multiple logics	Learning and Transformation (adapting core mission, capabilities, and structures)

*grey text represents existing literature landscape; black text represents new contribution; table particularly highlights the differences in key tensions and key theoretical mechanisms of the three constructs.

Third, the findings present suggestive evidence that initiatives that scale through headquarters have a greater impact on international organizations' responsible innovation capability than initiatives that scale without headquarters assistance. This is due to systemic organizational imprinting (Marquis and Tilcsik, 2013) increased by strategically scaling initiatives and digital solutions as they prompt organizations to develop organizational learning and strategic renewal beyond these initiatives, meaning that they can foster digital transformation for international organizations and enable them to continue serving their development agendas in this modern era. Among the different dimensions of responsible innovation capability, mission stretch – as an outcome of digital solution initiatives – was the most transformative and most surprising. Even though the role of digitalization in the management of organizations is subject to lively debate among scholars and practitioners (Davenport et al., 2012; George, Osinga, et al., 2016; McAfee et al., 2012), few have explicitly addressed the benefits of digital technology as an enabler of responsible innovation (Frey and Gatzweiler, 2018; Maiolini et al., 2016). We find that digital solutions create transparency and increase the ability of organizations to collaborate. Furthermore, given that international organizations often work in developing countries with poor infrastructure, these solutions enable them to connect with remote communities to help them overcome disadvantages of physical distance and empower citizens. These benefits, previously identified as a key opportunity in the literature (Madon and Krishna, 2018), are empirically demonstrated in this study.

Importantly, we show that digital solutions present a replacement or disruption of an organization's original value chain as they clearly catalyze change at multiple organizational levels and can lead to successful digital transformation. Digital solutions prompt organizations to create new ecosystems through their reach, new technical competencies and increased data wealth. For example, the *S-Movement* initiative made the organization better understand and connect with its beneficiaries. As described by Nadkarni and Prügl (2020), successful digital transformation involves changes at many levels within the organization, drawing direct parallels with the changes the initiatives in this study made to the organization: the exchange of resources and capabilities (Yeow et al. 2018), aligning with the new competencies; the reconfiguration of processes and structures (Resca et al. 2013), aligning with the new structures developed by initiatives; and adjustments in leadership and

culture (Llopis et al., 2004; Singh and Hess, 2017), which our study takes further to include the development of new value streams.

Our research also illustrates how nonprofit intrapreneurship can make international organizations better examples and facilitators of global enablement of responsible innovation (Whiteman et al., 2013). The digital solutions increased transparency in how the UN organizations worked and have the potential to change the UN – making it more cooperative, faster and interconnected. While the context of the international organizations is highlighted as unique, the transformational power of intrapreneurship coupled with the use of digital technology can transfer to other contexts, especially in industries that are highly regulated and globally dispersed.

3.8 Limitations and Conclusion

This study uncovers how nonprofit intrapreneurial initiatives contribute to a responsible innovation capability in international organizations and provides a deeper understanding of an underexplored phenomenon related to grand challenges. The setting of nonprofit intrapreneurial initiatives as extreme cases in international organizations helped surface new insights on the nature of responsible innovation tensions emphasizing success cases, which may limit the transferability of these insights to other contexts. Although we took great care to avoid informant biases and retrospective sense-making through the methodology, the nature of the data does not allow us to rule out biases completely. In addition, the variety of fields and applications we studied made it difficult to develop finer-grained performance metrics for initiatives, potentially an important avenue for future studies. Another limitation is that because of the challenge of identifying “extreme cases” and gaining detailed data access, the initiatives were sampled from five different UN agencies. While the data did not show any systematic variation across these organizations, we recommend future research to create more detailed accounts of specific organizational processes and contingencies in a single organization.

In summary, this paper shows that nonprofit intrapreneurial initiatives can contribute to an organization’s responsible innovation capability via competence development, structural alignment and

mission stretch. Moreover, digital solutions and initiatives scaled with the help of the headquarters imprinted new learnings and routines on the organization, leading to further transformation. Therefore, we suggest that in today's digital and changing world, organizations have the potential to renew themselves to address grand challenges by fostering nonprofit intrapreneurship to fundamentally change the way they deliver aid, work with institutions, develop internal competences, create new teams and even transform their value propositions.

4 The Relational Value of Innovation Units

4.1 Introduction

A key imperative for organizations in a fast-changing world is innovation – the development of new products and services to address changing customer and societal needs, and the development of new ways of working, internally and externally, to improve efficiency, engagement, and legitimacy. However, it is not easy to innovate effectively: many innovation programs do not meet expectations, and for large organizations in particular, the challenge of getting new ideas through a bureaucratic and risk-averse system is substantial (Brown and Eisenhardt, 1995; Dougherty, 1992; Tidd and Bessant, 2020). One increasingly common approach to innovation in established organizations – and our focus here – is the use of dedicated *innovation units* such as skunkworks, corporate venturing units, scouting units or special taskforces (Burgelman, 1984; Dushnitsky, 2012; Monteiro and Birkinshaw, 2017). By placing them outside the normal flow of value-adding activities, and giving them dedicated resources and a specific mandate, senior executives view such units as a way of overcoming the organizational obstacles that hinder innovation.

However, the track record of innovation units in delivering on their objectives and staying in operation is mostly poor (Burgelman and Valikangas, 2004; Hill and Birkinshaw, 2012; Decreton, Monteiro, Frangos and Friedman, 2021). One reason for mixed outcomes is that it is hard to establish metrics to track their progress and outputs. It is often argued that these units are not just developing tangible technologies or products, they are also building relationships, developing capabilities and changing mindsets; and yet these aspects of their achievements are frequently neglected because it is difficult to evaluate these and capture their effect on the organization (Hill and Birkinshaw, 2008; Karim and Kaul, 2015; Mudambi and Swift, 2014). Moreover, academic theories on the processes by which "new" ways of organizing nurture innovation are scarce (Schotter et al., 2017; Puranam, Alexy, and Reitzig, 2014) and we know little about how these units goals are developed over time.

To improve our understanding of how and when innovation units contribute to their organizations, this paper takes a *relational perspective*. In contrast to the resource-based perspective, whereby value lies in assets that are owned and controlled by the organization (Wernerfelt, 1984; Barney, 1991; Peteraf, 1993), the relational perspective suggests that value exists in the relationships *between* entities. This perspective has been explored in both inter-firm (Dyer and Singh, 1998; Kale et al., 2000) and intra-firm (Nahapiet and Ghoshal, 1998) contexts, and in an umbrella fashion looking across contexts (Inkpen and Tsang, 2005). Given the boundary spanning nature of the activities of innovation units and their often multifaceted roles to connect internal and external stakeholders (Monteiro and Birkinshaw, 2017; Mudambi and Swift, 2009), we contend that they can usefully be studied using this relational perspective. In terms of empirical context, our research focused on innovation units in large international nonprofit organizations, specifically on United Nations agencies such as the World Health Organization. In addition to being an interesting context (given that most studies of innovation have taken place in for-profit settings), we focused on nonprofit organizations because relationship-building is central to their raison d'etre due to the interlinked nature of their missions. Nonprofit organizations have plural objectives, often linked to the sustainable development goals; they trade primarily in intangible assets (e.g. connections, goodwill, reputation) rather than in commercial products; and they operate within complex networks of local and global stakeholders (Weiss, 2016; Ambos and Tatarinov, 2021). These features are not unique to non-profits, but because they are particularly salient in the non-profit context, we can draw out insights into the role of innovation units that might be hidden or under-appreciated in other contexts. In sum, we contend that a large part of what makes large international non-profits successful is their ability to span boundaries and build new relationships in domains of emerging importance, as well as their openness to allowing others to prosper through their efforts. Unlike the for-profit context where the objective function is to build valuable resources (Barney, 1991) or to achieve relational rents that lead to profits (Dyer and Singh, 1998), the outcome in a non-profit context is *relational value*, defined as the set of relationships and the

resources embedded in them that help the organization achieve its objectives. Our research question is therefore *how do innovation units in large international non-profit organizations build relational value?*

Using a process of abductive inquiry (Dubois and Gadde, 2002), we conducted detailed case studies of four United Nations agencies over a three-year period, focusing specifically on the formation and evolution over time of their innovation units. The four units all made a significant positive impact on their respective parent organizations. By following the units' activities partly in real-time and partly in retrospect we were able to gain an unusually detailed level of insight into how they operated and evolved. The key findings can be summarized as follows. First, analysis of the activities of the four units allowed us to identify four generic *value-adding orientations* for innovation units: interunit linking, ecosystem linking, capacity building and stakeholder building. These orientations aligned with internally facing or externally facing activities, and created relational value through different mechanisms: the internally facing ones (interunit linking and capacity building) enabled the disparate parts of their organization to collaborate and agree on operational norms, the externally facing ones (ecosystem linking and stakeholder building) enabled the development of knowledge sharing routines and processes with new external partners, as well as sourcing new ideas and funding sources. Second, and most importantly, the four innovation units evolved significantly over time. Unlike the for-profit context where a high degree of focus and stability is beneficial (Hill and Birkinshaw, 2014), the four innovation units we studied shifted their emphasis over time, often oscillating back-and-forth between an internal and external focus as well as on building and linking orientations, sometimes because of the specific circumstances they faced and sometimes because of the complementarities between the two sides of their activities. The oscillation enabled the innovation units to create more relational value than if they had emphasized an internal or external focus alone, and it also appeared to help them reach sustainable growth and longevity.

Pulling these findings together, we paint a vastly different picture of how innovation units

operate than that suggested by the extant literature. Our primary theoretical contribution (building on Dyer and Singh, 1998 and Nahapiet and Ghoshal, 1998) is to flesh out the elements of a relational view of innovation units. In doing so, we contribute to the literatures on innovation outputs and outcomes (Schotter at al., 2017; Christensen et al., 2018) as well as the strategic leadership choices that organizations take when organizing around innovation (Altman and Tushman, 2017). According to established literature, innovation units tend to emphasize the development of tangible products and technologies as their source of value creation (Cantwell and Mudambi, 2005) and these are the metrics by which their success is measured within the organization. Our alternative perspective shows that innovation units can emphasize the development of intangibles through relationships (internal and external) with the objective to create relational value that is not owned by any one party. This allows us also to contribute to the discussion around innovation unit goals and mandates (Asakawa, 2001; Cohen, Bingham and Hallen, 2019; Davis, Eisenhardt and Bingham, 2009), through our observations in the non-profit world. According to the established view, innovation units need clarity in their goals to ensure their attention is focused on the right types of opportunities (Locke, 1996; Stetler and Magnusson, 2015). Our alternative view shows that in this context innovation units benefit from having relatively ambiguous goals (e.g. Brun and Saetre, 2009) and create additional value when allowed to oscillate their attention back-and-forth between internal and external stakeholders. These differences are partly a function of the contexts in which the research was conducted, but also suggest that a wider lens on innovation units' value creation is warranted to understand their full contribution to their organizations. In the final part of the paper, we therefore pull together these views and we put forward an integrative perspective on the value and role of innovation units as enablers of change in organizations.

4.2 Theoretical Background

4.2.1 The Value of Innovation Units

Organizations have experimented with different types of innovation units for many years (Burgelman, 1984; Monteiro and Birkinshaw, 2017), and used a variety of names including scouting units, incubators and accelerators, skunkworks and corporate venturing units (Agarwal et al., 2004; Dushnitsky, 2012; Stuart, 2000). Formally for this study, an innovation unit is a *discrete unit outside the primary value-chain of activities with a mandate from senior leadership to enable and support innovative activities aligned with the organization's goals*. This focus excludes traditional Research and Development (R&D) departments and units. Typically, these units are seen as an integral part of an organization's value-chain, they are subject to clear organizational metrics (e.g. number of new products or patents) and they operate under a different set of expectations than stand-alone innovation units.

Innovation units usually have a set of tangible primary objectives, such as investing in start-ups or launching new ventures, and a variety of intangible secondary objectives such as establishing new connections to partner organisations, attracting talent, creating a more entrepreneurial culture, and improving the reputation of the parent organization (e.g. Cantwell and Piscitello, 2002; Stuart and Podolny, 1996; Martin et al., 2011). However, most academic research to date has tended to focus on tangible primary objectives, at least in part because they are more easily measured, leaving the intangible elements of value-creation as desirable side-features or 'spillover' benefits for the remaining organization (Burgelman, 1984; Dushnitsky, 2012; Monteiro and Birkinshaw, 2017).

Our approach in this paper is to put the spotlight on the more intangible benefits of innovation units, and on their capacity to create *relational value* through the relationships they build. Several recent studies have discussed this type of value-adding role, often using the language of boundary-spanning or brokerage (Fleming and Waguespack, 2007; Monteiro and Birkinshaw, 2017; Schotter et al, 2017). For example, Monteiro and Birkinshaw (2017) focus on scouting units insourcing new ideas from external partners. Schotter and colleagues (2017) highlight the role of boundary spanners within large

diverse multinational organizations. And Tippmann and colleagues (2017) show how through knowledge transformation created through boundary spanning, collaborators from across the MNC can construct new opportunities for creative outcomes. In general, previous research has shown that boundary spanners, as individuals in the firm, can improve RandD performance by bringing in ideas from the outside (Mudambi and Swift, 2009). However, we contend that each of these prior studies has taken a partial view, emphasizing some aspects of the phenomenon and downplaying others. The function and role of boundary spanners, whether individuals or units, has been hard to concretize in the literature (Schotter et al., 2017) and their development over time has not yet been efficiently addressed.

Our *modus operandi* is to put forward the concept of relational value as a broad organizing framework building on existing theory, to avoid making any restrictive assumptions about the possible ways innovation units might create value, and then to use this framework to guide our empirical analysis. We build on the relational view of Dyer and Singh (1998) and to some degree on the intra-organizational literature on social capital (Nahapiet and Ghoshal, 1998; Obstfeld, 2005). Unlike the resource-based view (Barney, 1982) which argues that value lies in assets and capabilities controlled by the organization, the relational view suggests value exists in the relationships between entities, and that 'relational advantage' can be developed by the parties to a relationship by investing in complementary resources, relation-specific assets, knowledge-sharing routines and effective governance (Dyer and Singh, 1998). The relational view has been applied in several different empirical contexts, such as strategic alliances and corporate venturing (Kale et al., 2000; Weber et al, 2016), and to compare a variety of inter- and intra-firm contexts (Inkpen and Tsang, 2005). It has become influential in recent years to explain inter-organizational relationships, particularly because of the emergence of so-called ecosystem orchestrators like Amazon and Alibaba that have influence far in excess of the resources they control (de Meyer and Williamson, 2019; Jacobides, Cennamo and Gawer, 2018). Since its conceptualization, the relational view has been applied in different contexts focusing beyond the value creation and capture at the interfirm alliance level (Dyer et al., 2008; Lavie et al.,

2012), on the stakeholder management level (Bridoux and Stoelhorst 2016), on specific contexts related to technology development (Scarbrough et al., 2015) and innovation communities (Dahlander and Frederiksen, 2012), to name a few.

The intra-organization literature on social capital (Adler and Kwon, 2002; Nahapiet and Ghoshal, 1998) has some commonalities with the relational view, notably the idea that relationships are a "resource for social action" – meaning that those individuals with stronger and more extensive networks of relationships will be more effective at getting things done. Social capital is also a multi-faceted concept – it is a function of the number and diversity of the linkages between people ('structural capital' in Nahapiet and Ghosal's (1998) terms), the quality and depth of specific ties (relational capital) and the existence of implicit norms and expectations among people (cognitive capital). Many academic studies have used these concepts to explain aspects of organizational life, for example studies of communities of practice, absorptive capacity and structural holes (Burt, 2004; Wenger, 1999; Zahra and George, 2002), but hardly any have elaborated on the broader effects or value creation through social capital.

4.2.2 Relational Value as an Organizing Framework

Our framework builds on these two research perspectives, and specifically on the simple notion that value exists in relationships. Innovation units potentially have a wide variety of outcomes, but an important one – and the focus of this paper – is their capacity to create relational value, which we define as the set of relationships and the resources embedded in them that help the organization achieve its objectives. We suggest it is useful to separate out the activities of innovation units into four basic activities based on two dimensions as shown in Figure 3.1.

Figure 3.1: Organizing Framework – Types of Relational Value Created Internally and Externally

	Internal Focus (Interunit)	**External Focus (Interorganizational)**
Building	**Capacity Building** (Nahapiet and Ghoshal, 1998)	**Stakeholder Building** (Dyer and Singh, 1998)
Linking	**Interunit Linking** (Tsai and Ghoshal, 1998; Hansen, 2002)	**Ecosystem Linking** (Scarbrough et al., 2015; Dahlander and Frederiksen, 2012)

The first dimension is the locus of value creation: internal versus external. In other words, innovation units can potentially create value through their activities inside the legal boundaries of the organization, or by working with actors and other organizations beyond those boundaries. In both these domains the innovation unit is performing a boundary spanning activity, i.e. "a set of communication and coordination activities […] within an organization and between organizations to integrate activities across multiple cultural, institutional and organizational contexts" (Schotter et al., 2017 pg. 404). While the original concept of boundary spanning was externally-focused, as a buffer between the organization's technical core and the changing external environment (Thompson, 1967; Tushman, 1977), it has also been used frequently to talk about how internal silos and divisions can be bridged (e.g. Ancona and Caldwell, 1992; Tushman and Katz, 1983; Tushman and Scanlan, 1981). For example, Monteiro and Birkinshaw (2017) described the boundary spanning process for a "scouting unit" in Silicon Valley which sought to build relationships with local start-ups on the one hand, and directly with teams and operating units within the parent company on the other, to help create useful linkages.

The second dimension is the nature of value-creation, which we characterize as linking versus building. Linking refers to the creation of ties or networks that did not previously exist ('structural capital' in the words of Nahapiet and Ghoshal, 1998), building refers to the process of infusing those ties or networks with additional value (relational and cognitive capital, Nahapiet and Ghoshal, 1998).

Within the boundaries of the firm, linking is mostly about overcoming internal divisions, for example by brokering ties between individuals or units (Hansen, 1999; Obstfeld, 2005) or by tapping into knowledge that lies outside a group's usual area of expertise (Ancona and Caldwell, 1992). Building refers to any type of coordinated activity done by a working group or project team that results in the creation of tangible or intangible assets. Outside the boundaries of the firm, linking is the process of forming relationships with external actors of various types, such as customers, suppliers, complementors and government bodies, whereas building is the type of coordinated activity described by Dyer and Singh (1998) that creates meaningful value within a specific relationship or a set of relationships. Linking obviously precedes building for any specific relationship. However, the innovation unit could potentially emphasize linking (creating new relationships) or it might emphasize building (on existing relationships), or both.

As shown in Figure 3.1, the organizing framework suggests four generic value-adding orientations that the innovation unit might take, and for the ease of further discussion we have given them names that are consistent with their definitions, viz. interunit linking, ecosystem linking, capacity building and stakeholder building. This framework helps us to position prior studies of innovation units. For example, the literature on corporate venture capital units focuses on ecosystem linking and stakeholder building (e.g. Gaba and Meyer, 2008; Dushnitsky and Lenox, 2005), research on brainstorming and new business incubation emphasizes inter-unit linking and capacity building (Hargadon and Sutton, 1997; Wenger, 1999), and studies of scouting units are mostly about inter-unit and ecosystem linking (Monteiro and Birkinshaw, 2017).

Two further points on this framework. First, we use the term *orientation* rather than role or activity to describe the four cells because they have both strategic and behavioural qualities. As explained by Obstfeld (2005) in his work on the *tertius iungens* orientation, the term "…suggests a construct of medium specificity between a highly specific attitude (e.g., toward a task) and a more general personality trait. A strategic orientation refers to the preferred means for approaching problems

in a social context." This is important in our setting, as our empirical research involved tracking the activities done by the innovation units and interviewing those working in the units to understand their intentions.

Second, while this framework could be potentially used to describe any type of organizational activity, we believe it is particularly suited to the current context. Innovation units sit outside the primary value-adding process in an organization, and they are usually created with a mandate for change, i.e. to pursue outcomes that cannot be achieved through established methods. In such circumstances, progress is most likely to be made through relationship-building, i.e. through influence and persuasion rather than hierarchical authority and resource allocation, and through boundary-spanning rather than working within existing areas of activity.

As should be clear from the discussion so far, we have no preconceptions about the relative importance of each of these orientations, nor whether it is possible or advisable for an innovation unit to adopt multiple orientations at the same time. Rather, we use it to frame the subsequent abductive inquiry (Dubois and Gadde, 2002), in which we study the specific activities of four innovation units over time, going back and forth between what we observe in the field and what prior theory indicates.

4.3 Methodology

4.3.1 Research Context

Despite still being a new phenomenon in the United Nations (UN), dedicated innovation units increasingly play a role in accelerating innovation to address the sustainable development goals, and also to enable their parent organizations to become more flexible and agile (Aleinikoff, 2014; Ambos and Tatarinov, 2021). This study draws on unique data from innovation units in four of these non-profit organizations. Out of the sixty-three UN entities that participated in the 3rd UN-wide Innovation Capacity Mapping in 2019, twenty-five had an innovation unit already established, eight more than the previous year, with fifteen such units expected to be opened by 2020 (ILO, 2019). This proliferation of

interest in innovation provided an ideal context to study whether and how innovation units add value to their parent organizations.

Innovation in the UN context means developing new products or processes to serve the organizations' beneficiaries and address the grand challenges more effectively, such as by developing new ways of growing food in slum areas, giving refugees access to quality education, or predicting migration patterns. Innovation is particularly challenging to the UN because of its elaborate political processes of decision-making, accountability, and risk-minimization, which remains despite several waves of reform to induce a more entrepreneurial spirit (Weiss and Carayannis, 2017). UN organizations resemble (for profit) multinational enterprises in that they are internationally-dispersed, large and complex, but they differ in the ultimate goals they are seeking to achieve, which in turn influences their internal values and culture, as well as their structure, funding and decision-making processes (Williams, 2002). Our focus on UN organizations, in other words, provides an interesting and unusual context to study how innovation units seek to help their parent organizations (Siggelkow, 2007). In the final part of the paper we explicitly consider issues of generalizability to other contexts.

4.3.2 Research Approach

To address the research question (*how do innovation units in large international non-profit organizations build relational value?*) we used abductive inquiry, meaning our theoretical framework, empirical fieldwork and case analysis evolved simultaneously (Dubois and Gadde, 2002). This approach started when we uncovered the existence of previously not researched innovation units in the UN – while researching another topic. While examining these units' activities, interactions, and development, we were surprised to see how differently these units functioned to those previously documented. Their strategies and activities were not explained by existing theories. This led us to start collecting more in-depth data on these salient case studies. Case studies are particularly well suited to understanding such complex phenomena, examining processes, and explaining how certain actions lead to specific outcomes (Edmondson and McManus, 2007; Eisenhardt et al., 2016; George and Bennett,

2005). The abductive approach enabled us to develop theory from these salient case studies utilizing deep insights of empirical phenomena and their contexts, while iteratively matching back to the emerging frameworks and theory development. This pragmatic approach allowed us to find the balance between theory and observation and present a new way to theoretically view the phenomenon (Tavory and Timmermans, 2014) while allowing us to explain and change the theoretical framework throughout the entire research process (Friedrichs and Kratochwil, 2009).

4.3.3 Sample and Data Collection

The data used for this study was collected over the course of three years to explore the activities of innovation units in four prominent UN agencies (*Discovery, Atlantis, Endeavor,* and *Challenger*). We conducted systematic first-person interviews with innovation unit founders, leaders in the organizations, and members of the units. In one organization that had established the most recent innovation unit, one member of the research team was embedded for the first two years of the unit's existence. She participated in weekly unit meetings, was fully informed, and documented all decisions. In the other three organizations which had more established innovation units, we conducted observations around important events and joined them for major announcements or collaborations. The interviews, observations, participation in events, and iterative interactions with these units allowed us to gain unique insights into the strategic development of these units, the changes in focus and activities over time, and the interactions these units had with the rest of the organization as well as the ecosystem. Throughout the data collection period, we continuously iterated on the emerging insights and their links to existing theory. Insights from these interviews and observations were supported with publicly available material from the organizations' websites and other channels.

At the time we started the data collection in 2017, there were only a handful of UN organizations with existing innovation units. We followed a purposeful sampling approach in selecting innovation units, aiming for "maximum variation" (Lincoln and Guba, 1985; Patton, 1980) on potentially interesting dimensions. Specifically, the four innovation units are representative of different

types of UN agencies (large/small, humanitarian/developmental). While all four organizations are extremely globally dispersed, two are large organizations, with budgets in the range of 6-8 billion USD and global staff of over 15,000 people, and two are smaller with budgets closer to 100-200 million USD and staff sizes of 300 to 700 people. A range of organizational sizes is interesting to examine if there are differences between the activities of units that need to reach fewer global staff or have fewer resources.

The units were created at different points in time, meaning that some had time to develop while others were relatively new. The oldest unit in the sample was established in 2012, the youngest in 2018. Data was collected from 2017 to 2020, so in one case we could follow the development over the entire course of the unit's existence and knew the organization prior to the establishment of the innovation unit.

Atlantis' (names have been anonymized) Innovation Service, established in 2012, was amongst the oldest innovation units in the UN system and had gathered experience in designing, testing, and reiterating the most effective approaches to innovation. The success of the unit could be seen in its innovation fund, which invested $1 million USD annually in internal initiatives; in its fellowship program, which trained 105 people globally in 2017 and steadily increased since; and in the number of employees, which started as five people in one location and grew to 14 people in 7 global locations.

Discovery's Innovation Lab, launched at the end of 2014, used quite a different responsibility structure as it was primarily volunteer based. The success of the unit could be measured in its growth – from three people in 2014 to fifteen in 2020. At the time our research finished, it ran its own physical lab space within the organization and had received top-down funding to allow for one paid-position in the team. The number of initiatives it incubated grew yearly, from one in 2014 to six in 2017.

Endeavor's Innovation Accelerator, established in 2015, was the only unit to sit apart from the headquarters of the organization and took an early focus on scaling innovation. The unit had grown from a team of five to a team of thirty in five years. At the time our research finished, it had over 80

projects ongoing in over 45 countries, and 11 projects scaling up globally. The unit had won numerous global awards.

Finally *Challenger*'s Office of Innovation was launched in 2018, a reflection of the increasing prioritization of innovation across the entire UN system (WIPO, 2017). *Challenger* grew from a team of two in 2018 to a team of five in 2020 including external consultants and academic partners, as well as rotating interns. The unit had successfully run several internal initiatives as well as an annual event. The event in 2020 saw nearly 4,000 participants from over 50 countries and 25 high-potential innovations for health were showcased. Table 3.1a and 3.1b show the details of the cases in this study and the data sources.

Table 3.1a: Sample

Org	***HQ location/ unit location***	***Name of unit***	***Year unit est.***	***Unit Mandate***	***Organization's Purpose***	***Unit Staff***	***# org staff global***	***Total Org budget size***
Discovery	Geneva; Geneva	*Discovery* Innovation Lab	2014	To unleash the full potential for creativity and innovation of *Discovery* staff	To foster inclusive and sustainable economic development, and contribute to achieving the SDGs	15, rotate	315	$92.9M (2018)
Challenger	Geneva; Geneva	*Challenger* Office of Innovation	2018	Identifies, promotes and facilitates implementation of high-potential innovations towards reaching the SDGs and ending [a disease|]	To end [a disease|] by 2030 as a public health threat	4.5	675	$242M (2018)
Atlantis	Geneva; Geneva and dispersed	*Atlantis* Innovation Service	2012	Create an enabling environment for innovation to flourish in *Atlantis*; create safe spaces for experimentation to take place in field operations, as well as at HQ	To safeguard the rights and well-being of [their beneficiaries]	13	16,800	$8.22B (2018)
Endeavor	Rome; Munich	*Endeavor* Innovation Accelerator	2015	Identifies, supports and scales high-potential solutions to end hunger worldwide	To meet emergency needs support economic and social development	32	17,000	$7.2B (2018)

Table 3.1b: Data Sources

	Primary					*Secondary*
Org	***No. of interviews***	***No. of Focus Group Participations***	***Interviewees/Focus Group Participants***	***Observations***	***Internal Strategy Documents***	***Annual Reports; Articles***
Discovery	*9*	*3*	*Founder of Innovation Unit; Innovation Unit Members; Initiative Leads*	*1 bootcamp, 2 events*	*Internal training documents on innovation; internal strategy development documents*	*12 articles published by the unit; 2 reports on activities*
Challenger	*8*	*3*	*Founder and Head of Innovation Unit; Members of Innovation Unit; Academic Partners of Innovation Unit*	*2 events; weekly team meeting participation for 1 year*	*Strategic development documents; survey data; initiatives development documents; partner development document*	*10 articles*
Atlantis	*15*	*4*	*Founder and Head of Innovation Unit; Head of Communications of Innovation Unit; Innovation Unit Members; Head of Innovation Unit*	*1 workshop; ½ day with team*	*Strategic development documents; survey data; initiatives development documents; partner development document*	*4 annual reports; 65 online articles published by innovation unit*
Endeavor	*6*	*2*	*Founder of Innovation Unit; Business Development Lead of Innovation Unit; Innovation Unit Members*	*1 full day bootcamp; 1 event*	*Documentation on bootcamp development and initiative development*	*4 annual reports; 30 articles and videos on activities published online*

4.3.4 Analysis

The data analysis included open coding of interviews plus analysis of observations, recorded a with notes, and secondary sources to understand the types of activities the innovation units were involved in and how these create advantage for the organization (Miles and Huberman, 1994).

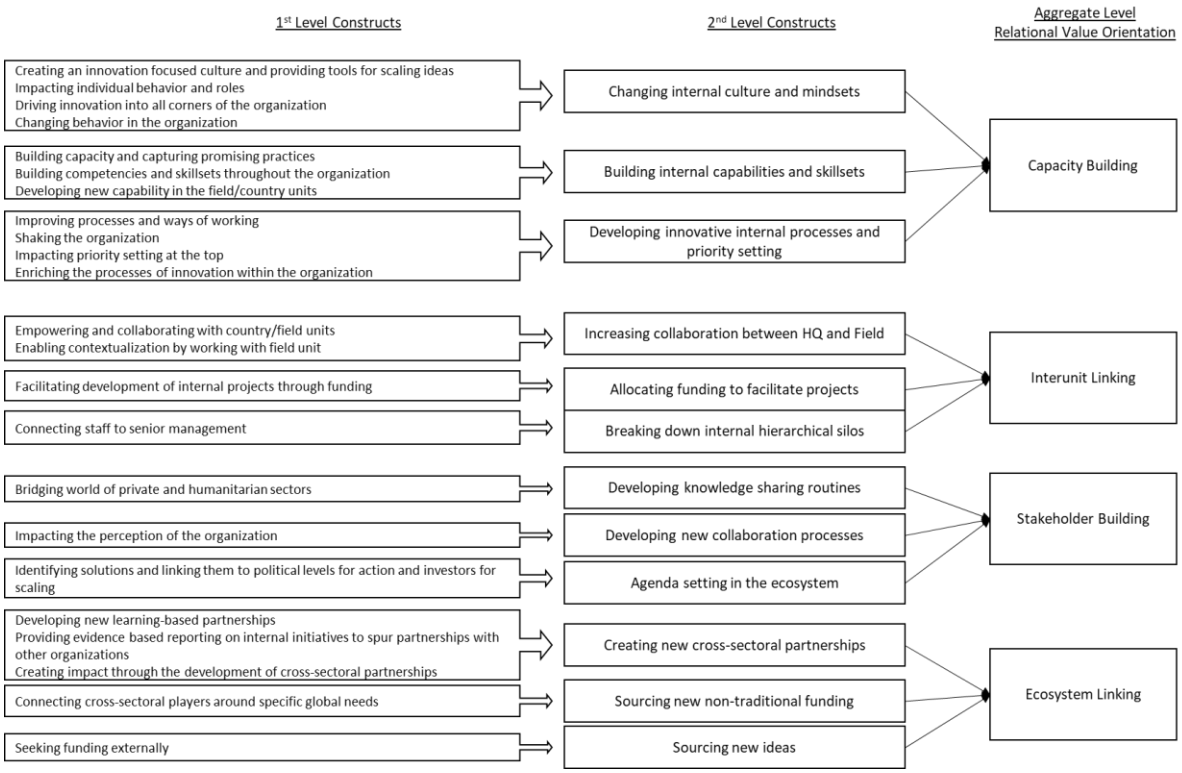
In a first step, we mapped all the activities performed by the units. The extensive data collection and observational work allowed us to create a repository of everything these units did, in terms of events, funding schemes, workshops, internships etc., as well as the views of key individuals through the interviews. A summary of these activities and sample interview quotes are provided in Appendix 9.4 and Appendix 9.5.

In a second step, we reviewed the data, clustering together similar activities and themes. Open coding enabled a deep understanding of the internal processes of these units and their roles within the organization. By iterating among empirical themes, and between the themes and relevant literature, the analysis moved from first-order codes of organizational evidence of value creation to second-order

conceptual categories (Gioia et al., 2013). Although the cases exhibited some variation, the analysis was concerned with understanding patterns among cases (George and Bennett, 2005) to provide a firmer grounding of the emerging theory (Eisenhardt, 1989; Eisenhardt and Graebner, 2007).

The third step was to link the second-order conceptual categories to the four theoretically derived orientations described earlier. While it was not obvious *a priori* how well these parts of the puzzle would fit together, the process was straightforward, as shown in Figure 3.2. As one would expect, there were more categories associated with some value-creation orientations than others.

Figure 3.2: Coding of interviews and aggregation to value creation orientations



Finally, continuous cross-case analysis was used by applying pattern-matching techniques to compare the trajectories of the four cases and how each activity added to what types of relational value to allow us to further develop our emergent model and build theory around our observations (Dubois and Gadde, 2002; Tavory and Timmermans, 2014).

4.4 Findings

We present the findings in three parts. First, based on our in-depth analysis of the four innovation units, we describe the activities they undertook, and we map them against the four value-creation orientations in our organizing framework. Second, we consider each innovation unit in turn, looking at how its orientation evolved over time. Third, we move to a cross-case analysis, looking at the differences in trajectories of development and discussing reasons for the differences observed.

4.4.1 Innovation Unit Activities and Relational Value Orientations

Internally Focused (Interunit) Activities. The internal operations of the four organizations were characterized by siloed departments unaccustomed to working together and wary of each other. There was strict hierarchical rigidity within the organizations, and trust issues between headquarters and country offices. There were therefore many types of boundaries (professional silos, headquarters-periphery and generational differences) that needed to be overcome for the innovation units to be effective. These extreme silos created friction between the innovation unit members and other parts of the organization. To overcome this challenge, one unit (*Discovery*) tried to engage senior colleagues and tap into existing internal expertise. The team decided they needed, *"credible champions of innovation, who could show tangible positive results of innovation, who could influence others to believe in fresh thinking and new ways of working; and who would be able to provide us with the expertise to become a more effective innovation lab." Discovery* therefore launched an 'Innovation Champions' program to engage advisers, idea generators and influencers. *"Champions would either act as advisors to new projects (Shakers) or be active in innovating new [internal] projects/processes (Makers)."* This activity exemplifies the *interunit linking* orientation – which enabled the unit to bring together people who would normally never work together while at the same time showing the tangible effects of innovation through peer learning. The associated training and mentoring activities were examples of the *capacity building* orientation, as they facilitated the development of shared narratives

and led to increases in internal capabilities and skillsets.

By conducting activities and trainings in the country offices the innovation units were able to effectively bridge the gap between headquarters and field as well. For example, one unit (*Atlantis)* set up an organization wide training on innovation methodologies adapted to the specific context of working with refugees in country offices. The Head of Communication at the unit told us, *"They are the organization's ambassadors for innovation and lasting positive change. The program encourages continuous learning, challenging assumptions, and perspectives, the value of collaboration and openness for failure and risk-taking."* By explaining the relevance of the new idea across internal organizational boundaries, and thereby building a shared narrative, the innovation unit was engaging in a *capacity building* orientation.

In performing these activities, the innovation unit's create relational value by breaking down internal silos and linking internal units while also developing new capacity within the organization. As we will describe in detail below, all four units started out with this as their primary focus (at least in part). In terms of the organizing framework introduced earlier, the units typically took on *inter-unit linking* and *capacity building* orientations, to facilitate knowledge sharing processes and routines, as well as a shared language, across the organization.

Externally Focused (Interorganizational) Activities. External boundaries faced by International Organizations are primarily cross-sector boundaries, such as with donors, governments, and private sector organizations; inter-organizational, such as with other UN agencies; or boundaries of scaling to individual beneficiaries. These boundaries give rise to legitimacy concerns; and provide challenges for innovation units to identify and communicate with the ecosystem. The organization is often not capable of identifying the right players and positioning itself in a way that would enable closer collaboration. To facilitate these types of cross-industry collaborations, innovation units take on specific matchmaking activities that connect to external expertise, to external partners, or to external funding. For example, *Challenger's* Office of Innovation created an "innovation exchange marketplace" that,

"*Explores the need to further invest in innovations for health, as well as to facilitate engagement of countries, innovators and investors for the implementation of innovations to accelerate progress towards the SDGs*." By connecting initiatives to health ministers with specific challenges and to private sector funders, it creates relational value by using the organization's legitimacy as leverage to make quality connections across sectors, which lead to the creation of new cross-sectoral partnerships as well as new knowledge sharing routines across sectors. These activities reflected an *ecosystem linking* orientation, as they were mostly about making connections. However, there was also evidence of a *stakeholder building* orientation as these platforms became established.

Another external boundary-spanning challenge emerged around the topic of innovation funding. International Organizations traditionally receive funding from member states (governments) to address a social 'grand challenges' mandate. Using this money for innovation proved to be a difficult ethical question for some in the organization and for many donors because innovation is known to involve failure and experimentation, which donors often do not want their money to be spent on. To overcome these legitimacy issues, innovation units increasingly ventured to find non-traditional funding sources. We also saw that while these funding sources often started out only financing innovation, they could eventually lead to large scale organization-wide projects. The innovation unit head of *Atlantis* explained the topic in detail: *"... now as the organizational budget is getting tighter, it's even more difficult. We said, we want to go and find the resources that would otherwise not come to Atlantis."*

To summarize, these findings illustrate the wide varieties of activities the innovation units engaged in, and how they covered all four of the relational value-creation orientations in our organizing framework, though to varying degrees. Internally, they seek to improve collaboration between headquarters and country offices, and breaking down internal silos through an *inter-unit linking* orientation, and changing the internal culture and enhancing skills through a *capacity building* orientation. Externally, they create new cross-sectoral partnerships and source new ideas and funding through an *ecosystem linking* orientation, and then building knowledge sharing routines and processes

across sectors through a *stakeholder building* orientation. It is worth underlining that none of these activities were simple for the innovation units to implement, as they were operating in an institutional setting with well-established structures and processes. Therefore, we structured the narrative around the barriers to change and the activities that needed to be put in place to transcend those barriers.

4.4.2 Innovation Unit Evolution

Having documented the breadth of activities taken on by the innovation units, the second part of our findings examines the mix of activities for each unit, and how this mix varied over time. We first describe each unit separately, before moving to a cross-case analysis and discussion.

***Discovery*'s** Innovation Lab started out with the mission to make the whole organization more innovative by 'changing internal incentives' (incentives referred to many different sources of motivation, not just financial incentives). It was established in 2014 by a small group within *Discovery* which gathered and brainstormed ideas around how to integrate innovation into *Discovery*'s daily work. They believed that there was a need in the system for incentives for thinking outside the box. As one of the founders explained, *"We are very practical in nature and I think this also translates into how we developed our innovation practice. So, we started the innovation lab with a lot of flexibility, and it was basically built on the motivation of the people in the house."* The first activity of the unit sought to change the internal culture and mindset, and it involved a problem-solving workshop which gathered different teams from across the organization to brainstorm ideas for solving pan-organizational challenges in new cross-functional ways. It led to the formalization of the unit and funding from the top. In our terminology, this was a *capacity building* orientation.

One of the next activities the unit ran was an "Innovation Challenge" in partnership with an NGO to, "*bring together student innovators with Discovery's technical experts. Participants prototyped solutions to a real-life challenge focused on expanding tourism in Liberia following the Ebola crisis*." This activity positioned the unit as a gateway to allow innovative students into the organization to infuse it with creative ideas to existing problems, to "*start thinking outside*

the box." It led to an increase in cross-team collaboration within the organization and with external partners, in other words both *inter-unit linking* and *ecosystem linking*. A following activity involved launching a physical space within the organization which aimed to provide a place for people to collaborate and work more with other teams on innovative projects. The lab *"provided people in Discovery with the space, tools, but also supported them to be creative and innovative in their daily work,*" developing internal capabilities and skillsets for *capacity building* and *interunit linking*.

The focus then shifted externally again, when the members of *Discovery*'s Innovation Lab were key in creating and shaping a major innovation event including multiple stakeholders in a "*dynamic format of co-creation factories and cross-org workshops*". This was seen as a major step forward for the Lab as it effectively showed that, "*Innovation and collaboration could radically accelerate the SDGs*," a Lab member described. About fifty organizations participated in the event, enabling the Lab to directly create new knowledge sharing routines with new types of partners the organization has not worked with previously, an example of *Stakeholder Building.* Bridging the external and internal environments continued to be a focus for the lab, but they also continued to work on overcoming internal boundaries through events such as the Innovation Heroes, a "*flagship initiative of the Innovation Lab, the Innovation Heroes aims at showcasing Discovery's innovative practices and current innovators,*" a lab member explained. She said that the uptake of the innovation hero's activity internally has changed the culture, making innovation more "*accessible and acceptable*," as well as enabling further internal collaboration by "*breaking down of silos*." This activity was a further example of internal *capacity building*. See Table 3.2 for the evolution of Discovery's activities, alongside the other three described below.

Table 3.2: Evolution of Innovation Units Over Time

Discovery's Evolution				
	Phase 1	**Phase 2**	**Phase 3**	**Phase 4**
Dates	2014	2015	2016	2017 – 2020
Primary Activities	Problem solving workshop	Innovation Challenge in partnership with NGO and students	Creation of Innovation Lab Space	Innovation Heroes and Innovation Ecosystem Events
Relational Value Created	Led to change in culture and building new capabilities and skillsets: *Capacity Building*	Increase in cross-team collaboration particularly around expanding solutions towards addressing broader challenges and bridged to the external NGO and student teams to increase *knowledge sharing routines: Ecosystem Linking*	The lab, *"provided people in Discovery with the space, tools, but also supported them to be creative and innovative in their daily work,"* developing *Capacity building and interunit linking*	Increased internal collaboration and breaking down of silos to establish *Interunit linking* including management incorporating KPIs related to innovation; Continued support for staff through *capacity building* around innovation; creation *of knowledge sharing routines* as number of activities has increased to 30 per year and number of partners growing exponentially – *Stakeholder building and ecosystem linking*
Growth	Growth	Growth	Growth	Rapid Growth
Atlantis' Evolution				
	Phase 1	**Phase 2**	**Phase 3**	**Phase 4**
Dates	2012	2013-2018	2018-2019	2020
Primary Activities	Developed modular shelters for refugees in partnership with International Telecom	Innovation Fellowship Program/Training	Evidence Based Communication and AI experiments	Set up labs to be closer to the country offices; continue to expand innovation fellowship
Relational Value Created	Showed that *it could create knowledge sharing routines* and use its on the ground knowledge and legitimacy to create deeper value for all players involved including sourcing non-traditional funding sources – *Stakeholder Building and Ecosystem Linking*; *Capacity building* internally around innovation and culture	Encourages continuous learning, challenging assumptions, and perspectives, the value of collaboration and openness for failure and risk-taking; trains roughly 25 people per year – increasing absorptive capacity and *Capacity Building*	Increased number of technical partners in the organization and widened the scope of communication both internally and externally (*Stakeholder building and ecosystem linking; interunit linking*)	Increased collaboration between HQ and country offices through 5 new innovation labs established – *interunit linking; capability building* through training program
Growth	Rapid growth	Rapid growth	Growth	Growth
Endeavor's Evolution				
	Phase 1	**Phase 2**	**Phase 3**	**Phase 4**

Dates	2015-2016	2017	2018 -2019	2020
Primary Activity	Innovation Bootcamps for Internal Teams	Innovation Sprints and Bootcamps	Innovation Fund and Bootcamps	Innovation Bootcamps (external and global)
Relational Value Created	Conducted 4 bootcamps with 29 internal teams; resulted in 7 scaling projects; broke down barriers between teams and led to *capability building*, *interunit linking*	Longer Sprints for internal teams enabled greater creation of complementary resources and capabilities; and opening to external teams allowed the team to build 76 partnerships - *interunit linking, capability building; and ecosystem linking*	Further opening up bootcamps allowed partnerships to increase from 76 to 156 in 2018 (105% change) – *knowledge sharing routines;* internally the innovation fund raised $35 million in co-funding for projects – *interunit linking; and ecosystem linking and stakeholder building*	Conducted high-profile global bootcamps for internal teams (*capacity building)* and for large MNCs, sister organizations, at a global scale to increase exposure and increase number of partners – *interunit linking; and ecosystem linking and stakeholder building*
Growth	Growth	Growth	Rapid Growth	Rapid Growth
Challenger's Evolution				
	Phase 1	**Phase 2**	**Phase 3**	**Phase 4**
Dates	2018	Jan – June 2019	June 2019 – June 2020	June 2020 – Dec 2020
Primary Boundary Spanning Activity	Conversations via internal WhatsApp group	Event to bring together sectors while also engaging internal teams at informal events	Virtual event to bring together sectors; opening up of previously internal events to external	Platform for innovatively solving health problems
Relational Value Created	Activated and empowered internal culture change – *capacity building*	Weeklong event exposed 19 innovations to 10 investors – *stakeholder building and ecosystem linking*; internal informal weekly events brought together teams and grew to be self-organized weekly – *capacity building*	Connected over 20 investors with 25 high-potential innovations; 3 million USD committed– *stakeholder building and ecosystem linking*	Connected numerous government ministers with private sector funders and start-ups using its global network and reach – *ecosystem linking*
Growth	Growth	Growth	Growth	Stagnation

Atlantis' innovation unit was established as an inter-divisional unit in 2012 in the headquarters in Geneva. The former *Atlantis* High Commissioner was interested in creating a space that could capture, harness and reward innovation within the organization. A small team was established to better understand the sense of innovation at *Atlantis* and how it could be spread across and beyond the organization. The unit head explained, *"As with all innovation initiatives, we wanted to understand what the real challenges for driving innovation into all corners of the*

organization actually were." The team consisted of four people including a Programme Officer at *Atlantis* and the Head of International Corporate Partnerships. The programme officer explained that both internal and external activities were important:

> *In the first phase, the focus of Innovation Service sought to invest in private sector partnerships and new collaborations that were primarily product or project focused. The objective was to learn from the private sector and bring new skills and knowledge into Atlantis' structure.*

The Innovation Unit head explained, "*At first the unit was very demand driven, seeking to assist with innovative solutions that were in demand within the organization as well as developing new types of partnerships externally*." For example, the unit was able to connect with a large private sector telecommunications company and bring it in as new partner on a specific project for developing innovative modular shelters for refugees. This was seen as a 'win' within the team and the learnings from the initiative showed that it could create knowledge sharing routines and use its legitimacy to create deeper value for all players involved including sourcing non-traditional funding. The emphasis at this stage was therefore on *stakeholder building and ecosystem linking*. The non-traditional funding sources helped expand what the organization had previously done, opening up the scope of what was possible in terms of new resource streams and new types of partnerships.

The next area of activity was to develop an Innovation Fellowship Programme, focused on building UNHCR staff/affiliate's innovation skills and competencies in addition to supporting them to facilitate innovation with colleagues, partners, and refugees in their own operations and divisions; an example of *capacity building*. Subsequently, the Innovation Service worked on communication and AI experimentation in partnership with a large academic institution. As a member of the unit explained:

> *The team is experimenting with public interest communication as their main means of communication, which applies a science-driven framework and approach to better understand [the organizations] function in the humanitarian field, drive innovation more quickly, and create behavioral and cultural change.*

She described how the experiments led to the publication of externally facing articles that included contributions from *Atlantis* and their external partners, an example of *stakeholder building*.

The internal thought leadership pieces developed at the same time, showed to the organizational staff that "*innovation was not just for people sitting in Silicon Valley,"* thereby contributing to internal *capacity building*.

The Service was also running experiments with AI technology with outside partners and using it to address the organization's goals. By seeking out and bringing in this technology from the outside, the Service again created knowledge sharing routines and new partnerships (stakeholder building). And by developing the initiative in-house, the Service facilitated skill development among employees, thereby contributing to its *capacity building.*

Finally, the unit also worked to ensure that ideas developed in Headquarters were relevant for the country office staff and "*"inspired by needs in the field."* One of the later activities was to set up, "*labs for innovation to be in closer contact and more engaged with the field."* As the Innovation unit Head explained: *"So the idea is to not to have a global approach... its all about cultural change… bringing that and testing some of our thinking closer to where our beneficiaries are."* He went on to explain that the labs had received much uptake and were already starting to expand with more people and new initiatives, effectively enabling greater *interunit linking*.

Endeavor's innovation unit was established in 2015 in Munich with the mandate to be *"a platform to identify new ideas and approaches and nurture them into global solutions.*" The initial goals also included strengthening an innovative culture throughout *Endeavor,* and forging better connections with private, public, and academic sectors. ***"****Why we exist is support infrastructure, we want to support innovators and entrepreneurs to really bring innovations to scale,"* explained the Head of the innovation unit, which started as a small team of five people. As a founding member explained, "*It was important that we had a diversified team which included one or two people who knew the organization and diverse internal processes and also team members with an entrepreneurial background, as implementing innovation is a craft."* The unit started out conducting Innovation Bootcamps for internal teams, which took teams through the ideation process to funding and implementation. These bootcamps

were a form of *inter-unit linking* as cross-functional teams were required to participate.

As the unit developed, the Bootcamps expanded to include Sprints and opened for external partners as well as for internal employees of the organization. These sprints adapted to take into consideration the social indicators used for success within the organization. Projects were selected based on six evaluation criteria: the level of innovation, the potential impact the idea could have if it was scaled, the strength of the team, the presence of methods that potentially allowed scaling, the extent to which it fitted *Endeavor's* corporate strategy, and whether the project was generally inclusive. As the Business Development Lead explained, *"Ideas need to be core to Endeavor's work*." The internally facing sprints enabled the unit to develop internal capabilities and skillsets to build cognitive capital in the organization (*capacity building)*. By bringing in experts to train the staff around innovation methodologies and technical skills specifically related to their ideas (e.g. the use of Blockchain for effective supply chains), the unit enabled knowledge sharing routines to emerge. In our terminology, this was an example of *ecosystem linking*.

Through the Innovation Fund, which was added later, the innovation unit used its broad network to connect innovators that joined its bootcamps to external private sector partners for either technological expertise or other resources: "*Teams receive financial support, guidance and space to bring their solutions to life, and access to Endeavor's global network of partners and resources*." This support led to the development of new impactful partnerships that Endeavor created, thanks to its global reach, high visibility and social purpose. The unit also ran activities to assist in implementing initiatives coming out of the sprints. Members of the unit would travel to country offices with the idea creator and spend up to six months there helping the initiative move from proof-of-concept to scale. This close collaboration with the country offices was the key backbone of the unit's activities as explained to us by the founder, a form of *inter-unit linking.*

Challenger's innovation unit was established directly under the Executive Director in June 2018 with a mission summarized by four key words – *Identify, Incubate, Accelerate* and *Amplify*. It

needed innovation to help it reach the SDGs and ending a well-known disease. The belief was that for innovation to happen, the organization needed strong top-level support, but bottom-up innovation also had to be enabled and supported. By year end 2019, the team consisted of four and a half staff. The head of the unit explained its role as follows: "*Innovation is doing things differently to have higher impact. The Office of Innovation acts as a centralized group dedicated to fostering innovation culture and to supporting ideas scale up by providing appropriate tools. Technology can be bought but the culture cannot be bought."*

The first activities were internally focused, increasing communication in the organization for example by setting up a WhatsApp group that would enable people from different parts of the organization to share thoughts about challenges and solutions in their daily roles, as well as the larger issues related to the organization's goals. As the founder of the innovation unit explained, "*The Inn-Conversations enable people to speak to each other*" and foster stronger *inter-unit linkages.* These conversations were successful and led to the development of new cross-team initiatives as well as more personal interactions such as weekly drinks. An innovation team member told us, the "*culture changed"* as these types of informal events were not previously the norm, in what was viewed as an extremely hierarchical and formal organization.

Subsequent activities primarily revolved around the health innovation exchange marketplace, which connected external innovators (or social enterprises) with funders (private sector and public sector) and ministries of health and governments (public sector). The unit networked to develop a completely new set of partners for this event, but also started attending events that traditionally the organization would not have been privy to (such as start-up events in potential donor locations). This led to the creation of new knowledge sharing routines, and it positioned the unit as a platform through which other partners interacted (*ecosystem linking).* At the same time, the unit continued hosting informal events within the organization to break down team silos; these events were eventually also opened up to external partners and became more about bringing in ideas from the outside.

Eventually, the unit decided to focus further on its externally facing activities as a platform to connect investors with humanitarian start-ups and governments and even started to move towards setting up processes that would enable it to set up as its own entity with loose ties to the organization, foregoing many of the internal activities that had initially been established.

Outcomes. The four units used different metrics for evaluate their outcomes, but a common theme is that all of them grew from founding to the point when our research ended, in terms of both the number of people working in the units, and the budget they were allocated or were able to raise from external sources.

The most successful unit, in terms of reach, number of projects scaled, budget, and size, was Endeavor. This team grew from five people in 2015 to over 50 people in 2021, and its budget increased ten-fold over six years to $117 million USD in 2021. The unit was praised both within the organization as well as by external press for its organizing abilities, increasing the scope of potential partnerships for the organization, and the projects that it was able to bring to global scale in five years. These projects included blockchain innovation to provide cash-based transfers to refugees, AI satellite mapping initiatives to aid disaster relief, as well as new concepts for growing food in desolate zones.

Discovery's Innovation unit was also extremely successful though it started with much less funding and top down support. The team grew from three people in 2014 who were working as volunteers, to having a team of over fifteen rotating members in 2021 with a large lab space dedicated to their work in the central HQ location and funding from the top. The team was also central to setting up the new innovation strategy the organization planned to implement in late 2021.

Atlantis' unit was initially seen as one of the most successful in the UN system. It was established in 2012 and the team grew rapidly in terms of people (from 5 people in one location, to over 20 dispersed across seven global locations), skillsets and budget. Their innovation training program and certain flagship initiatives were seen to be lighthouse projects for the community. In addition, the team pioneered ways of communicating about their work both within the organization and externally through

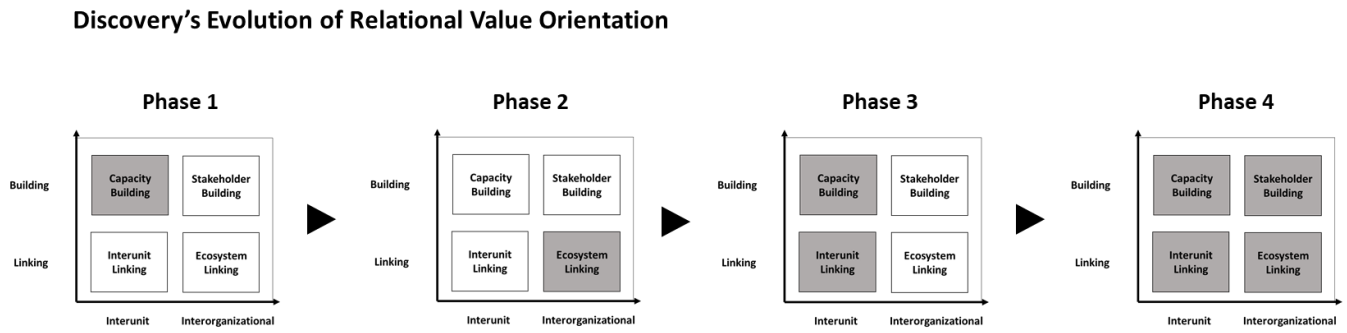
the art of storytelling. Despite these strong successes, after a change of leadership and a push towards decentralization in 2019, the unit faced some concerns about funding and optimizing its strategic position within the organization.

The youngest unit, Challenger also saw initial strong growth in terms of number of people and budget after its founding in 2018 with only two people. It received clear top down support through further resources and a seat at the table in important decisions. Unfortunately, the team was unable to capitalize on its initial momentum and acknowledged failures in achieving certain internally facing goals. While its external activities were seen as impactful within the start-up and MedTech communities, by mid-2021 its future was unclear and it remained unknown to what extent the unit would remain a strategic priority for the organization.

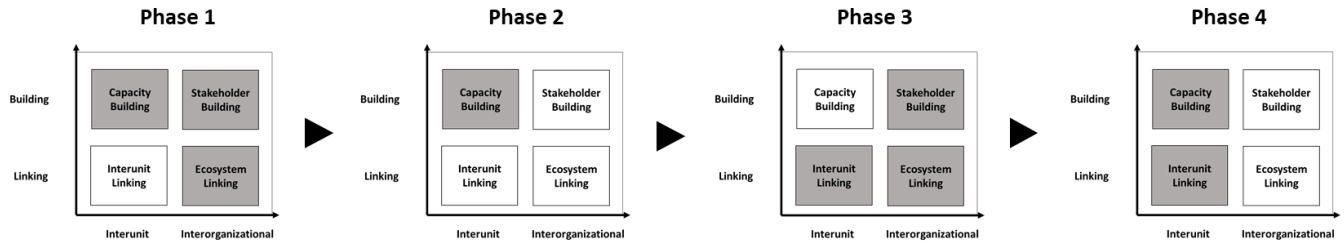
4.4.3 Patterns of evolution

We now turn to a cross-case analysis of the four innovation units, with a view to understanding the trajectories of development they followed and the reasons why they followed their evolutionary paths. Figure 3.3 provides a graphical interpretation of the shifts we observed.

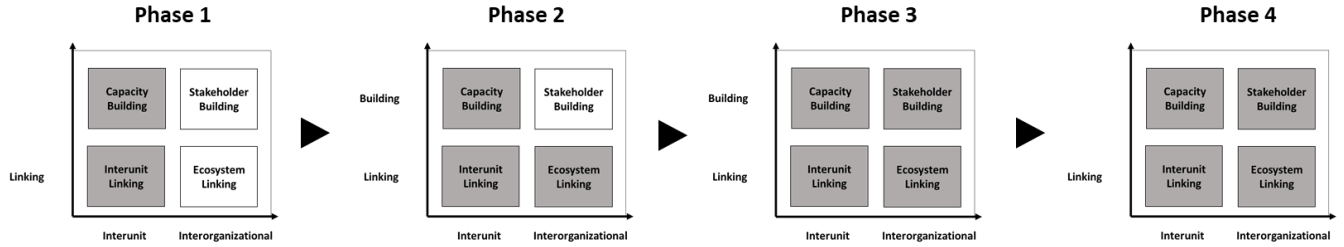
Figure 3.3: Evolution of Relational Value Orientation for Innovation Units



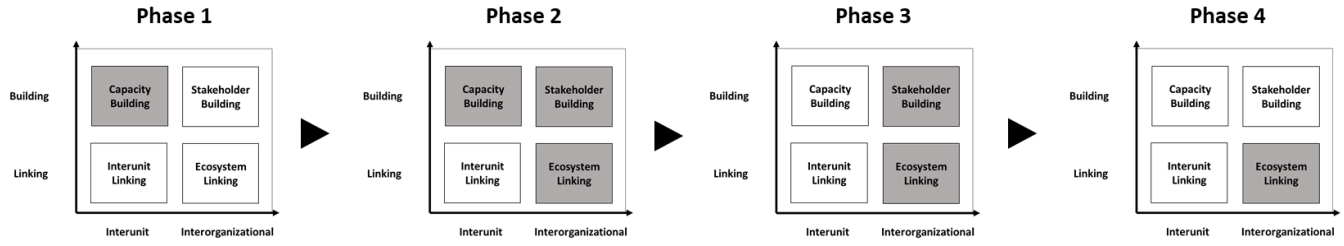
Atlantis' Evolution of Relational Value Orientation



Endeavor's Evolution of Relational Value Orientation



Challenger's Evolution of Relational Value Orientation



All the units started with capacity building, either exclusively or in combination with other orientations. *Discovery* then evolved to *ecosystem linking* through developing knowledge sharing routines with external partners, before oscillating back to an internal focus where it emphasized *interunit linking* by setting up a physical space in the building for people from different teams to meet. While continuing in this vein, it also started to expand the number of partners, creating value through *stakeholder building and ecosystem linking.* This oscillation was due to resource scarcity and volunteer level contribution of the stuff to the units. The evolutionary process was drawn out over seven years and saw the unit become increasingly visible and legitimate within the organization and in its ecosystem. The organization showed evidence that it valued the unit's contributions by enabling its team to enter high level strategic

conversations.

We saw a similar pattern in *Endeavor,* where the unit started out with *capability building* and *interunit linking* orientations. It then evolved further, moving into *ecosystem linking* and then *stakeholder building,* so that by the time our research ended it was also covering all four domains of the organizing framework. In comparison to the *Discovery* case, this unit saw less oscillation, to some extent because it was well-resourced from the start and also because it had a very clearly developed strategy to focus on more disruptive innovation from the get-go, including being set up physically away from the HQ of the organization. This unit was also seen as successful both within its organization as well as at delivering high levels of impact globally.

Taken together, these two units illustrate one trajectory, i.e. towards an ambidextrous orientation in which the complementarities between internally- and externally focused activities are emphasized. This ambidextrous orientation is not widely seen in other studies of innovation units. For example, Hill and Birkinshaw (2008) show that corporate venturing units are more effective in the short term if they focus on a narrow set of activities. In the next section, we examine some of the contextual factors that might explain these differences.

The second trajectory, exhibited by *Atlantis* and *Challenger,* was towards a unitary orientations – either external or internal. *Atlantis* followed a similar pattern to *Discovery* for five years, oscillating between internal and external orientations, but in the final year of our study it gravitated to a narrow focus on *inter-unit linking* and *capability building*. We believe this is the case because the unit took on a new leadership which refocused the strategy and aligned it closer to the changing strategy of the organization which was decentralizing many of its structures to country offices.

In contrast, *Challenger* began to see that its externally-facing activities were significantly more productive and rewarding, and shifted over time towards *stakeholder building* and *ecosystem linking*. Over the final two years of our study, this unit almost entirely stopped its internally-focused activities, focusing primarily on *ecosystem linking.* This shift was driven by difficult decision making processes

and strategic shifts within the larger organization, including a major leadership change, as well as difficulty in getting internally facing activities off the ground due to uncertainty in the organization. *Challenger* eventually started the process of spinning off from its organization. In these two cases, the internally and externally facing activities were seen as competing and the units could not perform both over time.

To summarize, the cross-case analysis shows that while all the units started with a capacity building focus, over time two trajectories emerged through an oscillation of activities that was caused by lack of resources rather than building up activities over time. We saw that the two units that were able to eventually focus on all four orientations were the ones seen as more successful in the ecosystem, were granted increased access to resources by their organizations to enable stability and longevity of the unit. The organizing framework with activities aligned to relational value orientations can be seen in Figure 3.4.

Figure 3.4: Relational Value Creation Oreintations and Activities

	Internal Focus (Interunit)	**External Focus (Interorganizational)**
Building	**Capacity Building** • Changing internal culture and mindsets to build cognitive capital • Building internal capabilities and skillsets to build cognitive capital • Developing innovative processes and priority setting to build structural capital	**Stakeholder Building** • Developing knowledge sharing routines across sectors • Developing new collaborative processes • Agenda setting in the ecosystem
Linking	**Interunit Linking** • Increasing collaboration between HQ and country offices to establish interunit relations • Allocating funding to facilitate collaborative projects • Breaking down internal hierarchical silos to develop interunit network paths	**Ecosystem Linking** • Creating new cross-sectoral partnerships • Sourcing ideas in the ecosystem • Opening up new ways of funding

4.5 Theory Development

Having presented the empirical findings, we now move to the theory development part of the paper, where we blend insights from the data with existing concepts and findings from the literature.

We address three aspects of the phenomenon here – the contextual boundary conditions of the relational value framework, the evolution of activities and orientations over time, the scope of activities and orientations in an innovation unit.

4.5.1 Organizational context

In our initial framing of this research, we chose to focus on the creation of *relational value* (the network of relationships and the resources embedded in them) rather than the creation of *resource value* (tangible and intangible outputs that ownership rights can be ascribed to). As noted earlier, we would expect innovation units to create both relational and resource value, but because relational value is harder to observe and measure it receives less attention in practice and in research. Our research focussed on large international non-profit organizations (UN Agencies) because we expected relational value to be particularly pertinent in that complex, multi-stakeholder context, and this expectation was borne out in the evidence collected.

To interpret our findings from the context of our study for the broader world of organizations, it is useful to consider what might be a specific contingency of the UN Agency context, and which observations may be applicable more widely. Comparing our findings to other case-study or process-based studies of innovation units (e.g. Monteiro and Birkinshaw, 2017), we propose that the complexity resulting from accountability to multiple stakeholders is a key contingency. UN agencies have complex ownership and financing structures through their member states, they have primarily social and/or environment-based objectives, and their resource allocation is subject to political considerations. These organizations are frequently prone to internal conflict and disagreements over what activities should be prioritized and have multiple organizational objectives (Ambos and Tatarinov, 2021). They also tend to operate in bureaucratic ways, to ensure transparency and accountability around how money is spent, especially when that money comes from governments and charities. These stakeholders have diverse expectations and require different narratives. For example, public sector donors may have different requirements for reporting than private sector technology companies and the metrics they use for

success may be different. Due to the cooperative (rather than competitive) nature of their work, these organizations collaborate with governments, local and global NGOs, small entrepreneurs as well as large MNCs – and innovation units have a relatively large degree of freedom as to which stakeholders they choose to work with. Innovative projects are hardly ever implemented without the engagement of multiple cross-sector stakeholders.

The activities of innovation units are likely to be significantly influenced by the organizational context in which they operate. Innovation units in a for-profit context are expected to deliver concrete resource-based value (e.g. successful new products/technologies or positive investment returns) and there is an expectation of "quick wins" to maintain organizational support (Burgelman and Sayles, 1988; Dooley and O'Sullivan, 2001). In our non-profit setting, by contrast, the innovation units were not expected to demonstrate resource-based value. Their goals were stated more ambiguously, with their definition of "success" being to be perceived as valuable and legitimate by their multiple stakeholders (and primarily by the parent organization itself), and to continue to receive funding and support.

This makes it difficult to evaluate success for innovation units, and particularly so when they are primarily creating relational value where legitimacy and impact are central. These units have multiple and often ambiguous goals (making cross-case comparisons of success difficult), and we know from other contexts that they are often shut down before they have had sufficient time to show their worth (Burgelman and Valikangas, 2005). We therefore propose that the longevity of the unit is a useful proxy for it retaining the confidence and support of the organization's leadership and enabling continuous growth of the unit. It has the added benefit that it can be objectively measured. Longevity and growth have also been used as a performance variable in other studies of innovation units (Hill and Birkinshaw, 2012) as well as in the entrepreneurship literature on new ventures (Covin and Slevin, 1991; Bruderl, Preisendorfer and Ziegler, 1992).

As a first set of formal propositions, we therefore see relational value playing a key role in

multi-stakeholder contexts that are characterized by different, and often fluid, stakeholder expectations as opposed to for-profit contexts where there is a relatively clear consensus on the 'bottom line'. For one, innovation units have more opportunities to create relational value because of the myriad ways in which they can connect to and build linkages with their stakeholders locally and globally. Second, they deliberately emphasize relational value creation as opposed to resource value creation, because of the ambiguity about their role and desired contribution to the organization.

> Proposition 1. The greater the complexity in the operating environment, especially in terms of multiple stakeholder expectations, (a) the greater the *opportunity* for innovation units to create relational value, and (b) the more innovation units will *emphasize* relational value creation rather than asset value creation to build legitimacy with their organizations and enhance their longevity and growth.

4.5.2 Mechanisms of Unit Evolution

Next, it is important to consider *how* innovation units shift their orientation over time. We found that units adopt different orientations over their development and that they oscillate between different orientations rather than add to existing orientations. Two points are worth highlighting here vis-à-vis existing literature:

First, units pursue multiple orientations rather a single focus. A consistent theme in the existing literature is that innovation units with clear focus and alignment tend to outperform those with ambiguous roles (Locke, 1996; Stetler and Magnusson, 2015), with the implicit understanding that the individuals running the unit have a clear orientation towards a particular way of creating value. Our study suggests a somewhat different story. We have evidence of innovation units shifting relatively quickly from one orientation to another, or indeed developing multiple orientations over time. There is also evidence that units strive to develop such multiple orientations (instead of focussing) their activities to create relational value.

Second, they evolve by addressing distinct orientations rather then adding gradually to existing orientations. To make sense of the innovation units' evolution, it is useful to refer to the ambidexterity literature (e.g. Gibson and Birkinshaw, 2004; Boumgarden, Nickerson and Zenger, 2012), and the

notion that a discrete unit might overcome the tension between exploration and exploitation by oscillating back-and-forth between these competing tensions (temporal ambidexterity) or by building a way of working that allowed it to do both together (contextual ambidexterity). One important contingency factor affecting the choice of mechanism is likely to be resource scarcity (Gupta, Smith and Shalley, 2006; March 1991). Specifically, our evidence suggests that oscillation back-and-forth was an approach used more in the first few years, partly because of limited human and financial resources and partly because of limited expertise in managing multiple stakeholders. As these innovation units built their own internal capabilities and gained financial strength, they were more likely to achieve contextual ambidexterity, though we note that *Atlantis* and *Challenger* both appeared to be veering towards a unitary orientation towards the end of our period of research. *Discovery* and *Endeavor,* on the contrary, were able to develop activities that covered all four orientations.

> Proposition 2. Innovation units oscillate between internal and external activities due to resource scarcity until they accumulate resources and capabilities to address multiple orientations at the same time.

4.5.3 Breadth of Activities and Orientations

Finally, we focus on the breadth of activities undertaken by innovation units and their overall orientation. As already noted, much of the existing literature on innovation units has emphasized the importance of a clear and narrow focus of activities. For example, Hill and Birkinshaw (2008) found empirical support for the argument that "the structures and systems used by venture units will be a function of their strategic role, and that their performance will be higher when internal elements are aligned." Several applied studies of corporate venturing (e.g. Campbell et al.,2004; Chesbrough, 2002) have provided similar advice and studies of other types of innovation units (in particular in the domain of RandD) show that units take on a clear mandate (Kuemmerle, 1999; Håkanson and Nobel, 2001; Ambos, 2005) that remains stable over time (Asakawa, 2001; Ambos and Ambos, 2011).

Our research suggests a different logic, namely that innovation units that perform a variety of different activities and take on multiple orientations will, over time, be more successful than

those that are relatively narrow in focus. The reason for this, we propose, is because we are focusing on relational value not resource value. Creating *resource* value can be thought of as a 'convergent' activity, in which investment is made in transforming opportunities into tangible outcomes through aligned and focused effort. Creating *relational* value is a 'divergent' activity where the volume and diversity of connections is important, and there is a higher level of organizational slack. We therefore propose that the breadth of relational value creation, in terms of the two dimensions of our organizing framework (internal vs external and building vs linking) is an important determinant of whether an innovation unit is deemed to be successful or not as measured in terms of in growth.

Building on our organizing framework, the arguments pertaining to the two dimensions differ. Taking the internal versus external dimension first, we can anticipate some tension between the two orientations, partly because the innovation unit operates with limited resources, and partly because there is a self-reinforcing process at work in each sphere of activity that tends to drive out other priorities (March, 1991). Our evidence suggests there are benefits for innovation units to adopt a dual orientation bridging internal and external activities and that these build on each other to a certain extent. Similar arguments have been made in other contexts. For example, the open innovation literature emphasizes the building of internal capabilities first as a means of connecting effectively to external knowledge sources (Chesbrough, Lettl and Ritter, 2018; Laursen and Salter, 2006). However, we can anticipate that achieving such a dual orientation is challenging from a managerial perspective, especially in resource constrained environments, as the benefits are not immediate.

In the case of linking versus building, the argument is slightly different because for any given relationship these activities are likely to be complementary. An innovation unit that only focused on linking (rather than linking and building) might struggle to survive because linking work here is primarily of the *tertius iungens* variety (i.e. brokering contacts between those inside and outside the organization so that the third party can then step back, Obstfeld, 2005). A broker draws its power solely from its network position but does not actually "own" the knowledge. Thus, is it vital for organizations

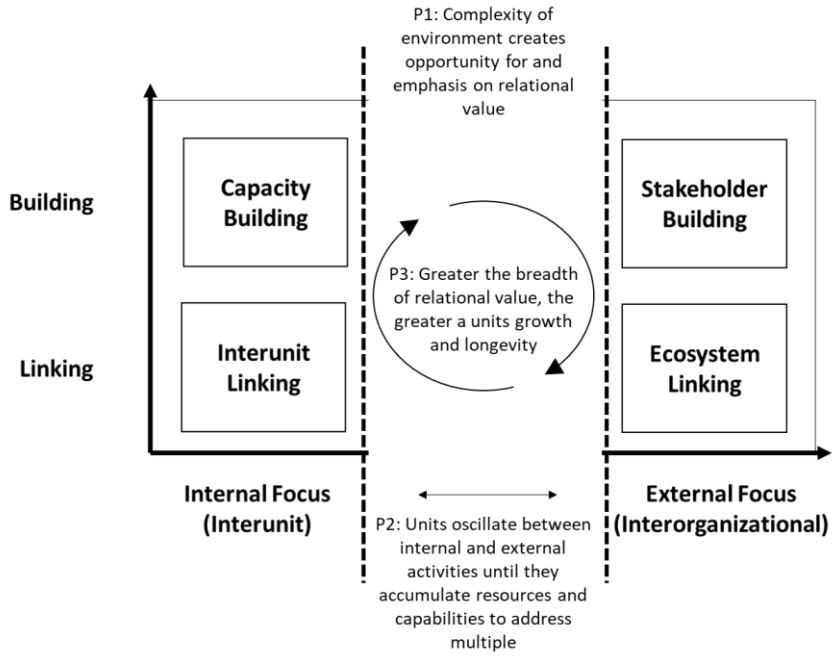
to also engage in building as a complementary activity. A case in point is Monteiro and Birkinshaw (2017) who studied a scouting unit that was acting primarily in a linking capacity, but which was seeking to provide transformational services in its capacity as a 'trusted advisor' to business units inside the parent organization. Despite being complementary, linking and building activities are distinct in the types of capabilities the require. While we expect some tensions between a focus on linking and building, the evolution of the units' orientations shown in Fig 3 show more 'vertical' development, that is complementary linking and building, rather than adding 'horizontally' between internal and external. This suggest that it is more feasible to embrace linking and building at the same time than internal and external activities.

In sum, we anticipate that greater breadth on both dimensions of our organizing framework will be beneficial to the innovation unit as all these activities reinforce each other to create relational value, but we acknowledge that the managerial challenges in combining internal and external activities are likely to be significantly higher than in combining linking and building activities.

> Proposition 3a. The greater the *breadth* of relational value created by the innovation unit, that is (a) creating relational value internally *and* externally, and (b) creating relational value through linking *and* building, the greater its longevity.

Figure 3.5 presents the theoretical model which shows the relational value framework and incorporates the propositions above.

Figure 3.5: Theoretical Model



4.6 Discussion

4.6.1 A Relational Perspective on Innovation Units

The relational perspective enables an alternative view on innovation units. Our study uncovered this alternative view in the extreme setting of non-profit International Organizations. We specified the concept of relational value and how it is linked to a unit's activities and evolution. This resulted in a new framework about the processes of development of a unit and should not be seen as a framework about the outcomes of relational value. When using the relational perspective, we uncover several dimensions along which a broader viewpoint can be provided and highlight contextual amplifiers that make it particularly relevant in the non-profit sector.

In private sector innovation units such as RandD units, research has highlighted that the goals are clear and oriented at profit maximization (Cohen and Levinthal, 1990). Using the relational perspective, we see that the goals are also sometimes ambiguous, act like moving targets, and are inherently social by nature. In established research conducted in the private sector, the innovation unit mandate is characterized by stability (Mudambi and Swift, 2014), while through the relational

perspective we see oscillation as the defining mandate characteristic for relational value creation. By taking a broader definition of value, we actually show empirically that the ability to oscillate creates impact at multiple levels both within the organization as well as externally. The stakeholders in traditional RandD units, while also forcing to compensate for differing institutional logics, are clearly defined and limited (Hall and Martin, 2005; Oxley and Sampson, 2004); while in this relational context, the stakeholders form a complex network which includes not only donors and resourcing partners, but a wide range of cross sectoral players both large and small, global and local. This expanded scope of potential partners adds network complexity.

In the traditional context, the outcomes of the innovation units are usually tangible, such as patents or products, that provide new sources of knowledge to the organization (Awate et al., 2015). In the relational context, we see the outcomes can be largely intangible and difficult to create metrics for. Social metrics such as reach and lives saved have been lauded as incomplete, and this relational perspective shows indeed why the impact can be much broader. We see that the boundaries in traditional organizing innovation research are either external or internal, with the majority of units only dealing with external boundaries (Monteiro and Birkinshaw, 2017). Contrastingly, through the relational perspective, we see that innovation unit deal with internal and external boundaries, sometimes simultaneously. While in the private sector, boundary spanners have been observed to focus primarily on boundaries with other companies (Schotter and Beamish, 2011), what we see in the unique context of the innovation units in the UN, is that their external boundaries are cross-sector by nature, as well as inter-organizational and linked to distance with beneficiaries. The activities of traditional units are focused while in the UN context, these are multi-faceted as seen in our cases. The governance in the private sector is about separation even in the cases of multilateral RandD alliances where firms balance knowledge sharing and knowledge leakages (Li et al., 2012), while in this context, we find that the governance is about enabling connections and less on the focus of knowledge protection. Finally, the goals in traditionally studied units are clearly defined and usually manded from the top (Cantwell and

Mudambi, 2005), while what we see using the relational perspective is that the goals are emergent. See Table 5 for a summary of how conceptualization relational value allows a shift in examining certain aspects of how innovation units work.

In summary, our abductive study on an emergent phenomenon enables us to make contributions by linking the often-snapshot activity-based view to the relational perspective in a longitudinal manner. This evolutionary perspective percolates fine grained findings about the value creating roles that innovation units play and how these change over time. By defining relational value as the set of relationships and the resources embedded in them that help the organization achieve its objectives, we build theory to open a wider lens for examining innovation units and showing that true impact may be beyond products and processes developed by these units.

4.7 Conclusion

This study develops theory around the development of relational value creation roles of innovation units. This research shows that units in the UN context create value beyond innovation outputs and are able to overcome complex stakeholder settings and resource deficiency by oscillating their strategic orientations. The limitation of the study was that our sample took into consideration only one context, which may make generalizability difficult. Thus, we would urge further researchers to study the phenomenon across contexts. Despite this, the emergent context of the study allows the authors to develop new theory about what innovation units, which are not bound to scouting to RandD or to product development, can look like; and even further, how they impact the organization. This research provides a new perspective on innovation units in the organization. Hierarchically organized MNE's can learn from the activities of the innovation units of extremely hierarchical UN agencies as these units are examples of organizational structures that can mitigate dynamically evolving boundaries that traditionally give rise to coordination and control issues.

5 Scaling Digital Solutions for Wicked Problems: Ecosystem Versatility

"Digital technology is shaping history. But there is also the sense that it is running away with us. Where will it take us? The answers to these questions depend on our ability to work together across disciplines and actors, across nations and political divides."

-UN Secretary General, Antonio Guterres

5.1 Introduction

Prior IB literature demonstrated that products tend to be either replicated or locally adapted as they scale internationally (Jonsson and Foss, 2011; Szulanski and Jensen, 2006; Veniak, Midgley, and Devinney, 2004). Recent efforts have been made to extend internationalization theory to the digital world (Banlieva and Dhanaraj, 2019; Coviello, Kano, and Liesch, 2017), but need to account for the character of digital solutions. Digital solutions incorporate data driven technologies, algorithms and software to solve problems in new ways, engender closer interaction with the end-user, create technology affordances and are highly modular in nature (Nambisan, Zahra, and Luo, 2019). Many digital technologies and digitally enabled enterprises not only depend on scale for their economic viability but are themselves based on network effects (Oborn, Barrett, Orlikowski, and Kim, 2019) and have large data requirements, such as for machine learning (Brynjolfsson and McAfee, 2014), so that scaling becomes imperative (Bharadwaj, El Sawy, Pavlou, and Venkatraman, 2013; Monaghan, Tippmann, and Coviello, 2020). Digital solutions are also embedded in configurations of actors and internationalizing such ecosystems has proven extremely challenging (Li, Chen, Yi, Mao, and Liao, 2019). These unique characteristics of digital solutions require a different perspective for examining their international scaling.

Recent developments related to the internationalization of MNCs have shown the importance of business ecosystems (Ganco, Kapoor, and Lee, 2020; Parente, Rong, Geleilate, and Misati, 2019), which are networks of organizations and individuals that co-evolve capabilities and align their

investments to create additional value and/or improve efficiency (Adner, 2017; Iansiti and Levien, 2004; Moore, 1993; Williamson and De Meyer, 2012). Ecosystems can be comprised of private sector actors such as MNCs, as well as actors such as International Organizations, NGO's and social enterprises. Yet, we know little about how digital solutions build their ecosystems and adapt them when scaling across different locations. Scaling in the IB literature mostly involves an anchor firm with internal technological capabilities that sets up relationships with host market firms or other profit-motivated actors (Parente et al., 2019), while digital solutions are often characterized as 'distributed innovations' (Oborn et al., 2019) and thus require a more explicit definition of the roles involved in the ecosystem configuration beyond the anchor firm (Dedehayir, Mäkinen and Ortt, 2018) particularly when the anchor firm is a non-business actor such as a UN agency.

Our lack of understanding is even more severe when digital solutions seek to address problems seen in more rugged international business environments, such as those found in developing regions. There is a gap in the theorizing of how international businesses can work across traditional boundaries to address development problems at the business-social interface (Buckley, Doh, and Benischke, 2017), specifically when using digital solutions. Many development problems can be labelled as "wicked problems" with complex properties that make them difficult to define and impossible to find optimal solutions for. This applies to poverty, climate change, or migration (Churchman, 1967; George, Howard-Grenville, Joshi, and Tihanyi, 2016; Rittel and Webber, 1973), where the root causes may be multiple and entangled with one another, where behaviors and practices are socially and culturally embedded, and where the needs and beneficiaries are many (making scale particularly important) (Busch and Barkema, 2020; Oborn et al., 2019; Seelos and Mair, 2013). While technological solutions to these issues are mooted for many problems, there is a long-standing legacy of failures, often due to developers or donors not accounting for local conditions or users (Chliova and Ringov, 2007; Haug, 1991). The combination of this situation with the equally pressing question of how to scale such solutions internationally is largely unaddressed (Kistruck, Beamish, Qureshi, and Sutter; 2013; Seelos

and Mair, 2007). Given the salience of scaling digital solutions in development settings, the paper focuses on how the process of international scaling takes place and asks: *How are digital solutions for wicked problems scaled across locations – and how are their ecosystems (re-)configured?*

We address this question through an inductive case study approach by investigating four digital solutions originating from International Organizations such as the United Nations agencies. These solutions aim to address wicked problems in development contexts. The solutions use digital technology such as artificial intelligence, blockchain or geospatial mapping, have been scaled to multiple countries, and are distributed by nature (Oborn et al., 2019). Therefore, and in line with recent IB research (Li et al., 2019; Parente et al., 2019), we view the configurations of digital solutions through an ecosystem lens. To comprehend the nature of the ecosystem, we delve into the actual configurations and re-configurations of each solution's ecosystem to capture the complexity of the specific context (Brusoni and Prencipe, 2013). By mapping the ecosystem actors in each new location as the digital solution scales, showcasing their activities and value they add to the solution, we provide fine-grained detail on the roles of the different ecosystem players that are needed to successfully create impact, and on how these roles change during the scaling process.

This research contributes to the literature on how digital solutions scale internationally. The first contribution is a framework specifying the roles different actors play in ecosystems during the internationalization process of digital solutions, advancing the scarce literature on ecosystem configurations to address different institutional contexts (Li et al., 2019; Nambisan et al., 2019; Williamson and De Meyer, 2012). Second, we propose the concept of ecosystem versatility as a property of a digital solution's ecosystem, which we define as the degree of change in the ecosystem in each new implementation of the digital initiative. This highlights the interaction between the global-local configurations in the internationalization process and thereby contributes to recent efforts to extend internationalization theory to the digital world (Banlieva and Dhanaraj, 2019; Coviello et al., 2017; Strange and Humphrey, 2019). Third, our study derives four different types of scaling which vary

in their ecosystem versatility and local adaptation of the application. These insights add to the discussion around adaptation and replication; in particular, in relation to wicked problems in development contexts, it shows the need for localization and adaptation of technology through different partner configurations, to create greater impact and value (Busch and Barkema, 2020; Chilova and Ringov, 2007; Kistruck et al., 2013).

The rest of this study comprises a Theoretical Background section, followed by Methodology, Findings, Theoretical Development with propositions and theoretical framework, and ends with the Discussion, Limitations and Conclusion.

5.2 Theoretical Background

5.2.1 Differentiating Digital Solutions

The role of digitalization on the management of organizations is subject to a lively debate in management research (Davenport, Barth, and Bean, 2012; George, Haas, and Pentland, 2014; McAfee, Brynjolfsson, and Davenport, 2012). Digital solutions can be seen as outputs of digitalization as they rely on digital technology, that is any device that functions using a binary computational code as well as services associated with such (Hadlington and Scase, 2018) which have primarily virtual components. In addition, digital solutions are innovations suited to solve complex problems in a different way (examples in medicine: Nekorachko, Pkhakadze, and Vlasenko, 2019; deforestation: Watanabe, Naveed, and Neitaanmaki, 2018). From a business innovation perspective, there are several key characteristics of digital solutions that are relevant (see for instance Majchrazak, Markus and Wareham, 2016; Nambisan et al., 2019). Three main qualities stand out and differentiate digital solutions from classic technology products: modularity, generativity, and affordances.

Digital solutions have at their core digital technology. The first property is digital technologies' modularity and their layered modular architecture (Yoo, Henfridsson, and Lyytinen, 2010). Modularity allows digital technology to be recombined to create functionalities addressing new uses. Technical

modularity was a long-held concept in engineered systems, defined anew by the innovation management literature to describe how base components could be combined into different configurations of systems, or architectures (Baldwin and Clark, 2000). Digital technologies' modularity is in software, which when coupled with their layered characteristics, gives digital solutions a greater plasticity, allowing virtual components to be recombined or otherwise transformed in more ways than physical products. Modules and other knowledge are made transferrable by the creation of standardized interfaces between the layers, further facilitating their recombination or adapting to new applications or user environments with reductions in reprogramming (Baldwin and Clark, 2000; Yoo, Henfridsson, and Lyytinen, 2010). This in effect eases the scaling of technologies to greater uses, or new uses and environments.

The second property of digital technology is their generativity. The 'generative capacity' of digital technologies was first specified by Zittrain (2006) for the Internet, describing the ability of the Internet's many varied participants, empowered by digital technology, to not only build and distribute code and content, but to do so in spectacular recombinative fashion. This was defined as the Internet's generative capacity, or ability to expand into and integrate with many domains (Zittrain, 2006). The generative nature of digital solutions opens the door for complementary knowledge partners to participate (Baldwin and Woodard, 2009), to create partnerships that can create more varied meanings (Yoo, Henfridsson, and Lyytinen, 2010), and to adopt different roles.

Affordances are a related concept to generativity, used in the information systems literature to describe the action possibilities or opportunities for action (Nambisan et al., 2019) provided by a digital solution to users and the usage situations they face. Affordances are the actions that individuals or organizations can take with a technology to shape it to a (often local) purpose (Majchrzak and Markus, 2013). Research on affordances can provide a window into how different uses and local contexts vary considerably with the same technology (Nambisan et al., 2019). Compared to other technology products, digital solutions are characterized by their data-intensive nature, often relying on users for the

co-creation of value (Iansiti and Lakhani, 2014). Consequently, the success of digital solutions depends on scale, reconfiguration and continuing iterative advancement (Ansari, Garud, and Kumaraswamy, 2016; Nambisan et al., 2017). These properties allow digital solutions to take on a greater range of functionality than physical hardware products' (Autio and Thomas, 2014). Certain implications of these characteristics of digital solutions vis-à-vis technology products are highlighted in Table 4.1.

Table 4.1: Differentiating Digital Solutions

	Technology Product	**Digital Solutions**
International Growth and Applicability	Often standardized, as lower configurability and physical nature means growth by replication is necessary, subject to economies of scale in production of physical artifacts. Specific product components or features may be locally adapted.	**Layered Modular Architecture and Modularity of Virtual Components:** Suggests that digital technologies are free of constraints faced by physical products. Main constraints are local knowledge needs that limit local adaptations of system (which may require local partners or users as well as integrators/implementers).
Data and distributed nature	Often structured, not time sensitive.	**Generativity**: Mainly unstructured, real-time needs (which allow the solution to recombine local knowledge and technological application). User data becomes valuable as an output. Advanced users may co-create system via intensive, iterative interaction.
End User Involvement	Limited to traditional end user role as user of product.	**Affordances:** User-contexts such as differences in institutional context may shape affordances and participate in co-creation of new functionalities (i.e., reshaping uses of the technology as system scales, requiring new local partners).

These properties have two important implications for how digital solutions are conceptualized to emerge and grow. First, digital solutions require embedding in ecosystems of different stakeholders, which enable close interaction with end-users, but also with other intersectoral partners (Autio and Thomas, 2014; Li et al., 2019). Second, most digital technologies and digitally-enabled enterprises not only depend on scale for their economic viability but are themselves based on network effects (Oborn et al., 2019) as they have large data requirements, meaning that scaling becomes imperative (Bharadwaj et al., 2013; Monaghan et al., 2020). The challenge has proven to be the internationalizing of such ecosystems (Li et al., 2019).

5.2.2 Scaling Digital Solutions Internationally

Scaling is a critical issue in international business, and even more so when digital solutions are concerned (Monaghan et al., 2019). This phenomenon has either been described from the perspective of the international expansion of a product or service in the MNC (Jonsson and Foss, 2011; Szulanski and Jensen, 2006) or as the growth of entrepreneurial firms (Coviello et al., 2017; Monaghan et al., 2020). In the first perspective, scaling largely involves replication across country borders as it relates to specific knowledge (Kostova and Roth, 2002), international entry (Tallman, Luo, and Buckley, 2018; Vermeulen and Barkema, 2002), entrepreneurial growth (Gulati and DeSantola, 2016; Hennart, 2019; Monaghan and Tippmann, 2018), and more recently, industry relationships (Monaghan et al., 2020). In parallel to the prominent integration-responsiveness dilemma (Doz and Prahalad, 1991), a "replication dilemma" often emerges between desiring the benefits of replicating a model exactly and needing to adapt it to the salient characteristics of new international environments (Devinney, Midgley, and Venaik, 2000; Winter and Szulanski, 2001). The ability to scale through replication in a new environment may also be severely constrained by forces beyond the recipients' control, such as government regulation (Teece, 1998), incompatible technologies (Kogut and Zander, 1992), or inadequate resources (Pfeffer and Gerald, 1978). The second perspective is on the growth of digital entrepreneurial firms (Coviello et al., 2017; Monaghan et al., 2020) which refers to high-growth firms as 'scale-ups' (DeSantola and Gulati, 2017; Duruflé, Hellmann, and Wilson, 2017, Gulati and DeSantola, 2016) and sheds light on the role of digitalization in their internationalization. However, prior literature on scaling new technology (Autio et al., 2018; Hennart, 2019; Monaghan et al., 2020) despite the emerging interest in scaling as related to the IB context, does not discuss the variety of scaling (Nambisan et al., 2019). In this paper we focus on the scaling of specific digital solutions (rather than products or firms) that are likely to be embedded in ecosystems and where scaling is imperative to unfold their potential.

When internationalizing, ecosystems often need to be reconfigured rather than replicated

(Nambisan et al., 2019; Li et al., 2019). Business models are usually reconfigured as single firms' adaptation to changing conditions (Massa, Tucci, and Afuah, 2017), but in situations with multiple partners, reconfiguration of the ecosystem may be an equivalent mechanism occurring during the scaling process (Autio and Thomas, 2014). This also happens to be an important gaps in research, namely, ascertaining the ecosystems' role in helping organizations create sustainable value through growth. The ecosystems literature has been used to examine MNCs scaling to new countries (internationalization such as for example Parente et al., 2019) but the ecosystem perspective has not been used to examine initiative level scaling (products/solutions). Parente et al. (2019) show that ecosystems are important in weak institutional environments when MNCs enter a new country, but to date we know little about the configurations of ecosystems when scaling a digital solution.

5.2.3 Scaling Digital Solutions for Wicked Problems

Digital solutions have been held as a panacea for solving many global challenges, including "wicked problems" from communications and new ways of working to solving market imperfections and empowering the poor (Forti, 2018; Gray, 2016; Millard and Carpenter, 2014; Quibria, Tschang, and Reyes-Macasaquit, 2002). Most international development problems are considered "wicked" in that they involve hard to achieve objectives (e.g. reducing poverty), and complex root causes, including long-standing, deeply embedded socio-economic divides, poor governance issues, and corruption (Collier, 2007). Due to their public good characteristics, it has been proposed that collaborative partnerships are better suited to address them than government alone (Prahalad, 2004). Select success cases have been feted (Hughes and Lonie, 2007; Seelos and Mair 2007), but infrastructure remains a challenge in humanitarian and development contexts, and where wicked problems need to be solved iteratively and collaboratively (Roberts, 2000; Sabel and Zeitlin, 2004; Weber and Khademian, 2008). Even as local knowledge becomes a key resource, the rise of more sophisticated users with the capability to co-create additional services alters the local digital solutions' trajectories, demonstrating the technology's affordances (Oborn et al, 2019). These affordances are activated through scale (Bharadwaj

et al., 2013; Monaghan et al., 2020).

When digital solutions are scaled in developing contexts, there is additional complexity from the newness of the technology, the need to adapt it to new demands, and the need to deal with institutional complexity (as arises from locally embedded knowledge and unfamiliar institutional partners) (Ambos and Tatarinov, 2021). There is limited purpose-built "theory" in the literature for describing mechanisms of international scaling for development contexts (notable exceptions being Chliova and Ringov, 2007 and Busch and Barkema, 2020), and especially for digital solutions (Ambos and Tatarinov, 2021). The notion of replication taking place via templates has been proposed for the development context (Chliova and Ringov, 2017) but these settings present difficulties to such conventional solutions and organizations (Busch and Barkema, 2021). As they increasingly involve the use and reapplication of sophisticated digital technology, the configuration and activities of supporting partners can be expected to be challenged. Drawing on the IB literature, we can expect scaling to be impacted when country borders, applications, and conditions (e.g. knowledge base) change, and in the developing contexts, for scaling to encounter different kinds of institutional voids. It can thus be surmised that the *"reproducing (of) a productive system of practices in multiple locations"* may not succeed without some adaptation (Ringov, Liu, Jensen, and Szulanski, 2016, p. 3; Winter and Szulanski, 2001; Winter, Szulanski, and Ringov, 2012). Consequently, there is a need to examine how the modular, layered nature of digital solutions creates a basis for affordances through new partners making a variety of contributions.

Based on the above literature review, we identify a pertinent research gap on how digital solutions scale internationally, particularly digital solutions for wicked problems in development contexts, and the role of ecosystem (re)configuration in this process.

5.3 Methodology

5.3.1 Research Context

This research explores digital solutions originating from four prominent United Nations (UN) agencies. These are all large, globally dispersed organizations with clearly defined mandates and beneficiaries in the humanitarian and development sector. The UN is tasked with addressing problems in challenging development contexts - problems often characterized as "wicked" (Churchman, 1967; Rittel and Webber, 1973). As multilateral, inter-governmental organizations, the missions of these organizations are to provide solutions for local challenges, but also to scale these for implementation globally. This requires a deep understanding of the local context and its actors, but at the same time, the ability to implement solutions globally (Ambos and Tatarinov, 2021). Overall, the UN is facing increasing pressure to foster innovation driven by digital technology for greater impact and to do so at global scale (Voegtlin and Scherer, 2017).

Given that the UN often works in developing countries with low infrastructure environments, connecting with remote communities to help them overcome disadvantages of physical distance and empowering citizens using technology is a key opportunity (Madon and Krishna, 2018). At the same time, the principles that guide these organizations lead them to be cautious of the ethical challenges related to bias and data security that can be found in new implementations of frontier technologies (Heaven, 2020; Metz, 2019). An important feature of this research is the focus on digital solutions that require organizational resources and processes to develop (Burgelman, Maidique, and Wheelwright, 1996) and are relatively new to the work of these agencies (Vota, 2018). As the UN rarely have the resources and internal expertise to develop digital solutions in-house, such solutions are embedded in a network of multiple partnerships in all phases from development to iteration and scale. These solutions are rooted within a complex organization, rather than being driven by the individual entrepreneur (Kistruck and Beamish, 2010; Mair and Marti, 2006; Tracey and Stott, 2017). To further our understanding of how different players are brought together in ecosystems for the global scaling of

digital technology, this context provides a well-matched setting for our research. Following the approach taken by prior studies exploring replication (Winter and Szulanski, 2001; Ringov and Chilova, 2017), our research seeks to identify mechanisms related to the "who, what, and how" of digital solution ecosystems that successfully scale internationally.

5.3.2 Research Design

To address our research questions, we opted for an inductive research design to capture emergent insights as a basis for theory building from salient case studies (Miles and Huberman, 1994; Yin, 1994). Case study research is particularly well-suited to understanding such complex phenomena, examining processes, and explaining how certain actions lead to specific outcomes (Edmondson and McManus, 2007; Eisenhardt, Graebner, and Sonenshein, 2016; George and Bennett, 2005). The qualitative approach has been widely used in IB research particularly when looking to understand a novel phenomenon in an understudied empirical context (Awate, Larsen, and Mudambi, 2015).

5.3.3 Sample

We spent three years researching digital solutions to study their innovation processes, from which scaling emerged as an important phenomenon. This led us to analyze the contingencies of how they scale and the factors that influence their configuration in each new location. We chose to look at digital solutions born out of UN agencies due to the complex nature of the partnerships involved as well as the salience of the cases where social factors are central to the solution. Based on a snowball sampling technique (Noy, 2008), we chose to study all digital solutions that we could find in 2017 which were being developed in UN agencies. This approach was necessary due to the rarity of digital solutions in these organizations at the time. In addition, the UN agencies are historically wary of sharing information and the research team was able to gain access to further solutions by being introduced between organizations by team leads. Our selection criteria for sample solutions stipulated that the digital solutions needed to be beyond the proof-of-concept phase and had to be based on frontier technology.

Out of the four solutions, two were aimed at the individual as the end-user and two at institutional end users, such as governments. This distinction was important because it would enable us to examine the relevance of end-user type when researching the evolution of the initiative as it scaled. The two that were individual facing were *Alcott* and *Butler* (names have been anonymized). *Alcott* allows refugees in refugee camps to receive cash-based transfers via blockchain by providing them a digital identification, either in the form of a QR code or by using biometric data. It scaled to four refugee camps in three countries over three years. *Alcott's* purpose is to enable trust-based transactional assurance. *Butler* is based on a SMS platform and chatbots that speak to users to answer questions in real-time to empower youth participation and has scaled to sixty-eight countries in nine years. *Butler's* purpose is analytics and data collection. The two solutions that have institutional end-users are *Carter* and *Desai. Carter* uses artificial intelligence and algorithms based on the specific country context to map and predict the displacement of people across the globe. It scaled to twenty-two regions in Somalia in three years and aimed to scale in Nigeria. *Carter's* purpose is predictive analytics. *Desai* uses geospatial mapping to model populations in countries that do not have readily available access to this data, to provide much needed policy and decision-making power to governments and other institutions. *Desai* scaled to ten countries in three years. *Desai's* purpose is analytics for assisted decision-making.

5.3.4 Data Collection

The research team gained preferential access to key decision makers in the HQ (New York, Rome, Geneva) of these organizations as well as several initiative implementors working in the field offices, such as in Pakistan and Kenya. We built a large database of primary and secondary data relating to the development of the focal digital solutions. The primary data collection included twenty-four interviews with stakeholders to understand how these solutions scale and their ecosystem in each location. These interviews were semi-structured to allow for deep inquiry (Rubin and Rubin, 2011) and conducted with individuals who were directly involved in the initiative. We asked respondents about: 1) how the initiative scaled from location to location; 2) the types of partners involved and how these

changed over time; 3) the stakeholders involved and role of the interviewee; 4) the goals, challenges and key factors that they noted in the scaling process; 5) how this process differed for digital solutions rather than less technology intensive ones.

In addition, we hosted several workshops to bring together innovation leads from these organizations to discuss their experiences. Workshops were recorded and analyzed. Working closely with the organizations, two of the authors wrote up case studies and validated insights and perspectives with different actors in the organizations. One author also participated in an innovation bootcamp where one of the solutions was being actively developed and continued to interact closely with umbrella organizations (non UN agencies) that help foster innovation in these organizations. Additional secondary data sources were consulted and added during the research process, such as the solutions' websites where key data is updated regularly; organization's, government's, and partner's annual reports; press releases; consultant's reports; and UN internal publications. During the thirty-six months of the data collection process, and as themes emerged, the authors went back and forth frequently to multiple people involved in the solutions to check on the development of the project, clarify open questions and follow all communications and press releases about the digital solutions. We collected data on each case until saturation was reached. Saturation was determined when interviews became repetitive and our case studies were validated by interviewees. Despite following the solutions for three years, we had to draw on some retrospective accounts for one of the solutions. The reliance on multiple informants, several of whom covered the entire evolution of the initiative, aimed to reduce potential retrospective biases as information was confirmed across several sources (Golden, 1992; Jick, 1979; Leonard-Barton, 1990). Table 4.2 summarizes the data sources and characteristics of the four case studies.

Table 4.2: Solutions' Characteristics and Data Collection

Solution Characteristics	***Alcott***	***Butler***	***Carter***	***Desai***
Description	Blockchain technology to deliver cash payments in refugee camp	Citizen and youth engagement platform	Predictive analysis AI platform to forecast population movements	Geospatial data for population mapping
Primary End-User	Individual	Individual	Institutional	Institutional
Launch Year	2017	2011	2016	2017
Org/HQ location	Org A/Rome	Org B/New York	Org C/Geneva	Org D/New York
Locations	Pakistan; Jordan; Bangladesh	Global – 68 countries	Somalia	Nigeria, DRC, Zambia, Mozambique, S Sudan, (10 countries total)
Current situation	Scaling	Developing new services and building on existing tool	Being spun-off	Scaling
Technology	Blockchain	SMS platform; chatbot	Artificial Intelligence	Geospatial mapping
Reach	600,000 refugees	10 million users	22 regions mapped	10 countries mapped
Humanitarian Impact	Increases ease, ability to pay for food	Empowers communities by giving a voice to youth	Helps governments prepare for refugee crisis situations	Supports informed government decision-making in low- and middle-income countries
Solution Purpose	Trust-based transactional assurance	Analytics; Data collection	Predictive analytics	Analytics; Assisted decision making
Data Collection				
*Interviews**	7	6	7	4
*Observations***	2		1	
Annual Reports	6	4	5	6
Press Releases	8	25	10	15
Presentations	2	1	2	

*with Initiative Leads, Data Scientists, or other initiative stakeholders.
**observations involved a researcher spending time with the team in their offices as they worked on the initiative.

5.3.5 Data Analysis

Our research followed established procedures and used each case as a stand-alone 'experiment,' commencing with a detailed within-case analysis before progressing to the cross-case comparison (Eisenhardt, 1989; Yin, 2015). We began by writing up cases in a chronological way and used temporal bracketing to analyze the international scaling patterns (Langley, 1999). In line with our theoretical background, we used an ecosystems lens, taking the ecosystem as the unit of analysis, to structure our data collection following the definition that ecosystems are described as cooperative governance modes, where value creation requires multiple co-specialized partners (Adner, 2017; Autio and Thomas, 2014; Li et al., 2019; Jacobides, Cennamo, and Gawer, 2018).

First, we identified key actors in the respective ecosystem. Across all cases, we found that in addition to the UN agencies who were pioneering the digital solutions, the following actors also participated: sister UN agencies, MNCs, local businesses and SMEs, governments, NGOs (both international and local), country offices, academia, and public sector. Once this analysis step was completed by the researchers, it was again validated by the UN global lead of each initiative. This process revealed the need to use a more fine-grained analyses to surface the local-global interactions in the ecosystem. Consequently, we also included salient intra-organizational relationships.

In a next step of analyses, we grouped the specific roles that actors took on in the ecosystem. We started with a coarse-grained definition of orchestrator, integrator, and complementor (Nambisan et al., 2019) and further refined these roles during the analysis process. The orchestrator was the ecosystem leader who drove the initiative forward and took the role of initiating the scaling, like "keystone" or "hub" firms that have been shown to provide ecosystem stability and ensure the creation and extraction of value without the benefit of hierarchical authority (Dhanaraj and Parkhe, 2006; Iansiti and Levien, 2004). The integrator is the closest partner in terms of knowledge in the initiative who provides support to the orchestrator and enables the connections to other partners, such as a country office, government partner or strong academic partner (like Celuch, Bourdeau, and Khayum, 2017).

The complementors in these ecosystems include donors who provide funding, partners that provide market access to the end-user, partners that aid with initiative delivery and visibility, and the technology developers. These actors subsume the activities that will help the initiative expand (Dedehayir et al., 2018; Williamson and De Meyer, 2012). Finally, we created a graphical representation for each ecosystem map and started with detailed within-case analyses to understand how these ecosystems changed with scaling. After that, we conducted cross-case analyses, comparing the overall patterns of international scaling.

5.4 Findings

The findings section provides a rich description for each of the solutions. It portrays the scaling process and the ecosystem partnerships established in each location, highlighting the role of the actors and the changes as the solution expanded globally. The figures at the end of this section provide a snapshot of the ecosystem actors, reach (number of users or scope of application), and the way the technology was applied as the solution scaled.

5.4.1 Alcott

The Challenge. The mission of Org A is to fight hunger worldwide, providing food assistance where it is most urgently needed - during and after conflicts and natural disasters. Hunger is a wicked problem as it is difficult to frame and difficult to address in single solutions. Cash based transfers formed a major part of this work by providing aid to beneficiaries in the form of cash rather than food. "*40% of our workload is comprised of cash-based transfers and that part of our business is growing year over year*," explained the Head of the Change Management Division at Org A. But moving money to 14 million people globally incurred high fees and was marred by financial risk due to the instability of banks in conflict situations or weak states. In addition, customer privacy was a major issue as negotiating transfers through banks required the client's personal data to be shared with the bank. These were not transparent with their data usage or the data was lost in the transfer, making the process opaque

and increasing the risk of cash waste. In addition, Org A often had to operate multiple platforms and solutions to provide cash to its diverse country and client base, increasing complexity.

Solution Development. In January 2017, an accountant working in an Org A country office came to the organization's Innovation Accelerator with an idea to develop a blockchain solution to improve how the organization transferred cash. The ideation process took the idea through a bootcamp where it was refined by the original idea champion, a blockchain expert from the Singularity University network, and the Accelerator team. There were several iterations before the tool was ready for pilot. A global consultancy firm also advised on the pilot and were asked by the organization to consider potential risks related to the introduction of the blockchain technology in areas where such technology could potentially be used and how to mitigate these.

Ecosystem: Location 1. Having developed a proof of concept in Munich, the organization's team travelled to Pakistan to pilot the digital solution: to transfer money via blockchain. The team hoped to confirm basic assumptions around blockchain's effectiveness in managing cash transactions. "*We need to transfer money to a lot of [refugees] whose identity we are not entirely sure of at all times. We also need those transactions to be secure and at a lower cost,"* explained an initiative team member. Organizational staff observing these issues in the field recognized the need for a neutral platform that would tackle some of these challenges. "*It is not about the technology. We know that technology is a way to get greater efficiency and effectiveness but our end goal is – its dignity of people, efficiency and effectiveness. The goal of the blockchain project is to increase efficiency and transparency and accountability,"* the Head of the Change Management Division explained. The cash was transferred through a blockchain-backed system for distributing and recording cash transactions, integrated with iris-scanning technology already employed by Org A. Each refugee had their own unique biometric identification (based on a technology management system developed by another International Organization). Indeed, the blockchain increased transparency and traceability of those transfers and empowered the refugees by providing them digital identities and cutting out insecure middlemen. The

ecosystem in Pakistan included diverse actors: Parity Technologies, a global technology company specializing in blockchain infrastructure, and Datarella, an enterprise blockchain solution company who launched the initiative with the organization and aided with the on-going technology development. The organization's Innovation Accelerator seed-funded the initiative and worked closely with the Pakistan country office to ensure onboarding and acceptance in the refugee camps. To provide further funding for the operations, the UK's Department for International Development (DFID), became a partner in the project. The initiative was piloted successfully with 100 people before the team decided to test it in another location in the same country to confirm that the technology was easily transferrable. Regarding the introduction of these new programs, the head of the Change Management Division explained the challenges of working with diverse actors in the ecosystem:

> *The first constraint in a way is understanding what is happening on the ground and […] the operational constraints: do you actually have the ability to mount one of those programs locally? Is the program aligned with what the host government wants to do and their policy of providing assistance? And then, there are different donors that we have that provide us the opportunity to have these programs – they may have different preferences and risk appetite.*

The implementation in Pakistan was successful, providing a 98% reduction in local bank fees for Org A, while keep the beneficiary experience the same. Thus, by mid-2018, Org A was also exploring how blockchain technology might be used in other workstreams such as supply chain operations and digital identity management. But the team's more immediate goal was to scale the tool to other locations.

Ecosystem: Location 2. The second location chosen by the Innovation Accelerator team was in the Azraq refugee camp in Jordan where the team began implementation with 10,500 Syrian refugees. The ecosystem of partners in this new expansion again worked closely together with Parity Technologies to continue developing the blockchain. In addition, UN Women, a sister agency, joined the project to act as a validator of the transactions:

> *The women, who are participants in UN Women's Cash for Work Programme, will be able to request cash back at the supermarket or make their purchases directly. UN Women and [Org A] validate each other's transaction through the common use of [Alcott], which reduces*

fragmentation in humanitarian assistance.

DFID and Datarella also stayed in the ecosystem in the Jordan location to adapt the technological solution to the local requirements. Again, the organization's Innovation Accelerator funded the initiative but worked closely with the local country office in Jordan to transfer the knowledge gained in Pakistan.

By 2018, *Alcott* was providing more than a million USD worth of cash-based transfers through 100,000 transactions, *Alcott* reduced local banking fees by more than 90%, transferring cash through a virtual wallet. "*The [organization] currently transfers about USD 3 million in cash per month to over 100,000 beneficiaries across two refugee camps in Jordan*," explained an initiative team member. *"The total number of beneficiaries are 500,000, and we hope to reach them all by the end of this year."* In 2019, the initiative also started servicing refugees in a second camp in Jordan reaching 107,000 Syrian refugees.

Ecosystem: Location 3 and Scaling. After initial pilot and testing in late 2019 and early 2020, the initiative officially launched in the world's large refugee camp in Cox's Bazar in Bangladesh to try to reach as many refugees as possible and accelerate the impact of the initiative. As explained in the news brief from the time:

> *The technology was introduced to bolster the assistance that [Org A] provides people while it faces COVID-19. As of September 2020, the initiative was servicing over 500,000 of the 855,000 Rohingya refugees in Cox's Bazar, and [Org A] planned to extend its use to all of them before the years' end*.

For Bangladesh, the technology was adapted from using iris scanning to using QR codes for identification allowing refugees to still receive a digital identity (code) to distinguish them from others, without revealing their true identities, for security and privacy reasons. The reason QR codes were used in Bangladesh was because the refugee camp was not equipped with the iris scanning technology already available in Jordan's camps. The academic partner invited to evaluate the future strategy of the project explained the difference in this new location:

> *In the case of Jordan, the technological infrastructure for Cash Based Transfers exists, which is not the case for Cox's Bazaar, Bangladesh, where energy access/supply and technical capacity can impede delivery of cash assistance through blockchain. Culturally and in the humanitarian community, new technology can be perceived as risky due to the potential for data mismanagement* (Awan and Nunhuck, 2020).

Two other UN agencies, DFID, and the two technology companies remained as partners for the new implementation in Bangladesh which was organized by the Innovation Accelerator. The Business Development lead at the Innovation Accelerator explained, "*We wanted to scale up to show that this initiative can bring true value to the organization."* In late 2019 and early 2020, Org A asked a group of academics at University College London Department of Science, Technology, Engineering and Public Policy, to understand how to gain these partnerships and assess the governance of the initiative in a broader attempt to increase collaboration and build further cross-organizational relationships. The team believed that the future of the initiative was highly related to the ability to get new partners on board as well as to retain the existing partners.

5.4.2 Butler

The Challenge. Org B is a UN agency responsible for providing humanitarian and developmental aid to children worldwide. Youth involvement in policy setting and developmental decision-making is heavily embedded in local culture and institutions and is thus a wicked problem due to the difficulty of framing it. The Uganda country office had several identified challenges related to engaging young people's opinions but recognized the rise in the usage of mobile phones, which had an increasing penetration rate in the country. In Uganda, the youth face challenges related to unemployment; poverty and ignorance, due to high dropout rates when youth go to work on the farms, early pregnancies, or cultural issues; a high rate of HIV/AIDs infections; and High Population growth rate which affects living standards.

Solution Development. In May 2011, under the leadership of the Ugandan country office Representative, Org B developed RapidSMS, an open-source SMS platform that supported data collection and youth engagement activities. The country office hired a former IT and digital media

consultant to build on RapidSMS to create a mobile-based application that could communicate directly with youth on important topics. The manager and his small team created the tool now called *Butler*, which aimed to give an opportunity to every young person in Uganda to participate in the decisions that affected them and to take an active role in informing the development of the country, promoting transparency and accountability at the grassroots level. As *Butler* Coordination Specialist (Innovation), explained, "*The Innovation team does not do any program that is not scalable, adaptable, and programable*." So, from the get-go, *Butler* was meant to scale after the pilot.

Ecosystem: Location 1. To be fully launched in Uganda, Org B partnered with IBM, the global computer hardware company, to develop the tool to reach national scale. A news release from the launch explained:

> *Since February 2013, [Butler] has been using text analytics and machine learning technologies from IBM Research to help deal with the flood of information by automating the classification of messages*.

In addition to the technology partner, the country office developed partnerships with the government, NGOs, and youth organizations. Young people were targeted to join *Butler* through local non-governmental organizations (NGOs), youth groups (such as Scouts, Girls Education Movement), and faith-based organizations. The government also used the data gathered through the tool to help shape policy. Responses received by SMS on *Butler* were analyzed in real time and the data was mapped at the local level and compiled nationally. *Butler* users were made anonymous to protect young people when sharing sensitive information. After the initial pilot in Uganda reached 200,000 people, *Butler* started scaling in neighboring countries, reaching Zambia and Burundi in 2012.

Ecosystem: Location 2. The Zambia country office sent an engineer to Uganda to work closely with the *Butler* team there to understand the system and develop the *Butler* strategy for Zambia. The role of the Country Office was important in enabling the tool to succeed. As the initiative lead explained, "*If there is not enough support and need from the country office management, there will be delays and challenges scaling the tool locally*." The Zambia country office, in partnership with Zambia's National

AIDS Council (NAC), launched *Butler* in Zambia during the 2012 World AIDS' Day. *Butler* in Zambia was built on the foundation of its Uganda counterpart and was further developed through a participatory, consultative process including a design workshop that involved young people and program experts from the NAC, government ministries, and local NGOs, representatives from mobile companies, and software developers. The ecosystem in Zambia was organized by the Org B Country Office in close partnership with the NAC who aided with leadership and coordination and several other partners and funded by a global organization. Local mobile phone operators (such as Airtel, MTN, and Zamtel) provided SMS services to *Butler* at discounted rates to enable *Butler* to provide confidential, free-of-charge, and real-time counselling services on HIV and Reproductive Health to adolescents and youths. The difference in Zambia was on the particular focus on HIV/AIDS that the tool used in its application as well as the one-on-one interaction with young people. This culminated in the development of a dashboard enabling partners to respond to individual messages coming in from young people from any channel. *"One million voices are more powerful than 1000 voices*," explained one *Butler* Coordination Specialist.

Ecosystem: Location 3 and Scaling. After 2012, the initiative scaled quickly reaching eleven countries by 2014. As explained by a Coordination Specialist, "*In each country where [Butler] scaled, the tool was deployed for a specific purpose and contextualized to that environment."* One of the largest implementations was in Nigeria in 2014, where the tool was used to help Org B workers share critical information about Ebola, polio, and new-born care with families living in remote areas that health workers cannot easily reach. The initiative was spearheaded by the Org B Nigeria country office with National Youth Service Corps (NYSC) as the main partner and key player in the recruitment of responders. The government was also a key supporter of the initiative with the Office of the Vice President, Nigerian Senators and members of the House of Representatives using *Butler* to connect with their communities on critical issues for what needs to be improved or where the focus needs to be in service delivery. All major mobile network operators in Nigeria - AirTel, Etisalat, Glo and MTN –

provided free SMS services for *Butler* and the Bill and Melinda Gates Foundation provided funding support for *Butler* Nigeria. The number of users on the platform in Nigeria hit 1 million less than a year after the launch.

Global Scale. As the tool scaled, new capabilities were added based on the original technology backbone. "*The RapidPro software that is the backbone of [Butler] needs to be able to take in the massive scale the tool is seeing. It needs to be able to handle 100 million people easily*," explained the *Butler* lead. In developing countries, SMS remained the most used channel of delivery (65%), but digital channels gained traction, as *Butler* expanded partnerships to private sector companies to use platforms such as Facebook messenger, Viber, Telegram, LINE and WhatsApp. Using Artificial Intelligence, *Butler* also offered *Butler* Bots, which learned about its users and interacted with them in private on sensitive issues. The *Butler* Bots were locally adaptable and were a 'smart' approach to respond to queries via SMS and digital channels. *Butler* bots had the ability to answer 10 times more questions at a much lower cost as more users became digital and allowed *Butler* to dramatically increase its reach and impact on youth around the world. The data from *Butler* was used to inform high-level policy decisions both at the country level and at UN resource allocation meetings.

5.4.3 Carter

The Challenge. Org C is a global organization dedicated to saving lives, protecting rights, and building a better future for refugees, forcibly displaced communities and stateless people. In 2017, when Somalia was teetering on the brink of famine, the organization's Somalian country office feared that it would create a surge of refugees like the one in 2011, when 2,000 refugees were arriving per day to the camps also due to famine, overwhelming the resources. The Country office approached the Innovation Service in HQ to ask if it was possible to predict the number of arrivals to the region. "*That was a challenging question for me*," the Data Scientist at the Org C Innovation Service said, "*but it was the question that launched [Carter]*." Understanding and trying to predict human migration patterns aimed to innovatively address the need to help vast numbers of humans facing adverse conditions, a wicked

problem which is boundary-less and hence, difficult to frame.

Solution Development. Org C had already been experimenting with predictive analytics for two years before the request (from 2015- 2016) and the team had sought out value-based partnerships, including the World Meteorological Organization, the Met Office in the UK, academia, and other UN institutions. The collaborative partnership model granted them access to data, resources, and expertise that was not available in-house. With the collaboration of these organizations and with the support of UN Global Pulse, a flagship innovation initiative of the UN's Secretary-General on big data, the team was able to build a model that used meteorological data to predict the refugee population flow into Greece. The Greece experiment was discontinued in 2016, but the insights and partnerships gained during that project prepared organization's Innovation team to respond to the request from the Somalia country office.

Ecosystem: Location 1. For the solution developed in Somalia, the Innovation Service team built partnerships with fourteen organizations to source seven years of data for the experiment. Using supervised machine learning, Org C designed *Carter*, an engine that was fed data and used trained models to predict the displacement of people in Somalia. The ambition of this initiative, the project manager explained, was "*to increase the capability of Org C, in this case, to be able to predict and prepare better*." The project was orchestrated by the Innovation Service in Geneva HQ but in close partnership with teams in the country offices, particularly with the Somalia Country Office, who assisted in sharing the operational context knowledge of the region as well as other sub-units in Somalia who also shared their data (Country Office in Dollo Ado, Melkadida-sub office). The local Regional Hub provided feedback on the project. NGO partners also provided data to aid the development of the project. UN Global Pulse data scientists acted as mentors in data science and artificial intelligence. The Uptake Foundation, a Global NGO, provided technical training to the Innovation Service team. Other NGOs were involved for data collection and visibility. According to the news brief from Org C, "[*These NGOs] data and technical knowledge on climate, weather and market prices is key for the development*

of this project. This data represents those influential factors for [human] movement in an operational context where those who are forcibly displaced, highly depend on them." By 2018, the initiative was able to predict the displacement of persons in eighteen regions in Somalia a month in advance. "*[Carter] has shown us that we can be doing so much more with data, especially when it's openly shared*," explained the data scientist.

Ecosystem: Location 2. After scaling to twenty-two regions in Somalia and being able to predict their migration patterns a month out, the team started to struggle with getting the project to scale further. The goal was to make this initiative the backbone for decision making in the organization. A news brief at the time explained, "*The Innovation Service team hopes that [Carter] will become a standard decision-making tool at Org C*." But when the team was starting to think about scaling to Nigeria with the same partners as in Greece and Somalia, the project was stopped by top management within the organization. The data scientist explained to us, "*The challenges with projects like [Carter] where you are free to select whatever you want is that there is no framework. There are no predecessors that can guide you.*" The project manager went on to explain that there were issues with the perceived ethics of the tool because of the nature of the humanitarian work of the organization, and the biases that could be present in predictive tools and their data: "*If the predictive tools do not work correctly, we are risking human lives, not responding well, or prioritizing something over something else which is a very serious decision with big consequences*." The initiative lead further explained that the organizational culture in the country offices was risk averse and not ready for such a tool: "*I remember a country information management officer in Somalia telling me, 'I don't think Org C is ready for [Carter]. Wait for 5 years, maybe in 5 years they will be, but not right now*."

The above concern resulted in Org C working with the University of Essex Human Rights, Big Data and Technology Project to create a spin-off of the project through the inclusion of satellite imagery for understanding the interrelation between weather/climate anomalies, conflict and displacement. This collaboration was being expanded by joining forces with Omdena - a global group of volunteer AI

engineers that work to solve specific challenges with Artificial Intelligence. The team explained, "*There is a spin-off. And they are trying to expand the scope to work more regionally*." By September 2020, the spin off was still in development phase.

5.4.4 Desai

The Challenge. Org D is the UN agency aimed at improving reproductive and maternal health worldwide. In 2017, the Afghanistan country office reached out to HQ to ask for help mapping and completing the country census. The last census in Afghanistan was done in 1978, which meant that the government and development agencies did not have a complete picture of important variables for decision making. Countries were lacking basic data to understand where to build hospitals or new schools or the impact of diseases, vaccines, and conflict on their populations. This wicked problem was difficult to answer prior to the technology intervention, as it would have required open knowledge flows including into hard to reach, conflict ridden locations which were inaccessible.

Solution Development. As explained by the initiative technical lead, the census problem in Afghanistan was the beginning of the initiative:

> *[Afghanistan] had 12 provinces out of 34 where they connected data, but the other provinces were just inaccessible or insecure or there was too much mobility going on so that they couldn't do a full census in the entire territory. They asked if we had an idea of what could be done in the absence of official stats. We had just come to know [a research program at a UK university] and [an international NGO], together we called the Afghanistan country office who spearheaded the modeling population aspect.*

The query from Afghanistan led to an experiment to understand how to use that data that was collected in the 12 provinces and to use that to create correlations by combining the limited data available with the satellite imagery from those provinces where no data could be collected. The technical lead explained how the HQ team started to experiment with the country office and various data sources to get the tool off the ground. "*We used high resolution satellite imagery that already existed. We also used [research partner] to develop the data sets further using survey data. We also sponsored and funded our own micro-census to get sample data on which we can then further model*."

Ecosystem: Location 1. After a year and a half and many challenges, the team was able to provide solid results to the UN leadership and to the Afghanistan government. "*The President was really happy; the UN was really happy and finally we had numbers at the district level."* The initiative was officially launched in January 2018 as *Desai* which is based on geo-referenced infrastructure and provides demographic data for development. *Desai* works with countries to generate, validate, and use geospatial data on population, settlements, infrastructure, and boundaries. *Desai* combines the expertise of partners in government, UN, academia, and the private sector to design adaptable and relevant geospatial solutions. The scaling process and importance of the country office was explained by the initiative lead:

> *In a first step, country offices ask us for the tool, then we go there and understand the problems they are dealing with and the needs on the ground. I was in South Sudan in February and it's hard to imagine how difficult the situation is on the ground. The government is unable to get the data and innovative solutions are necessary or it would take years.*

Org D country offices are allocated a geospatial mapping expert to help implement the project as well as training on mapping, geospatial ability, as explained by the initiative lead:

> *To increase the capacity in the country office, we develop trainings in open source or the tech of choice that would enable our government partners and local country staff to be able to translate the data into real decision-making power. They can answer questions such as where to develop future sites for schools, for hospitals.*

Ecosystem: Location 2. Eventually, as the tool began to scale to new countries such as Nigeria in 2018, different partners started to join the project. For example, the Gates Foundation came on board for channeling funding from DFID, which had provided a grant for the project, as well as to aid with implementing the initiative for the polio vaccine mapping. The Gates Foundation was looking to measure population growth and create more effective vaccination campaigns, particularly in the context of Nigeria. In addition, a research center at Columbia University was brought in to act at the implementor. A couple of challenges then arose related to the partnerships:

> *What was challenging, was that we were in this partnership with two donors and [research partner] and [NGO] as technical partners, and another agency was brought in with a coordinating role. That was a challenge in determining roles and responsibilities of the partners in the project.*

In addition, the local country office of Org D in Nigeria was also involved as well as the government and the DFID for funding. As explained by the Initiative lead, "*In terms of resources, there is a single donor contact. The money goes from DFID to the Gates Foundation and then to Org D. Org D then distributes the funds to the country offices*." The Nigeria application was meant to assess the effectiveness of the vaccination campaign for polio using the census data.

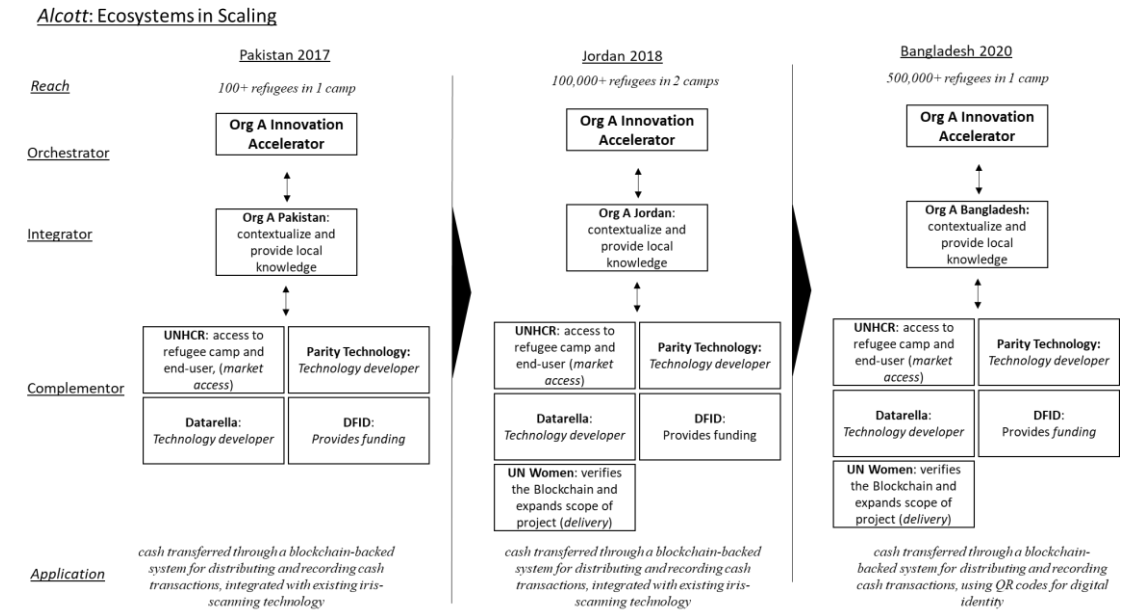
Ecosystem: Location 3. The project then scaled to the Democratic Republic of the Congo (DRC) in 2019, where the application focused on using the census data to support a six-month rapid response measles vaccination campaign effort to end a measles epidemic that killed more than 6,000 people since the beginning of 2019. New health-related government partners came on board in the country for the broader application of the technology and utilizing the extensive network in the country, *Desai* created the key data layers needed to produce the maps. These layers included settlement names and locations; settlement extents; health facilities; health zones and health area boundaries; and road data. In addition, the technology was built up in DRC to add in the semi-automated approach when creating maps.

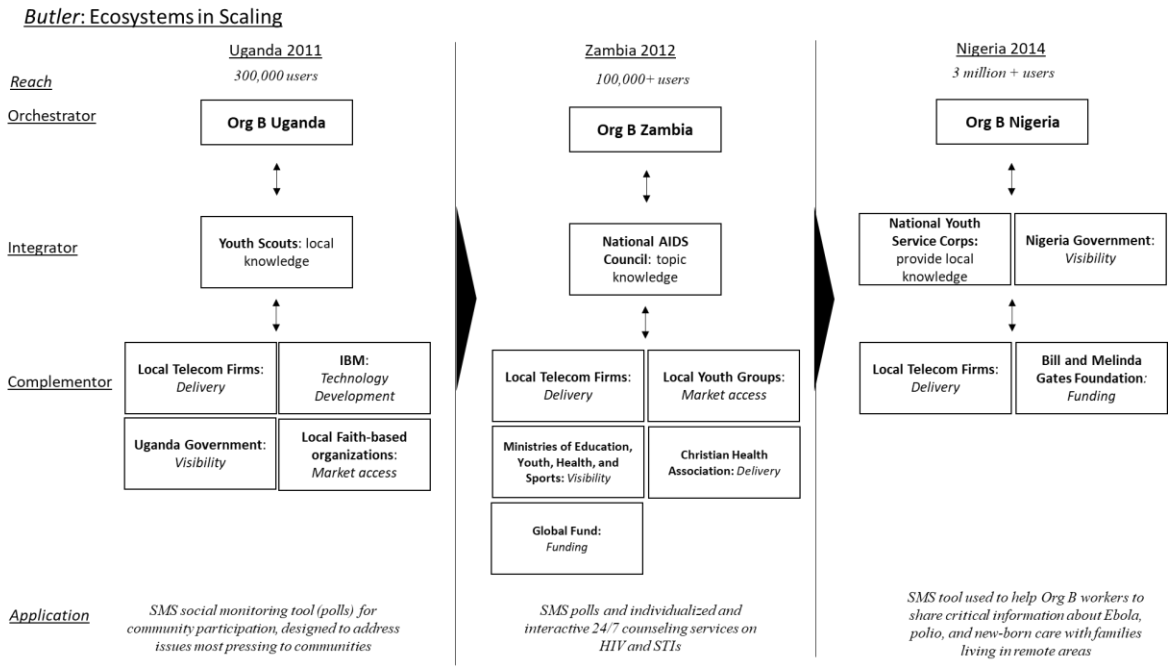
What became challenging for Org D was the implementation then at great scale across countries. The main issue as explained by the initiative lead was around the differences in working speed between the various organizations, particularly with strict timelines and country engagements, which she said, *"…was not in line with how UN agencies operate."* Recruiting new staff was also slow in the organization which made the organization struggle to keep up with the demands of the partners in the beginning of the scaling. Eventually the presence of the country offices on the ground enabled Org D to get their footing back: *"There are no doubts about responsibilities anymore."* By September 2020, the tool had been scaled to Burkina Faso, DRC, Ethiopia, Ghana, Mazambique, Namibia, Nigeria, Sierra Leone, South Sudan, and Zambia.

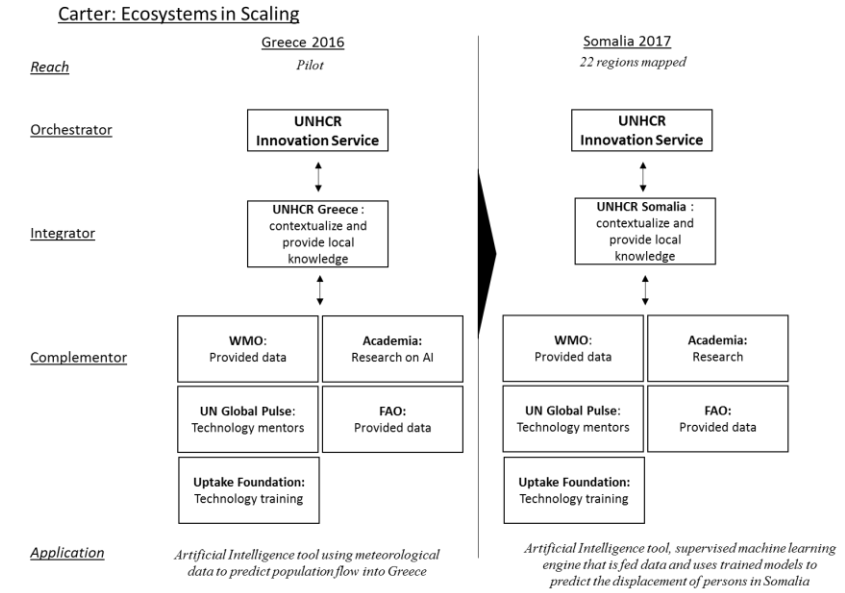
In summary, our findings describe how the ecosystems around digital solutions led by the UN organizations were configured and how they changed during the scaling. Mapping and comparing the ecosystem actors in each new location allowed us to gain detailed insights into the roles needed to

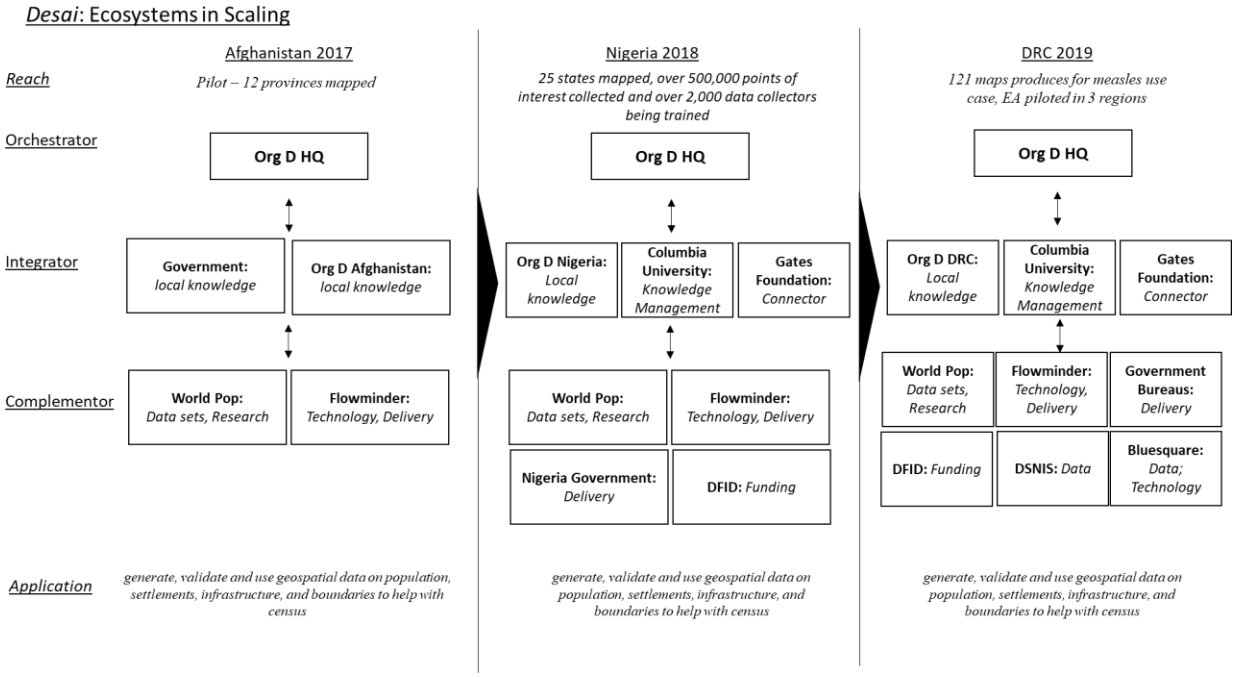
successfully create impact. Figures 4.1a-d provide an overview of these inductively deduced roles and the activities these actors performed and summarize the descriptions in the rich text above. These figures will guide the discussion in the theory development.

Figures 4.1a, 4.1b, 4.1c, 4.1d: Digital Solution Ecosystems in Scaling









5.5 Theory Development

5.5.1 Ecosystem Roles for the Scaling of Digital Solutions

As portrayed in the findings section, the categorization of roles as orchestrator, integrator, and complementor fittingly describes the configuration of the ecosystems. Our analyses further revealed the

specific activities of these actors and the value these activities created for the international scaling of the digital solution.

Within the broader strategy and innovation literature, the orchestrator role is played by a focal firm such as the HQ or subsidiary with the main activity of driving and setting up the ecosystem around the value proposition and focal firm's strategic intent (Dhanaraj and Parkhe, 2006; Iansiti and Levien, 2004). Beyond the hierarchically-determined phase of blueprint creation and partner role-orchestration typically seen in the strategy literature (Autio and Thomas, 2020), the orchestration of the ecosystem during the scaling phases is seen to take on the activities of legitimization, network activation, and organizational responsibility, suggesting that ecosystem orchestration could be viewed as a form of dynamic capability (Teece, 2007; 2014). Similar to prior studies (Nambisan et al., 2019) the orchestration capability facilitated both internal (intra-actor) and external coherence. While the function of resource orchestration is often described for a resource or capability level, our cases highlight the importance of the orchestrator in bringing parties together in support of an idea and its eventual program of work. In this sense, the orchestrator must manage both the problem framing and solution – two aspects that then involve the other two roles of complementor and integrator (Brusoni and Prencipe, 2013).

At the other side of the ecosystem, is the complementor role. Aligning with Williamson and De Meyer (2012), our findings show that the complementors are functional roles that provide value creating activities such as technology development, funding, market access, research, visibility, and delivery. These complementors were global actors and stayed relatively stable in the ecosystems of *Alcott* and *Carter*, but consistent with the affordances created by the layered modular nature of digital architectures, they changed between local and global partners in *Butler* and *Desai*, depending on the end-user needs in that location. Developing these new partnerships was crucial for the ecosystem to activate the potential affordances of scaling the digital solution as it engendered a recombination of knowledge to create avenues to new applications.

Most importantly, our findings shed new light on the integrator, which acts as the connector between the orchestrator and the complementors, channeling knowledge between them by providing access to local knowledge and partners that contribute to the ecosystem. Some prior studies have not separated the integrator role from the orchestrator (Dedehayir et al., 2018), but our findings show that in the context of the international scaling of digital solutions, the layered and modular nature of the technology further focuses the integrator role, even as it enables new integrators to participate in new locations (for the case of *Desai*). This then becomes key to enabling the generativity and data feedback loops by facilitating the participation of diverse end-users, each with specific needs. While this role may be particularly salient in the focal context, technology projects for complex problems generally require not only a technical implementation such as project management, but additional roles that "integrate" the soft knowledge of requirements, stakeholders needs, buy-in and actions, and partner incentivization (where financial motives are not strong enough), both within the local and global environments. In summary, our results specify different ecosystem roles, and their activities as critical for the scaling of digital solutions. We show these in Table 3 and suggest the following proposition for future research:

> *P1a: The Orchestrator mobilizes the network and provides legitimacy for the scaling of the digital solution.*
>
> *P1b: The Implementor enables access to local knowledge and partners - activating the affordances of the scaling of the digital solution.*
>
> *P1c: The Complementor grants access to the end-user - enabling the generativity and data feedback loops necessary for the digital solutions to scale.*

Table 4.3: Ecosystem Roles for Scaling of Digital Solutions

Ecosystem Roles	Primary Activity	Driver of Ecosystem Configuration in International Scaling
Orchestrator	Ideate and set up the ecosystem around the idea (Iansiti and Levien, 2004; Dhanaraj and Parkhe, 2006)	*Legitimization* *Network activation*
Integrator	Contextualize and provide local knowledge	*Knowledge Access* *Partner Access* **Enables the affordances and recombination of knowledge to create new application avenues*
Complementor	Assist in on the ground delivery and access to end-user through value-creating activities (expanding on Williamson and De Meyer, 2012)	*Delivery* *Technology Development* *Funding* *Market Access* *Research* *Visibility* **Enables access to end-user for generativity and data*

5.5.2 Ecosystem Versatility

The analyses of digital solution's ecosystems during their scaling showed that they exhibit different degrees of changes across different locations. Contrary to previous studies on ecosystems, our research not only captures the perspective of a central platform or anchor firm and its network (Li et al., 2019; Namabisan et al., 2019) but includes fine-grained patterns depicting which actors inside an organization were involved, which global and local partners were activated or substituted and how the ecosystems reconfigured over time (Dedehayir et al., 2018). Figure 1 provided a detailed overview of the ecosystem patterns. It showed clear differences between the two cases (*Butler* and *Desai*) where ecosystems were heavily reconfigured to fit the requirements of the environment, and those (*Alcott* and *Carter*) where ecosystems were replicated without major changes. The implementation of *Desai* and *Butler* was driven by different local constituencies, prompting the ecosystem to be reconfigured each scaling location. For *Alcott* and *Carter*, on the contrary, the ecosystem configuration was the same for all three locations, with all the same actors involved in the same roles. *Alcott* was implemented in refugee camps across several countries, and while the countries vary, the partners in this specific setting

stayed the same. We refer to this distinct property as *ecosystem versatility* - defined as *the degree of change in the ecosystem in each new implementation of the digital solution*. This may include the change of the type of network partner (e.g. MNC, NGO, or government) or the locus of the partner (global or local actor) at the orchestrator, integrator or complementor role.

In three cases, the HQ was the driving and orchestrating force in scaling, while in *Butler*, the local subsidiaries took the lead. If ecosystem versatility is high, not only the local actors change, e.g. one would expect a local NGO to take over in a new country, but also the overall configuration is changed. For example, even though some of the partners in *Desai* had global postures, the integrators changed every time. *Desai* initially started with a small group of partners consisting of the organization, an international academic research partner, a for-profit research and technology firm, the local subsidiary and government. With each scaling location, the ecosystem grew to include more and larger actors who would step into the key integrator role. It was a surprising finding to see integrators change in the scaling process. This highlights the need for integrators to have local knowledge access, and to be more hands-on in local partner management. Versatility emerged out of a necessity to respond to institutional diversity during the scaling process.

In contrast to many previous IB studies, ecosystem versatility as a concept goes beyond a perspective of replication or adaptation across countries. Ecosystem versatility is associated with the diversity of the institutional context (rather than country differences) and exposes the global and local locus of organizations for scaling digital solution. These insights provide an extension to IB theory as well as the way ecosystems are conceptualized. It adds to previous studies using the ecosystem lens from the perspective of a single MNC to analyze internationalization in weak institutional environments (Parente et al., 2019) to examine the implications of reconfiguring business ecosystems in diverse institutional environments (Li et al., 2019) when scaling solutions globally from the perspective of the ecosystem as a whole. Based on these insights, we formulate the following proposition:

P2: Ecosystem Versatility is defined as the degree of change in the ecosystem in each new implementation of the digital solution in terms of types of partners or locus of partners at the Orchestrator, Integrator or Complementor role and arises due to the need to address diversity in institutional requirements across locations.

5.5.3 Components of International Scaling for Digital Solutions

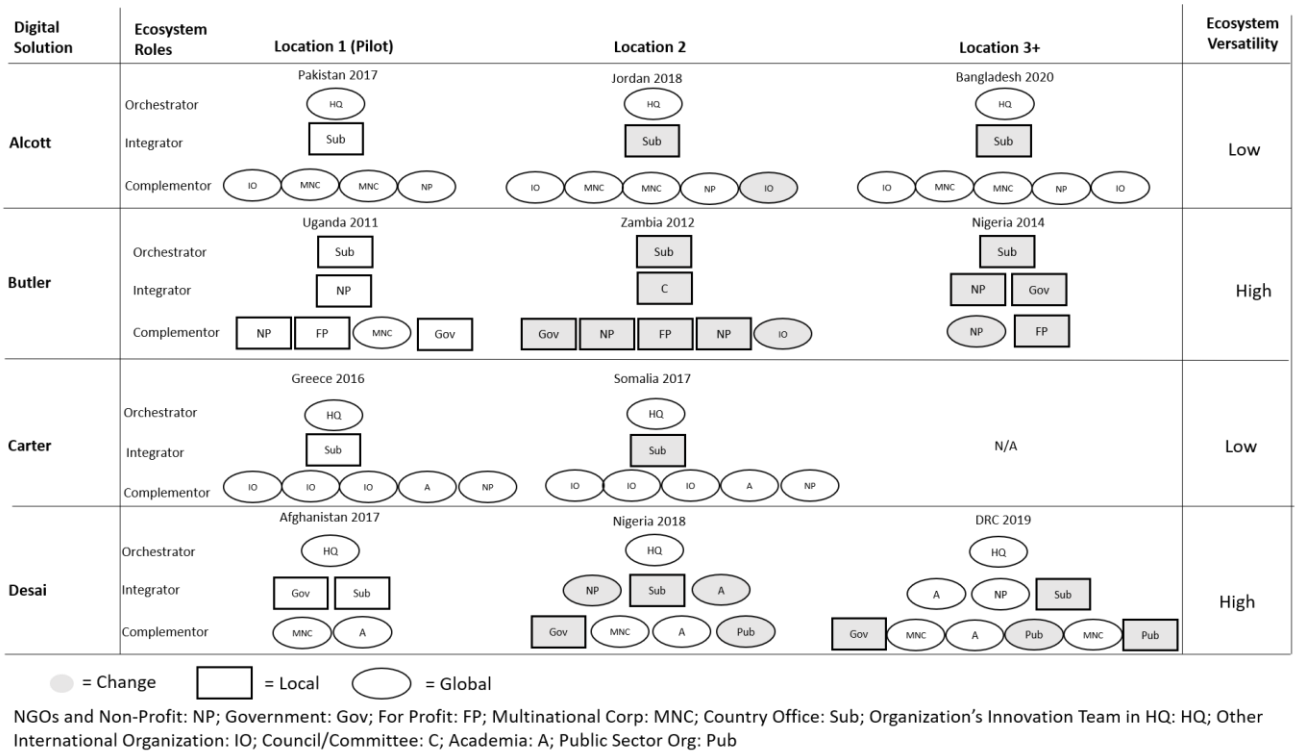
The cases reveal that the international scaling of digital solutions requires complex interactions of the core digital technology and the ecosystem. But they also differed in the manner of the local adaptation of the technological application. For example, *Alcott* is designed for a particular functional purpose, so that its application does not vary significantly across countries. Despite being applied to different uses, *Desai* also pursued a rather standardized application approach. *Butler*, however, involved different applications that were situated to specific cultures. Most interesting is that as the initiative scaled, contextualizing its goals and usage to each location, its technological capabilities also developed over time moving from being a pure SMS platform, to using social media platforms, digital messaging providers, and eventually AI enabled chatbots – illustrating the powerful nature of the modular systems. *Carter* kept a similar ecosystem network from the pilot of the digital solution in Greece to the second scaling in Somalia, but the application changed from using predictive analytics based on meteorological data for population movements, to using predictive analytics based on new local variables for measuring displacement from Somalia. These observations lead us to present the following proposition:

P3: International scaling of digital solutions consists of three components of which: the digital technology remains standardized, while the ecosystem and the application may change across locations.

The three propositions are summarized in the theoretical model shown in Figure 2. To scale internationally, digital solutions need to address three key challenges: First, institutional diversity, where differences in the institutional contexts for which the solution is implemented are addressed by versatile ecosystems which are reconfigured according to the different requirements the context exposes. Second, tackling the newness of the technology, the generativity, modularity and affordances are enabled in each new location. Third, the centrality of addressing local needs for the successful application of the digital technology sometimes requires a local adaptation of the entire application

based on end-user needs. The presence of these digitalization challenges determines how the three components change or remain stable over time.

Figure 4.2: Evolution of Ecosystem Configurations during Scaling



5.5.4 Types of International Scaling for Digital Solutions

Based on the recombination possibilities of the three components of a digital solution, our research suggests four different types of international scaling (as shown in Figure 4.3). The case of *Alcott* aligns more closely with the IB literature on replication or standardization of products (Jonsson and Foss, 2011) and shows in a *replication* of all three components. *Carter* portrays the second way how a digital solution can scale: by maintaining the ecosystem configuration but changing the local application of the tool. We call this *adaptive localization*. The third type of scaling is through standardizing the application but adapting the ecosystem with each new location (high ecosystem versatility). For *Desai,* institutional legitimacy and close interaction with the local public sector was key for the success of its solution based on the nature of the tool and institutional end-user so partners

had to be adapted in each new country. We called this *versatile integration*. And finally, the fourth way is for the digital solution to change not only its ecosystem but also the application of the solution. This *versatile adaptation* was seen in the *Butler* case which adapted its partners in each new location as well as by changing the problem focus of the tool, despite continuing to use the same core technology as the system's backbone.

Figure 4.3: Theoretical model

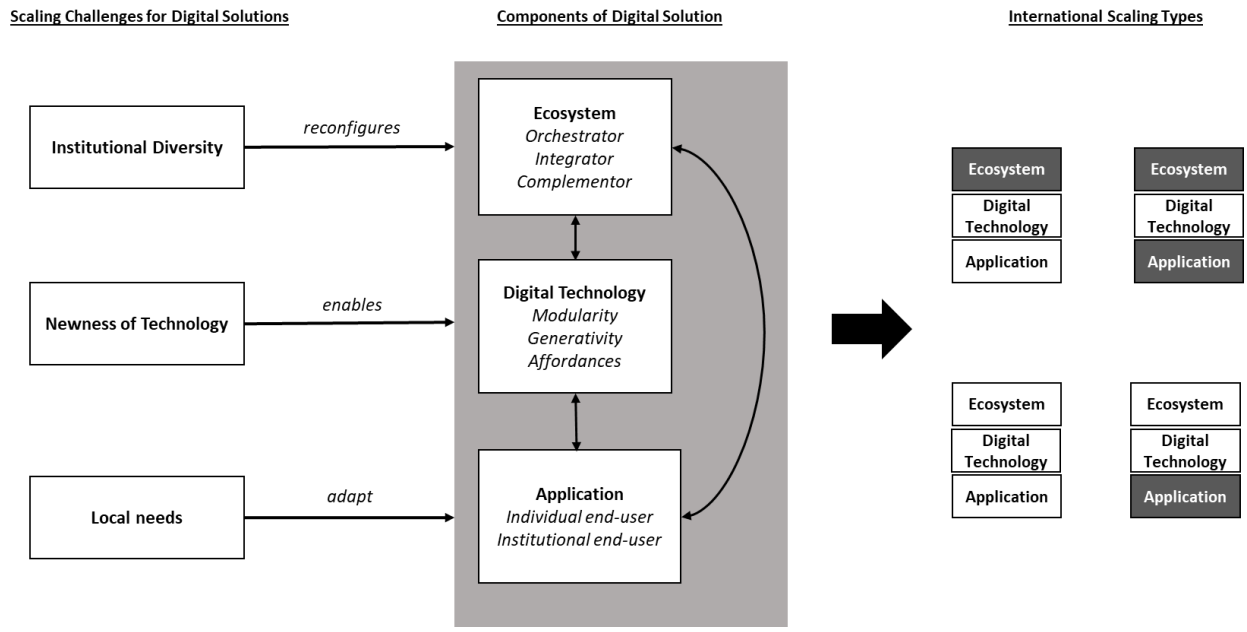
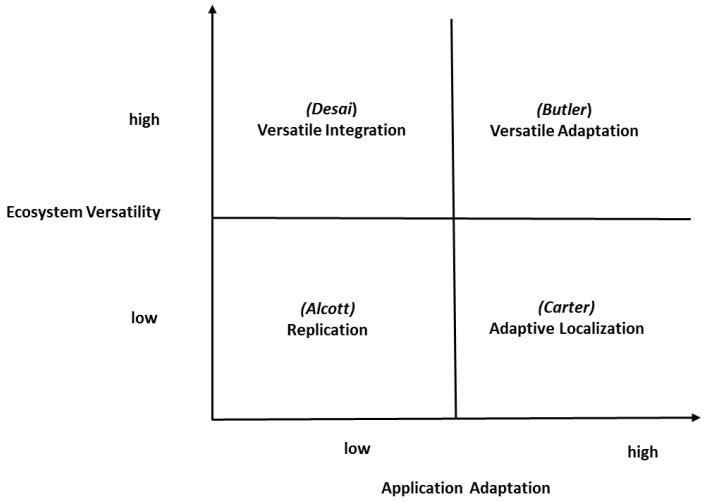


Figure 4.4: Theoretical framework: International Scaling Types



While the lower quadrants of Figure 4.4, *replication* and *adaptive localization*, align with existing IB theory, which focus on the standardization and adaptation of products, *versatile integration* and *versatile adaptation* are counter intuitive. We see the main differences of these cases rooted in their ecosystem versatility. In the cases with low ecosystem versatility, we observe classic headquarter-subsidiary structures where the headquarter used the local subsidiary as an intermediary to guide local implementation. It was somewhat surprising to see that the complementor role was taken by global (not local) partners, as one would expect the parts of the network connecting to the end-user to be purely local for maximum adaptation. Given the modular nature of the digital solutions it makes sense that the actor in this role could change to meet the requirements of the nature of the solution, its end-user and the context. And finally, these solutions were found to have a slower scaling speed.

In these cases where ecosystem versatility was high (*Desai* and *Butler)*, we see that the integrator role changed with each scaling. In addition, we see a combination of global and local complementors. And finally, these solutions scaled much faster than the others. *Butler* scaled to eleven countries in the first three years of existence and *Desai* to ten countries. While in the same amount of time, *Alcott* scaled only to three countries and *Carter* to one country. This finding is very counterintuitive as IB theory suggests that high levels of replication or standardization should be associated with higher efficiency and higher internationalization speed (Musteen, Francis, and Datta, 2010; Schu, Morschett, and Swoboda, 2016; Vermeulen and Barkema, 2002) and what we see here is the opposite of that. This may speak to the affordances created by the modular, layered nature of the digital technology, which ultimately allow the standardization of the technology, but permit the ecosystems and application to change to answer the diverse needs of the end-user.

5.6 Discussion

Addressing the question how digital solutions for wicked problems are scaled across locations, our study makes three contributions to the literature. First, we uncover different ecosystem roles and their contribution to the international scaling of digital solutions. Similar to Nambisan et al. (2019), we

find that digital solutions not only radically reshape the nature and structure of the global economy but also the interconnected nature with which MNCs can work with organizations in other industries to address the world's most pressing needs, as well as the specific roles necessary for such collaborations. These insights add to the scarce literature that has focused on specifying the roles of different ecosystem actors (De Meyer and Williamson, 2012) and the roles played in digital solutions ecosystems' for global reach (Li et al., 2019; Nambisan et al., 2019).

In the context of UN agencies, the application of the orchestrator-integrator-complementor framework not only revealed the deep embeddedness of local problems but also the need for digital solutions to be managed by networks of different partners (rather than owned by a single organization), as shown in previous work on distributed social innovation (Oborn et al., 2019). Owing to our specific research context, we uncover the role of the orchestrating organizations (the UN agencies) as ethical gatekeepers in digital solution scaling. We see that the UN agencies were able to add value through their global charter and status, as well as through the legitimacy created over many years of access to local partners and beneficiaries in the field. This provides an interesting avenue for future researchers to build on when looking to understand business ecosystems, as digital solutions are facing increased ethical concerns, both in the non-for-profit as well as in the for-profit domain. Orchestrators may serve that ethical role but need to interact with and be informed by their complementors, as technologies can change, and applications consequences can be unintended or only realized after initial experiments. The rise of tech savvy "digital natives" across populations is leading to important transformations, including global societal changes (Vodanovich, Sundaram, and Myers, 2010) and complementors can act as the link to enable a change in the interaction between the organizations and these beneficiaries. The access to data is also transformative for many organizations (Davenport et al., 2012) to understand their beneficiaries and their needs. Our study showed the critical role of the integrator, a role previously not well defined in the literature, possibly due to its incorporation into the focal firm as orchestrator. Given the layered nature of digital technology, in a cooperative setting, the orchestrator can afford to give up

its architecting responsibility, and to focus on soft issues as legitimacy, and the partnerships and the application itself. We see that often large bureaucratic organizations are unable to connect with the complementors directly (Ambos and Tatarinov, 2021) and require partners to source localized knowledge. While the emphasis on the integrator role may be context-bound, we propose that the three different roles are generic and driven by the characteristics of digital solutions.

Second, we introduce the concept of ecosystem versatility. This concept goes beyond a perspective of replication or adaptation of partnerships and collaborators, instead, exposing the nuanced interactions between the global and local reach of organizations. As such, it provides a more granular perspective that makes the literature of ecosystems more applicable to internationalization challenges. Further, it can be an important extension to IB theory by virtue of conceptualizing internationalization, and specifically, scaling beyond the MNC or the international new venture. Recently, many calls have been made to make IB theory more adaptable to the digital world, such as for conceptualizing firm-specific advantages (Banlieva and Dhanaraj, 2019) or global value chains (Strange and Humphrey, 2019). A new perspective on how the idea of ecosystems can be conceptualized for internationalization of digital solutions has so far been missing.

Third, we empirically tease out the components of a scaling digital solution. These components are 1) the ecosystem, comprised of the network of roles highlighted above, which are necessary for the digital solution to scale effectively; 2) the core digital technology, which is characterized by its modularity, technological affordances, and generativity; and 3) the application of the solution which adapts to local needs. Technology-based development projects depend on scale to achieve success, but given the high chances of failure, organizations have to mediate these risks by developing versatile ecosystems with strong local components (i.e. *Butler)*. The activities show that there is a need to have strong localization and end-user access in all locations to be able to scale. This is a choice between learning about the end-user oneself (Hart, 2005) and including actors in the ecosystem who already have trust and legitimacy with those users, particularly in contexts where social capital is salient. This

final point is counterintuitive as it creates friction with the idea that standardizing products and partners globally generates the greatest value-add and success. Contrasting these insights to the literature on international scaling, our framework provides a different approach to how digital solutions for wicked problems scale internationally.

5.7 Limitations and Conclusion

This research sheds light on the challenges of scaling digital solutions that seek to address wicked problems. Applying an inductive research design, we provide fine-grained detail on the global-local and intra- and inter-organizational dynamics of ecosystems during the international scaling process. The limitations of this work are related primarily to its inductive nature and its specific context. While taking great care to avoid informant biases and retrospective sense-making through the methodology, the nature of the data does not allow one to rule out biases completely. The variety of fields and applications in the study also made it difficult to develop more fine-grained measurement for the impacts of the partnerships within the ecosystems, which can be an important avenue for future studies. Another limitation of the study is that due to the challenge of identifying rare cases and gaining detailed data access, the solutions were sampled from four different organizations and based on different types of technologies. While the data showed neither systematic variation across these organizations nor related to the type of technology employed, we recommend future research in one single organization to create more detailed accounts on specific organizational processes and contingencies. We would also envision future research to test our propositions and collect quantitative data around the new constructs we develop.

The choice of our research context was based on the salience of the focal phenomenon. Naturally, our findings are embedded in this specific context of digital solutions driven by UN agencies and their relevance to a pure for-profit context will have to be confirmed by future studies. However, it may at least inform MNCs how to drive greater cross-industry collaboration when addressing the world's wicked problems. We would urge future researchers to continue moving in this direction of

bridging the social-business divide and to explore more deeply the coordination mechanisms of these ecosystems needed for global scaling. Effectively, through the fine-grained ecosystem maps that emerge in our findings, we build deeper knowledge on a previously overlooked phenomenon in IB.

6 Overall Discussion

This dissertation focuses on the management, structuring and scaling of innovation in International Organizations. The three articles advance our theoretical and empirical understanding. This thesis contributes in two main ways: first it opens up a new area, namely the phenomenon of innovation in the social, non-profit context; and second, it provides empirical data on this new phenomenon (based on Allen Newell) through three units of analysis: the initiative level, the organizational level, and the ecosystem level. The first study empirically showcases that nonprofit intrapreneurial initiatives can contribute to an organization's responsible innovation capability via competence development, structural alignment and mission stretch. Moreover, digital initiatives scaled with the help of the headquarters imprinted new learnings and routines on the organization, leading to further transformation. The second study gathers empirical data on a new phenomenon of innovation units in social contexts and uncovers that these units not only perform their mandate to generate innovation outputs, but they also create value through building relationships within the organization and in the ecosystem. By taking a broader relational perspective and defining relational value as the set of relationships and the resources embedded in them that help the organization achieve its objectives, this study builds theory to open a wider lens for examining innovation units and the impact they can make within an organization. The third article empirically analyzes ecosystem scaling and shows the importance of localization and ecosystem reconfiguration when scaling digital solutions. It adds to a refined conceptualization of ecosystems, and in particular their versatility exhibited during scaling. Furthermore, this paper adds to a new agenda of International Business theorizing, adapting our theories to the digital business reality of this world as well as to the context to wicked problems. This research addresses digital technology scaling while showing how MNCs can learn from new contexts to drive greater cross-industry collaboration when addressing the world's social problems.

6.1 Theoretical Contributions

The three articles in this dissertation contribute to the ongoing debate on how innovation can act as a renewal mechanism for large, bureaucratic, globally dispersed international organizations with social, nonprofit missions. The first study examined scaling at the initiative level and the contributions to the literature are threefold. First, I advance the conceptual development of responsible innovation literature by identifying an organizational capability for responsible innovation (Owen et al., 2012; Seelos and Mair, 2013; Stilgoe et al., 2013; Voegtlin and Scherer, 2017) that manifests in competence development, structural alignment, and mission stretch. Second, by extending the literature on for-profit intrapreneurship in large, complex organizations (Burgelman, 1983; Birkinshaw, 1997; Kistruck and Beamish, 2010; Raisch and Tushman, 2016) to the specific socially oriented contingencies of international organizations, I define nonprofit intrapreneurship and characterize its tensions, scaling patterns, and outcomes. Specifically, I show how different intrapreneurial scaling mechanisms mitigate concrete tensions in the organization between "doing good" and "doing no harm." Finally, I find that compared with initiatives that scale from country to country, initiatives that scale through headquarters lead to a systemic organizational imprinting (Marquis and Tilcsik, 2013) and a greater impact on an organizations' responsible innovation capability. This extends the theoretical discussion that nonprofit intrapreneurship can foster organizational learning for digital transformation (Christensen et al., 2006; Hess et al., 2016; Nadkarni and Prügl, 2020) and provides an important insight about how international organizations can achieve greater impact from responsible innovation.

The second article focuses on an organizational perspective. I contribute by painting a vastly different picture of how innovation units operate than that suggested by the extant literature. According to the established view (developed in for-profit organizations), innovation units tend to emphasize the development of tangible products and technologies with a view to capturing value. My alternative view (observed in nonprofit organizations) shows that innovation units emphasize the development of intangibles through relationships (internal and external) with a view to creating value that is not owned

by any one party. There is also a big difference in the role or mandate of the innovation unit. According to the established view, innovation units need clarity in their goals to ensure their attention is focused on the right types of opportunities (Locke, 1996; Stetler and Magnusson, 2015). My alternative view shows that innovation units benefit from having relatively ambiguous goals (e.g. Brun and Saetre, 2009) and create additional value when allowed to oscillate their attention back-and-forth between internal and external audiences. These differences are partly a function of the contexts in which the research was conducted, but also suggest that a wider lens on innovation units' value creation is warranted.

The third article focuses on the ecosystem level and adds to the literature on how digital solutions scale internationally. The first contribution is a framework specifying the roles different actors play in ecosystems during the internationalization process of digital solutions, advancing the scarce literature on ecosystem configurations to address different institutional contexts (Li et al., 2019; Nambisan et al., 2019; Williamson and De Meyer, 2012). Second, I propose the concept of ecosystem versatility as a property of a digital solution's ecosystem, which I define as the degree of change in the ecosystem in each new implementation of the digital initiative. This highlights the interaction between the global-local configurations in the internationalization process and thereby contributes to recent efforts to extend internationalization theory to the digital world (Banlieva and Dhanaraj, 2019; Coviello et al., 2017; Strange and Humphrey, 2019). Third, my study derives four different types of scaling for digital solutions which vary in their ecosystem versatility and local adaptation of the application. These insights add to the discussion around adaptation and replication; in particular, in relation to wicked problems in development contexts, it shows the need for localization and adaptation of technology through different partner configurations, to create greater impact and value (Busch and Barkema, 2020; Chilova and Ringov, 2007; Kistruck et al., 2013).

6.2 Limitations and Future Research

The limitations of this work are related primarily to three main issues: the inductive nature of the methodology, the specific context, and the breadth of the sampled data. Regarding the methodology,

the three parts of the thesis are based on qualitative analysis, relying primarily on first person interviews. While taking great care to avoid informant biases and retrospective sense-making through the methodology, the nature of the data does not allow one to rule out biases completely. The variety of fields and applications in all the studies also make it difficult to create generalizable impact metrics. For example, in the first study, the variety made it difficult to measure success of the initiatives. In the second study this variety made it difficult to develop more fine-grained measurement for the impacts of the partnerships within the ecosystems. Studying less varied applications would allow future researchers to developed more detailed metrics around the impacts of partnerships, specific technological initiatives, or certain geographical areas during the scaling process - which can be an important avenue for future studies. In general, using a qualitative methodology, while it allowed me to build theory, did not give me the necessary data to test that theory. The interview-based data collection did not provide me the necessary quantitative data to measure empirically my results. For example, if I had quantitative data in the first study, this would have enabled me to test the different types of organizational impact which I propose. In the second study (on innovation units), such data would have enabled me to test growth and quantify success. And in the third study, this data would have enabled me to measure the true scale/reach of the initiative as it scaled as well as to potentially test the contribution of each player in the ecosystem. To summarize, the qualitative methodology allowed me to generate propositions through my work but did not allow me to test those hypotheses.

Regarding the context, the setting of international organizations, specifically UN agencies, helped surface new insights on the nature of responsible innovation tensions, innovation unit value creation and ecosystem roles. While the context was unique and salient due to its bureaucratic and change-averse systems, the context did not lend itself readily to generalizability to other sectors. The characteristics of the UN agencies are vastly different to any other context and while some parallels can be drawn to certain MNCs or social enterprises, the major limitation of my studies is the ongoing question of whether the empirical data I uncovered and the theories I developed are generalizable to

other large bureaucratic organizations (such as private banks or public sector institutions) or specific only to the UN. Without testing these theories in other settings, the answer to that question will remain unknown.

Finally, due to the phenomenon driven nature of this dissertation and that I was researching a topic and context previously unaddressed in management research, one limitation of my work is that I had to opt for breadth rather than depth in the data collection. In trying to understand as much as possible about the emerging topic, I sampled as many self-selected initiatives and organizations as I could find. This, while giving me a broad overview of the phenomenon and gaining detailed data access, meant that the initiatives were sampled from five different international organizations in the first study, four different organizations in the second study, and again four in the third study. While the data did not show any systematic variation across these organizations, it did not provide for the type of depth that is desired in empirical research.

Based on these limitations, I have three main recommendations for future researchers. Regarding the methodology, I recommend that future researchers test my empirically developed propositions through collecting and analyzing quantitative datasets on these topics. Impact metrics are an extremely challenging topic for academics and practitioners alike when it comes to innovation and organizing innovation. This will likely be a key field in the years to come and correctly collected and analyzed quantitative data will be key to uncovering new angles.

Regarding the depth of the sampled data, I recommend future research in a single organization to create more detailed accounts of specific organizational processes and contingencies. While all these organizations were UN agencies, it would still be interesting for future researchers to delve into a longitudinal process study in one organization to reduce variation created through specific modalities of individual agencies. Another potential avenue would be a process based longitudinal study of the evolution of a single initiative and its impact on its organization of origin.

Regarding the context, I would urge future researchers to continue moving in this direction of bridging the social business divide and to explore more deeply the coordination mechanisms of ecosystems needed for global scaling; the multilateral broader activities and impact created by innovation units; and the parallels that can be drawn from our empirical findings in this specific context to that of other industries and settings. Furthermore, the international organizations are increasingly becoming transparent and open to collaboration, which I believe provides a fertile ground for young researchers to conduct cross-sectoral data collections using a mixed sample from public sector, private sector, and international organizations.

7 Conclusion

This dissertation comprises three studies taking three different views on innovation as a renewal mechanism for international organizations, approaching the topic from the initiative level, the organizational level, and the ecosystem level with a strong empirical backbone for each study. The phenomenon driven work delivers cross-cutting value to several academic debates, including those on innovation management, managing grand challenges, and digital transformation. By opening a deeply understudied context, this dissertation creates a potential avenue for future researchers to draw parallels between the global bureaucratic UN agencies and equally global and bureaucratic MNCs. The findings are promising also in that they show the cross-sectoral potential for delivering global impact through innovation as well as revamping institutions that are important actors for development and humanitarian sectors globally.

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9 Appendix

9.1 Representative Quotes of Scaling Mechanisms

Scaling Theme	Representative Quote
Organically Scaling	
Self-Sustaining	
Country office must generate own funding for initiative	"Each country office needs to make the push for the tool and to generate their own funding such as seeking funding from donors." – *S-Voice*, *Initiative Champion*
Seed funding efforts led by country office	"The teams were qualified under a "Innovation Challenge Fund" called by [our] Regional Office in Bangkok. On August 16, 2016 both teams were provided with 60% advance required (USD $12,000 and USD $3,000) for building the technology that can help ease more than 5,000 micro entrepreneurs who rely on [this type of yarn]." – *P-Yarn*, Initiative Champion
Reliance on local resources	"We rely on local technology and network providers to give us the discounts to make the tool work. Each country office finds these providers locally." – S-Voice, Initiative Champion "Working our way through a number of electronics shops in West Nile region, we initially found an amplifier, solar battery and loudspeaker option – not a perfect solution but good enough to start testing within just a few days." – P-Moto, Refugee Camp Leader
Lateral Knowledge Transfer	
Learn from and exchange knowledge with other countries	"The representative came to visit us and went to the field, she got to know the [initiative] very well, so because of that connection and her connections in Georgia, it is how we connected. And then we went to Georgia–including the Secretary of the Ministry here -we had a lot of discussion about how they are doing, what are doing, a lot of sharing was there. And later, the Georgian team came to Nepal, they also saw. That it is how it developed." – P-Yarn, Initiative Champion "A few years ago a friend working with [I-NGO] slapped a [P-Moto] sticker to my laptop and excitedly told me about the organization's new project in South Sudan." – *P-Moto*, Refugee Camp Leader
Beneficiaries voice problem and engage with initiative	"To work, the idea needed to evolve organically and quickly to the context. With [refugee beneficiary] leading this evolution he was able to continuously make contextually appropriate improvements. He created value from the initial idea – simply put, this is innovation." – *P-Moto*, Refugee Camp Leader
Autonomous Adaptation	
Country office chooses implementation	"There is no top down push to use the initiative. Each country office focuses on a locally relevant topic of [initiative] deployment. For example, in Pakistan, the country team focused on a topic considered taboo, female menstrual hygiene." – *S-Voice*, Former Initiative Lead Pakistan, now Global Initiative Lead
Scale and contextualization chosen locally	"Each country office where [initiative] scaled to, deploys the tool for a specific purpose. In Italy, for example, the tool is used on a smaller scale. It is made accessible to migrants from Cameroon in order to build a community and share information easily. The tool was activated in Guatemala after the volcano in order to better understand where the damage was and to spread information about the danger." – *S-Voice*, Former Initiative Lead Pakistan, now Global Initiative Lead
Partners chosen locally	"As a result of the pilot's success, the Government of Nepal will scale up the initiative with additional funding to produce and install the machines in another 22 districts within the next year (2016)." – *P-Yarn*, Initiative Team
Strategically Scaling	
Global ideation	
Headquarters aids in conceptualizing the initiative	"The team in Dollo Ado initially requested assistance in scenario-building, but by this time, former members of [tech company] had re-joined the Innovation Service, and their experiences had already proven that the right data and partnerships could lead to a new proactive and predictive methodology." – *S-Movement*, Innovation Team Lead
Global planning of deployment	"It is now being implemented in Nigeria, Democratic Republic of Congo, Zambia, Mozambique and S Sudan. The project in Afghanistan was completed in 2017. 14 other countries have already asked for the tool to be implemented there as well (including Iraq, Burkina Faso, and Mali) but we will take that decision as our resources are less than the demand." – *S-Map*, Initiative Lead

Scaling Theme	Representative Quote
Headquarters develops global partnerships for the initiative	"The program continues to explore new strategies around connected learning and explore new partners who are interested in joining the effort, such as Google. It's now hardwired into the programming of our organization." – *P-Edu*, Innovation Team Lead
Resource Support	
Expert sent to the field	"In a first step, country offices ask us for the tool then we go there and understand the problems they are dealing with. Try to understand the needs on the ground. After that, it is down to the country. I was in South Sudan and February and it is hard to imagine how difficult the situation is on the ground. The government is unable to get the data and innovative solutions are necessary or it would take years." – *S-Map*, Initiative Lead
Organizational support from regional office	"There are 2 full time staff who provide program oversight across the four countries located at [our] regional office." – *P-Edu*, Innovation Team Lead
Headquarters enables access to the technology	"We enabled the access to the technology. But the secret was how to adapt it." –*P-Food*, Business Dev Lead Innovation Accelerator
Headquarters sources funding	"In terms of resources, there is a single donor contact. The money goes from [government agency] to [large foundation] and then to [our International Organization], which then distributes the funds to the country offices." – *S-Map*, Initiative Lead
Knowledge and Performance Management	
Standardized metrics and monitoring	"[we] have been working with [large foundation] to understand the difference between outcomes and outputs. While measures like 'classroom size' are an important indicator to tell us how many students use the program and theoretically how much attention each student receives (outputs of the program), it is not the best indicator for measuring the quality of education (program outcome). The outcomes are what really need to be measured to tell us if our program is having the impact we want it to have." – *P-Edu*, Innovation Team Lead
Managing knowledge flows	"My activities as the team lead is to fully oversee the project and recruit those individuals that will be placed in the field. I provide high level guidance for the implementation and guide colleagues in the field to create an enabling environment…. I have to make sure the information flows well." – *S-Map*, Initiative Team Lead

9.2 Responsible Innovation Capability Themes and Representative Quotes

Capability Theme	Representative Quote
Competence Development	
New development priorities	"[Our] strategic plan now includes 1 strategic area for Innovation. This is split into a. enhancing efficiency and b. reaching more people, cheaper. [sic] Once [headquarters] started seeing the scale plus the use, there was a huge mindset shift." *S-Voice*, Innovation Lead
Faster learning	"After the first localized unit, within the first year, we wanted to directly reach 1000 people – which we did with the 50 units. For this year, we want to multiply this by 5 and are on the path to get there." *P-Food*, Innovation Lead "The initiative has allowed [our organization] to support census' and has cut time, energy, costs with supporting these activities – I believe it has reduced the cost by half just in the 1 year and 9 months we have been implementing." *S-Map*, Initiative Champion
Developing technology skills	"Initially we had to partner with a technology provider to get this off the ground, but now we have trained our team and brought in new people to be able to run this on our own." *S-Movement*, Innovation Lead "Capability internally is increased through the training programs we provide to the government staff. These trainings are facilitated and joined by the country office staff so also increases the capability of [our organization]." *S-Map*, Initiative Champion
Structural Alignment	
Bridging existing teams/competences	"The project was handed over from innovation unit to education. They now run the program 100% although it took 6 months to completely move over." *P-Edu*, Innovation Lead
Structures for creating new competence/expertise	"The initiative led to the development of a team in the headquarters in New York. I lead the team and have 2 colleagues to provide program support. It is a small team from the [organization's] side with a total of 9-10 people. The existence of our team has really strengthened the geospatial capacity of [the organization] and we are now moving towards establishing an enterprise approach to geospatial activities within the next 2 -3 years." *S-Map*, Innovation Lead
Mission Stretch	
Additions to existing value chain (vertical integration)	"We have real-time consolidation in the finances. We are saving fees by not using the banks. Before we had to create many bank accounts, but now we go through a virtual wallet. The money goes directly from [the organization] to the beneficiary." – *S-Cash,* Innovation Lead
Replacement/disruption of value chain	"[This initiative] I believe has also led to the development of another project which collects census data in one place and disseminates /maps it. This new initiative is being developed and enabled by geospatial mapping. [The initiative] has enabled this initiative just by aligning for use case development. This platform will further build capacity at a country level. We are merging two work streams here and it's a big value added." *S-Map*, Initiative Champion

9.3 Intrapreneurial Initiatives and Their Internal Influence

Initiative	Scaling Mechanism	Responsible Innovation Capability: Description and Key Quotes		
		Competence Development	**Structural Alignment**	**Mission Stretch**
Product-Edu	Strategic	Staff trains to develop digital education further in refugee camps	Bridged the innovation team and the education unit	
		"Connected learning now - it's hardwired into the programming of our organization." – P-Edu, Innovation Lead	"It took 6 months to move the budget across. Now [P-Edu] has moved to the education unit of the organization and we still advise on it. We are working closely together now but even more closely during the transition." – P-Edu, Innovation Lead	
Product-Food	Strategic	Increased speed of learning in the organization that lead to increased speed in scaling to new contexts; technical knowledge on hydroponic	Led to creation of new team to house knowledge about hydroponic growing and potential use cases	
		"Through the knowledge we have developed, we aim to continue enabling partners, making knowledge and materials accessible to farmers, and working towards financial sustainability long-term." – P-Food team lead	"By now we have developed our own center of excellence for hydroponics. Which we include in the new hydroponic platform, which will be the go-to location for any country that wants to implement this type of project. This would hold all the information." …"We now have a [initiative name] team of seven people and this runs a community to share knowledge on hydroponics in the humanitarian and development context globally. Within the community of practitioners, experts, and advocates [the initiative] is facilitating communication and collaboration to stop duplication of efforts and build on successes." – P-Food, Innovation Team Member	
Product-Moto	Organic			
Product-Yarn	Organic			
Solution-Movement	Strategic	Staff learns from technology partner to eventually house AI capability in house	Bridge with tech team to uncover ethical biases of algorithms	Moving from being a reactive organization to being a proactive (predictive) organization; acting as ethical gatekeepers for other AI initiatives

Initiative	Scaling Mechanism	Responsible Innovation Capability: Description and Key Quotes		
		Competence Development	**Structural Alignment**	**Mission Stretch**
		The ambition of this initiative was "to increase the capability of [org], in this case, to be able to predict and prepare better." – S-Movement, Data Scientist	"We worked closely at the beginning with the IT team and other partners before we were able to develop these capabilities in our team. If the predictive tools do not work correctly, we are risking human lives, not responding well, or prioritizing something over something else which is a very serious decision with big consequences. So we need to understand the biases of our code." – S-Movement, Data Scientist	"Our experience with the initiative has led us to becoming an expert in this new technology. We often find ourselves acting as validators to understand if other initiatives are really AI or not and if their algorithms are taking into consideration all the variables." – S-Movement, Innovation Team Member
Solution-Cash	Strategic	Staff learned about blockchain technology in house	Led to the development of a new team on emerging technologies to explore further frontier innovations	Enabled the organization to bypass financial service providers and banks; and to develop a blockchain platform that can be used by sister organizations
		"We spent the first year providing resources to the idea champion to help him develop the technical know-how to develop the tool. After these year and new locations, we now have that knowledge in-house." - S-Cash, Innovation Team Member	The original idea champion was named to run a new [org] team called Emerging Technologies. This team "seeks to harness the power of blockchain to foster interagency collaboration and create efficiencies." - S-Cash, Innovation Team Member	"We control the data and have real time consolidation of the finances. We are saving fees by not using the banks. Before we had to create many bank accounts, but now we go through a virtual wallet. The money goes directly from WFP to the beneficiary. [sic] We have a team scaling this project run by the original idea champion [now head of emerging technologies in the organization]."- S-Cash, Innovation Team Member
Solution-Map	Strategic	Building competence at the country level; training of local staff to run the initiative; technical knowhow on geospatial mapping	New team created to house knowledge and developed further use cases	Created learnings around satellite imagery and led to the creation of other initiatives and new work streams within the organization

Initiative	Scaling Mechanism	Responsible Innovation Capability: Description and Key Quotes		
		Competence Development	**Structural Alignment**	**Mission Stretch**
		"Capability internally is increased through the training programs we provide to the government staff. These trainings are facilitated and joined by the country office staff so also increases the capability of [the organization]." - S-Map, Initiative Lead	"The initiative led to the development of a team in the HQ in New York. I lead the team and have 2 colleagues to provide program support. It is a small team from the [org] side with a total of 9-10 people. The existence of our team has really strengthened the geospatial capacity of [org] and we are now moving towards establishing an enterprise approach to geospatial activities within the next 2 -3 years." - S-Map, Initiative Lead	"This initiative in my opinion has clearly added to [the organization's] value proposition and we hope to have enterprise servers in the future to be able to store all of the data in house to move beyond the isolated country to country approach."- S-Map, Initiative Lead
Solution-Voice	Organic	Developed technical know skills on managing the backbone of the SMS tool, lead to re-prioritization of strategy	Led to development of global team comprised of initiative champions from country offices that deployed S-Voice	Organization is acting as a platform and using the tech backbone for governments, other orgs, and local NGOs
		"The impact was twofold. On a country level, we saw management see their importance in the impact and reach of the tool. And the second impact was at the headquarters level. Prioritizing innovations has shifted dramatically at the headquarters level." – S-Voice, Innovation Champion Pakistan	"We now have a global [S-Voice] team. It consists of me, the initiative creator, and a former digital advertising consultant from the private sector. The team sits under the innovation lead at [org] and helps deal with the data analytics challenges of local implementations." - S-Voice, Innovation Champion Pakistan	"We purposefully chose to keep the tool un-branded so that a partner could 'own it'. Over 350 partners are involved globally, including government, non-government, private sector, schools, universities, and youth networks. We don't want to be closed in our own bubble."

9.4 Activities and Relational Value Orientation of Innovation Units

Activity	Description	Value creation orientation
Innovation Fellowship Training Program	The Innovation Fellowship training Programme focuses on building organization staff/affiliate's innovation skills and competencies in addition to supporting them to facilitate innovation with colleagues, partners, and refugees in their own operations and divisions. Over the course of the year, Innovation Fellows learn and use innovation methods, tools, and embed new approaches to complex organizational problems.	Capacity building
Developing Internal Thought leadership	Thought leadership focuses on assisting organization staff to integrate concepts of human-centred design (design and test starting with the end user) and lean start up (iterative experimentation) into their regular work streams. The goal is to identify and leverage game- changing trends for products or services through collaborations. The unit regularly publishes blogs and articles around topics relevant to the innovative design process and disruptive innovations.	Capacity building
Experimenting with new forms of communication	Units experiment with new ways of communicating about their work in the organization through more science-driven frameworks and approaches - to better understand the units function in the humanitarian field, drive innovation more quickly, and create behavioral and cultural change.	Inter-unit linking

Providing training on Innovation Methodology	These are 3 to 5-day working groups or sprints with more than one team participating in each event as a way for the unit to introduce employees of the organization to the agile method of Human Centred Design and other innovation methodologies.	Capacity building
Providing Creative Consulting Internally	The unit mentors and assists internal innovators with their projects through consulting.	Capacity building
Experimenting with frontier technology in house	The unit experiments with developing its own frontier tech initiatives.	Capacity building
Financial Support for Initiatives	The unit runs an innovation fund of 1 million USD. The objective of the Fund is to provide a safe budgetary space for colleagues to experiment with new ideas and test assumptions around this project within their team.	Inter-unit linking
Hosting Sprints and Solutions Clinics	Other initiatives included innovation sprints and panels that take the form of 8-hour sprint workshop in which 20 selected participants generate, develop and present digital solutions to develop market-based livelihoods for vulnerable migrants and forcibly displaced communities. The winners were announced during the panel discussion the following day.	Capacity building
Setting up Physical Space/Lab	The unit carves out a space that enables organization's staff to work together, with people outside their direct teams; as well as to take training provided/organized by the innovation unit.	Capacity building
Assisting in implementation of initiatives	As well as funding, teams have the opportunity to work directly with country office staff to implement the initiative on the ground and reach a proof of concept or develop prototypes ready for implementation.	Capacity building
Embedding new initiatives into organizational processes	Enabling scaled initiatives to develop into standardized organizational processes.	Capacity building
Finding external Experts to help initiatives	Beyond financing and ideation support, the unit also provides mentorship and community building capabilities to those teams involved. The unit has also brought in private sector experts to advise and coach attendees	Ecosystem linking
Networking Strategically	One of the pillars of the unit work is to network with the ecosystem, academia, other organizations, and enterprises that could spark creativity or lead to future collaborations.	Ecosystem linking
Providing seed funding for initiatives from partners	The unit connects initiatives with external funding partners.	Ecosystem linking
Innovation Marketplace	The unit runs a three-day launch event that gives the opportunity for both internal and external innovators to connect with decision-makers, investors, communities, International Organizations and implementers.	Stakeholder building
Creating and Publishing Articles online	The unit prioritizes thought leadership across innovation in International Organizations, publishing several articles a month highlighting learnings from innovation processes, projects, and efforts across the organization's global footprint.	Ecosystem linking
Bringing in partners to help with Experimenting frontier technology	Initially the team did not have the capabilities to develop these types of technologies in-house so they partnered with external tech experts who could teach the team.	Stakeholder building
Hosting and Managing Innovation Events	The unit gathers Geneva Ecosystem players to showcase the Lab's work, initiatives, and innovators.	Ecosystem linking
Sourcing ideas	Innovation sourcing through online applications (for-profit start-ups, NGO start-ups, companies/NGOs/UN, organization team), active sourcing (targeted startup outreach), and innovation challenges dedicated to innovation challenges as well as challenges with external partners to source creative ideas across the globe;	Ecosystem linking
Conducting Open Bootcamps	Innovation bootcamps to develop some of the most promising ideas. For ideas that successfully passed through the innovation sourcing phase, the unit holds five-day “Innovation Bootcamps” to refine the project ideas and match the context to the reality on the ground, especially if the idea came from outside of the organization.	Stakeholder building
Tapping into ‘innovation hubs”	The unit launched either innovation hubs or identified regions of focus several countries globally, to create spaces for testing and iterating projects in the field.	Stakeholder building
Collaborating on Research with academic partners	The unit regularly adds academic partners to the team temporarily to bring in new ideas as well as partnering with academia on research projects	Stakeholder building

9.5 Representative Quotes for Coding of Interviews for Relational Value Orientations

Representative Quotes	1st Level Constructs: Relational Value Created
“Innovation is doing things differently to have higher impact. The [Innovation unit] acts as a centralized group dedicated to foster innovation culture and to support ideas scale up by providing appropriate tools. Technology can be bought but the culture cannot be bought.” - Head of Unit, UNAIDS	Creating an Innovation focused culture and providing tools for scaling ideas
"... the goal was still to have everyone in the organization doing innovation as part of their role.” - Lead, Innovation Unit, ITC	Impacting individual behavior and roles
"From there, the founding members of what would eventually become the UNHCR Innovation Unit reworked the roadmap to adopt a more organically flowing one geared towards understanding what innovation in UNHCR truly meant. As with all innovation initiatives, they wanted to understand what the real challenges for driving innovation into all corners of the organization actually were." - Former Head of Innovation, UNHCR	Driving innovation into all corners of the organization
“From the beginning, our vision of innovation was built around the idea that innovation comes from within all of us and that innovation must not be delegated to a small group of similar people ‘who are into innovation.’" - Team Member Innovation Unit, ITC	Making sure innovation permeates throughout the organization
"[This flagship initiative] is grounded in the idea that to have sustainable innovation you need to focus on mindset change and culture – to make innovation more accessible. We believe the only way to achieve this is to change individual behaviors at all levels of the organization,” - Innovation Unit Team Member, Strategic Communications, UNHCR	Changing behavior in the organization
"Assistance can be provided for capacity building on innovation methodologies, to supporting experimentation as well as to capture promising practices on innovation." -Team Member, Innovation Unit, UNHCR	Building capacity and capturing promising practices
"Currently, the [unit] works both to build competencies and innovation skillsets, as well as strengthening innovation efforts in HQ related functions, such as HR, finance and administration." - Team Member, Innovation Unit, UNHCR	Building competencies and skillsets throughout the organization
"While the Innovation [unit] team remains strong and has a dedicated office at headquarters in Geneva, the team equally focused on equipping field staff and offices to understand and apply innovation principles independently." - Team member Innovation Unit, UNHCR	Developing new capabilities in country units
“The goal was to take these innovations and make them operational for WFP.” - Business Development Lead, Innovation Unit, WFP	Improving processes and ways of working
“Time, managerial support, tools and training will lead to a culture of change. There is an urgency to work with management on this. This is the time to shake the organization. This is the beauty of innovation.” - Team member Innovation units, UNAIDS	Shaking the organization
"The [unit] was working further towards incorporating innovation into the corporate strategy team. This would include adding KPIs, such as measuring the number of innovations in house, into the operational plan of the organization. It shows that the work that the Lab is doing has been a source of inspiration in house." - Team Member, Innovation Unit, ITC	Impacting priority setting at the top
"...and incremental innovation in hopes of expanding our rather limited definition of innovation and including small innovative pursuits dealt with on a day-to-day basis, disruptive innovation in hopes of supporting larger, more transformative projects, and scale in hopes of expanding upon and enriching the process of innovation both within UNHCR and outside of it." -Former Lead of Innovation Unit, UNHCR	Enriching the processes of innovation within the organization
"Do we see if there is a way to empower regional and country offices more by making them more engaged not just the HQ mediating this partnership but they themselves becoming a more active part in partnership and where innovation is not actually a good medium to do that because you have a lot of co-creation you need to do at the beginning, so you need to involve those partners. How do we make sure that country offices become more engaged; so, kind of decentralizing our role." - Advisor Innovation Unit, UNAIDS	Empowering and collaborating with country offices
“We thought innovation would scale automatically but it does not work that way. Each context is different. The [unit] has worked in the field with WFP Country Offices to localize the initiatives and operationalize them to the specific needs.” - Business Development Lead at Innovation Unit, WFP	Enabling contextualization by working with country offices

"[We] facilitate the development of innovative projects and solutions for [the organizations] operations, units and bureaus by providing funding to innovators who wish to design, test or scale up their ideas." -Team Member Innovation Unit, UNHCR	Facilitate development of internal projects through funding
"Given our nature, we can only act as amplifier. We need to carry everybody with us; we need a stronger senior management engagement. We need to act as the facilitator between senior management and staff." - Innovation Unit Lead at UNAIDS	Connecting staff to senior management
For example, for community innovation, we want to bring people from our country office to share what are the ideas that they have in responding to COVID-19. On the external side, we are really re-thinking the way we are engaging, basically going back to our original purpose. Our purpose when we set up [our flagship initiative] was identifying gaps in countries, identifying solutions and linking them to political levels for action and investor for scaling. I think we are continuing to build on that purpose." - Team Member, Innovation Unit, UNAIDS	Identifying solutions and linking them to political levels for action and investors for scaling
"It is essential to build the innovation story through more storytelling. In this way it will be possible to show how [our organization] has changed the world and that everybody is an innovator. We need to build the historical narrative – with successes and failures - for which everybody has been part of," Innovation Unit Lead at UNAIDS	Impacting the perception of the organization
"Part of the WFP Accelerator's work is to bridge the gap between the worlds of startups and humanitarian aid." Team Member, Innovation Unit, WFP	Bridging worlds of private and humanitarian sectors
"[The unit] sought to invest in private sector partnerships and new collaborations that were primarily product or project focused. The objective was to learn from the private sector and bring new skills and knowledge into UNHCR's structure. This approach led to strong partnerships with the Vodafone Foundation, the UPS Foundation, the IKEA Foundation and others" - Former Head of Innovation, UNHCR	Developing new learning-based partnerships
"The goal for the [unit] is to continue reinforcing our position as an innovation facilitator within the [organization] through showcasing our results and bridging the divide to start partnering with other organizations, using our innovation expertise to help the greater UN ecosystem achieve the SDGs. This is why we have new partners with other organizations around our flagship initiative on Blockchain." - Team member Innovation Unit, WFP	Providing evidence-based reporting on internal initiatives to spur partnerships with other organizations
"During the mission we met with the Ministry of Health, the director of the TB Program and the Ministry of Innovation. All showed a lot of interest in the technology and saw big potential for its application in Ethiopia. We thus further discussed the possibility to set up a national center for AI - given that Ethiopia also just launched its own satellite and is creating a huge amount of data through it. Once we have been able to put in place the same partnerships as did for Ethiopia in four or five other countries, then we can say that we have delivered impact."- Team Member Innovation Unit, UNAIDS	Creating impact through the development of cross-sectoral partnerships
"Fundamentally, the objective is the multi stakeholder platform, we will have WHO, Gates Foundation and USAID all coming on board. The idea is that there are a number of innovations that are being developed in India, which does not get translated beyond India, and some of these would be relevant for the African market. Our role is our knowledge of Africa and ability to identify the needs. We can go to these guys and say Ethiopia needs a new way of running test for TB that is not clinic based, then it is for them to find what is available and put resources behind those innovations. We can play the role of combining the technologies with the financial resources that are available." - Innovation Unit Lead, UNAIDS	Connecting cross-sectoral players around specific global needs
"The exit for us is either when the innovation is adopted at the corporate level, is spun off, or becomes funded." - Business Development Lead at Innovation Unit, WFP	Seeking funding externally