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Entrepreneurial Resource Mobilization Under Resource Scarcity: Examining the Nexus of Agency and Context

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List of Abbreviations

AMA	Academy of Management Annals
AMJ	Academy of Management Journal
AMR	Academy of Management Review
ASQ	Administrative Science Quarterly
ERD	Entrepreneurship and Regional Development
ETP	Entrepreneurship: Theory and Practice
FDA	Food and Drug Administration
HW	Hardware
JBV	Journal of Business Venturing
JMS	Journal of Management Studies
JOM	Journal of Management
k	1,000
MS	Management Science
OS	Organization Science
OSt	Organization Studies
RP	Research Policy
SEJ	Strategic Entrepreneurship Journal
SMJ	Strategic Management Journal
SW	Software
TEA	Total Early-Stage Entrepreneurial Activity
UK	United Kingdom
USA	United States of America
USD	United States Dollar
VC	Venture Capital

Abstract

This thesis examines how entrepreneurial ventures mobilize resources in contexts of local resource scarcity. Drawing on a systematic review of the existing research landscape (Essay I), I analyze resource mobilization behaviors of early-stage technology ventures in two related studies (Essays II and III). The first study illuminates resource mobilization trajectories and associated performance outcomes in a resource-scarce context. Through inductive analysis of multiple cases, I show that high-performing ventures dynamically alternate between resource seeking and selective bricolage behaviors as they mature. Resource seeking behaviors in resource-scarce local contexts often hinge upon the initiation of exchange relationships with foreign resource holders. The second study thus deals with ventures' behaviors in foreign tie formation. My data reveals that successful ventures tend to rely less on domestic networks, and to deploy strategic rather than opportunistic resource mobilization behaviors. This dissertation contributes to theory on entrepreneurial resource mobilization in an international context.

Zusammenfassung

Diese Dissertation untersucht, wie neue Unternehmen im Kontext lokaler Ressourcenknappheit Ressourcen mobilisieren. Aufbauend auf einer systematischen Literaturanalyse der bestehenden Forschungslandschaft (Aufsatz I), betrachte ich die Verhaltensweisen der Ressourcenmobilisierung junger Technologieunternehmen in zwei qualitativen Studien (Aufsatz II und III). Die erste Studie beleuchtet den Entwicklungsverlauf der Ressourcenmobilisierung neuer Unternehmen und die damit verbundenen Ergebnisse in einem ressourcenknappen Kontext: Performante Unternehmen alternieren dynamisch zwischen der Suche nach standardisierten Ressourcen und der selektiven Nutzung der Ressourcen, die zur Hand sind. Unter lokaler Ressourcenknappheit setzt die Suche nach standardisierten Ressourcen eine Kontaktaufnahme mit ausländischen Ressourcenbesitzern voraus. Damit befasst sich die zweite Studie und zeigt, dass erfolgreiche Unternehmen weniger auf lokale Netzwerke zurückgreifen und sich strategischer statt opportunistischer Verhaltensweisen bedienen. Die Dissertation leistet einen Beitrag zur Theorie unternehmerischer Ressourcenmobilisierung im internationalen Kontext.

1. Introduction

Entrepreneurial ventures tackle humankind's grand challenges across the globe. They contribute to poverty alleviation (Bruton, Ketchen, et al., 2013; Sutter et al., 2019), the creation of inclusive economic growth (George et al., 2012; McMullen, 2011), the battle against climate change (Vernet et al., 2019), and the improvement of healthcare quality and accessibility (Agarwal et al., 2020; Bhattacharyya et al., 2010)—among numerous other important missions. However, ventures that seek to tackle these challenges often face severe resource constraints (Desa & Basu, 2013; Grichnik et al., 2014). These constraints stem not only from the liabilities associated with newness and smallness, which most new ventures experience (Stinchcombe, 1965), but also from the fact that they often emerge and operate in particularly challenging environments (Mair & Marti, 2009; Zahra et al., 2008), which lack critical resource pools (Castrogiovanni, 1991).

Resources are vital for new ventures to embark on the exploitation of opportunities (Alvarez et al., 2013), and as such their survival often depends on their successful efforts to obtain them (Aldrich & Ruef, 2006; Baum, 1996; Musso & Schiavo, 2008). Thus, the question of how new ventures mobilize the resources they need is to central entrepreneurship research. It becomes particularly intriguing for ventures operating in contexts of resource scarcity, where they must reconcile the resources needed in tackling grand challenges on the one hand, with low availability thereof on the other hand. This is the case in many low and lower middle income countries today (Bosma et al., 2020).

Despite extensive scholarly interest in the study of entrepreneurial resource mobilization (see Clough et al., 2019 for a recent review), extant literature provides surprisingly few insights into how ventures approach the conundrum of local resource scarcity. Most prior work on entrepreneurial resource mobilization assumes the availability of resources in ventures'

immediate surroundings (e.g., Grossman et al., 2012; Hallen & Eisenhardt, 2012; J. Zhang et al., 2008) and the feasibility of exchanges between resource holders and seekers (Armanios et al., 2017; Shane & Cable, 2002). As such, it is not clear that these studies' insights can apply to ventures operating in resource-scarce contexts, where resource pools and relevant infrastructures are less pronounced (Khavul & Bruton, 2013). Existing studies that do examine resource mobilization in resource-scarce contexts often focus on the practice of *bricolage*—“making do by applying combinations of the resources at hand” (Baker & Nelson, 2005, p. 333)—rather than examining the pathways that ventures may pursue to acquire locally unavailable standard resources (e.g., Desa & Basu, 2013). The limits of the current research landscape thus call for more differentiated investigations into how resource mobilization can unfold, providing directions for new ventures in various contexts and with various resource endowments.

Research that offers guidance on how new ventures can navigate their contexts of local resource scarcity is of high practical relevance, given the plethora of ventures that are emerging in these conditions. The Nigerian venture Ubenwa, for instance, has developed a diagnostic tool to detect the risk of asphyxia in newborns upon their birth (*Ubenwa*, 2020)—addressing the third most common cause of childhood mortality, which claims about one million lives each year worldwide (Lawn et al., 2007; World Health Organization, 2020). A prominent example from India is Mfine, a telemedicine platform that connects patients with specialists online and facilitates testing access during the COVID-19 pandemic (*Mfine*, 2020). Entrepreneurial ventures of all kinds loom in low and lower middle income countries, where we can observe considerable total early-stage entrepreneurial activity (TEA), denoting the share of entrepreneurs within a country's total population, aged 18 to 64 years (Bosma et al., 2020). While varying between countries and regions, several TEA scores of low and lower middle income countries exceed those of high income countries: Madagascar's score of 19% exceeds

the United States' (17%) and Canada's (18%); and India's score of 15% exceeds Ireland's (12%) and Israel's (13%) (Bosma et al., 2020).

The distribution of entrepreneurial activity stands in stark contrast to extant literature's overemphasis on high income countries (see Essay I). Taken together, this creates a vital mandate for researchers to shed light on entrepreneurial resource mobilization and to “turn research into actionable insights to frame and tackle some of the biggest challenges that we face in our global community” (George, Howard-Grenville, et al., 2016, p. 1880).

1.1. Theoretical Background

New ventures typically start out with fewer resources than they need to effectively exploit opportunities (Shane, 2003). As they are new and small, new ventures usually lack a track record and legitimacy, and their outcomes are uncertain—complicating the acquisition of resources from other actors (Baum & Oliver, 1991; Stinchcombe, 1965; T. Yang & Aldrich, 2017). These resources may be either tangible or intangible assets (Hanlon & Saunders, 2007; Wernerfelt, 1984). Building on the past two decades of research, Clough and colleagues (2019) categorize resources into “financial capital (e.g., cash or loans from a bank), human capital (e.g., skills from an employee), and social capital (e.g., information obtained from social contacts)” (p. 240), as well as other capital, like legitimacy or intellectual property.

These different resources are essential for ventures to exploit opportunities in the first place (Alvarez et al., 2013), achieve sustainable competitive advantage (Barney, 1991), grow (Penrose, 1959), and ultimately secure firm survival (Aldrich & Ruef, 2006). Following the resource-based view of the firm, firms are essentially a bundle of resources (Wernerfelt, 1984). The skillful combination and processing of resources in this bundle then serves to create valuable services and products (Penrose, 1959; Rubin, 1973). Importantly, initial access to resources is self-reinforcing, in that it reduces the liabilities of newness and smallness (Cooper

et al., 1994; Stinchcombe, 1965) and makes subsequent resource acquisitions easier (Shane & Cable, 2002). Thus, the study of ventures' early stages of development, which set the course for future success or failure, is particularly important and intriguing (Baum, 1996; Cooper et al., 1994). Taking this line of argument further, if ventures start with insufficient resources, yet strive to extend them into a productive 'bundle,' the processes of closing this gap are at the very heart of every entrepreneurial endeavor.

The "processes by which entrepreneurs assemble the resources used to execute on an opportunity" (Clough et al., 2019, p. 240) are often challenging tasks for early-stage ventures (Baker & Nelson, 2005; Shane & Venkataraman, 2000). Extant research provides a range of options for ventures approaching them, all of which can ultimately be distilled into two primary pathways: Either, entrepreneurs can access existing resources from external resource holders (Villanueva et al., 2012), acquiring them for a market price (J. Zhang et al., 2008) or otherwise persuading the resource holders to grant access—by virtue of, for instance, social embeddedness (Newbert & Tornikoski, 2013) or strong relationships (Semrau & Werner, 2014). Or, entrepreneurs can opt for alternatives to existing resources held by external resource holders, substituting one intended resource with another, repurposing or creating a resource to their needs, or salvaging resources that others have discarded (Boyd, 1990; Hillman et al., 2009; McDougall & Oviatt, 2000). Prominent manifestations include the use of bricolage, and bootstrapping—with the latter encompassing "a combination of methods that reduce overall capital requirements, improve cash flow, and take advantage of personal sources of financing" (Ebben & Johnson, 2006, p. 853).

When resources are scarce in their immediate environs, entrepreneurs' resource mobilization is exacerbated (Lee et al., 2019) and the resulting resource constraints can reduce ventures' prospects of growth and survival (Musso & Schiavo, 2008). However, research also indicates that resource constraints can stimulate innovativeness (Katila & Shane, 2005), productivity

(Musso & Schiavo, 2008), entrepreneurial management (Bradley, Wiklund, et al., 2011), and entrepreneurial resourcefulness (Bradley, 2015; Corbett & Katz, 2013), the latter of which refers to “learned behavioral, financial, and social repertoires for dealing with problems, especially those of novelty” (Bradley, 2015, p. 1). Resourceful responses to resource scarcity include bricolage (Baker & Nelson, 2005; Desa & Basu, 2013), bootstrapping (Grichnik et al., 2014), as well as the establishment and use of network ties (Agarwal et al., 2020; Boso et al., 2013; Jayawarna et al., 2011; Kodithuwakku & Rosa, 2002). In brief, there are several ways to deal with local resource scarcity—also explaining the existence of exemplary ventures like Ubenwa and Mfine, which manage to survive in spite of unfavorable conditions. How they respond to resource scarcity depends on entrepreneurs’ perception and enactment of their respective resource contexts (Dolmans et al., 2014; Powell & Baker, 2014b).

1.2. Research Objectives

This thesis aims to shed light on the different ways by which entrepreneurs mobilize resources in resource-scarce local contexts. In a first step, this calls for a holistic understanding of the resource mobilization mechanisms prior research has postulated, as well as a delineation of how these mechanisms are connected and how they differ from each other. This foundational understanding is needed before anchoring subsequent empirical work in the respective mechanisms, and before adding a complicating, contextual layer of resource scarcity to the investigation.

The first essay (Chapter 2) therefore offers a systematic literature review that provides an overview of the extant research landscape. As the body of literature on entrepreneurial resource mobilization is highly fragmented (Clough et al., 2019), the essay endeavors (1) to provide clarity on entrepreneurial resource mobilization mechanisms as well as their conceptual linkages, and (2) to establish promising directions for future research. I thereby strive to contribute to theory on entrepreneurial resource mobilization by answering the question: *How*

do existing mechanisms in the entrepreneurial resource mobilization literature relate to each other, and what are the relevant themes and unanswered questions therein?

The second essay (Chapter 3) is inspired by a conundrum that resource-hungry technology ventures in resource-scarce contexts face: How to reconcile substantial and sophisticated resource requirements with low availability thereof? Inherited knowledge points at resource seeking—the “continued attempt to acquire standard resources” (Baker & Nelson, 2005, p. 353)—as a solution for high resource needs, and bricolage as a solution for resource scarcity (e.g., Busch & Barkema, 2020a; Desa & Basu, 2013). Each mechanism alone, however, does not suffice to solve this puzzle—we need to examine both in concert. While Baker and Nelson's (2005) pathbreaking study points at a *combination* of both mechanisms as a growth-promoting response to resource scarcity, later research predominantly examines the effects of bricolage in isolation (e.g., Stenholm & Renko, 2016; Wu et al., 2017). This leaves us with an incomplete understanding of how technology ventures combine bricolage and resource seeking over time (Desa & Basu, 2013), and of the outcomes a combination of both mechanisms can yield (Sunduramurthy et al., 2016). This essay aims to contribute to the body of research on entrepreneurial resourcefulness by addressing this knowledge gap and answering the question: *How do technology ventures in resource-scarce contexts combine resource mobilization behaviors in their early development, and with what effects?*

The use of bricolage in resource-scarce contexts is coherent with its representation as a response to resource scarcity in extant literature (e.g., Busch & Barkema, 2020a; Desa & Basu, 2013). Resource seeking, however, raises questions as to how it can be deployed at all in resource-scarce contexts, where resource holders and transaction infrastructures are limited. Indeed, the literature suggests that ventures can transcend their immediate, resource-scarce contexts, reaching resource holders abroad in order to seek resources (J. Li & Fleury, 2020; Yamakawa et al., 2013)—representing the third essay's main theme (Chapter 4). Because liaising with

resource holders abroad can be burdensome (Bell et al., 2012; Johanson & Vahlne, 2009; Reuer & Lahiri, 2014), entrepreneurs tend to rely on their domestic network contacts to reduce this burden and build bridges across borders (Bell et al., 2012; Mäkelä & Maula, 2008). Extant literature provides few insights, however, into how new ventures can liaise with foreign resource holders when their domestic networks are themselves constrained, and what outcomes they can achieve. For instance, ventures in resource-scarce contexts often lack access to venture capital investors (Mäkelä & Maula, 2008) or international alliances (Al-Laham & Souitaris, 2008), network contacts that prior work suggests can be important resources to building relationships with foreign resource holders. This essay aims to contribute to scholarly understandings of resource mobilization and networking in an international context by answering the question: *How do early-stage technology ventures in resource-scarce contexts form ties with foreign resource holders, and with what effects?*

1.3. Data Set and Methodology

In line with my essays' research questions and objectives, as well as the state of the underlying prior theory, I selected different methodological approaches in this dissertation (Edmondson & McManus, 2007). To understand the landscape of existing mechanisms in the resource mobilization literature, the first essay is grounded in a systematic literature review (Siddaway et al., 2019; Tranfield et al., 2003). By providing an organizing framework of extant mechanisms and by delineating relevant gaps in the literature, this essay synthesizes the theoretical foundations for the empirical studies that underlie Essays II and III. The second and third essays qualitatively examine new ventures' resource mobilization behaviors in multiple-case studies (Eisenhardt, 1989; Yin, 2013). Table 1 summarizes all three essays.

Essay	I: Entrepreneurial Resource Mobilization: A Literature Review and Research Agenda	II: Beyond Bricolage: Early-Stage Technology Venture Resource Mobilization in Resource-Scarce Contexts*	III: Building Bridges: How Early-Stage Ventures in Resource-Scarce Contexts Form Ties with Foreign Resource Holders**
Research Question	<i>How do existing mechanisms in the entrepreneurial resource mobilization literature relate to each other, and what are the relevant themes and unanswered questions therein?</i>	<i>How do technology ventures in resource-scarce contexts combine resource mobilization behaviors in their early development, and with what effects?</i>	<i>How do early-stage technology ventures in resource-scarce contexts form ties with foreign resource holders, and with what effects?</i>
Key Theory(ies)	<ul style="list-style-type: none"> ▪ Entrepreneurial resource mobilization 	<ul style="list-style-type: none"> ▪ Entrepreneurial resourcefulness 	<ul style="list-style-type: none"> ▪ International entrepreneurship ▪ Networks
Method	Systematic literature review	Multiple-case study	Multiple-case study
Data	148 articles from peer-reviewed academic journals	36 interviews and additional material from 7 ventures; 24 expert interviews***	50 interviews and additional material from 10 ventures; 24 expert interviews
Key Findings	<ul style="list-style-type: none"> ▪ There are seven overarching mechanisms which are represented incoherently in extant literature ▪ Future research should strive for more comprehensive examination of antecedents, contingency factors, outcomes, and context of entrepreneurial resource mobilization 	<ul style="list-style-type: none"> ▪ Ventures followed different resource mobilization trajectories ▪ High-performers increased resource seeking as they developed and dynamically alternated lower and higher levels of selective bricolage ▪ High- and low-performers' trajectories diverged upon experiencing catalytic events ▪ Ventures reinterpreted their resource spaces from local to global 	<ul style="list-style-type: none"> ▪ Ventures relying less on domestic networks and deploying a strategic approach with proactive tie formation behaviors acquired more foreign resources ▪ Ventures relying more on domestic networks and deploying an opportunistic approach acquired less foreign resources

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*** Subset of the dataset used in Essay III, see Essay II Appendix B for joint question catalogue informing Essay II and III

Table 1: Summary of Essays

The systematic literature review (Essay I) encompasses a sample of 148 peer-reviewed articles on entrepreneurial resource mobilization published in academic journals between 2000 and 2020 (see Clough et al., 2019). I identified relevant literature based on a keyword search in three electronic databases and complemented it by manually adding related articles, for instance from prior literature reviews. In order to arrive at the final sample, I assessed each article for eligibility based on a set of theoretical and methodological criteria (see Tranfield et al., 2003), such as the centrality of resource mobilization to its analyses and arguments, and the applicability of its findings for entrepreneurial ventures, as opposed to more established organizations. I then performed a thematic analysis (Tranfield et al., 2003) of all 148 articles to extract overarching themes from the literature (Siddaway et al., 2019).

The second and third essays stem from inductive multiple-case study analyses (Eisenhardt, 1989; Yin, 2013), as this method is particularly suitable to generate “robust, generalizable, and testable” theory (Eisenhardt & Graebner, 2007, p. 27) that advances the nascent state or prior research (Edmondson & McManus, 2007). Inductive methods are further apt for the study of grand challenges, “complex problems with significant implications, unknown solutions, and intertwined and evolving technical and social interactions” (Eisenhardt et al., 2016, p. 1115), which scholars across research disciplines increasingly recognize as important (Eisenhardt et al., 2016; Ferraro et al., 2015; George, Howard-Grenville, et al., 2016).

Essays II and III have emerged out of a single research project with the broad objective to understand early-stage technology ventures’ resource mobilization behaviors in resource-scarce contexts. I chose Uganda’s medical technology industry as a research setting, because it epitomizes the nexus of high and sophisticated resource needs with a local context of resource scarcity. The sampled medical technology ventures operated from the country’s capital Kampala, had a maximum age of eight years, and were largely active in maternal, neonatal, and women’s health—representing underserved segments with substantial unmet medical needs (Institute for Health Metrics and Evaluation, 2019). In the course of a first data collection wave, the concrete focus areas that are now addressed in Essays II and III surfaced as relevant themes from the interviews. I then used a second data collection wave to investigate both focus areas in more depth, that is, the evolution of bricolage and resource seeking behaviors (Essay II), and the network dynamics behind resource seeking across geographical contexts (Essay III).

As a result, both essays originally build on the same data set comprising 10 technology ventures. The collected data corpus consists of 50 semi-structured interviews with sampled ventures’ (co-) founders and team members, complemented by 24 interviews with external informants, field notes, graphical materials, and archival data. In order to facilitate the comparison of technology development outcomes across cases, I confined the sample in Essay II to a subset

of seven ventures whose technologies require clinical trial approval prior to commercialization. This resulted in a reduced number of interviews from 50 to 36 that were considered in this study's data analysis.

In both studies, I followed a two-tiered inductive analysis process, starting with within-case analyses (Eisenhardt, 1989), in the form of case-study write-ups and outlines of network evolutions per case, "allow[ing] the unique patterns of each case to emerge before investigators push to generalize patterns across cases" (Eisenhardt, 1989, p. 540). I then determined categories for the following cross-case analyses by coding interview transcripts (Eisenhardt, 1989; Grodal et al., 2020), focusing in on the interplay of bricolage and resource seeking behaviors in Essay II and on the patterns of foreign tie formation behaviors in Essay III. Throughout the analyses, I iterated emerging constructs and relationships against different data sources (Eisenhardt & Graebner, 2007) and frequently consulted relevant literature to juxtapose them with emerging theory (Eisenhardt, 1989; Eisenhardt et al., 2016; Miles et al., 2013).

1.4. Dissertation Structure

This dissertation is divided into three essays. Essay I's systematic literature review, presented in Chapter 2, lays the conceptual foundation for the detailed study of entrepreneurial resource mobilization behaviors in the following chapters. Essay II, presented in Chapter 3, examines the combination of resource mobilization mechanisms, specifically bricolage and resource seeking, and its associated outcome implications on technology development for early-stage technology ventures in a resource-scarce context. Essay III, presented in Chapter 4, focuses on resource seeking by examining foreign tie formation behaviors and their effects on the foreign resource mobilization success of early-stage technology ventures in a resource-scarce context (see Table 1 for a summary of all three essays). The dissertation concludes with a discussion of these studies' key findings, their implications for theory and practice, and the avenues for future research they suggest.

2. Essay I – Entrepreneurial Resource Mobilization: A Literature Review and Research Agenda

2.1. Introduction

The mobilization of resources lies at the heart of every entrepreneurial endeavor. Executing an opportunity requires resources and resources are scarce. Indeed, new ventures rarely have enough resources to cover their needs (Shane, 2003), so their growth and survival depends on entrepreneurs engaging in the challenging task of mobilizing resources currently controlled by other actors (Villanueva et al., 2012). Making the right choices on how to approach this endeavor and which resources to target is especially crucial for ventures in their early stages as these initial choices can determine ventures' outcomes like survival (Baum, 1996) and long-term performance (Baum et al., 2000; Simsek et al., 2015). I understand resources as tangible and intangible assets (Hanlon & Saunders, 2007) and further borrow from Clough and colleagues (2019) in categorizing resources as financial (i.e., individual and venture level debt and equity), human (e.g., founder's education, team member skills), social (i.e., inter-personal and inter-organizational social network and resources accessible therein); and other capital (e.g., legitimacy, intellectual property, and technology).

Ample prior research has paid tribute to the importance of entrepreneurial resource mobilization—"the processes by which entrepreneurs assemble the resources used to execute on an opportunity" (Clough et al., 2019, p. 240)—but this research has resulted in a divided body of literature. In their recent review, Clough and colleagues (2019) lament that "the study of entrepreneurial resource mobilization—while empirically rich—is conceptually fragmented and lacks an organizing framework" (p. 241). This fragmentation, coupled with the sheer scale of prior research into this broad topic, makes it difficult for entrepreneurship scholars to build on each other's insights and by so doing develop the field.

Extant literature reviews and the underlying research streams have fundamentally advanced scholarly understandings of how entrepreneurs mobilize resources, and from whom. With their organizing framework of sources and types of support, Hanlon and Saunders (2007) helped to develop a more holistic understanding of the diverse arrays of resources and resource holders entrepreneurs rely on in their early stages. Rawhouser and colleagues (2017) examined the agentic strategies and tools entrepreneurs deploy to mobilize resources, which were derived from economic, sociological, and social psychological research disciplines. Those authors' analysis of extant literature led them to advance the idea that ventures broadly pursue either projective strategies, whereby ventures use their future potential to convince resource holders, or interpersonal strategies, whereby they leverage relationships with resource holders. Tools comprise words, actions, associations, and intangibles. Most recently, Clough and colleagues (2019) organized extant research using a process perspective, identifying three distinct phases of resource mobilization: search, access, and transfer.

While collectively insightful, these prior literature reviews do not offer a full sense of the greater scheme of how the different constructs used in prior research relate to each other, in how far they overlap, or are distinctly unique. For instance, Rawhouser and colleagues (2017) classify the 'catalyzing strategies' used by ventures to form ties with investors (Hallen & Eisenhardt, 2012) as both projective and interpersonal, involving both actions and words. While this reveals the multifacetedness observable in prior work on entrepreneurial resource mobilization, it underscores the need for a higher level categorization of extant literature: Where do the strategies and tools, which ventures can evidently combine (Rawhouser et al., 2017), range on a superordinated level of overarching mechanisms? Such mechanisms that extant research refers to include, among others, the use of networks (Grossman et al., 2012), signals (Ahlers et al., 2015), and resource seeking (Baker & Nelson, 2005), but little attention has been paid to the clarification of what these mechanisms comprise and how they are connected or intersect

(e.g., is the use of networks and resource seeking conceptually reconcilable?)—especially because the “distinct labels” (Clough et al., 2019, p. 262) used in different studies obscure potential points of relation. To truly capture the breadth of possibilities entrepreneurs face in mobilizing resources, we need conceptual clarity on the range of discrete resource mobilization mechanisms that exist, including insights on their antecedents, contingency factors, outcomes, and context. As such, this literature review strives (1) to provide clarity on the overarching mechanisms which entrepreneurs employ to mobilize resources, why and how they do so, and with what results, and (2) to identify directions for future research. More specifically, I strive to answer the question: *How do existing mechanisms in the entrepreneurial resource mobilization literature relate to each other, and what are the relevant themes and unanswered questions therein?*

To synthesize relevant prior research, I conducted a systematic literature review (Siddaway et al., 2019; Tranfield et al., 2003), analyzing in-depth a sample of 148 articles published in peer-reviewed management and entrepreneurship journals between 2000 and 2020—following the sampling horizon in prior work (Clough et al., 2019), which started with Shane and Venkataraman’s (2000) seminal article on the domain of entrepreneurship research. This consolidated set of literature reveals key trends and promising avenues for future research along five research clusters: (1) depictions of the mechanisms themselves, (2) antecedents, (3) contingency factors, (4) outcomes, and (5) context.

My analysis first substantiates existing concerns on the fragmentation and inconsistent labeling of prior research, which future research should address by positioning future studies more squarely in relation to the full array of discrete mechanisms. Enhanced clarity on research mobilization mechanisms may also help future researchers to identify and explore additional resource mobilization mechanisms that do not seem to fit into any of these categories, as they have not yet been identified or theorized within the literature. Second, I encourage scholars to

extend the currently small research body on antecedents that are associated with resource mobilization. Specifically, future studies should explore why, and under which conditions, entrepreneurs decide to pursue resource mobilization in the first place, taking into account their evolving resource needs and stages of development (Sullivan & Ford, 2014). The role of resource endowments as antecedent factors also warrants further research in the future. Third, this literature review sheds light on the sizeable research strand on contingency factors affecting resource mobilization outcomes. As the majority of contingencies in prior work comprises organizational accomplishments and further resource endowments accumulated throughout a venture's journey, I suggest future research incorporates a more diverse set of factors that informs a wider range of entrepreneurs and their ventures—including those that are particularly nascent or less-well-endowed—and that considers entrepreneurial agency. Fourth, prior work on resource mobilization outcomes predominantly examines the acquisition of financial resources, as previously lamented by Clough and colleagues (2019), and offers little diversity in the measurement of additional outcome metrics—for instance on an organizational or product level. I call for future research to investigate a broader range of outcomes that resource mobilization entails, doing justice to the various results entrepreneurial ventures could strive for. Fifth, and in line with entrepreneurship scholars' growing general interest in context (Welter et al., 2019; Welter & Baker, 2020), I call for more multi-faceted approaches in future contextual studies, accounting for subjective perceptions of context, the ways in which context is shaped and enacted, along with the study of international resource mobilization.

Taken together, this review provides conceptual clarity on resource mobilization in the greater scheme of things, links currently scattered concepts into an organizing framework, and identifies promising directions for future research. It thereby contributes to entrepreneurial resource mobilization theory and scholarly understandings of the entrepreneurial process, allowing for a more integrated and comprehensive future research effort.

2.2. Methods

I conducted a systematic literature review, following established methodological frameworks (Combs et al., 2010; Siddaway et al., 2019; Tranfield et al., 2003) in order to ensure a “methodical, replicable, and transparent approach” (Siddaway et al., 2019, p. 749). The purpose of this review is to (1) elucidate overarching resource mobilization mechanisms as detailed in the extant entrepreneurship literature, as well as their respective antecedents, contingency factors, outcomes, and context, and to (2) identify directions for future research—answering the research question: *How do existing mechanisms in the entrepreneurial resource mobilization literature relate to each other, and what are the relevant themes and unanswered questions therein?* During the review process, I was guided by the need for conceptual and terminological consistency in the field, yet remained open to new directions and insights, in light of the fact that “management reviews are often regarded as a process of exploration, discovery, and development” (Tranfield et al., 2003, p. 215).

This review’s scope encompasses research on both commercial and social entrepreneurship that covers diverse geographical contexts, levels of analysis (covering both individual entrepreneurs and firms), and methods. Outside this review’s scope lie adjacent constructs related to entrepreneurs’ resource management, such as the mobilized resources’ configuration, bundling, and allocation.

2.2.1. Identification and Selection of Literature

I identified articles for consideration in this literature review through a keyword search in electronic academic journal databases, complemented by manual additions of relevant literature. Following recommendations to include at least two different databases (Siddaway et al., 2019), I used the EBSCO Business Source Complete, JSTOR, and Web of Science Core Collection digital libraries, all of which are frequently used in management literature reviews (Adams et al., 2017; Zoogah et al., 2015), to identify articles with the following terms in their

title, abstract, or keywords:¹ (1) (entrepreneur* OR founder* OR “new venture(s)” OR “new firm(s)” OR “new business(es)”) AND (2) (resource* OR capital) AND (3) (acqui* OR mobiliz* OR mobilis* OR search* OR seek* OR assembl* OR access OR bricolage). The search terms were informed by the methodologies of previous literature reviews (Clough et al., 2019; Rawhouser et al., 2017)². I extracted peer-reviewed academic journal articles in English published between 2000 and Summer 2020, with the starting point corresponding to the year in which Shane and Venkataraman (2000) established the first holistic conceptual framework for the field of entrepreneurship research (see Clough et al., 2019).

In order to “bring together, synthesize, and critique one or more literatures” (Siddaway et al., 2019, p. 749), I specifically searched fifteen leading journals of management, organization theory, entrepreneurship, and innovation (Chartered Association of Business Schools, 2018)³: Academy of Management Annals (AMA), Academy of Management Journal (AMJ), Academy of Management Review (AMR), Administrative Science Quarterly (ASQ), Entrepreneurship and Regional Development (ERD), Entrepreneurship: Theory and Practice (ETP), Journal of Business Venturing (JBV), Journal of Management (JOM), Journal of Management Studies (JMS), Management Science (MS), Organization Science (OS), Organization Studies (OSt), Research Policy (RP), Strategic Entrepreneurship Journal (SEJ), and Strategic Management Journal (SMJ). My choice of journals mirrors Clough and co-authors' (2019) selection, but

¹ I only searched abstracts and titles in JSTOR, because the database does not facilitate searches of author-supplied keywords.

² Previously used search terms include “entrepreneur,” “acquire resources,” “resource acquisition,” “mobilize resources,” “resource mobilization,” “access to resources,” and “accumulate resources” (Rawhouser et al., 2017, p. 474); as well as “entrepreneur*,” “new firm(s),” “new venture(s),” “new business(es),” “founder(s),” “resource*,” “capital*,” “network*,” and “bricolage” (Clough et al., 2019, p. 242). I added synonyms like “seek,” “assembl*,” and “search” to this list, and omitted “network” and “accumulate,” to ensure greater specificity of the search results and delineate them from the network- and resource deployment-centered literatures.

³ All journals are rated 4 or 4* by the Chartered Association of Business Schools (2018), with the exception of the Entrepreneurship and Regional Development Journal, which I included specifically to allow for diversity in contexts and research settings.

includes a broader range of journals that have published relevant studies on entrepreneurial resource mobilization (JMS: Calic & Mosakowski, 2016; AMA: Clough et al., 2019; OST: Duymedjian & Rüling, 2010; RP: Hsu, 2007; AMR: Huang & Knight, 2017; ERD: J. Zhang & Wong, 2008).

Before consolidating all the articles I identified, I manually added relevant articles across resource mobilization mechanisms, primarily drawn from citations in prior literature reviews (Clough et al., 2019; Hanlon & Saunders, 2007; Rawhouser et al., 2017) that did not emerge from the electronic database search, including those published in journals other than the pre-selection above. The majority of these manually added articles used different terminology in their titles, abstracts, or keywords than the key terms I searched. For instance, some publications refer to “(business) start-ups” (Cassar, 2004; Wry et al., 2014) rather than “new ventures,” “new firms,” or “new businesses.” Many studies use financing terminology, such as “investment” (Hallen & Eisenhardt, 2012) or “funding” (Greenberg & Mollick, 2017), rather than mentioning “resource” or “capital.” Some studies do include “resource” or “capital” in their titles, abstracts, or keywords, but none of the search terms from my third cluster (acqui* OR mobiliz* OR mobilis* OR search* OR seek* OR assembl* OR access OR bricolage) (Allison et al., 2015; Bengtsson & Hsu, 2015). While this review is not exhaustive, I strove to “accumulate a relatively complete census of relevant literature” (Webster & Watson, 2002, p. xvi). My electronic search (which yielded 579 articles), in conjunction with my manual additions (76 articles), resulted in a list of 655 articles (see Figure 1 for sample identification and selection process).

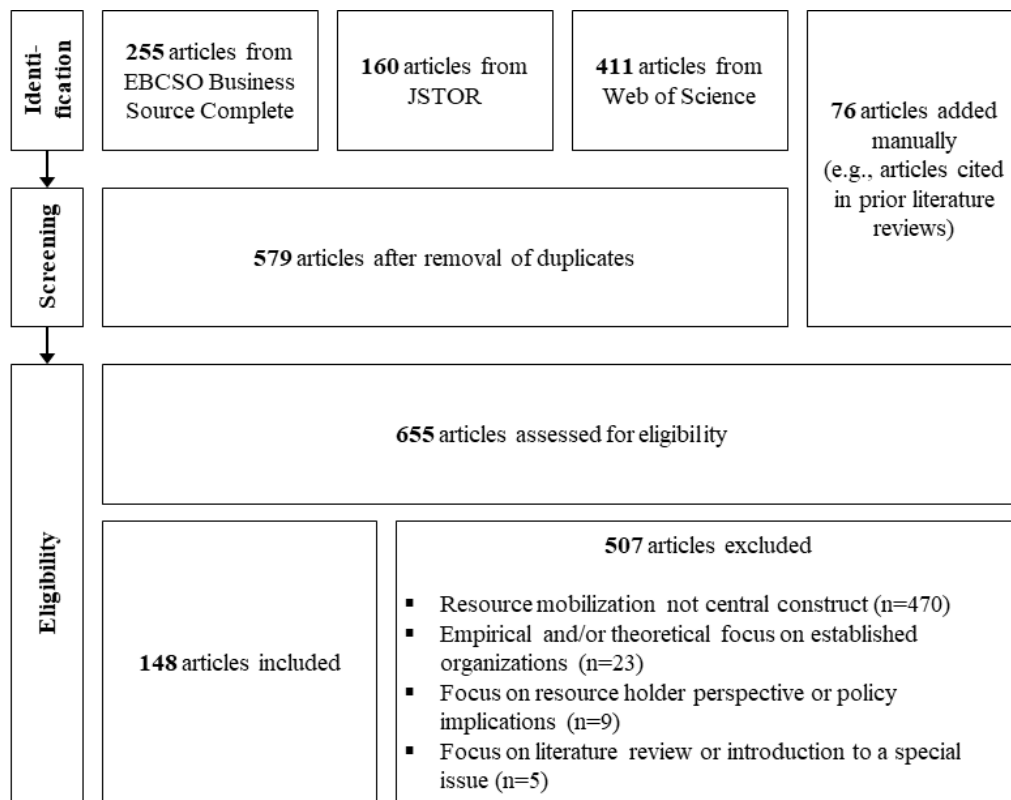


Figure 1: Literature Identification and Selection

Source: Reporting framework based on Moher and colleagues (2009)

I then screened all 655 publications, reading their titles and abstracts and consulting the full-texts where needed, to assess their eligibility for this review (see Moher et al., 2009), based upon four criteria (see Tranfield et al., 2003). First, I excluded studies in which resource mobilization is not the central construct under investigation or is only peripherally addressed. This occurred in, for instance, publications anchored in the network research tradition, which do not connect networks and resource mobilization explicitly (e.g., Tatarynowicz et al., 2016; Ter Wal et al., 2016; E. Y. Zhao et al., 2020), and in studies that use resource endowments as independent variables without prior consideration of the resource mobilization process that accumulated them (e.g., Prashantham & Dhanaraj, 2010; Sullivan & Marvel, 2011). Second, I excluded studies whose empirical and/or theoretical focus is on established organizations (and their spin-off firms or intrapreneurship) (e.g., Halme et al., 2012; Watson, 2007), because such organizations typically build on larger resource endowment, network, and legitimacy bases compared to new ventures (Hallen, 2008; Stinchcombe, 1965; Zimmerman & Zeitz, 2002).

Third, I excluded studies that examined resource mobilization from a purely resource holder-centered perspective—for instance in examining investors’ decision-making processes (e.g., Meyer et al., 2009; Shepherd et al., 2003)—or policy lens (e.g., Giraudo et al., 2019; Patzelt & Shepherd, 2009), rather than centering around the entrepreneurial perspective. Fourth, I excluded pure literature reviews and/or introductions to special issues (e.g., Clough et al., 2019; Janssen et al., 2018; Rawhouser et al., 2017) from the review as such, but used their insights and organizing frameworks to make sense of the research landscape.

I refined these in- and exclusion criteria throughout the literature selection process (see Tranfield et al., 2003), then iterated and reapplied them to the entire list of publications. Specifically, upon familiarizing myself with the different facets in resource mobilization-outcome relationships, I distinguished between (a) studies investigating the impact of resource mobilization mechanisms on outcomes, and (b) studies investigating only the relationship between resource endowments and outcomes. The latter do not center on resource mobilization, so I excluded them from this review. For instance, Schwienbacher (2013) examines the effect of entrepreneurs’ early-stage financing choices on later firm growth; this study qualifies for inclusion in this literature review. In contrast, Rosenbusch and colleagues (2013) conduct a meta-analysis on the relationship between financial capital endowed to a firm and financial performance; this study is excluded from the literature review.

My identification and selection procedure resulted in a final list of 148 articles (see Appendix A). I documented all identified articles and the process steps leading to their final selection, including decisions on refined criteria, in a comprehensive data repository.

2.2.2. Research Synthesis

My final literature selection includes 148 articles published between 2000 and mid-2020. The distribution of articles in my sample by year of publication reveals a positive trend, with the

number of published studies increasing over the past decade, reaching apexes in 2016 and 2018 (see Figure 2).

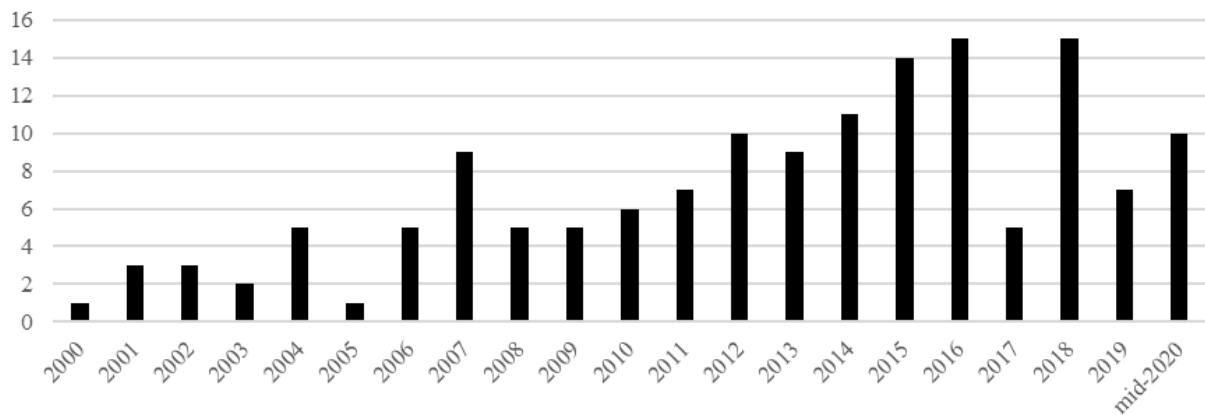


Figure 2: Number of Sampled Articles on Entrepreneurial Resource Mobilization by Year of Publication

Source: Author's own illustration

The articles in my review are anchored in several relevant research streams beyond resource mobilization, such as network and social capital theory, signaling theory, and functionally specialized literature streams (e.g., venture financing). The majority of articles (60%) was published in entrepreneurship journals with the remaining 40% spread across organization and management journals, as well as more specialized outlets (see Table 2). The fact that research on entrepreneurial resource mobilization is well represented in key organization and general management journals, such as the *Strategic Management Journal* (eight articles), the *Academy of Management Journal* (seven articles), *Organization Science* (five articles), and *Administrative Science Quarterly* (five articles), underscores the relevance of theoretical insights on this topic for scholars beyond the entrepreneurship discipline. Indeed, 24% of the articles in my sample were published in organization and general management journals, compared to an 11-12% overall representation of entrepreneurship research therein (Baker et al., 2017). Interestingly, 12 articles were published in *Research Policy*, a journal that examines “the interaction between innovation, technology, or research” (Research Policy, 2020). Most of these articles were published between 2011 and 2020, indicating an increasing interest in the interface of science- and technology-based entrepreneurship and resource mobilization.

Journal	Category**	Number of Articles
Journal of Business Venturing	Entrepreneurship	35
Entrepreneurship: Theory and Practice	Entrepreneurship	26
Entrepreneurship and Regional Development	Entrepreneurship	17
Research Policy	Other	12
Strategic Entrepreneurship Journal	Entrepreneurship	8
Strategic Management Journal	Management	8
Academy of Management Journal	Management	7
Management Science	Management	6
Small Business Economics*	Other	5
Organization Science	Organization	5
Administrative Science Quarterly	Management	5
Journal of Management	Management	4
Academy of Management Review	Management	2
Journal of Management Studies	Management	2
Journal of World Business*	Other	1
Managerial and Decision Economics*	Other	1
Journal of Small Business Management*	Other	1
Journal of Financial Economics*	Other	1
Journal of Finance*	Other	1
Organization Studies	Organization	1
Total		148

* Journal not included in initial electronic database search; article(s) added to sample manually

** Based on Baker and colleagues (2017), where feasible, except Organization Science, included here in Organization literature

Table 2: Number of Sampled Articles by Journal

Out of these 148 sampled studies, 100 (68%) use quantitative research methods, 29 (20%) use qualitative research methods, and 19 (13%) are conceptual or use a mixed methods approach (see Table 3). This share of qualitative methods is slightly higher than the share of all qualitative research in entrepreneurship journals, which sat at 16% between 2011 and 2015 (Baker et al., 2017), but remains clearly underrepresented.

Research Method	Entrepreneurship		Management		Organization		Other		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Empirical: Quantitative	61	71%	20	59%	4	67%	15	68%	100	68%
Empirical: Qualitative	16	19%	8	24%	0	0%	5	23%	29	20%
Empirical: Mixed Methods	5	6%	3	9%	1	17%	1	5%	10	7%
Conceptual	4	5%	3	9%	1	17%	1	5%	9	6%
Total	86	100%	34	100%	6	100%	22	100%	148	100%

Percentages do not add up to 100% due to rounding

Table 3: Number and Percentage of Sampled Articles by Research Method and Journal Category

Out of all 148 sampled articles, 107 articles comprise analyses on a firm level, while 26 articles examine individual-level resource mobilization, and 15 articles examine both (e.g., crowdfunding profiles that do not necessarily distinguish between founders and firms). The resource holders examined in my sampled articles often include financial investors, such as venture capital (VC) investors or those active on crowdfunding and -lending platforms, and in

many cases are not specified (e.g., in bricolage or bootstrapping studies) (see Table 4). This methodological trend could be ascribed to the greater ease of measuring financial resources compared to other types of resources drawn from employees, accelerators, and/or suppliers.

Type of Resource Holder Examined	Number	%
Diverse / mixed / not specified	57	39%
Investors (VC)	37	25%
Investors (diverse / mixed)	17	11%
Crowdfunding & micro- / crowdlending platforms	12	8%
Other partners	7	5%
Banks & debt financiers	5	3%
Investors (angel)	4	3%
Employees	4	3%
Family & friends	2	1%
Accelerators	1	1%
Suppliers	1	1%
Customers	1	1%
Total	148	100%

Table 4: Number and Percentage of Sampled Articles by Resource Holder Type

The comparison of sampled studies' empirical geographic contexts reveals another asymmetry in the literature (see Table 5): The majority of empirical sample populations is located in high income countries (70%), with another 10% in upper middle income countries—most of these studies focus on entrepreneurship in China—and only 7% in lower middle income countries. One study's sample is located in a low income country. This focus on high income countries is not surprising, in light of many scholars' research sites. However, it does not do justice to the realities of entrepreneurship across the globe: Total early-stage entrepreneurial activity (TEA) is broadly comparable across national income levels (Bosma et al., 2020). In fact, the most recent Global Entrepreneurship Monitor Report identified the highest levels of TEA in Chile, Ecuador, Guatemala, Brazil, Panama, Colombia, and Armenia—only two out of these seven countries are classified as high income economies by the World Bank (2020). The discrepancy between the loci of most entrepreneurial activity and research becomes particularly salient in light of global population distributions: Only one-seventh of the global population lives in high income countries, with the majority located in upper and lower middle income countries (World Bank, 2019a).

Location of Studies' Empirical Sample	Number	%
High income country(ies)	103	70%
Upper middle income country(ies)	15	10%
Lower middle income country(ies)	10	7%
Low income country(ies)	1	1%
Diverse	10	7%
n/a (conceptual study)	9	6%
Total	148	100%

Percentages do not add up to 100% due to rounding | Categorization based on World Bank list of economies (2020)

Table 5: Number and Percentage of Sampled Articles by Location of Studies' Empirical Sample

For the purpose of this literature review, I engaged in a thematic analysis (Tranfield et al., 2003) aimed at identifying relevant themes in the literature, as well as underlying “relations, contradictions, gaps, and inconsistencies” (Siddaway et al., 2019, p. 751). Based on this research synthesis, I map the current landscape of entrepreneurial resource mobilization research into an organizing framework of mechanisms, and associated research clusters consisting of antecedents, contingency factors, outcomes, and context (see Jones & Gatrell, 2014; Keupp & Gassmann, 2009), and outline promising avenues for future research.

2.2.3. Coding Approach

My analysis of selected articles followed a hybrid approach (Fereday, 2006). First, I classified articles based on the main resource mobilization mechanism they theorized. Building on my previous understanding of the literature, I identified recurring mechanisms suggested by prior work in my literature review’s sample. For instance, studies frequently emphasize the importance of *networks* for resource mobilization (e.g., Shane & Cable, 2002; Villanueva et al., 2012). Some authors contrast networks with *markets* in their study of entrepreneurial resource mobilization (J. Zhang et al., 2008; J. Zhang & Wong, 2008). Others suggest that *signals* are a relevant means of resource mobilization (e.g., Ahlers et al., 2015; Plummer et al., 2016). The mechanisms that prior work discusses add up to a list of seven (explained in more detail in Chapters 2.3.1.1.-2.3.1.7.). I then examined the very studies that had informed the compilation of seven mechanisms to understand each mechanism in more detail. This resulted in the coding scheme presented in Table 6, which I subsequently used to categorize the remaining articles in my sample based on textual indicators in title, abstract, and/or the full-text version. This process

was iterative, in that I frequently revisited priorly categorized articles, and looked out for potential additional mechanisms that would emerge. Studies that are not aligned with any mechanism in particular (e.g., Cornelius & Gokpinar, 2020; Greenberg & Mollick, 2017), or whose underlying mechanism was not seized upon in any other article in my sample (e.g., spatial collocation in Kolympiris et al., 2011), are categorized as “other / not specified” (see Figure 3).

Mechanism	Criterion for Classification	Typical Textual Indicators	Exemplary Articles
	The article depicts individuals’ or organizations’ uses of...		
1. Networks	... existing ties, or tie formation, as a means of mobilizing resources (see J. Zhang et al., 2008), including but not limited to arm’s length transactions (J. Zhang & Wong, 2008).	Affiliation(s) Alliance(s) Network(s) Relation(s) Relationship(s) Social capital Tie(s)	Batjargal & Liu (2004); McNamara et al. (2018); Shane & Cable (2002)
2. Markets	... economic interaction with resource holder(s), to which they had no previous ties, as a means of mobilizing resources (J. Zhang et al., 2008), whereby the economic exchange was limited to arm’s length transactions (J. Zhang & Wong, 2008), and typically conducted in a marketplace, such as an online platform.	Market(s)	J. Zhang et al. (2008); J. Zhang & Wong (2008) <i>Note: Articles theorize network versus market mechanisms</i>
3. Signals	... visible displays of their attributes (Plummer et al., 2016), affiliations (Stuart et al., 1999), network positions (Stuart, 1998), accomplishments (Courtney et al., 2017), or previous resource endowments (Islam et al., 2018) as a means of mobilizing resources, or increasing the likelihood thereof.	Signal(s) Signal(l)ing	Ahlers et al. (2015); Söderblom et al. (2015); S. Yang et al. (2020)
4. Narratives and Symbols	... narratives, stories and/or symbols, or of their storytelling capacities (Martens et al., 2007; Zott & Huy, 2007) as a means of mobilizing resources, or increasing the likelihood thereof.	Narrative(s) Story(ies) Symbol(s) Language Presentation	Allison et al. (2015); Clarke (2011); Lounsbury & Glynn (2001)
5. Resource Seeking	... efforts to obtain standard resources (Baker & Nelson, 2005), either explicitly labeled as resource seeking, or one of its conceptual synonyms, which include optimization (Desa & Basu, 2013), ingenieurung (Sunduramurthy et al., 2016), and engineering (Stinchfield et al., 2012).	Engineering Ingenieurung Optimization Resource seeking	Baker & Nelson (2005); Stinchfield et al. (2012); Sunduramurthy et al. (2016) <i>Note: Articles theorize resource seeking versus bricolage mechanisms</i>
6. Bricolage	... behaviors that involve “making do” as a means of resource mobilization, labeled explicitly as bricolage (Baker & Nelson, 2005).	Bricolage	Busch & Barkema (2020a); G. Fisher (2012); Stenholm & Renko (2016)
7. Bootstrapping	... behaviors that involve the “methods...used to reduce firm reliance on outside financing” (Ebben & Johnson, 2006, p. 853), labeled explicitly as bootstrapping (see Waleczek et al., 2018; Winborg & Landström, 2001).	Bootstrap(p)ing	Ebben & Johnson (2006); Grichnik et al. (2014); Vanacker et al. (2011)

Table 6: Classification of Articles According to Their Theorizing of Primary Resource Mobilization Mechanism

Source: Author’s synthesis of extant literature

Second, I inductively analyzed the theme(s) each article addresses, such as global mindsets (Lin et al., 2020), media attention (Petkova et al., 2013), or disaster recovery (Nelson & Lima, 2020). In doing so, I also consulted title, abstract, and/or the full-text version of each article and searched for the relevant constructs underlying each study. In this process, I regarded and documented the independent and dependent variable(s), as well as mediators and moderators operationalized in the studies, if applicable. The categorization of articles based on the underlying themes was accompanied by the categorization in research clusters (i.e., antecedents, mechanisms, contingency factors, outcomes, context), inspired by Jones and Gatrell (2014) and Keupp and Gassmann (2009), and resulted in the overview presented in Figure 4. This process step was also iterative in nature.

2.3. Entrepreneurial Resource Mobilization Research Landscape

Entrepreneurial resource mobilization has received substantial attention from scholars across research disciplines—mirrored in the large number of studies that were published in selected journals over the last 20 years. However, this broad research landscape is fragmented; it lacks coherence across different research strands. This literature review draws the missing conceptual linkages between resource mobilization mechanisms (see Figure 3), and offers an organizing framework of its antecedents, contingency factors, outcomes, and context (see Figure 4).

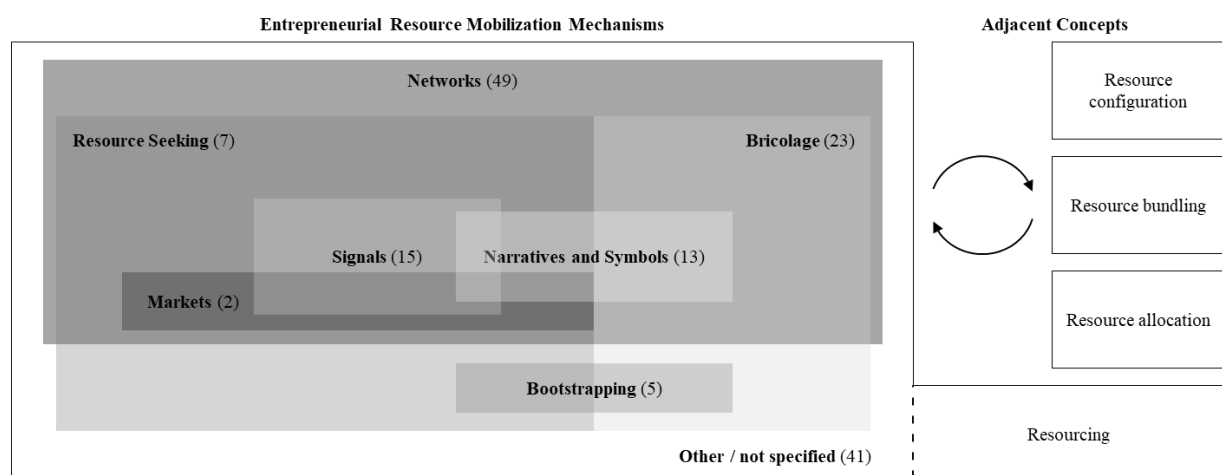
2.3.1. Mechanisms

Analysis of the sampled articles in this review reveals a broad array of different resource mobilization mechanisms that are non-mutually exclusive and vary in their theoretical groundings and depth. While some are anchored in key research traditions in the organizational and management literature (e.g., networks), others have emerged from more recent considerations of entrepreneurial resourcefulness (e.g., bricolage), or have been predominantly theorized as one tool among many (e.g., narratives). Figure 3 depicts the seven resource

mobilization mechanisms I identified in this literature review, along with their conceptual overlaps and coverage frequencies in extant research.

The most prominent mechanism depicted in prior work is the use of networks (e.g., Shane & Cable, 2002)—described in 49 articles as a primary resource mobilization mechanism. Beyond the studies that explicitly outline networking behaviors, the use of networks relates conceptually to most prior work on resource mobilization, as it entails the formation of ties between an entrepreneur or their venture and a resource holder or other tie alters (Ozdemir et al., 2016). Two studies in my sample specifically contrast the use of networks with market methods (J. Zhang et al., 2008; J. Zhang & Wong, 2008). Further analysis reveals that the use of markets conceptually overlaps with networking and could be accommodated under network theorizing if we reduced a market transaction to tie formation activity between strangers. Signals (15 articles) represent a resource mobilization mechanism that appears to be applied implicitly at the interface of markets and networks: Entrepreneurs may signal various qualities, achievements, and affiliations (e.g., Plummer et al., 2016) to their networks and other market participants. Narratives and symbols (13 articles) can be used to convey similar contents or messages to resource holders, facilitating resource mobilization (e.g., Zott & Huy, 2007). Extant research also describes two resource mobilization mechanisms in juxtaposed opposition to each other: resource seeking (7 articles)—the “continued attempt to acquire standard resources” (Baker & Nelson, 2005, p. 353), hence underlying most prior work on resource mobilization—and bricolage (23 articles)—“making do by applying combinations of the resources at hand to new problems and opportunities” (Baker & Nelson, 2005, p. 333). Bootstrapping (5 articles), depicting the “methods that are used to reduce firm reliance on outside financing” (Ebben & Johnson, 2006, p. 853), are associated in extant literature with both resource seeking and bricolage (Busch & Barkema, 2020a; Clough et al., 2019).

As a result of the conceptual ambiguity across extant research, a large share of articles (41 out of 148) are not explicitly theoretically anchored in any of these seven resource mobilization mechanisms. Most of them align roughly with the broad categories of resource seeking and/or networks, as they *implicitly* examine the mechanisms entrepreneurs deploy to seek standard resources (e.g., venture capital in Wry et al., 2014), and the ways they use network ties in doing so (e.g., with existing investors in Guerini & Quas, 2016). These articles are theoretically rooted, for instance, in entrepreneurial resource mobilization and finance (Block et al., 2014; Lanahan & Armanios, 2018), the venture capital literature (Guerini & Quas, 2016; Warnick et al., 2018), or the literature on managerial capabilities (Huy & Zott, 2019; Townsend & Busenitz, 2015).



(X): Covered in X articles as primary resource mobilization mechanism (non-mutually exclusive) | Conceptual overlaps presented graphically do not necessarily reflect explicit research strand overlap | Size of shapes and overlaps does not reflect research intensity

Figure 3: Entrepreneurial Resource Mobilization and Adjacent Concepts

Source: Author's own illustration

In this review, I separate resource mobilization, including the assembly (Clough et al., 2019) or acquisition (Lounsbury & Glynn, 2001) of resources, from resource configuration (Eisenhardt & Martin, 2000), bundling (Penrose, 1959; Wernerfelt, 1984), allocation (Lovallo et al., 2020), and other forms of managing an existing set of resource endowments (Sirmon & Hitt, 2003). Extant literature has further promoted the idea of *resourcing* as “the creation in practice of assets such as people, time, money, knowledge, or skill; and qualities of relationships such as

trust, authority, or complementarity such that they enable actors to enact schemas” (Feldman, 2004, p. 296). Describing the creation of resources by means such as “turning objects into resources” (Sonenshein, 2014, p. 817), this concept of resourcing overlaps conceptually with resource mobilization. It emphasizes the malleable nature of resources, which can be more or less valuable depending on how actors engage with them (Keating et al., 2014; Sonenshein, 2014). This idea becomes particularly salient in bricolage, which involves creating necessary resources by recombining or repurposing resources already at hand (Baker & Nelson, 2005; Di Domenico et al., 2010). The conceptual overlap between resource mobilization and resourcing is on full display in recent publications that use the terms interchangeably (Jayawarna et al., 2020), or that cluster resource mobilization and allocation under the terminological umbrella of *resourcing* (Michaelis, Carr, et al., 2020).

2.3.1.1. Networks

A large share of the studies in my sample underscores the importance of network mechanisms to entrepreneurial resource mobilization (e.g., Hallen, 2008; Shane & Stuart, 2002; Villanueva et al., 2012): “There is little doubt that entrepreneurs’ ties provide them with resources and/or access to resources” (Khayesi & George, 2011, p. 473). Notably, entrepreneurs’ networks can be used to convey information (Shane & Cable, 2002), send positive signals about their ventures and affiliations (Hsu, 2007), or instill shared understandings and trust (Ozdemir et al., 2016). Both direct ties and indirect ties⁴ (e.g., Shane & Cable, 2002), whether strong or weak (distinguished by the frequency and intensity of interactions, see Granovetter, 1973) can aid in resource mobilization (Hallen & Eisenhardt, 2012).

⁴ I define a direct tie as an immediate relationship between a focal venture or entrepreneur and a tie alter (Ozdemir et al., 2016; J. Zhang et al., 2008) and an indirect tie as a link between a focal venture or entrepreneur and a tie alter “who are not directly connected but through whom a connection can be made through a social network of each party’s direct ties” (Shane & Cable, 2002, p. 367).

Entrepreneurs employ different networking behaviors or styles when navigating and building the networks around them (Hallen et al., 2020). For instance, entrepreneurs can either deepen (focus on strong ties) and/or broaden (foster more, but often weaker, ties) their networks (Vissa, 2012). A related trade-off is the choice between securing access to resources and/or increasing resource diversity within their networks (Ozdemir et al., 2016). Several studies further illuminate entrepreneurs' choices in selecting resource holders. For instance, prior work reveals that when selecting tie formation targets, entrepreneurs tend to prioritize contacts with the most resource variety (Grossman et al., 2012) and with good reputations (Hsu, 2004).

2.3.1.2. Markets

A small thread of research contrasts the use of networks with the use of markets. Accordingly, once entrepreneurs fully exploit their ties, or when the cost of exploiting ties exceeds expected outcomes, they turn to markets (J. Zhang et al., 2008; J. Zhang & Wong, 2008). Applicable “in a scenario when entrepreneurs and investors do not know each other either directly or indirectly before initiating the potential business exchange” (J. Zhang et al., 2008, p. 594), market mechanisms encompass, among others, public event attendance, advertising, and cold-calling, to name a few.

As such, the use of markets can be conceptually classified as a network mechanism and represents a subset thereof: When entrepreneurs and resource holders who have no prior direct or indirect ties initiate a resource exchange with each other, this constitutes an act of tie formation (see Gulati, 1995; Vissa, 2011) and hence could be considered to constitute a network mechanism. This conceptual overlap may help to account for why the contrasting juxtaposition of networks and markets has thus far not gained traction in entrepreneurial resource mobilization research. It is possible, however, that with emerging research on online resource mobilization, where resources are exchanged with little or no interaction between entrepreneurs and resource holders, as is the case on crowdfunding or crowdlending platforms, market

mechanisms—with or without consideration of underlying network dynamics—will increasingly attract scholarly interest in the future.

2.3.1.3. Signals

A third thread of research borrows from signaling theory (Spence, 1973), examining the different signals entrepreneurs and their ventures can send to resource holders to facilitate resource mobilization. Fifteen articles in my sample study how ventures can mobilize resources by signaling, for instance, their existing resource endowments (e.g., Islam et al., 2018), founders' education and experience levels (e.g., Ko & McKelvie, 2018), or credibility (e.g., S. Yang et al., 2020). In environments that are particularly noisy with competition, entrepreneurs may combine different signals, such as venture characteristics and third-party affiliations (Plummer et al., 2016).

Extant literature depicts signals both in contexts where entrepreneurs and resource holders are already connected (Huang & Knight, 2017) and not (yet) connected—for example on crowdfunding (e.g., Oo et al., 2019) or microcredit platforms (Moss et al., 2015)—and thus implicitly positions this resource mobilization mechanism at the interface of networks and markets.

2.3.1.4. Narratives and Symbols

Entrepreneurs also convey information, influence resource holders, and ultimately facilitate resource mobilization by using narratives and symbols. Martens et al. (2007) show that narratives and storytelling help to “construct unambiguous identities” (p. 1125), provide information on venture risks, and elicit familiarity, which aid in resource mobilization. Besides, narratives have been found to harness cultural capital (Lounsbury & Glynn, 2001) and linguistic cues around social or business opportunities (Allison et al., 2015).

Symbols rely on evoked meanings and common interpretations by entrepreneurs and resource holders. They can convey personal credibility and achievements (Zott & Huy, 2007), create identities, and affect emotions (Clarke, 2011). Symbols encompass, for instance, visuals like meeting settings, or actions like deliberate displays of education, venture performance, awards, and stakeholder relationships (Zott & Huy, 2007). Although conceptually overlapping with the use of signals, narratives and symbols are largely studied separately in the sampled articles of this review (see Clarke, 2011; Moss et al., 2015 for notable exceptions of this pattern).

2.3.1.5. Resource Seeking

Resource seeking represents another research stream that has emerged in separation from the study of networks, markets, signals, and narratives and symbols. The term describes the “continued attempt to acquire standard resources” (Baker & Nelson, 2005, p. 353) that are in line with consensus operating procedures and standards (Duymedjian & Rüling, 2010; Halme et al., 2012) to optimally satisfy ventures’ resource requirements (Desa & Basu, 2013). To meet resource needs, ventures engaging in resource seeking “search for the best sources of these resources” (Desa & Basu, 2013, p. 28) and pay market-level prices for them (Desa & Basu, 2013). The essence of resource seeking has been depicted using various labels, such as optimization (Desa & Basu, 2013), ingenieuring (Sunduramurthy et al., 2016), and engineering (Stinchfield et al., 2012). I find that two articles do not follow this classification, but instead position resource seeking as the motivation that drives entrepreneurial resource mobilization (Forbes et al., 2006; Kalnins & Chung, 2004). Studies rarely address resource seeking in isolation, instead juxtaposing it against a supposedly oppositional mechanism, bricolage.

2.3.1.6. Bricolage

In contrast to resource seeking, which is largely depicted as a “rational” approach, bricolage is presented as “less rational” (Stinchfield et al., 2012, p. 3). Lévi-Strauss (1967) coined the term within the field of anthropology, however within the context of entrepreneurship studies it is

currently defined as “making do by applying combinations of resources already at hand to new problems and opportunities” (Baker & Nelson, 2005, p. 333).

Often presented as a response to resource scarcity (e.g., Desa & Basu, 2013; Wierenga, 2020), extant research broadly describes bricolage behaviors in terms of four key features: (1) “making do” (Baker & Nelson, 2005; Lévi-Strauss, 1967); (2) the reallocation, recombination, and/or repurposing of resources; (3) the use of resources at hand (Baker & Nelson, 2005; Di Domenico et al., 2010), and (4) the refusal to be constrained by limitations (Stinchfield et al., 2012). Manifestations of bricolage can differ across firms. For instance, Baker and Nelson (2005) distinguish between parallel bricolage—characterized by regular and repeated use of bricoleurial activity across projects—and selective bricolage—the deliberate choice of bricolage for suitable occasions or projects. Five studies in my sample examine bricolage in contrast to resource seeking (e.g., Desa & Basu, 2013), while the majority of articles on bricolage examines the mechanism in isolation from other resource mobilization mechanisms (e.g., Stenholm & Renko, 2016).

2.3.1.7. Bootstrapping

When facing financial resource constraints, extant research suggests that firms may resort to bootstrapping mechanisms (Grichnik et al., 2014; Waleczek et al., 2018), the “methods...used to reduce firm reliance on outside financing” (Ebben & Johnson, 2006, p. 853), as a means of coping with limitations and meeting resource needs while avoiding overdependence on external resource providers (Winborg & Landström, 2001). Five studies in my sample examine the use of bootstrapping mechanisms that can take form, for instance, of working capital optimization (e.g., late payment of managers’ salaries or suppliers), equipment borrowing and leasing, or optimization of supplier conditions (see Winborg & Landström, 2001 for a list of bootstrapping elements).

2.3.2. Nomological Net of Research Clusters

In the following, I will outline how prior research depicts resource mobilization mechanisms by organizing them into research clusters of antecedents, contingency factors, outcomes, and context. Figure 4 summarizes the underlying constructs and the frequency with which they occur in my review’s sample. Antecedents affect whether and how entrepreneurs and their ventures deploy resource mobilization mechanisms. The latter then relate to outcomes—a relationship that is often subject to contingency factors. Outcomes are multifold, with resource endowments at times mediating and/or moderating subsequent results, and can, in turn, represent antecedents to the resource mobilization mechanisms (for instance in the form of resource endowments that affect whether and how entrepreneurs mobilize resources thereafter). Contextual considerations can be understood as affecting, and, seldom, as being affected by each of the previous research clusters.

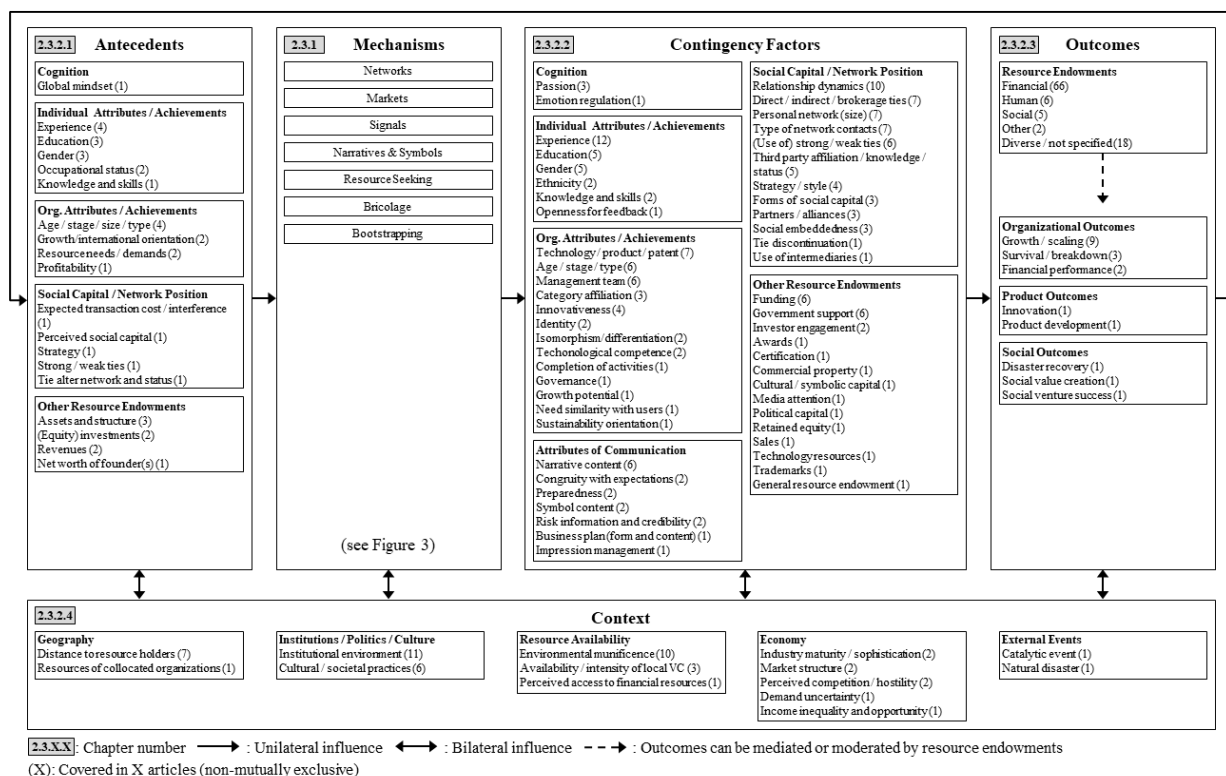


Figure 4: Organizing Framework of Entrepreneurial Resource Mobilization by Research Cluster

Source: Author’s own illustration, presentation based on Keupp and Gassmann (2009)

2.3.2.1. Antecedents

A small share of studies in my sample addresses the antecedents of entrepreneurs' engagement in the varied resource mobilization mechanisms, that is, the factors influencing *whether* and *how* they engage in resource mobilization. In illuminating different antecedents, scholars have predominantly focused on what factors antecede the use of networks. Beside these eight articles grounded in network research, as well as three articles studying the antecedents of bootstrapping, little research has explored the antecedents of other resource mobilization mechanisms (see Table 7).

Networks	Markets	Signals	Narratives and Symbols	Resource Seeking	Bricolage	Bootstrapping	Other / Not specified	Total
8	1*	1	0	1*	1	3	4	17

* Articles counted twice because they study two primary mechanisms in comparison (e.g., networks versus markets, resource seeking versus bricolage)

Table 7: Number of Articles Studying Antecedents per Primary Resource Mobilization Mechanism

The antecedents to resource mobilization behaviors described in extant literature can be grouped into five key categories (see Figure 4): First, one study relates entrepreneurial cognition, specifically leaders' global mindsets, to international networking and knowledge acquisition activities (Lin et al., 2020). Second, several studies examine how entrepreneurs' individual attributes and achievements help to determine their resource mobilization activity. They primarily focus on individuals' levels of education (e.g., Gartner et al., 2012) and experience (e.g., Grichnik et al., 2014), and their genders (Becker-Blease & Sohl, 2007). For instance, Grichnik and colleagues (2014) find that entrepreneurs' experiences and academic education levels affect whether their ventures engage in bootstrapping mechanisms and which specific bootstrapping behaviors they pursue. Third, prior work has connected organizational attributes and achievements to resource mobilization mechanisms, highlighting the role of organizational age and stage, size, and/or type for subsequent engagement in each mechanism. For instance, Cassar (2004) finds a positive relationship between venture size and the use of debt financing. Fourth, scholars have demonstrated connections between ventures' extant (and

perceived, see Jonsson & Lindbergh, 2013) social capital and network positions, and associated resource mobilization mechanisms. For instance, the networks and prestige of ventures' existing investors may influence their decisions to seek additional investors (P. Wang, 2020). As such, networks not only represent a mechanism for resource mobilization, but studies can also operationalize network attributes, like ventures' existing ties, as independent variables that precede and affect ventures' quest for resources. Fifth, prior work has occasionally connected other forms of resource endowments, such as existing assets and investments, or initial revenues, to subsequent resource mobilization. Walthoff-Borm and co-authors (2018), for instance, present high debt levels and high shares of intangible assets as drivers of equity crowdfunding activities. As resource endowments, or lacks thereof, typically drive entrepreneurs to mobilize resources in the first place (e.g., Walthoff-Borm et al., 2018; P. Wang, 2020), it is surprising that my sample literature does not contain more articles examining the effect of resource endowments on the choice of resource mobilization mechanisms.

2.3.2.2. Contingency Factors

Scholars have devoted ample attention to numerous contingency factors that affect the relationships between resource mobilization mechanisms and their outcomes, predominantly in terms of resource endowments. A large chunk of research (37 articles) focuses on network mechanisms. A nearly equal amount of studies is not explicitly anchored in any resource mobilization mechanism, but exhibits characteristics of network mechanisms and resource seeking. For instance, numerous studies examine the different factors that make ventures more or less likely to receive VC funding, such as category affiliations (Wry & Lounsbury, 2013), business plan contents (Kirsch et al., 2009), and founders' ethnicities (Bengtsson & Hsu, 2015). Signals, as well as narratives and symbols rank third and fourth in terms of the frequency with which they appear in prior work on resource mobilization contingency factors. Interestingly,

and despite the ample research that exists in this field, none of the articles in my sample addresses contingency factors for markets, resource seeking, and bootstrapping (see Table 8).

Networks	Markets	Signals	Narratives and Symbols	Resource Seeking	Bricolage	Bootstrapping	Other / Not specified	Total
37	0	14	13	0	2	0	29	95

Table 8: Number of Articles Studying Contingency Factors per Primary Resource Mobilization Mechanism

The contingency factors affecting the relationship between resource mobilization mechanisms and their outcomes can be organized into six categories (see Figure 4). First, a few studies have examined effects of cognitive contingencies, such as the regulation of emotions (Huy & Zott, 2019) and entrepreneurs’ passion (Chen et al., 2009). Second, the attributes and/or achievements or individuals like founders and entrepreneurs have received more scholarly attention, with most research focusing on individual experience levels (e.g., Kotha & George, 2012). Third, numerous studies explore the effects of organizational attributes and/or achievements, often in terms of the quality of ventures’ management teams (Townsend & Busenitz, 2015), venture turnover levels (Beckman et al., 2007), ventures’ technological or product features and statuses (e.g., measured in terms of patents, as in Haeussler et al., 2014), and ventures’ ages, stages, or organizational types (Khoury et al., 2015). Fourth, attributes of communication play a role in determining resource mobilization outcomes, particularly the underlying content of the narratives and symbols ventures choose to deploy. For instance, Allison and co-authors (2015) find that linguistic cues that highlight social rather than business opportunities result in higher success on an online prosocial lending platform. Fifth, extant research has related entrepreneurs’ social capital and network positions with resource mobilization outcomes, particularly when network mechanisms come into play. Huang and Knight (2017), for instance, conceptually examine how network mechanisms yield venture growth as mediated by entrepreneur-investor relationships. Prior research explores the role of personal or firm network size and composition (e.g., Semrau & Werner, 2014) as often as it explores the types of ties (e.g., Wuebker et al., 2015) and relationship dynamics, including

power ratios and trust (e.g., Newbert & Tornikoski, 2013). Sixth, a sizeable body of research illuminates how *prior* resource endowments affect outcomes, such as *future* resource endowments. Obtained funding (e.g., Blevins & Ragozzino, 2018) and government support (e.g., Söderblom et al., 2015) are among the most prevalent resource mobilization contingency factors investigated in my sample. The positive impact of prior resource endowments on resource mobilization outcomes is noted frequently across studies: The more (non-redundant) certificates (Lanahan & Armanios, 2018), awards (Hallen, 2008), media attention (Petkova et al., 2013), or other endowments a venture has received, the more likely it is that its current resource mobilization efforts will succeed. These findings underscore the importance of successful resource mobilization for entrepreneurs, as it can trigger subsequent self-reinforcing resource mobilization successes.

Prior work investigating the contingency factors of entrepreneurial resource mobilization outcomes rarely considers one variable in isolation. Rather, the majority of articles in my sample examines the effect of both individual and organizational attributes and achievements, at times combined with social capital and network positions, communication, and/or other prior resource endowments. This underscores the complex interplay of factors involved in determining the outcomes of entrepreneurial resource mobilization. A sizeable portion of extant research also examines the effects of these factors as they relate to contextual elements like geography (e.g., Mollick, 2014) and the local institutional environments (e.g., Khoury et al., 2015), hinting at the salience of context in entrepreneurial resource mobilization, which I will turn to in Chapter 2.3.2.4. Few articles consider the role of entrepreneurial agency, denoting entrepreneurs' interactive engagement with their structural environment (Emirbayer & Mische, 1998) based on their "habit, imagination, and judgment" (p. 970) in whether their resource mobilization yields favorable outcomes or not: A small set of articles examines the relationship between bricolage and different outcomes as subject to the way or strategy with which

entrepreneurs deploy bricolage (e.g., Tasavori et al., 2018). With the exception of Schwienbacher's (2013) study relating early-stage investor choices to later-stage firm growth, other resource mobilization mechanisms have been disregarded in terms of the choices entrepreneurs face in using them.

2.3.2.3. Outcomes

Extant research on the outcomes entailed by resource mobilization mechanisms, as represented in my sample, spans resource endowments, organizational, product, and social outcomes, whereby resource endowments can mediate or moderate the other outcomes. No individual-level outcomes emerged from this review. With the exception of markets, all resource mobilization mechanisms are represented in this research cluster. As such, extant research has predominantly focused on networks (38 articles), followed by signals (14 articles), narratives and symbols (13 articles), and bricolage (13 articles) (see Table 9), with bricolage primarily investigated for its effect on organizational, product, and social outcomes.⁵ A large share of studies is not categorized under any mechanism in this review (29 articles).

Networks	Markets	Signals	Narratives and Symbols	Resource Seeking	Bricolage	Boot-strapping	Other / Not specified	Total
38	0	14	13	3*	13	1	29	108

* Articles counted double because they study two primary mechanisms in comparison (e.g., resource seeking and bricolage)

Table 9: Number of Articles Studying Outcomes per Primary Resource Mobilization Mechanism

An overwhelmingly large body of research (90 out of 148 articles) investigates the factors that may lead to success in obtaining resource endowments.⁶ The investigation of resource endowment outcomes is dominated by the study of financial resources (see Figure 4), with 66 out of 90 studies regarding financial capital in their dependent variable (both quantitatively and

⁵ Note that my sample excludes multiple studies relating network mechanisms with performance outcomes (e.g., Baum et al., 2000; Milanov et al., 2015) as they do not theorize resource mobilization as their central construct.

⁶ Research examining the outcome implications of resources when operationalized as independent variables and representing the core construct of the study is excluded from this review (see Rosenbusch et al., 2013; Stam et al., 2014; Unger et al., 2011 for meta-analyses).

qualitatively) such as VC funding (Islam et al., 2018), crowdfunding (Cornelius & Gokpinar, 2020), or bank loans (H. Zhao & Lu, 2016). Fewer studies examine the mobilization of human, social, or other types of capital.

Fewer studies relate resource mobilization directly with organizational, product, and social outcomes (18 out of 148 articles). On the organizational level, the majority of articles addresses the relationship between bricolage and growth or scaling (e.g., Baker & Nelson, 2005), survival (e.g., Stenholm & Renko, 2016), or financial performance (An et al., 2020)—unveiling that bricolage leads to mixed effects: For instance, bricolage has been found to promote venture survival (Stenholm & Renko, 2016; Stinchfield et al., 2012), but also to be a source of breakdowns (Ladstaetter et al., 2018); it can promote growth and scaling if used judiciously (Busch & Barkema, 2020a), but hinders it if used excessively (Baker & Nelson, 2005). On the product level, Kickul and colleagues (2018) relate bricolage to different types of innovation. In terms of network mechanisms, Haeussler and colleagues (2012) examine how they affect high-technology product development. Three articles further analyze the implications of resource mobilization mechanisms—specifically bricolage at times juxtaposed against resource seeking—on social outcomes, such as social venture success (Sunduramurthy et al., 2016), social value creation (Sarkar, 2018), and disaster recovery (Nelson & Lima, 2020).

2.3.2.4. Context

The consideration of context has gained prominence in scholarly discourse on entrepreneurial resource mobilization in recent years—along with other research strands in entrepreneurship (Welter et al., 2019). Guiding work on the role and multiple facets of context has led the way for more diverse and deliberate inclusion of context in the study of entrepreneurship (Baker & Welter, 2018; Welter, 2011; Welter & Baker, 2020; Zahra et al., 2014). However, although the absolute number of articles operationalizing contextual elements in my sample demonstrates an

upward trend over the past decade, the share of articles in total publications remains largely unchanged.

The largest proportion of articles in my sample that operationalize context for the study of entrepreneurial resource mobilization addresses network mechanisms (15 articles). For instance, Rooks and colleagues (2016) compare how networks are used, and to what effect in collectivistic (here: rural Uganda) versus individualistic contexts (here: urban Uganda). Another large share of sampled studies that deals with context in some way is not explicitly anchored in any of the seven resource mobilization mechanisms (11 articles). Bricolage ranks third in terms contextual considerations (with 8 articles), possibly reflecting the fact that this mechanism is often theorized as a response to resource-scarce contexts (e.g., Desa & Basu, 2013). The remaining research is scattered sparsely across mechanisms (see Table 10).

Networks	Markets	Signals	Narratives and Symbols Seeking	Resource Seeking	Bricolage	Boot-strapping	Other / Not specified	Total
15	1*	1	2	4*	8	1	11	39

* Articles counted twice because they study two primary mechanisms in comparison (e.g., networks versus markets, resource seeking versus bricolage)

Table 10: Number of Articles Studying Context per Primary Resource Mobilization Mechanism

Prior research relates context to resource mobilization antecedents (e.g., Bertoni et al., 2019), the contingency factors affecting successful resource mobilization (e.g., Robson et al., 2009), and other organizational outcomes (e.g., Baker & Nelson, 2005). The latter two linkages represent a sizeable share of extant research on resource mobilization that considers context. Relatively few studies have examined context as a variable in relation to entrepreneurs' deployment of one resource mobilization mechanism over another.

The different dimensions of context considered within prior works fall into five categories (see Figure 4). The first category, geography, primarily centers around the distance between resource holders and seekers (e.g., Kolympiris et al., 2011). This contextual element is central to the study of international resource mobilization. However, despite the fact that I did not exclude international entrepreneurship literature from my sample, it only features in four

studies. This striking paucity reveals a limited integration of resource mobilization research with the international entrepreneurship research tradition (Filatotchev et al., 2016; Keupp & Gassmann, 2009). Second, the largest share of contextual research examines the role played by institutions, politics, and cultural practices in entrepreneurial resource mobilization. Desa (2012), for instance, finds in his study on technology social ventures worldwide that ventures are more likely to deploy bricolage in contexts of low technology regulation support. Third, the availability of resources, for instance operationalized as more or less munificent environments (e.g., Busch & Barkema, 2020a), has been related to resource mobilization mechanisms (13 articles) and bricolage in particular (6 articles). Fourth, economic factors, such as local competitive forces (e.g., Eckhardt & Delmar, 2006) or industry characteristics (Bhagavatula et al., 2010) have been occasionally related to entrepreneurial resource mobilization, altogether overshadowing the fifth and last category: While most articles operationalize contexts as snapshots in time taken from relatively static environments, two articles in my sample break out of this pattern and contextualize resource mobilization mechanisms in light of events in the external environment. McNamara and colleagues (2018) investigate the influence of large-scale catalytic events—in their study, the 2003 Special Olympics World Summer Games—on relationship dynamics, finding that entrepreneurs can use such events to reduce their dependence asymmetry with respect to resource holders. Nelson and Lima (2020) theorize about the ways in which bricolage behaviors can contribute to disaster recovery, analyzing the behavior as a response to one specific natural disaster in Brazil.

These recent articles offer an initial glimpse into the multiple elements of context that can affect and be affected by entrepreneurial resource mobilization. Nonetheless, a large share of research still considers only one element of context in isolation, such as the institutional environment (e.g., Du et al., 2015) or resource scarcity (e.g., Le Ngoc & Nguyen, 2009). They largely disregard the potentially vital lens of entrepreneurial perception—how entrepreneurs view and

define their own contexts. Research on bricolage assumes a trailblazing role in this field, emphasizing that what entrepreneurs make of their environments and the resources comprised therein can vary substantially (Baker & Nelson, 2005). Beyond prior work on bricolage, three articles also examine the effects of perceived deficits in social capital (Jonsson & Lindbergh, 2013), access to financial capital (Grichnik et al., 2014), and industry and market conditions (Eckhardt & Delmar, 2006; Grichnik et al., 2014) on resource mobilization. The overwhelming majority of studies in this sample treats context as exogenous, affecting resource mobilization mechanisms unilaterally, and with few exceptions (e.g., Kalnins & Chung, 2004; Keating et al., 2014; Kodithuwakku & Rosa, 2002) thereby neglects the endogenous nature of context whereby entrepreneurs can conversely influence and shape their contexts (Welter et al., 2019).

2.4. Avenues for Future Research

The landscape of research on entrepreneurial resource mobilization is conceptually rich, combining numerous theoretical perspectives. Prior work draws on strong theoretical foundations from multiple research traditions, such as network and social capital theory (Coleman, 1988), resource dependence theory (Pfeffer & Salancik, 1978), and signaling theory (Spence, 1973), to unravel how entrepreneurs mobilize resources, and with what effects. This robust body of research collectively outlines seven overarching resource mobilization mechanisms, the antecedents by which they are preceded or motivated, the contingency factors affecting how they relate to outcomes, the outcomes they yield, and how they interact with and within specific contexts.

At the same time, this literature (1) suffers from significant fragmentation and a related lack of coherence between several of its key threads, which have largely evolved in isolation from each other, and (2) reveals a number of un- or less-explored paths for scholars to walk in the future. Overall, future research on entrepreneurial resource mobilization would benefit from greater

consistency and the diversification of variables examined. I have identified a range of questions that may guide scholars towards these ends, summarized visually in Figure 5.

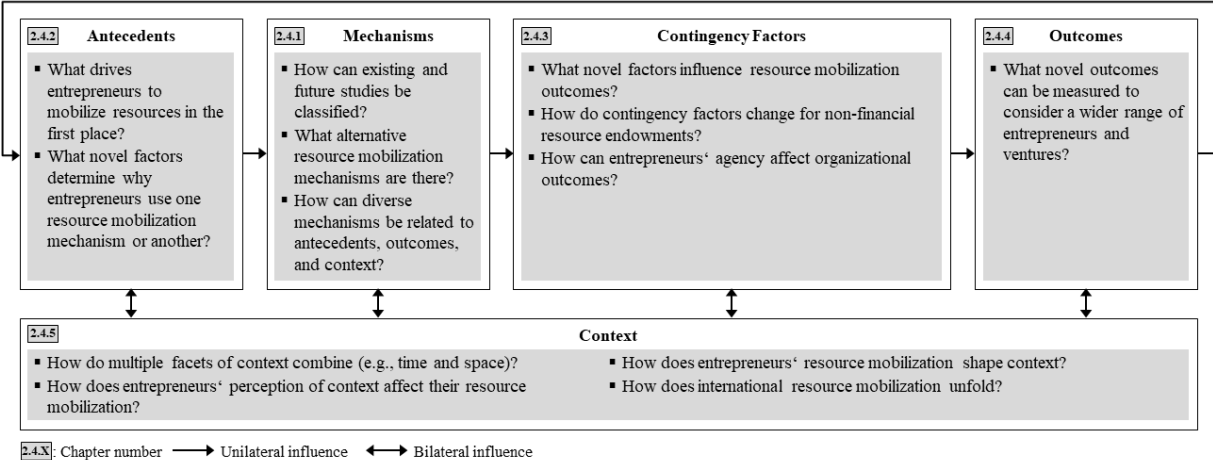


Figure 5: Guiding Questions for Future Research

Source: Author's own illustration

2.4.1. Mechanisms

To facilitate further knowledge accumulation on entrepreneurial resource mobilization, I encourage scholars to position their work more directly within the existing mechanisms posited by prior research and outlined in this essay. This will allow researchers to draw more, and more meaningful connections between them, such as salient points of conceptual overlap, and may be especially important for future research into network and resource seeking mechanisms: Almost one third of the articles in my sample that do not fall clearly into any one category could fit into either or both of these two. First, studies typically examine entrepreneurs' endeavors to raise funding on the capital market (i.e., a standard resource on a market place, pointing toward resource seeking as underlying mechanism), as in Wry and colleagues' (2014) study of nanotechnology ventures' category spanning and its effect on venture funding. Second, many studies presuppose the tie formation with professional investors that is needed for a resource transaction (i.e., pointing toward networks as underlying mechanism), as in Parhankangas and Ehrlich's (2014) study of entrepreneurs' impression management toward business angels. Explicit positioning of studies will also make it easier to identify, and create more space to

explore, gaps in existing research. Once enhanced transparency on existing research clusters has been accomplished, we can dedicate more attention to exploring novel mechanisms that complement the current portfolio. Agarwal and co-authors (2020), for instance, have made an important first step toward the discovery of new resource mobilization mechanisms in depicting the Indian frugality practice of *Jugaad* as a means of resource mobilization under resource scarcity.

Lastly, my analysis reveals a concerning asymmetry in levels of research on individual resource mobilization mechanisms. Network mechanisms received more attention than any other behavior across research clusters. In addition to networks, the analysis of antecedents centers around bootstrapping, contingency factors and outcomes center around signals as well as narratives and symbols, while contextual implications center around bricolage (see Tables 7-10). These imbalances suggest compelling questions for future research, such as: What factors determine whether and how entrepreneurs use signals, narratives and symbols, or other mechanisms for resource mobilization? Why do entrepreneurs engage in resource seeking as opposed to bricolage, and vice versa, in certain contexts? What determines how successful markets, resource seeking, bricolage, and bootstrapping will be for any given venture attempting to mobilize resources? What outcomes do the use of markets or pure resource seeking yield? How can signals, narratives, and symbols be used or perceived in varied cultural, or other contexts? Robson and colleagues (2013) have started the conversation on the latter question, showing the context-specific meanings of Ghanaian entrepreneurs' signals for credit-rating in their resource-scarce environment. Yet, much remains to be explored in these and other domains.

2.4.2. Antecedents

All of the studies in my sample assume that every entrepreneur will inevitably engage in resource mobilization. None of the studies in this review fundamentally challenges this very

assumption or thematizes the choice entrepreneurs must make to engage in resource mobilization across resource categories in the first place. Given the importance of resources for the exploitation of opportunities (Alvarez et al., 2013) and venture performance (Bradley, Shepherd, et al., 2011; George, 2005), the notion of entrepreneurs choosing *not* to mobilize resources does at first blush seem counterintuitive. However, there may be situations in which entrepreneurs do not engage in at least some aspects or forms of resource mobilization, especially at their ventures' inceptions, in their early days, or when they have achieved saturation of their immediate resource requirements. Examining the timing of resource mobilization behaviors—when ventures initiate, escalate, deescalate, or stop them—and the factors that prompt these decisions may be another promising future research avenue.

Taking this argument further, if saturation of resource requirements could affect resource mobilization, what role do resource endowments play? Surprisingly scant attention has been paid to the influence of resource endowments—of entrepreneurs and/or their ventures—on the use of resource mobilization mechanisms. Building on extant knowledge that resource stocks affect entrepreneurs' financing choices (e.g., Walthoff-Borm et al., 2018), their adoption of resource seeking and/or bricolage (Desa & Basu, 2013), as well as whether and how they bootstrap (e.g., Waleczek et al., 2018), future research could address the following questions: Which resources, and how much thereof, do entrepreneurs need to accumulate before they choose to engage in one mechanism or another? How do dynamic levels of resource needs and endowments interact (see Sullivan & Ford, 2014)? Is there a difference in objective and in perceived needs and endowments?

Entrepreneurs' perceptions, as well as their cognitive processes, are especially under-studied topics. Only one study in my sample theorizes the effect of cognitive elements—entrepreneurs' global mindsets—on subsequent resource mobilization behaviors (Lin et al., 2020). This is striking, in light of the existence numerous studies on resource *holders'* perspective and their

effects on their decision making (e.g., Shepherd et al., 2003). While cognitive antecedents are compelling standalone topics for new research, future studies may benefit from combining considerations of those factors with others as well. For instance, certain resource mobilization mechanisms could appear more or less desirable to entrepreneurs depending on their individual experiences, education levels, cultural upbringings, or prior successes and failures. Future studies on these topics will require a greater emphasis on qualitative, mixed, and cognitive research methods, including but not limited to think-aloud verbalizations (Grégoire & Schurer Lambert, 2014) and conjoint analyses (Lohrke et al., 2010).

2.4.3. Contingency Factors

A substantial body of research addresses the contingency factors of resource mobilization outcomes, prevalently the endowment with financial resources, and leaves us with a bouquet of interesting starting points for future research. The aspiration to *successfully* acquire or create resources that, in turn, can mediate and/or moderate the relationship with outcomes—whereby more resources will typically, but not always, translate into better outcomes (e.g., Bradley et al., 2011; Rosenbusch et al., 2013; Sullivan & Marvel, 2011)—lies at the very essence of resource mobilization. In recent decades, a growing body of research has explored factors that appear to influence resource endowments. However, it is surprising how much of this work—the vast majority—explores the same few core variables: entrepreneurs’ experiences and team qualities’ first and foremost, followed by product development levels, network attributes, and prior resource mobilization successes. Almost no existing research has explored contingency factors germane to early-stage entrepreneurial ventures with limited experience, short managerial track records, and largely undeveloped products, networks, and resource endowments, specifically (see Clough et al., 2019). Future studies should explore a more diverse set of contingency factors, potentially making the literature’s findings applicable to a wider range of entrepreneurs and ventures. Interesting research that has started this process of

diversification include, among others, Calic and Mosakowski's (2016) article on sustainability orientation and its effect on crowdfunding success, as well as S. Yang and colleagues' (2020) article on gender role congruity in accelerator program selection processes. Studies theorizing the role of communication attributes like business plan form and content (Kirsch et al., 2009) or microfinance platform profiles (Moss et al., 2015) as contingency factors also represent important emerging threads of research, with the potential to guide entrepreneurs with varied levels of maturity and current resource endowments.

The dominance of *financial* resource endowments in extant research on contingency factors further calls for increased scholarly attention to other resource categories. In how far do cognitive, individual, organizational attributes, and other contingency factors matter for the mobilization of non-financial resources?

Lastly, only a small research body that primarily studies bricolage (Baker & Nelson, 2005; Busch & Barkema, 2020a; Huang & Knight, 2017; Miozzo & DiVito, 2016; Sarkar, 2018; Schwienbacher, 2013; Sunduramurthy et al., 2016; Tasavori et al., 2018) has started considering entrepreneurs' agency (e.g., Tasselli & Kilduff, 2020) as a relevant factor affecting subsequent outcomes. Illuminating entrepreneurs' agentic behavior in investment tie formation, Hallen and Eisenhardt (2012) have introduced *efficiency* as a relevant consideration in entrepreneurial resource mobilization: "When firms form ties efficiently, they avoid lengthy and high-effort searches, failed attempts, and undesirable partners" (p. 35). This is an important variable that none of the studies in this sample has seized upon. The remainder of extant literature hardly informs entrepreneurs *how* to deploy resource mobilization mechanisms and *which choices* to make in order to yield the best-possible outcomes.

2.4.4. Outcomes

In light of the complex relationship between contingency factors and outcome constructs, I first call for more specification of the different layers involved between entrepreneurial resource

mobilization and outcomes as illustrated in Figure 4: Resource mobilization mechanisms have direct implications on organizational outcomes like survival (e.g., Stenholm & Renko, 2016) and growth (e.g., Busch & Barkema, 2020a; Schwienbacher, 2013; see also Nason & Wiklund, 2015), but this relationship can also be mediated or moderated by resource endowments (e.g., Bojica et al., 2018). Increased transparency on the relationship between resource mobilization mechanisms, resource endowments, and outcome variables would help to illuminate not only what resource mobilization yields, but how and why.

In terms of the resource endowments resulting from successful resource mobilization, diversity is imperative. In line with the cumulative research body on entrepreneurial resource mobilization (Clough et al., 2019), prior work predominantly examines financial resources. As such, extant literature largely disregards a bouquet of different resources—including human, social, and other capital, as well as new categories that have yet to be unraveled. For instance, it is questionable whether the insights we draw from articles on venture capital financing by professional investors can be translated to the sourcing of other resources like user data, licenses, volunteer labor, or certifications.

Figure 4 further demonstrates that scholars have adhered to a disconcertingly limited set of metrics for evaluating outcomes (see also Nason & Wiklund, 2015). While the study of growth, survival, and financial performance is undoubtedly essential, as they reflect many entrepreneurs' goals, a promising avenue for future research lies in extending the outcomes that are related to resource mobilization mechanisms. Scholars have yet to unpack, for example, the multiple outcome metrics that can inform the decisions of entrepreneurs pursuing social rather than financial goals (Mair & Martí, 2006), or temporary disaster relief rather than long-lasting venture survival (Williams & Shepherd, 2016). Diversifying outcome variables on the product or social level and beyond could represent a fruitful path for future studies.

2.4.5. Context

The list of contextual elements scholars can incorporate into future studies of entrepreneurial resource mobilization is long and diverse, ranging from collective memories and cultural myths to city planning and beyond (Welter & Baker, 2020). Yet, most studies in my sample focus on contextual variables like geography, institutional environments, and environmental munificence. Welter's (2011) calls for diversity in context have been heard, but "to capture the real everyday world of entrepreneurship across places and times" (Welter & Baker, 2020, p. 16), more remains to be done.

Extending considerations of context along and beyond the questions of "where" and "when," Welter's (2011) suggested starting points for contextual investigations, would open up particularly intriguing paths for future resource mobilization research. Importantly, future studies should go a step further than simply incorporating under-studied contextual elements, but instead pay tribute to the "multiplicity of where and when contexts, which cannot be theorized independently from each other, and the interplay of entrepreneurship, places, and time" (Welter & Baker, 2020, p. 16). For instance, future research could and should take a more nuanced view of resource constraints (e.g., Desa & Basu, 2013) or deficits (e.g., Robson et al., 2013) and their contextual boundaries, posing questions like: Which resources are scarce, and which are not? What is the spatial dimension of those constraints? How do those current constraints relate to historical contexts? If the context has evolved over time, how has it done so, and why? How do these identified constraints interact with other relevant contextual factors, like culture, language, or politics? Considering temporal factors in resource mobilization will be particularly critical to adequately capturing the "processes, sequences, and mechanisms by which events unfold and constructs relate to one another" (Aguinis & Bakker, 2020, p. 2)—McNamara and colleagues (2018), as well as Nelson and Lima (2020), have laid important foundations for these sorts of temporal considerations.

Another layer added to context largely neglected by extant research is the subjective perception of entrepreneurs toward their context, and the ways by which context is enacted. The dearth of extant literature on the effects of entrepreneurs' perceptions on resource mobilization efforts calls for future research to follow suit and weave in entrepreneurs' subjective interpretation (see Zahra et al., 2014) into the picture. We know that entrepreneurs do not merely experience context; context is "done" (Baker & Welter, 2017, p. 177), as entrepreneurs "actively enact and construct" their realities (Welter et al., 2019, p. 323). This suggests that future research should also explore the specific ways in which entrepreneurs co-create and shape their contexts, and thus the resources available to them, by contributing to the alleviation of poverty (Sutter et al., 2019), fostering inclusive growth (George et al., 2012), or initiating legislative changes (Baker & Welter, 2018; Welter et al., 2019), for instance.

Finally, the study of entrepreneurial resource mobilization across international borders represents a promising lens for future research. Future studies can draw on both the international entrepreneurship research tradition, and the research body on entrepreneurial resource mobilization and could benefit from integrating both. Despite the more recent setbacks in light of the ongoing COVID-19 pandemic, international resource flows are the vibrant reality for many entrepreneurs today (see for instance Morris & Strauss, 2020 on international lending, and United Nations Conference on Trade and Development, 2020 on international investment), and resource mobilization literature must reflect this reality.

Enhancing contextual and international considerations in theory building on entrepreneurial resource mobilization will require deep study of and engagement with diverse research settings, beyond the high and upper middle income countries observed most often in extant work. Limited data access should no longer serve as a viable excuse for scholars not to investigate settings beyond their immediate reach: If entrepreneurs can overcome limitations and mobilize

resources from across international borders, and in a plethora of different contexts, then so can entrepreneurship scholars.

2.5. Conclusion

Entrepreneurial resource mobilization has attracted scholarly interest from across numerous research disciplines and has grown into a sizeable body of research. After decades of research, however, scholars still have many avenues to explore in this field. This literature review clarifies key threads of extant research within an organizing framework, in an attempt to contribute to a greater integration of the currently fragmented and inconsistent field moving forward. I hope that this framework will assist collaborative and cumulative theory building on entrepreneurial resource mobilization in the near future.

This review also highlights a set of promising paths for future research that would not only help to advance the above-mentioned goal of integrating the field, but would also diversify the variables it investigates, contributing to a greater depth of understanding of the multifaceted nature of entrepreneurial resource mobilization. The rich theoretical potential for scholars, along with its high practical relevance for entrepreneurs, make it worth walking these paths.

3. Essay II – Beyond Bricolage: Early-Stage Technology Venture Resource Mobilization in Resource-Scarce Contexts

3.1. Introduction

Entrepreneurial ventures are increasingly seen as key development agents, providing basic necessities in impoverished areas (Bruton, Ketchen, et al., 2013; Sutter et al., 2019). While ventures can provide some necessities by deploying low-technology products, like foot-pump irrigation or stove pots (M. Fisher, 2006; Khavul & Bruton, 2013), meeting other needs, like healthcare, often requires more sophisticated technological answers. For example, most African countries' populations are growing while at the same time losing ever more of their medical professionals to migration (Kinfu et al., 2009)—calling, for instance, for technological solutions like telemedicine and portable diagnostics tools. Entrepreneurial technology ventures offer promise to develop scalable solutions to these imminent healthcare challenges (Bhattacharyya et al., 2010; Ekekwe, 2018; Foo et al., 2020). However, new ventures developing technological solutions in resource-scarce contexts face a serious conundrum: They have substantial and sophisticated resource needs yet operate in contexts that commonly lack the local pools of critical resources (Castrogiovanni, 1991) and infrastructure (Specht, 1993) that they require (Barney, 1991; Wernerfelt, 1984). Given that initial variations in resource availability and decisions about resource mobilization can determine ventures' immediate survival (Baum, 1996) and long-term performance (Baum et al., 2000; Simsek et al., 2015; Vohora et al., 2004; Zane & DeCarolis, 2016), examining early-stage ventures' mobilization of resources is an important area of inquiry.

Extant literature on resource mobilization in resource-scarce contexts suggests that ventures commonly adopt bricolage as a resourceful way to overcome the resource limitations of their surroundings (e.g., Baker & Nelson, 2005; George et al., 2012). Defined as “making do by

applying combinations of the resources at hand to new problems and opportunities” (Baker & Nelson, 2005, p. 333), bricolage helps ventures to survive in these resource-scarce contexts (Baker & Nelson, 2005; Stenholm & Renko, 2016). While bricolage has been shown as a highly prevalent way to exercise entrepreneurial resourcefulness—in terms of finding “novel and clever ways to bring, assemble, and deploy resources” (Williams et al., 2019, p. 2)—bricolage can also impair product quality (Lanzara, 1999), market disruption, and scaling (Kickul et al., 2018; Wu et al., 2017), all of which are outcomes that technology ventures typically strive for (García-Cabrera et al., 2019; Sullivan & Marvel, 2011; Zane & DeCarolis, 2016). Alternatively, ventures may respond to resource scarcity by resource seeking, which extant literature defines as the “continued attempt to acquire standard resources” (Baker & Nelson, 2005, p. 353) in line with commonly accepted industry operating procedures, norms, practices, and quality requirements (Duymedjian & Ruling, 2010; Halme et al., 2012) and in an optimal way (Desa & Basu, 2013). Yet, the applicability of this behavior in resource-scarce contexts, that commonly lack resources and infrastructure otherwise available in resource-rich contexts, is unclear (Khavul & Bruton, 2013).

It appears that either resource mobilization behavior alone cannot resolve the conundrum technology ventures face in resource-scarce contexts. Moreover, although new ventures face ever-changing resource needs and endowments (Dolmans et al., 2014; Newbert et al., 2013; Sullivan & Ford, 2014) that affect what resources they need to mobilize at any given time, extant theory does not yet fully capture the dynamics of bricolage and resource seeking as they unfold over the course of new venture development. Prior evidence (Baker & Nelson, 2005; Desa & Koch, 2014) points to the possibility that levels of bricolage may change over time, and that resource seeking could be a concurrent response to resource scarcity. As such, Baker and Nelson (2005) report high growth only for those ventures employing *selective bricolage*—implying its *combination* with other resource mobilization behaviors, as bricolage is used

selectively or occasionally in distinct resource categories, rather than “consistently and repeatedly...across multiple domains” (which Baker & Nelson refer to as *parallel bricolage*, 2005, p. 349). Despite these initial findings, most subsequent research on entrepreneurial resource mobilization seems to abide by and implicitly promote a false dichotomy in which ventures can only adopt *either* bricolage *or* resource seeking (e.g., An et al., 2020; Stenholm & Renko, 2016; Wu et al., 2017), and thus to a great extent fails to recognize the reality of ventures that are commonly “situated somewhere in between the two” (Duymedjian & Rüling, 2010, p. 139).⁷

The predominant approach of studying bricolage or resource seeking behaviors in isolation is problematic as it leaves us with a partial understanding of the effectiveness of each behavior, and almost no insights on their joint performance outcomes at any given moment (Desa & Basu, 2013), much less so over time (Sunduramurthy et al., 2016). Understanding these dynamics is particularly relevant for early-stage technology ventures, for which seeking standard resources that optimally meet the needs of their product engineering and scaling would likely attenuate some risk and speed up venture development (Eisenhardt & Schoonhoven, 1990). However, studies of technology venture resource seeking have to date largely been conducted in resource-rich contexts that presuppose both the availability of resource holders (e.g., Grossman et al., 2012; Hallen & Eisenhardt, 2012), and the feasibility of transacting with them (e.g., Shane &

⁷ For an important exception, see Desa and Basu (2013) who find that bricolage generally works as a substitute for resource seeking when environmental munificence is low, and as a complement when munificence is high. However, the authors examined variance of resource mobilization behaviors *across* ventures rather than *within* them over time. Moreover, select recent studies have started to examine the co-existence of bricolage with the other “theoretical perspective” of effectuation and causation decision-making logics to understand whether these can co-exist (G. Fisher, 2012), in what configurations (An et al., 2020), how they shift over a venture’s life-cycle (Servantie & Rispal, 2018), also in the context of social entrepreneurship (Nelson & Lima, 2020). While resources are one element upon which effectuation or causation logic can be applied, theory of effectuation and causation transcends resource mobilization decisions, to include both opportunity identification (e.g., uncovering options of what an entrepreneur could do based on the available means) and opportunity execution areas (e.g., competitive analysis, business planning), and thus falls short of answering our question.

Cable, 2002; J. Zhang et al., 2010), neither of which is common in resource-scarce, impoverished areas (Khavul & Bruton, 2013). Accordingly, we aim to bring to the fore and extend Baker and Nelson's (2005) insight that varied types and levels of bricolage behavior, and how they combine with resource seeking, can affect venture outcomes. Specifically, our study addresses the question: *How do technology ventures in resource-scarce contexts combine resource mobilization behaviors in their early development, and with what effects?*

In light of the gaps in the existing literature, we ground our theorizing in inductive data analysis, using a multiple-case study design (Eisenhardt, 1989; Yin, 2013). We selected Uganda's medical technology industry as our research context because it epitomizes substantial and sophisticated resource requirements for ventures operating in a resource-scarce context lacking in locally available talent, financing options (e.g., there is no domestic venture capital sector), and core technology infrastructure, including regulatory frameworks. Our main data sources consist of 36 semi-structured interviews with the founders and team members of seven early-stage medical technology ventures, complemented by 26 external informants' insights, field notes, and archival data.

This study makes three contributions to research on entrepreneurial resourcefulness: First, we nuance the notion of selective bricolage and its association with new venture outcomes. Specifically, while Baker and Nelson (2005) find that in contrast to parallel bricolage that stifles growth, selective bricolage promotes it, we identify two distinct trajectories of selective bricolage among our sampled ventures. These trajectories advanced new ventures' development to a different extent depending on the dynamics with which bricolage and resource seeking were combined. By doing so, our findings address a longstanding research gap while restressing the importance of examining bricolage *in conjunction* with other resource mobilization behaviors. Indeed, we affirm that attributing venture outcomes to either behavior alone would be misleading (Sunduramurthy et al., 2016), and add that it is also not enough to simply observe

relative levels of either resource mobilization behavior—rather, it is the dynamic combination of behaviors that distinguishes advanced ventures from those less advanced. Second, we extend Baker and Nelson’s (2005) seminal insights on how ventures transition in their resource mobilization response to resource scarcity by providing evidence of the dynamic interplay between bricolage and resource seeking within ventures over time. While prior literature highlights resource positions either on an environmental (Desa & Basu, 2013) or venture-level (cash positions or employee count) (Baker & Nelson, 2005; Desa & Basu, 2013) as key determinants of opting in and out of bricolage, our study illuminates that ventures differentially adopted bricolage as their response to situations of resource scarcity depending on the nature and sequencing of an early catalytic event. Third, we show how our sampled technology ventures in a resource-scarce context pursued resource seeking behaviors by reinterpreting the resource spaces in which they operated, moving beyond a focus on their immediate resource-scarce environs to a more global context. This helps to substantiate existing findings on the importance of contextual fluidity and mobility in entrepreneurial resourcefulness (Baker & Welter, 2018; Korsgaard et al., 2018; Welter et al., 2018; Zahra et al., 2014).

3.2. Theoretical Background

Our study asks how technology ventures in resource-scarce contexts combine resource mobilization behaviors over time in their early development, and with what effects. Scholars unilaterally stress the importance of resourcefulness for ventures operating in such contexts (Corbett & Katz, 2013; Duchesneau & Gartner, 1990; Michaelis, Carr, et al., 2020; Zahra & Garvis, 2000). Prior research on entrepreneurial resourcefulness describes it as a “broad[er] set of capabilities” (Bradley, 2015, p. 2), such as *thrift*, “behaviors related to conservative financial philosophies and resource-seeking [*sic*]” (Powell & Baker, 2011, p. 7); *bootstrapping*, the “methods that are used to reduce firm reliance on outside financing” (Ebben & Johnson, 2006, p. 853; see also Winborg & Landström, 2001); and *bricolage*, to name a few (Bradley,

McMullen, et al., 2011; Michaelis, Carr, et al., 2020; Powell & Baker, 2011; Welter et al., 2018). Ever since Baker and colleagues (2003) pointed to bricolage as a promising alternative to the frequently assumed “design-then-execute” planning process during the founding of new ventures, scholars have increasingly accepted it as a key resource mobilization behavior for overcoming resource constraints (Baker & Nelson, 2005; Di Domenico et al., 2010; G. Fisher, 2012; George et al., 2012). In delineating bricolage behaviors, a useful starting point was to cast them in contrast to more traditional resource seeking behaviors (e.g., Baker & Nelson, 2005; Desa & Basu, 2013; Duymedjian & Rüling, 2010). Unfortunately, and despite these authors’ insights, a fairly divided body of literature has emerged that tends to examine bricolage *in isolation from* other resource mobilization behaviors, such as the resource seeking behaviors it is often contrasted with, rather than *in conjunction*, which is especially problematic when attempting to attribute outcomes to either resource mobilization behavior *alone*. Below, we examine the extant literature on bricolage and resource seeking consecutively, and highlight where it falls short of answering our research question.

3.2.1. Bricolage

When resources are scarce, ventures need to employ alternative, resourceful approaches that best utilize what is available to them (Castrogiovanni, 1991; Desa & Basu, 2013; Hillman et al., 2009; Specht, 1993). Hence, in resource-scarce contexts, entrepreneurial ventures are likely to engage in bricolage (Desa & Basu, 2013). The entrepreneurship literature traditionally describes bricolage as spanning four main domains: (1) Ventures identify workable solutions by “making do” (Baker & Nelson, 2005; Lévi-Strauss, 1967) with what is available, even if the resulting solutions are imperfect (Baker, 2007; Ciborra, 1996; Lanzara, 1999)—i.e., even if these solutions “do not look very elegant, have lots of bugs and gaps, frictions and unusable components, but they do their job and can be improved” (Lanzara, 1999, p. 347). (2) They freely reallocate, recombine, and/or repurpose resources (3) that they have “at hand” (Baker & Nelson,

2005; Di Domenico et al., 2010). These are usually resources that others disregard, and that are thus uniquely cheap, if not free (Baker & Nelson, 2005). This includes “network bricolage,” the reliance on existing contacts (Baker et al., 2003). In employing bricolage, entrepreneurial ventures (4) refuse to be constrained by, and seek to counteract or challenge, limitations (Stinchfield et al., 2012) like resource shortages (Di Domenico et al., 2010), norms (Sunduramurthy et al., 2016), and rules (Baker & Nelson, 2005).

Research on bricolage has also started to identify nuances in when and how (intensely) bricolage manifests within a venture. For example, while most literature asserts that resource scarcity triggers bricolage out of necessity (Bojica et al., 2018; Duymedjian & Rüling, 2010), some scholars have begun to suggest that ventures also engage in bricolage under different and more resource-rich contexts (e.g., An et al., 2020; Garud & Karnøe, 2003). Observing bricolage behavior on a more granular level, Baker and Nelson (2005) offer additional nuances to the use of bricolage by distinguishing between selective bricolage, in which ventures employ bricolage only on select occasions or projects, and parallel bricolage, in which bricolage is applied universally over time and across resource categories.

While insightful, previous studies on the effects of bricolage on venture outcomes remain inconclusive. Notably, a significant number of studies has recognized the potential of bricolage to support venture survival (Stenholm & Renko, 2016), overall firm performance (An et al., 2020), and growth—when applied selectively (Baker & Nelson, 2005; Rönkkö et al., 2013). Research has also shown that, in social entrepreneurship contexts, bricolage behaviors can contribute to the scaling of social impact (Bacq et al., 2015; Busch & Barkema, 2020a; Desa & Koch, 2014). Further studies have suggested that bricolage behaviors can induce creativity in ventures (Baker & Nelson, 2005; Klerk, 2015), boosting the launch of new products with creative features (Wu et al., 2017), and ultimately nurturing innovativeness (Gundry et al., 2015; Kickul et al., 2018; Klerk, 2015; Salunke et al., 2013; Senyard et al., 2014). However,

such positive findings on bricolage’s outcomes often fail to acknowledge that product quality can suffer from the “second-best solutions, maladaptation, imperfection, inefficiency, incompleteness, [and] slowness” (Lanzara, 1999, p. 347) associated with bricolage—drawbacks that could be especially troubling for technology ventures, for which product quality (Zane & DeCarolis, 2016), regulatory approval (Stern, 2017), and development speed are especially paramount (Sullivan & Marvel, 2011). Extensive reliance on bricolage behaviors can also hamper ventures’ acquisitions of new resources (Kickul et al., 2018), lower or freeze their growth (Baker & Nelson, 2005; Bojica et al., 2018; Kickul et al., 2018) and financial performance (Stinchfield et al., 2012).

Looking at all of these positive and negative bricolage-linked outcomes together, it becomes clear that we need to understand specifically why and how a given venture engages in bricolage in order to best evaluate the behavior’s overall effects on its outcomes. Notably, Wu and colleagues (2017) find that bricolage is an appropriate behavior in turbulent contexts in which it can speed up new product development. Bojica and colleagues (2018) find that bricolage supported growth only for the resource-rich social entrepreneurship organizations they observed, not for those lacking a strong resource base. Lastly, the resource needs and innovation goals a venture seeks to satisfy with bricolage can determine its effect. For instance, the positive effect on creativity identified by Klerk (2015) stems from a study of independent artists with limited resource needs, especially relative to those of technology ventures. Similarly, bricolage’s positive impact on innovation—at least in social entrepreneurship—seems to depend on the nature of innovation a venture pursues: While bricolage is positively associated with *low-end* disruption (i.e., product offerings that are simpler and cheaper than what already exists on the market), it has a curvilinear relationship with *new market* disruption (i.e., offerings in new segments which other players in the market do not serve) (Kickul et al., 2018).

In light of the apparent importance of contextual resource availability in ventures' immediate environs, and ventures' resource needs, in determining the outcomes of bricolage, it is interesting to note that a large body of research to date has explored either the adoption of bricolage by low-technology ventures in low income countries (e.g., Busch & Barkema, 2020a; Hota et al., 2019; Sarkar, 2018), or high-technology ventures in high income countries (e.g., G. Fisher, 2012; Garud & Karnøe, 2003). The important combination of high-technology ventures operating in low income countries both remains open for and merits further investigation. Importantly, while Baker and Nelson's (2005) seminal study reveals that growth emanating from bricolage hinged on bricolage's selective adoption across categories, the majority of the work since has not followed suit. This makes it difficult to understand the extent to which favorable outcomes can be attributed to bricolage alone versus (together with) other (unobserved) resource mobilization behaviors.

3.2.2. Resource Seeking

A second, yet dispersed strand of research addresses resource seeking. For lack of a discrete literature stream, prior work largely conceptualizes resource seeking in an opposing view, in which resource seeking as a "rational" behavior (Baker & Nelson, 2005; Desa & Basu, 2013) is juxtaposed against bricolage, characterized as being "less rational" (Stinchfield et al., 2012, p. 890). Several studies present ventures engaging in resource seeking as entities that behave like "ingenieurs" (i.e., engineers), individuals whose actions are ostensibly directed by rationality and efficiency (Duymedjian & Ruling, 2010; Stinchfield et al., 2012; Sunduramurthy et al., 2016). The literature identifies resource seeking with three main features: (1) the pursuit of standard resources (Baker & Nelson, 2005), which (2) optimally satisfy ventures' needs in line with industry norms and quality requirements (Desa & Basu, 2013; Garud & Karnøe, 2003). As such, ventures "search for the best sources of these resources" (Desa & Basu, 2013, p. 28) and (3) pay market-level prices for them (Desa & Basu, 2013).

The resulting access to resources—although moderated by a number of factors like managing strategies—has been found to stimulate firm growth (Penrose, 1959; Wernerfelt, 1984) and to provide an important source of competitive advantage (Barney, 1991). It thus stands to reason that resource seeking produces favorable venture outcomes. However, studies on resource seeking, especially in technology ventures, frequently presuppose the availability of resource holders (e.g., Grossman et al., 2012; Hallen & Eisenhardt, 2012; J. Zhang et al., 2008), their willingness to engage in transactions with entrepreneurs (e.g., Shane & Cable, 2002; Starr & MacMillan, 1990; Zane & DeCarolis, 2016), and the existence of underlying market infrastructure that allows for said transactions (e.g., Armanios et al., 2017; J. Zhang et al., 2010). Entrepreneurial ventures do, unsurprisingly, appear to adopt more resource seeking in resource-rich contexts (Desa & Basu, 2013). This raises questions as to how prior findings on resource seeking translate to ventures in resource-scarce contexts that lack the assumed prerequisites for this kind of behavior.

3.3. Methods

In light of the questions the existing literature has left unanswered, we grounded our theorizing in data, adopting an inductive, multiple-case study research design (Eisenhardt, 1989; Yin, 2013). We used multiple cases, because this method is particularly suitable to the examination of entrepreneurial ventures within specific contexts (Baker & Welter, 2018), and to building “robust, generalizable, and testable” theory (Eisenhardt & Graebner, 2007, p. 27). In order to familiarize ourselves with the context (Flick, 2009), we started our research by talking to 26 external informants whom we selected for their experience in the Ugandan entrepreneurial ecosystem (see Appendix A). We label insights from these external informants EI-1, EI-2, etc.

3.3.1. Research Context

“There is so much infrastructure which is not in place. So, it’s like you want to cross a river but you don’t have a boat, you don’t have a bridge. So, whichever one you’re going to use, you first have to build that.”
(EI-1)

We chose Uganda as a suitable context given the resource scarcity that characterizes the country, coupled with the recent emergence of (and high need for) technology ventures. Uganda's resource scarcity is reflected in its relatively low ranking on a variety of scores such as the Human Development (United Nations Development Programme, 2018), Ease of Doing Business (World Bank, 2018), and Global Competitiveness Index (World Economic Forum, 2019). One of our external informants described Uganda in comparison to other countries as follows:

“...if you then compare [Uganda] to other countries, like you go to Nairobi, you see the difference between Kampala and Nairobi. You also see it in terms of international standards being implemented or not...Nairobi is called the Silicon Valley of Africa, and it might be true...So, [Uganda] still [has] a lot of catching up to do...I think the landscape is vast. Logistics [are] an issue. Talent recruitment is an issue. Access to funding is certainly an issue. What we see is also that, beyond basically friends and family, it's very hard to get funding [for] companies. Banks are usually not willing to—there is no venture capital, as you know, out there.” (EI-2)

Our conversations with external informants further revealed that angel funding for technology ventures is unusual in the country, as the rare investors who do exist consider technology ventures too uncertain to invest in (EI-3). Venture informants' descriptions of their resource context confirmed the objective rankings of Uganda's resource scarcity, and highlighted their corresponding subjective perceptions of resource scarcity for medical technology ventures whose substantial and sophisticated resource needs are often unmet in the country:

“Here you are, in [your] second year. You are learning just elementary-degree electronics and what not, and here you are trying to build [name of technology]. Things you can't even imagine. Things that you can't even ask your lecturer about, because they would be like, ‘Um, what are you talking about?’ So, there [are] so many factors that contribute to that kind of knowledge gap.” (Youhealth, A-3)

“But when we realized that...the machines were not there...But the challenge is still on, the diagnosticians, the radiologists—there are very few who are in the country. Many of them, actually, when they finish studying, they go do their masters in other countries and then they never come back because of the poor pay here...So, you find that the diagnosis part is still what? A challenge.” (Womed, C-1)

“Because the ecosystem is still young... We talk of funding, there is no strong funding opportunities, interest rates are extremely high.” (HealthQ, G-1)

Resource scarcity in Uganda is further complicated by the underdevelopment of regulatory frameworks, which is particularly problematic for ventures that involve original and proprietary technologies, as explained by one of our venture informants:

“Our environment is not yet conducive for the uptake of technologies that are built within the country. The way our systems are set up currently, they favor technologies that have been developed outside and then are brought into the country and are used by Ugandans and have already been tested and approved elsewhere.” (EI-4)

The absence of appropriate frameworks is further exacerbated by corruption (Hatchile Consult Limited, 2015; Transparency International, 2015, 2019), nepotism, and favoritism (EI-5).

3.3.2. Sample Selection

We confined our sample to the medical technology industry, because “studying a single industry enables more valid comparison of ventures” (Hallen & Eisenhardt, 2012, p. 39) and “reduces alternative explanations for human capital requirements and desirable funding amounts at each stage” (Ko & McKelvie, 2018, p. 444). Medical technology ventures typically require access to high levels of skill, knowledge, material inputs, and sophisticated machinery, all of which are especially scarce in Uganda (EI-1, EI-2). Our conversations with individuals involved with Ugandan medical technology ventures validated the fact that this general trend is relevant in this specific context, showing that their resource needs ranged from early prototyping components and know-how to industrial design and device production, depending on the given stages ventures underwent (e.g., from early prototyping to laboratory testing and ultimately to clinical trials).

In order to identify suitable ventures, we first screened multiple online databases, magazines, and lists of entrepreneurship award recipients. This led us to develop an initial list of ventures that we then iterated against a number of pre-defined criteria (Patton, 1990). Our first criterion for theoretical sampling was technological complexity. We focused on originally developed technologies that aimed to achieve some market disruption (Kickul et al., 2018), because this heightens resource requirements, their need for fast and efficient approval processes (EI-4), and the salience of regulatory uncertainty (Stern, 2017). Towards the same ends, we sampled ventures that appeared to require substantial research and development (Broekel, 2017). For lack of respective frameworks in Uganda, we leveraged established categories of medical

devices as defined by the United States Food and Drug Administration (FDA). All of our cases fall under the FDA's Class 2 medical devices, suggesting that they require comparable levels of regulation to ensure safety and effectiveness (FDA, 2020). Our second criterion involved confining our sample to one geographical area, which served both to minimize sample heterogeneity with respect to available local resources (see Zott & Huy, 2007) and to facilitate rich, in person data collection in a relatively short time period. We sampled ventures in Kampala, which differs from rural areas in talent availability, transport infrastructure, and transaction speeds, among others (EI-2). Our third criterion was new ventures with a maximum age of eight years at the time of our data collection (i.e., founded in 2013 or later) (Zahra, 1996) to ensure that our cases were all at comparable early stages of development in line with prior qualitative work on new firm creation (Fauchart & Gruber, 2011). Our fourth criterion involved sampling for similarity of resource level starting positions, given the importance of entrepreneurs' initial endowments to their subsequent resource mobilization efforts (Chatterji, 2009). This criterion enabled us to make better comparison across cases (Eisenhardt et al., 2016), and reduced the number of potential alternative explanations for our emerging theory (Eisenhardt & Graebner, 2007). We looked for venture (co-)founders with no meaningful prior industry or entrepreneurial experience at the time of their ventures' foundings, and who had received comparable levels of academic education in Uganda. In light of the importance of networks, and kinship ties specifically, for entrepreneurs in Uganda (Khayesi et al., 2014), we validated during our interviews that all team members had comparable family backgrounds and no prior contacts with local authorities.⁸ Similarly, none of the ventures we sampled appeared

⁸ To our knowledge, none of the ventures in our sample had a meaningful or advantageous social capital endowment based on (co-)founders' relatives, ruling out potential effects of nepotism or favoritism. Most entrepreneurs reported that their families supported them in terms of "upkeep," i.e., assisting with living expenses. Beyond this, we noted three cases in which entrepreneurs capitalized on kinship ties for their business. However, none of these activities distorted the organizational outcomes that we measured subsequently.

to have a notably divergent approach to handling Kampala's challenging business practices, outlined in Chapter 3.3.1. Fifth, to further ensure resource requirement similarity, we sought to minimize variance in market segments served, focusing in on maternal, neonatal, and women's health-related ventures, a group of beneficiaries that many Kampala-based technology ventures target in response to high unmet medical needs (Institute for Health Metrics and Evaluation, 2019).⁹ Finally, in order to obtain meaningful variance in observed resource mobilization behaviors and outcomes, we sampled ventures with varying amounts of external funding at the time of our first interviews. While finances constitute only one resource category, they are the most researched one, around which bricolage and resource seeking outcome differences are most likely to manifest (Clough et al., 2019). Paired with similar starting positions, this last criterion maximized the likelihood of attributing resulting outcome differences to ventures' behaviors over time. As we applied our pre-defined criteria, we realized Kampala's medical technology entrepreneurship ecosystem largely revolves around a community of researchers and graduates from Makerere University. While university affiliation was not a pre-defined sampling criterion and instead emerged as a by-product of the sampling process, it helped to further homogenize our sampled ventures' human and social capital, as well as their initial resource endowments, which collectively often represent key sources of variance in resource acquisition outcomes (see Zott & Huy, 2007).

We interacted with 21 Ugandan technology ventures in total and shortlisted 12 after applying our criteria: Ten ventures were active in maternal, neonatal, and women's health, and two served larger patient populations, yet included our target market segments. They caught our attention due to their seemingly substantial achievements and coverage in the media. We

⁹ All ventures in our final sample expressed aspirations to solve medical problems for urban and rural target groups in Uganda, as well as, eventually, for groups beyond the country's boundaries.

received confirmation from all 12 ventures that they would participate in our study. As our fieldwork progressed, two ventures stopped responding to interview requests. However, we added three ventures through snowball sampling, carefully aligned with our pre-defined sampling criteria, leaving us with 13 ventures when we started our first wave of in-depth interviews. Upon completion of our first data collection wave, and after learning more about the ventures' technologies, we realized that the resource requirements of medical device ventures with obligatory clinical trials before commercialization substantially differed from those of others (i.e., mobile application, electronic health record, or telemedicine providers). We thus added "requires clinical trial" to our sampling criteria, reducing the number of cases from 13 to 8. Finally, upon completion of our second data collection wave—and in line with prior research emphasizing "iterative theoretical and empirical choices that the researcher makes in the course of the case study project" (Fletcher & Plakoyiannaki, 2011, p. 183)—we came to the conclusion that one venture no longer fit our theoretical sampling criteria,¹⁰ leaving us with a final sample of seven (see Table 11).

¹⁰ In our first-wave interviews, the founders of one of the ventures in our sample used active language to refer to their venture's operations, current and future. During our second-wave interviews, however, we learned from the venture founders that many of the originally described activities were actually long dated, and that other activities referring to future development had been paused for at least nine months at that point. Given that they explained this pause as part of a shift in priorities due to other commitments, it was not methodologically sound to include this venture in our sample because: (1) It would be difficult to compute a valid score for this venture as the amount of time elapsed between venture founding and our data collection is the denominator of our technology development score (as is explained in Chapter 3.3.5.2.). (2) Whatever outcome measure we would take into account, they could not be attributed to the venture's resource mobilization configuration.

Venture (Pseudonym)	Founding Year ¹¹	Technology		Technology Status	Team Size	Founders	Informants	Relevant Archival Data Sources
		HW	SW					
A. Youhealth	2014	✓	✓	Prototype in refinement	3 (3)	2	2 co-founders, 1 team member	Social media, self-description, website, online articles, budget
B. WLab	2015	✓	✓	Clinical pilot imminent	3 (6)	3	2 co-founders	Social media, company presentation / pitch deck, website, online articles
C. Womed	2016		✓	Prototype in refinement	4 (3)	3	3 co-founders, 1 team member	Social media, website, online articles, conference report
D. Empoweru	2015	✓	✓	Clinical pilot imminent	6 (6)	3	3 co-founders	Social media, investment platform, website, online articles, budget, video
E. Motherry	2016	✓	✓	Clinical pilot completed, results under review	5 (1)	1	1 founder, 3 team members	Social media, technology development timeline, website, online articles, budget, conference report, business model canvas
F. Mcare	2014	✓		Clinical pilot ongoing	3 (3)	3	1 co-founder, 2 team members	Social media, online articles, grant applications, conference report
G. HealthQ	2013	✓	✓	Clinical pilot imminent	4 (6)	6	3 co-founders	Social media, investment platform, company presentation / pitch deck, website, online articles

Technology Status as of Summer 2020, i.e., the end of our second data collection wave; “Clinical pilot” indicates in-vivo testing prior to the initiation of clinical trials | Team Size as of Summer 2020 (in brackets: at founding) | Abbreviations: HW = Hardware; SW = Software

Table 11: Overview of Sampled Case Studies (Essay II)

3.3.3. Data Collection

Before starting our data collection, we ran a short pre-survey to validate ventures’ resource requirements, team compositions, and funding raised to that date to ensure they met our sampling criteria as anticipated, and held preparatory video calls with venture founders. Our main data corpus consists of transcripts from 36 semi-structured interviews conducted in English with (co-)founders and team members of our case study ventures, which total 483 single-spaced pages (approximately 160,000 words). We conducted these interviews in two waves over the course of nine months, which helped us to efficiently capture retrospective data that allowed for stronger grounding, as well as to collect real-time data, thereby counteracting potential recollection biases (see Ozcan & Eisenhardt, 2009).

¹¹ This denotes the year in which one or more co-founders had the idea to pursue their venture. We opted to show this rather than the more common year of official registration because many of the founders actively worked on mobilizing resources for their ventures before their registration dates. (All of our sampled ventures started as student projects.)

One author conducted the first wave of interviews in person, during a five-week field visit to Uganda in the Fall of 2019. This field visit also facilitated the gathering of information on the local ecosystem and contextualization of relevant resource infrastructure in Uganda. The author visited relevant local institutions such as Makerere University; the Ministry of Science, Technology, and Innovation; the Uganda Industrial Research Institute; and multiple entrepreneurship incubators and co-working spaces. The resulting insights from our field observations facilitated a better understanding of our informants' reference points during the interviews. Face-to-face interactions further helped to build rapport and trust with the informants (see Baker et al., 2017; Rowley, 2012), which also proved important in convincing venture teams to share sensitive information and demonstrate (even unpatented) technology prototypes.

Whenever feasible, we logged venture journeys on time-stamped posters during interviews, which helped us to triangulate retrospective narratives with additionally collected archival data (see Table 11) and/or with data from other informants from the venture. These multiple data sources helped us address issues like interviewees' imperfect memories, social desirability biases, and/or retrospective rationalizations. In order to better establish the sequencing of matters and enhance data accuracy (see Graebner & Eisenhardt, 2004; Ozcan & Eisenhardt, 2009), we framed our questions with reference to specific events to help the respondent recall past developments and then guide them forward, a process aided by our time-stamped posters, to produce chronologies of events (Eisenhardt, 1989). To validate emerging findings and gather additional data, we conducted a second wave of interviews in Summer 2020. In response to COVID-19-related travel restrictions in place at the time, we conducted these interviews via online calls, building upon the trusted relationships we had established with informants via multiple prior interactions (see Baker et al., 2017). In these calls, we also relied on graphically

depicted venture timelines to verify the accuracy of our recordings, and deepen our understanding of specific actions and events.

We based both our first- and second-wave interviews (see Table 12) on catalogues of open-ended questions (see Appendix B), guided by previous theory when available (Arsel, 2017), and aimed to encourage interviewees to tell “their own story in their own terms” (McCracken, 1988, p. 7). As is common in qualitative research, our interview questions changed over time (Pratt et al., 2020) as a result of iterative literature consultations and preliminary analyses. We recorded and transcribed verbatim all of our interviews (with the exception of preparatory calls and three interviews during which we took extensive notes), and followed up with interviewees via e-mail or mobile text messages to clarify remaining questions.

Informants	Time of Data Collection	Type	Length Range	Interviews	Informants
Venture informants	Summer 2019	Preparatory calls (virtual)	30 minutes	6	6
	Fall 2019 (Wave I)	Interviews (17 in person, 2 virtual)	30–110 minutes	19	20
	Summer 2020 (Wave II)	Follow-up interviews (virtual)	30–60 minutes	11	12
Total (per venture)				36 (4–7)	20 (2–4)
External informants	Summer & Fall 2019	Interviews (6 in person, 18 virtual)	30–80 minutes	24	26

Table 12: Overview of Interviews and Informants (Essay II)

Following our second round of interviews and data gathering, we sought to collect additional data to help verify our understanding of the resource mobilization dynamics at play within each venture. We approached this by first developing a list of key resource mobilization activity sets of bricolage and resource seeking that emerged from our data based on informants’ own words (see Appendix C). We then prepared mobile templates (see Appendix C) for each venture’s resource mobilization over time, which our informants could directly edit by drawing timeline curves on them, reflecting how much they had engaged in each activity every year. We sent these graphical templates to several informants from each venture via mobile text messages and

received at least one edited timeline per venture. We label venture team members with a prefix and a digit (e.g., A-1, A-2) to create unique identifiers.¹²

3.3.4. Data Analysis

Our analysis involved several iterations as we triangulated between our data, emerging theory accounts, and prior research (Eisenhardt & Graebner, 2007). To familiarize ourselves with each case, we first summarized the ventures' journeys in case study write-ups (see Eisenhardt, 1989), which we shared with founders for validation.

We then coded our interview transcripts and inductively generated initial categories for subsequent cross-case analyses (Grodal et al., 2020), guided by our research question: *How do technology ventures in resource-scarce contexts combine resource mobilization behaviors in their early development, and with what effects?* We had no a priori hypothesis in mind and remained “open to discovering new meanings and themes” (Baker & Welter, 2018, p. 388). One author coded the transcripts three times, each time accounting for emerging theoretical frameworks and newly collected data. For key coding categories like resource mobilization behaviors and resource categories, the second author coded meaningful units of analysis (i.e., text segments) as prepared by the first author (Campbell et al., 2013). Our initial inter-coder reliability (i.e., share of identical codings) was 87%. After the two coding authors discussed disagreements, our inter-coder agreement (i.e., share of identical codings after alignment on discrepancies) reached 99% (see Campbell et al., 2013 for details on this described approach). The third author, who was not actively involved in this data categorization and discussion process, challenged the emerging categories, serving as a “resident devil’s advocate”

¹² Two informants were members of two teams, each. We did not know this prior to starting our data collection process. In these cases, we refer to each of them with two alphanumerical designations, one per venture and team. To protect their personal, and their ventures', identities, we do not disclose the cases on which these individuals overlapped.

(Eisenhardt, 1989, p. 534), a practice established in prior research (Stinchfield et al., 2012; Sutton & Callahan, 1987).

In our subsequent cross-case analysis, we compared overall resource mobilization patterns, searching for differences and similarities, as well as for explanations thereof (Eisenhardt, 1989). Specifically, we compared high- and low-performing ventures in terms of their overall resource mobilization trajectories and searched for possible reasons thereof in entrepreneurs' commentaries on specific actions and events. We display representative quotes that informed our theory building throughout our results chapter (Miles et al., 2013).

We refined emerging constructs and relationships in an iterative fashion, triangulating them with our various data sources to ensure internal validity (Eisenhardt & Graebner, 2007) and to stabilize our emerging framework (Grodal et al., 2020). Throughout this process, we consulted relevant literature, seeking confirmations, contradictions, and/or extension of prior research (Eisenhardt, 1989; Eisenhardt et al., 2016; Miles et al., 2013).

3.3.5. Coding Approach

3.3.5.1. Resource Mobilization Behaviors

To analyze evidence of bricolage and resource seeking, respectively, we utilized a coding scheme that evolved during inter-coder negotiations and that synthesizes prior work on bricolage and resource seeking (see Table 13).

Construct	Textual Indicators	Representative Quote
Bricolage	A text segment is coded as evidence of bricolage when at least one of the following conditions is met:	
	1. Making Do. One or more venture team members expressed plans to take action, or described having taken action, to find a workable solution for a given problem (Baker & Nelson, 2005; Senyard et al., 2009), whereby the solution is not necessarily optimal or perfect (Baker, 2007; Ciborra, 1996; Lanzara, 1999).	“So, you can imagine, I’ve had to push myself to the place of learning how to design a website, because right now, we’re trying to limit on our expenses because the trial is not done so we can’t overspend.” (Mcare, F-2)
	2. Reallocation, Recombination, and/or Repurposing. One or more venture team members expressed plans, or described having taken steps, to reallocate, recombine, and/or repurpose a resource available to them (Baker & Nelson, 2005; Di Domenico et al., 2010) in a way the resource was not originally intended for (Senyard et al., 2009).	“At the beginning, actually, basically how we prototype is getting stuff that’s not working and it’s older, tried to recreate.” (Empoweru, D-3)
	3. Use of Resources at Hand. The resource a team planned to use, or used, in a given situation is, or was, available at a low cost, or for free (Baker & Nelson, 2005; Senyard et al., 2009). This can include venture team members’ own time (Sarkar, 2018) or network contacts (Baker et al., 2003).	“Actually, it’s [team member,] he has a space. He had his own space that he was using to do the hardware. So, we didn’t need a laboratory, or like, a specific institute...Actually one of his rooms is full of hardware pieces.” (WLab, B-2)
4. Refusal to Enact Limitations. The venture, when facing limitations (e.g., resource shortages or regulatory constraints), refused to be limited, instead planning to enact, or enacting, plans to overcome those limitations (Baker & Nelson, 2005; Di Domenico et al., 2010; Sunduramurthy et al., 2016).	“So, the uncertainties in the process have caused the big delays, and that has risen with us an opportunity...to implement a regulatory framework for innovations in Uganda...because the process of evaluation is not clearly defined.” (Mcare, F-3)	
Resource Seeking	A text segment is coded as evidence of resource seeking when at least one of the following conditions is met:	
	1. Standard Resources. One or more venture team members searched for, or acquired, a standard resource (Baker & Nelson, 2005; Duymedjian & Rüling, 2010; Halme et al., 2012).	“We were not medical experts, and then then we needed a more profound physician who had an understanding of the physics behind the technology we wanted to build...This needed [to be] someone of high profession who we had to pay to build such technologies.” (HealthQ, G-3)
	2. Optimal Fulfilment of Requirements. The resource that is sought, or has been acquired, optimally satisfies the requirements towards which it is to be directed (Desa & Basu, 2013), often in accordance with prior specifications (Duymedjian & Rüling, 2010).	“What we do is, we come up with the specifications, what exactly we want...Other things, like it should be wireless, it should be portable, because all that is part of the design. So, we come up with a design and specifications and send them to this firm in China, and they’re able to produce [it].” (Youhealth, A-1)
3. Market Price and/or Transaction. The venture intends to pay, or has paid, a market-level price in exchange for the resource it seeks to acquire or has acquired, as is the case in arm’s-length or market transactions (Desa & Basu, 2013).	“It has been quite costly for us to pay the company, [the] reason being is the high cost of labor in [country], it’s very high.”(HealthQ, G-3)	

Table 13: Coding Scheme for Resource Mobilization Behaviors

Source for textual indicators: Authors’ synthesis of prior work on bricolage and resource seeking

To understand ventures’ overall resource mobilization trajectories, we first compiled evidence of bricolage and resource seeking over time and by resource category—the latter having evolved from an iteration of two authors’ inductive categorizations (Campbell et al., 2013) with

prior work (Baker & Nelson, 2005; Clough et al., 2019), as well as informants' own explicitly stated resource categorizations (see Table 14).¹³

Resource Category	Textual Indicators	Representative Quote
Funding	The resource is of financial nature, e.g., grants, donations, equity investments, loans, or own invested capital.	“So, we thought of a way to, you know, start raising some funds, and one of the things we thought of was participating in different startup competitions.” (Youhealth, A-1)
Team	The resource comprises labor in the form of a team member dedicating their time. It does not include expertise and skills mobilized from external sources, e.g., contracted experts.	“I normally leave [my] office around 4:00. That’s during the working days. Then I get to [Womed]. With [Womed], I dedicate two hours every day... That’s for four days each. And then on Friday, I work for six hours for [Womed].” (Womed, C-3)
Capacity	The resource consists of capabilities or expertise, including but not limited to technical and business skills, knowledge, and the ability to conduct research or produce goods.	“Why we decided to outsource the hardware development: One, is because we don’t have the capacity to develop medical devices... So, we don’t actually have laboratories that do hardware development.” (Empoweru, D-3)
Material & Space	The resource consists of physical or virtual objects or rooms, including but not limited to hardware components, consumables, or software, as well as office or laboratory space.	“Then the things that I couldn’t use from the old devices, I would request we buy it, either from... I remember there used to be only one component shop... which is to sell electronics components.” (Empoweru, D-3)
Liaisons	The resource consists of social capital in the form of partnerships, collaborations, other forms of network ties.	“We also want to make partnerships with the Ministry, since this is a device that we want to design for Uganda. I think, if we get their support, it is much better.” (Mcare, F-1)
Users & Data	The resource denotes access to patients; patient materials, such as blood samples; and medical data, such as patient records. It is driven by the industry’s need for the testing and validation of products prior to their commercialization.	“We partner with that hospital and every time people come in—about 60, 70 patients come in. So, now that takes time. That takes time, and it will take about six, seven, eight months for us to collect a good bulk of data.” (Womed, C-1)
Authorities & Approvals	The resource comprises permissions, certifications, patents, or other official authorizations or credentials from government bodies or other institutions.	“We need approval from the ministry, because there are policies that we have to go through... We can only get the approval after completing our clinical trial’s pilot proposal, submit it. If it is accepted, we can go ahead.” (WLab, B-2)

Table 14: Coding Scheme for Resource Categories

Source for textual indicators: Authors’ inductive analysis and synthesis of prior work on bricolage and resource seeking

We also coded resource mobilization behaviors by activity set (see Appendix C). We followed Baker and Nelson’s (2005) “yes/no” binary coding logic in assigning a “B” (for bricolage) and/or an “R” (for resource seeking) tag per venture, and for each year, based on whether or not we had evidence for each resource category and activity. We then triangulated the resulting pattern with venture team members’ own recording of their resource mobilization behaviors over time, which we had captured in their mobile template drawings (see Appendices C and D).

¹³ We had asked venture team members what different input factors they had needed in order to capture their own categorization of resources and enable accurate and in-vivo (Miles et al., 2013) categorizations thereafter.

These templates added a more nuanced view on applied activity sets. The venture team members' records largely corresponded to our analyses, and added important additional insights in terms of ventures' deployment of selective bricolage toward the end of our data collection period.

We then triangulated the resulting resource mobilization trajectories with our measurements of ventures' *overall* intensity of bricolage and resource seeking engagement relative to one another. Specifically, we counted how often interviewees from a given venture mentioned a manifestation of either resource mobilization behavior in their interviews, per resource category. To account for the different amounts of time we spent speaking to each venture, we adjusted the number of mentions by the total word count of all interview transcripts with ventures' team members. We further defined threshold values to cluster the number of mentions into *high*, *moderate*, and *low*, as indicated in Appendix D (following Hallen & Eisenhardt, 2012), to better understand cross-case differences.

By combining different data sources and analyses, we sought to reduce potential recollection and retrospective biases (Eisenhardt & Graebner, 2007; Jick, 1979; Leonard-Barton, 1990), and to "look beyond initial impressions and see evidence through multiple lenses" (Eisenhardt, 1989, p. 533). The underlying data sources for each venture's resource mobilization trajectory and intensity are summarized in Appendix D.

3.3.5.2. Technology Development Outcomes

To differentiate between venture outcomes, we could not rely on established financial, growth, or scaling metrics, because none of our case study ventures reached a commercial stage during our data collection period. We accordingly developed a score suitable to our sample, which captures key technology development achievements, technological complexity, and venture age (see Appendix E). These key achievements include clinical trial completion, approval, funding, as well as patents. As such, they are in line with relevant outcome variables used in extant

entrepreneurship research: clinical trial success (Miozzo & DiVito, 2016), funding for operations and development (Zott & Huy, 2007), and patents (Hsu & Ziedonis, 2013; Miozzo & DiVito, 2016). Our technological complexity score accounts for a given technology's novelty, research intensity, hardware, and software design complexity. Both our achievement and complexity criteria emerged from interviews with venture team members (see Eisenhardt & Graebner, 2007; Hallen & Eisenhardt, 2012) and reflect universally relevant dimensions in the medical technology industry, as confirmed by a scholar in the authors' networks who extensively studies the sector across countries.

For each venture, we assigned a number between zero and one for each possible technology development achievement. We then calibrated the sum of all these achievements by venture age to account for the time needed to reach them. Thereafter, we multiplied this result by the venture's technological complexity score, which was based on an expert panel's ratings. Specifically, we consolidated and averaged the independent ratings of four medical technology experts, who provided assessments of each technology's complexity.¹⁴ In order to facilitate ratings along pre-defined criteria, the experts were provided with a description of each technology and with venture names. All of these experts hold a PhD degree in biomedicine or related fields, and work as consultants and/or researchers in Europe (three out of four experts) or Uganda (one expert). By combining technology development achievements, technological complexity, and age, our technology development score reflects how quickly early-stage ventures managed to advance their technologies towards commercialization, for which all of them strove, while accounting for the difficulty of doing so.

¹⁴ The individual and independent expert results resembled each other to a reasonable degree, with the median standard deviation across technologies and categories being lower than 0.9 on a scale from 1 to 5. The individual ratings per technology and expert are shown in Appendix E.

3.4. Resource Mobilization in a Resource-Scarce Context

Our findings shed light on the entrepreneurial resourcefulness employed by early-stage technology ventures in a resource-scarce context. We know from prior work that resource-scarce contexts commonly prompt high levels of bricolage (Desa, 2012; Desa & Basu, 2013; Hota et al., 2019; Linna, 2013; Sarkar, 2018), and that bricolage can manifest in either selective or parallel forms (Baker & Nelson, 2005). Our results extend this prior research by illuminating two resource mobilization trajectories that involve a dynamic interplay between varying levels of selective bricolage and resource seeking over time.

At their inception, all ventures reacted to the resource scarcity of their immediate environs by engaging in high levels of bricolage across resource categories. However, ventures' combinations of resource mobilization behaviors started to diverge early on down two distinct paths when the nascent ventures experienced different *catalytic events*, either in the form of local incubation and/or awards, or of international awards. One group of ventures, which we label *Permanent Hustlers* (comprising WLab, Womed, and Mcare), continuously maintained high bricolage behaviors and engaged in comparatively limited levels of resource seeking. This trajectory resulted in lower technology development outcomes. A second group of ventures, which we label *Optimizers* (comprising Youhealth, Empoweru, Motherry, and HealthQ), progressively increased their resource seeking behaviors and opted out of—and then back into—bricolage dynamically over time. This trajectory resulted in higher technology development outcomes. All of the ventures notably reinterpreted their resource spaces from their immediate local environs to a global context, bolstering their resource seeking. This enactment of context played a key role in the ventures' transitions in their resource mobilization responses to resource scarcity. Figure 6 summarizes the two groups' resource mobilization trajectories over time, and their associated technology development outcomes. We henceforth refer to the two different groups as “I” or “II” in interview quotes.

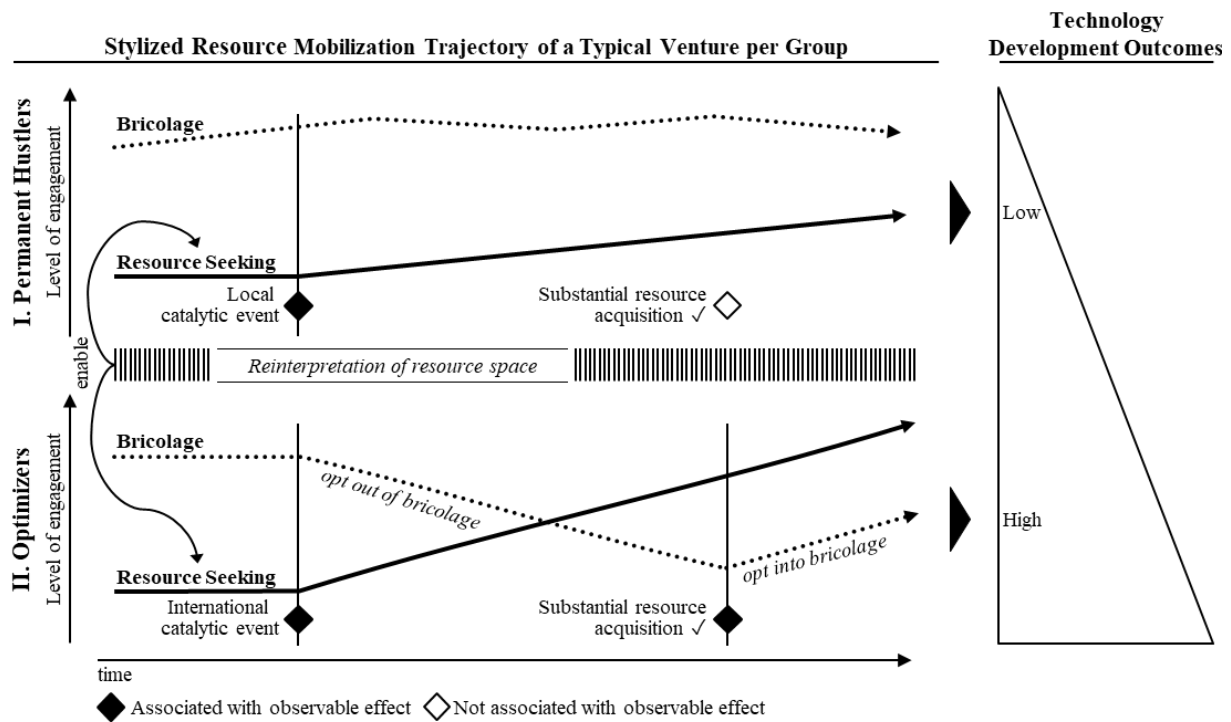


Figure 6: Resource Mobilization Trajectories and Associated Technology Development Outcomes

3.4.1. Bricolage as the First Response to Resource Scarcity

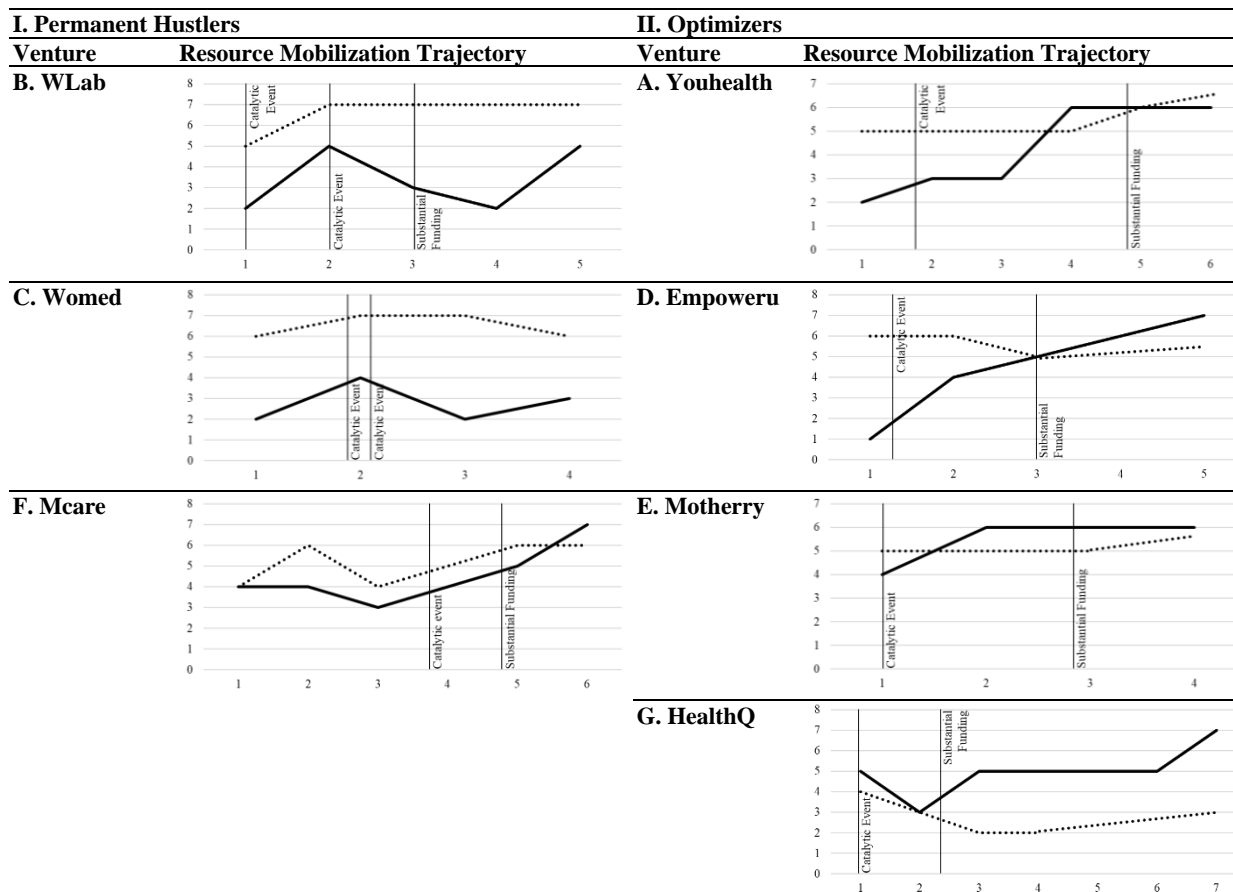
All ventures in our sample started their entrepreneurial journeys with high levels of bricolage and minimal levels of resource seeking. Initiating their entrepreneurial endeavors, ventures' founders sought to refine their ideas and prototypes at the local university, where they largely relied on low-cost or free resources at hand, such as fellow students' time, materials, or space—the priority being obtainability of the resource rather than its optimal fit for their needs (see also Appendix D showing predominant bricolage activity in ventures' beginnings for each venture, and split between bricolage and resource seeking by resource category over time).

"I would say at that time, [the beginning when they were all students], the main thing we thought of was, one, getting a good team. But by then, a good team meant just getting an engineer, someone to do the hardware for us, because we had little knowledge of what we actually needed. So, that's when we reached out to [our friend], who happened to be our first engineer, and discussed the idea...with him...And he said, 'it's possible,' so he started building the [prototype]." (Youhealth, A-1, II)

"Where we used to work from, it was in Makerere University, so we were not paying any rent to begin with. And we used some of their equipment to build our prototype, which was also free." (Womed, C-2, I)

"This is where we started from. So, from the field, we started a team, and we tasked everyone to come up with his own design. So, everybody had to come up with a design, and we came up with four. So, one came up with this, another one with this, etc. So, that was still using the low-cost materials." (Motherry, E-1, II)

"At that point, we were looking for as many ways to, should I say, to get components with limited resources that we had." (HealthQ, G-1, II)



X-axis: Venture age in years and milestones; Y-axis: Number of activity sets deployed in a given year |
 •••••: Bricolage —: Resource Seeking based on authors' coding and indicative of informants' graphs of activity sets |
Catalytic Event: see Chapter 3.4.2 | **Substantial Funding**: In determining when ventures received substantial funding, we followed a pattern observable in all ventures that either received smaller, often local grants and prize money (mostly below USD 5,000), or larger contributions of USD 20,000 or more. In line with an informant's accounts that such larger amounts of funding were vital for technology ventures yet difficult to obtain in Uganda (Youhealth, A-2), we categorized funds larger than USD 20,000 as substantial.

Table 15: Groups of Resource Mobilization Trajectories

This high initial engagement in bricolage across cases was coupled with some yet limited engagement in resource seeking (see Table 15), making it an instance of selective bricolage. In fact, with occasional exceptions, such as ventures buying simple components at local pharmacies or applying to prize-awarding competitions, our sampled ventures rarely employed any resource seeking behaviors in their earliest days. Reflecting on their resource mobilization behaviors during this time period, informants not only emphasized their use of bricolage over resource seeking, but also acknowledged their limited awareness of their resource requirements, and of the existence of potential resource pools that they could potentially tap into in the first place:

“And, we hadn't really thought much about the funding. We didn't know how much we'd need. We didn't know which different parts of the project would need different amounts of money.” (Youhealth, A-1, II)

“Actually, to be honest, our initial goal was just giving back to the community because we wanted to help the women, but as time went on I realized that as an entrepreneur, of course, you must...get something on the table...so you have to get some money to sustain this project.” (WLab, B-2, I)

“We didn’t know who to talk to. Like, that information wasn’t very clear to us by then...We were very new to the field, we didn’t know who to approach and what options we had.” (Empoweru, D-3, II)

During this period, our sampled ventures reported limited technology development progress, including inconclusive prototypes with low accuracy levels, which required substantial refinement.

“Initially, when we started, we didn’t have enough—enough funding to do real life prototyping. So, our concepts were basically theoretical. So, when we translated them into physical prototypes, sometimes we would see it—some things were not working out as the theory suggests.” (Empoweru, D-3, II)

“What we were building was something that we couldn’t build on our own.” (HealthQ, G-3, II)

3.4.2. Catalytic Events Preceding Divergence in Resource Mobilization Trajectories

Early in the ventures’ development, we noticed a beginning of divergence in “dynamics” (HealthQ, G-1, II), and the accompanying resource mobilization trajectories. In seeking to understand this divergence, we realized that the documented changes occurred soon after the ventures experienced what we term *catalytic events*. Our informants either described these events explicitly as sources of a “spark” (Empoweru, D-3, II) or “boost” (Womed, C-2, I; Motherry, E-1, II; Mcare, F-1, I), and/or frequently referred back to them when explaining subsequent venture developments. These catalytic events included admission into an incubation program and the bestowment of awards. They generally occurred within the first year after ventures’ inception (with the exception of Mcare, which experienced its catalytic event three years after its inception). Although it is not uncommon for new ventures in the Ugandan medical technology industry to gain admission into an incubation program or receive awards, the timing of the events in the course of our observed ventures’ developments appeared particularly influential:

“The [award], that was in 2015. It was something worth showing off, because we knew that, yes, we had birthed an idea. So, we had to carry it forward and work on it and build a venture.” (WLab, B-2, I)

“So, I think [the award] did the spark that let [Empoweru] become into a company. So, if it doesn’t, I think for [the award] and its timing, I don’t think [Empoweru] would have existed.” (Empoweru, D-3, II)

Our data shows that these events were catalytic in bringing venture teams a realization about the potential of their entrepreneurial projects and how they could advance them. Specifically, our evidence reveals five areas of change prompted by catalytic events across ventures (see Appendix F). Venture team members often reported experiencing (1) a surge of confidence right after their catalytic event: “They believed in us when not so many people did” (Empoweru, D-1, II). This confidence emerged along with the vital “confirmation” (HealthQ, G-3, II) of their idea’s viability and potential impact, that instilled a sense of urgency and “kickstart[ed]” their activities (HealthQ, G-3, II). This surge frequently coincided with (2) external recognition and exposure, as the incubator or award-providing entity “put [ventures and their technologies] out there” (Empoweru, D-1, II; HealthQ, G-3, II), increasing their visibility to “players and stakeholders in this field” (HealthQ, G-3, II) and opening “many doors of opportunity” (Empoweru, D-1, II) towards the attraction of further supporters. Catalytic events also led many venture teams to (3) reconceptualize what started as student projects into formalized firms—to “do things legally, officially” (HealthQ, G-1, II). This often entailed registering their ventures with official entities and clearly defining team members’ roles and responsibilities. Catalytic events additionally provided (4) vital new insights, particularly about potential venture resource needs, and sources of resources. Finally, following catalytic events, (5) all ventures “started pushing” (Youhealth, A-1, II) for additional resources, asking, “How can I get more funding,” or “How can I get more support” (Empoweru, D-3, II), and using “every opportunity that came around...to apply for it” (WLab, B-2, I). The resource endowments that came with catalytic events, although usually limited, helped to reinforce this increased resource seeking behavior. For instance, several ventures in both groups obtained comparable grants or prize money that assisted their technology development and, in turn, facilitated resource seeking:

“If we didn’t get the first round of funding from [the contest], we wouldn’t have a good enough prototype to present to [an incubator] and their grants to get more funding.” (Empoweru, D-3, II)

“I think from the kickstart of the project we started getting funding from here...that allowed us to do the first needs assessment, and finding the resources for our first prototype.” (Motherry, E-1, II)

Taken together, our analysis shows that catalytic events triggered a shift in how venture teams approached their entrepreneurial endeavors, shifting them from “projects” to “ventures.” Along with this shift, catalytic events preceded a change in ventures’ resource mobilization behaviors towards increased resource seeking.

3.4.3. Reinterpretation of Resource Spaces and Enablement of Resource Seeking

The increase in resource seeking we observed among all sampled ventures raised questions as to how ventures could overcome the limitations of their local context, where many standard resources (including funding, know-how, or components) were difficult to obtain, if available at all. Our evidence reveals that, to pursue resource seeking, ventures in both groups sidestepped the resource scarcity of their immediate environs, and *reinterpreted their resource spaces*, extending them beyond their immediate environs to encompass wider, global resource pools in order to seek standard resources. Indeed, our interviewees considered this sort of space reinterpretation common practice among ventures in Uganda:

“We do not have local investors interested in startups to begin with. If at all they are, there are very few. So, you find most startups applying outside Uganda to seek for funding, and yet [our technology] is a solution helping fellow Ugandans.” (Womed, C-2, I)

They did so by *looking out* to foreign foundations, universities, or manufacturers.

“So, we realize[d] that we were not going to get so much from here [Uganda]...” (Empoweru, D-1, II)

“We didn’t have sufficient funds, so we were looking for whatever could push us forward, and wherever we could get it from. So, we looked at all the viable opportunities, so we could now start searching for opportunities and applying.” (Motherry, E-1, II)

“We’re only finding funds as it can help us move ahead. We didn’t mind if the funds were local. We didn’t mind if the funds were probably outside Africa, or in Africa.” (Mcare, F-1, I)

“We always fall short with working within the country, and that's when we had to look out beyond our country.” (HealthQ, G-3, II)

Although no clear patterns emerged to further distinguish the two groups in terms of when or how the reinterpretation occurred,¹⁵ the act of looking out to wider, global resource pools functionally constituted a drastic act of resource seeking, which required ventures to overcome not only geographic, but administrative, cultural, and economic barriers (Ghemawat, 2005). The reinterpretation of their resource spaces and associated rejection of their immediate environs' limitations also functionally constituted a manifestation of bricolage. Indeed, resource seeking abroad was enabled by ventures refusing to enact limitations (Baker & Nelson, 2005) “imposed by available resource environments” (Di Domenico et al., 2010, p. 691) (see Table 16). As such, ventures' engagement in resource seeking behaviors was possible only because they engaged in bricolage—by refusing to accept the limitations of their local environs. This sequential dependence of a resource seeking behavior on an act of bricolage further substantiates the importance of accounting for the dynamic deployment of both resource mobilization behaviors over time.

Representative Quotes

“Well, it all started in 2016 when we realized **it was a challenge for us to get funding back home, and getting different expertise**. So—and you know **our local entrepreneurship ecosystem, we have very many challenges**. So, we thought it wise that it would be a great opportunity for us if we looked for, let's say, funding in other countries or looked for mentors.” (WLab, B-2, I)

Looking out was a gradual process. They were in touch with mentors, incl. one doctor coming up with the process of patenting, contacted international lawyer to help with the business case because “**the resources the country provides you find they are not being sufficient**.” (Womed, C-2, I; excerpt from interview notes)

“We tried actually to look for a **specialist to come and advise on the development, in medical device development, but that expertise was not available in Uganda**. . . . It became very hard to find the resource locally. So, that's when we realize[d], **let-alone expertise, there's no actual capacity within Uganda to actually develop clinical devices**. That's when we started looking for organizations, maybe who have done something related.” (Empoweru, D-3, II)

“So, the reason why we needed to fast-track the hardware was **we didn't have enough infrastructure in Uganda to fabricate design**. So, we have to partner with a company [abroad] to help us fast-track.” (Empoweru, D-3, II)

“I think it was in 2017, by the end of 2017—that's when I started looking abroad for opportunities beyond our own country, **beyond boundaries** to be able to support and to be able to get funding that can be able to sustain our innovation.” (Motherry, E-1, II)

[Asked about challenges with local authorities and approvals:] “I think it's a long way. With this, actually, it broadens our minds with this challenge because we didn't limit ourselves to just Uganda. We're like, ‘Okay, **in Uganda, we don't have this** [protocols for medical device approvals]. How are other countries doing it?’” (Mcare, F-1, I)

¹⁵ We have analyzed our data in several ways in order to understand whether timing or approach to resource space reinterpretation contributed to any systematic difference between our two groups that could affect their respective resource mobilization trajectories. However, we did not observe any such patterns. Different ventures within groups reinterpreted their resource spaces at different points over the course of their development. All ventures in our sample were homogeneous in terms of sought resource categories abroad (i.e., frequently seeking funding, capacity, materials and space, and liaisons; occasionally users and data, as well as authorities and approvals).

“Unfortunately, we do not have locally bodies that fund. You know, we don’t have development banks. We don’t have startup venture capitalist, that kind of thing. There is no infrastructure at all to help innovators and startups come up. So, our only alternative is to look out for funding organizations that are out there in the international space.” (Mcare, F-3, I)

“The ecosystem lacks talent...and lacks the natural, technical capacities to produce...the precise level we wanted. We sourced, we looked, and no one had the capacity...So, we had to look out.” (HealthQ, G-1, II)

“So, that was a challenge then, and that’s why we couldn’t find a company. Literally, there is no company that can build a medical device in Uganda. [Laughs.] So, it is something we had to outsource.” (HealthQ, G-3, II)

In Bold: Limitation(s) that ventures refuse to enact

Table 16: Representative Quotes for Reinterpretation of Resource Space as Refusal to Enact Limitations

3.4.4. Resource Mobilization Trajectories and Technology Development Outcomes

Despite many commonalities in our sampled ventures’ approaches toward the resource scarcity of their immediate environs in their early days, following their experiences of catalytic events we observed bifurcation into two groups of distinct resource mobilization trajectories. The divergence proved salient to comparisons of ventures’ technology development outcomes (see Table 17). Optimizers performed better on this measure than Permanent Hustlers (with the exception of Mcare, which achieved a higher score than the lowest ranked Optimizer, Empoweru). Below, we explain how the exact nature of a given catalytic event seemingly informed each group’s subsequent resource mobilization behaviors and outcomes.

I. Permanent Hustlers			II. Optimizers		
Venture	Type of Catalytic Event(s)	Technology Development Outcome Score	Venture	Type of Catalytic Event(s)	Technology Development Outcome Score
B. WLab	Local incubator, local award	0.77	A. Youhealth	International award	1.48
C. Womed	Local incubator, local award	0.22	D. Empoweru	International award	1.28
F. Mcare	Local incubator	1.38	E. Motherry	Local incubator	1.83
			G. HealthQ	International award	1.59

Local incubator: Ugandan incubator targeted at local entrepreneurs that strive to tackle local development challenges. The incubator provides access to expertise and network contacts, formalized training for community-oriented innovations, a platform for innovations to be presented to local and foreign stakeholders and, in some cases, financial support (USD ~5,000 for WLab and Motherry). | **Local award:** Different Ugandan entrepreneurship competitions, at times hosted by the local incubator, created for local technology entrepreneurs and bestowing prize money (USD ~500 for Womed). | **International award:** Award issued by varied prestigious international entrepreneurship competitions, hosted by United States-based organizations, and created for a global pool of entrepreneurs, entailing pitch events, selective access to expertise, network contacts (primarily international entrepreneurship and/or technology experts), and a platform to present innovations with local and international media attention. Some awards included prize money (USD ~5,000 for Empoweru, USD ~10,000 for HealthQ).

Table 17: Groups of Resource Mobilization Trajectories, Types of Catalytic Events, and Technology Development Outcomes

3.4.4.1. Permanent Hustlers

We labeled our first group of ventures *Permanent Hustlers* as our observations were reminiscent of the “urgent, unorthodox actions that are intended to be useful in addressing

immediate challenges and opportunities” (p. 1004), which G. Fisher and colleagues (2020) define as *entrepreneurial hustle*. Permanent Hustlers’ catalytic events involved participation in a local incubator and/or local technology-oriented award contests (see Table 17). Examining ventures’ case histories revealed interesting details about how the local incubator and local award contests embedded ventures in local communities and reinforced their bricolage behaviors. First, external informants emphasized that the local incubator attached great importance to “do[ing] what [ventures] can without resources,” and focused on “minimally available resources” (EI-6) at hand as opposed to “fall[ing] into that pattern of always applying for funding” (EI-4). The local incubator introduced ventures to healthcare professionals and hospitals nearby, experts who were at hand, to assist in developing or testing technologies.

“Throughout our engagements with them, we try to emphasize to them the fact that they need to be able to leverage and do what they can do without resources, because that’s what we also do here at [local incubator]. We have continued to run several projects that really need minimal, if not no, resources. So that, if the resources come in by good luck or you succeeded in an application, then you actually pick the resources and invest in them, but there are several things that they can fix without resources...We also do capacity building for them, because then we offer them the skill and techniques to be able to use the readily-, minimally-available resources.” (EI-6)

“They [medical technology ventures] tend to fall into that pattern of always applying for funding. Because it takes a lot more to take a health innovation to the market than maybe, say, [an] agricultural innovation or something in financial technology. You need to do a lot more research, and I guess they can fall into that pattern of continuously applying for grants.” (EI-4)

As the local incubator and award organizations were strongly anchored to their domestic context, their narratives (e.g., on their websites and in their promotional messages) centered around the importance of addressing local development challenges. External informants from the incubating organization frequently emphasized the incubator’s purpose as consisting of strengthening the resilience of local communities, and the expected roles of the ventures in serving their needs (EI-4, EI-6). This purpose was reinforced through designing locally-embedded programs for hosted ventures.

[Local incubator] made them visit [a district in Uganda] with the highest prevalence of [targeted disease]. [Local incubator] also helped organize research and the needs assessment process, provided them with facilitation, helped them get permission from districts down to hospitals and clinics, helped them define the need for the product that they had already started building. (WLab, B-1, I; excerpt from interview notes)

“This again boosted us because [local incubator] got us to a chain of other professionals that are doing maternal health at [local hospital]...These professionals also guided us on how just to perfect the device.” (Mcare, F-1, I)

While helpful in advancing their technologies with local support, this local embeddedness also encouraged ventures to prioritize “anchoring ourselves in the research environment in the country” (Mcare, F-3, I). Membership in the incubator also instilled in ventures a documented sense of responsibility toward the incubator and society at large:

“It’s like ‘we [local incubator] are funding you, so we expect you to represent us as an organization, as one of the startups that is being incubated.’” (WLab, B-1, I)

“That initial investment, it gives me a different perspective on what kind of expectations society has from you as someone who has been given an opportunity to serve.” (WLab, B-1, I)

“So, it was a milestone for us because, after getting that grant [from the local incubator] and going to the fields, we did the needs assessment, saw the real need that people had, that the women had. That alone gave us the zeal to keep pushing forward...We saw the real problem that women were facing, and we wanted to address it. So, what I can tell you is, yes, [local incubator] really did wonders for us, as our help.” (WLab, B-2, I)

“So, yes, [local incubator] definitely was the very first time that showed us that we can transition the invention into an innovation on the market, but we hope the greater good for our community, especially the mothers at large.” (Mcare, F-1, I)

As a result, we theorize that the local focus of the catalytic events ventures this group experienced, and the resulting sense of commitment to local communities and the resources within them, resulted in the validation of ventures’ initial high bricolage behaviors as an appropriate response to dealing with resource scarcity of their immediate environs.

The continuous use of bricolage across most resource categories that followed these catalytic events (see Appendix D) prevailed even after all Permanent Hustlers experienced other subsequent events that resulted from their resource seeking, such as participation in foreign acceleration programs and pitch events, or the receipt of grant funding. While the events did not emerge as catalytic in our analyses (in line with the criteria described in Chapter 3.4.2.), members of these ventures described some of these later events as “instrumental” (Mcare, F-1, I) in that they showed ventures that their products “were greater than the Ugandan market” (WLab, B-2, I), “how to monetize” (Womed, C-1, I), and how to “formulat[e] company structures” (Mcare, F-1, I). They even generated substantial five-digit funding (in USD) for

WLab and Mcare. Permanent Hustlers, however, maintained high levels of bricolage relative to resource seeking, despite these subsequent resource endowments and impulses. This is in line with findings from the imprinting literature, which shows that once imprinted, new ventures' strategies (Boeker, 1989), philosophies (Harris & Ogbonna, 1999), relationships (Milanov & Fernhaber, 2009), and policies (Burton & Beckman, 2007) adopted during a sensitive period of a venture's existence can imprint a venture and persist even in the face of contemporaneous influences. Two ventures' informants expressly reported that their participation in foreign accelerator programs ultimately had little impact on their overall behaviors:

“Well, I would say, obviously, when you're accepted [into the foreign accelerator], you have to come and do business in the ecosystem. And for me, again, I wouldn't say much has changed, because we still keep the same vision as a team and as a company.” (WLab, B-1, I)

[After foreign accelerator,] nothing changed in terms of management. “It helped build our networks, see who we can partner with.” (Womed, C-2, I; excerpt from interview notes)

At times, Permanent Hustlers' resulting approach that prioritizes action—whereby “the only way to get ahead is to get going, start doing something” (Mcare, F-2, I)—contributed to accelerations in technology development. For Mcare, for instance, the decision to “find a way around [bureaucratic obstacles]” (F-2, I) reportedly saved time in the patenting process, although the venture's founders were aware of future problems this could cause:

“So, then we realized it was going to be quicker if we just did it as an independent entity, not as the university. Of course, the potential for that causing a problem in the future is there. But at least it gets you going. You get the work done instead of just waiting on the university to do things for you, which is what they were suggesting.” (Mcare, F-1, I)

Despite the discrete benefits associated with their bricolage behaviors, Permanent Hustlers ultimately yielded lower technology development outcomes compared to Optimizers, partly because they knowingly risked technological quality by settling for sub-optimal results:

“So, we went ahead and said, okay, if we can't get there to what is ideal, what can we do that is almost similar to ideal, or that can give us a representation of what the ideal situation is?” (Mcare, F-1, I)

While their prioritization of action could speed up some aspects of technology development (e.g., patenting), these ventures also consistently adopted exceptionally time-intensive

bricolage behaviors, and relied on resource seeking to a relatively lower extent, which ultimately contributed little to their technology development efforts. For instance, WLab's and Mcare's decisions to start acting on their own in overcoming local regulatory limitations by drafting regulatory proposals, and WLab's attempts to start clinical trials in two different locations at the same time, which resulted in a duplication of efforts, ate up substantial amounts of time, also away from resource seeking, and ultimately contributed little to their technology development efforts. Given that building a technology venture requires high-quality (and expensive) assets and knowledge, settling for cheaper, sub-optimal resources in selected categories throughout their journeys ultimately created costs over time. In sum, as a result of local catalytic events validating bricolage behaviors as a dominant response to resource scarcity (relative to their resource seeking), Permanent Hustlers advanced their projects slower than Optimizers.

3.4.4.2. Optimizers

We labeled our second group *Optimizers* because these ventures' resource mobilization trajectories were characterized by increasing searches for optimal resources with "proven capabilities for the specific application for which the resource is intended" (Desa & Basu, 2013, p. 28), reflecting the concept of *optimization* as outlined by Desa and Basu (2013). Optimizers' catalytic events largely consisted of the bestowment of diverse international awards (see Table 17). These awards were hosted and funded by prestigious international corporations or universities from the United States. One of the ventures in our sample got to "...beat MIT [Massachusetts Institute of Technology], Harvard, and everyone at the competition in the US," making them realize that "people are going to believe in the cause, that is why it means so much to us" (Empoweru, D-1, II). Ventures in this group aligned their behaviors with the technology venture-building practices common in the United States, to which they were exposed through

these experiences.¹⁶ These catalytic events thus contributed to Optimizers' choices to opt out of their early bricolage behaviors and start concentrating on resource seeking behaviors soon afterwards.

Opting Out of Bricolage

Our interviewees described the experience of winning competitions on an international playing field early on in their ventures' development as particularly "eye-opening" (HealthQ, G-1, II). These catalytic events influenced subsequent behaviors, shifting ventures' reference points from serving local communities to international competition-derived benchmarks. For instance, Youhealth realized that "moving forward, we can compete at an international level and still make it" (A-2, II), an option they had not previously considered. An informant from HealthQ similarly recalled how their international award exposed them to "a lot of people in the industry globally" (G-1, II) and ultimately helped them "to attract more attention globally" (G-3, II). These catalytic events specifically led venture teams to adopt more ambitious scaling goals.

"What should I say after [the award]...We realized that we are filling a big gap in the market, in the world at large. This was a global issue. It was important that we came up with a solution as fast as possible."
(Empoweru, D-1, II)

Exposure to new practices and information during these catalytic events also shifted ventures' modes of operating, previously shaped by their local university environment, leading them towards increasingly business-oriented behaviors in line with the international competitive landscape. For example, HealthQ reported wondering, after "we won this prize...Who will lead the company? Who will manage the finances?...So, we tried now to start slowly, learning how

¹⁶ Motherry represents an exception to the association between specific types of catalytic events and resource mobilization trajectories we observed. Their catalytic event was their participation in the local incubator that ventures in the Permanent Hustlers group participated in, yet their resource mobilization behavior trajectory clearly fit the second group's overall trend. We explain this by (1) the frequency of international events, such as conferences and contests, that the Motherry team attended within the first nine months after experiencing their catalytic event, which exposed them to the same sort of business practices other Optimizers encountered in their early days, and (2) their founder's strikingly systematic approach to managing the venture, setting "goals" (E-1), and formulating a "vision" and "objectives" (E-1), which primed the team for resource seeking behaviors in spite of the local incubator's reinforcement of local embeddedness and bricolage behaviors.

to do all these corporate things” (G-3, II). As a result, ever since their catalytic events, Optimizers sought resources following clear resource requirement definitions and plans, and appeared to have *opted out* of bricolage activity in many resource categories.

“So, it’s for you to know exactly what kind of skills, or what kind of partners, are you looking out for...Once we set our goals we say: ‘This year, we need to achieve this.’ How are we achieving this? So, we look at the means of achieving this. We know that if we are looking at improving the accuracy of our device...how are we going to be able to achieve this? We have enough expertise. We have all the tools that are needed to do this. If we don’t have them, how do we get them? That’s how we keep track of them.” (Motherry, E-1, II)

As such, they regularly satisfied their resource requirements with standard, paid resources (e.g., rent, salaries, consulting fees). Three out of our four Optimizer ventures (Empoweru, Motherry, HealthQ), for instance, chose to pay for their own office spaces, which we visited while conducting our first round of interviews. In the same cases, team members received “allowances,” regular payments reminiscent of a tax-exempt salary. The choice to seek standard resources also frequently entailed the outsourcing of technology development and manufacturing.

Driven by a desire to develop high-quality technologies, ventures in this group consciously aligned themselves with international “standards, as stipulated for medical devices” (Empoweru, D-3, II), and “professional” (Youhealth, A-2, II) education standards, “in line with exactly what we are doing” (Motherry, E-1, II). For instance, HealthQ and Empoweru employed medical technology design agencies for their prototype development. As standardized and accurate products were often expensive, Optimizers facilitated their acquisition through “aggressive” (D-1, II; G-1, II) fundraising efforts. Planning ahead to satisfy future resource requirements, all ventures in this group acquired the funding necessary to conduct clinical trials:

“We find ourselves spending a lot of money on experts we are working with. In Uganda, we work with [name of specialist], highly recognized globally. And of course, working with such a professional person comes at a higher cost.” (HealthQ, G-3, II)

“Even when we have funding now, like at the moment when you have some of the funding available, but we still look for more funding. Because it helps us in the future, and also it helps us to not be limited with our innovative capabilities.” (HealthQ, G-3, II)

Optimizers' use of early funding often seemed to play a decisive role in advancing their technologies, and subsequently their technology developments and fundraising efforts reinforced each other:

“In terms of partnerships [with donors and incubation programs], I think that each of them played a role. Because in order to get the next round of funding, we had to have our prototype, which was funded by previous funding, which gave us some more money to prototype. And the chain continued to where we are.” (Empoweru, D-3, II)

“And to build the exact product we wanted, we had to pay high-level experts to help us build it, and with that support, we...were able to hire and pay them a lot of money to help us build our flagship kind of product...And achieving this meant that we had a product that now we could really put out there and showcase, to show how [much] farther we had come, and these meant as well being able to attract more funding because now this was a solidified device that you can see and you can take it through the process of what we have built and there is something tangible.” (HealthQ, G-3, II)

Interestingly, these resource seeking behaviors persisted in the face of varied levels of resource availability, as well as other subsequent (non-catalytic) events that, in contrast, prompted Permanent Hustlers to maintain bricolage. First, even after they had spent the prize money from their awards bestowed in catalytic events and they started to face resource restrictions again, Optimizers did not return to bricolage behaviors:

“So, at that point, we had used up the [prize money] buying components to do the initial prototype and then we needed to do the second round of prototyping...So, I think—and then there was also an issue of things like IP [intellectual property], and costs involved in involving clinical personnel, things like that. So, there were tiny, tiny costs that kept on building up as we went on. Yeah. And we realized if we didn't get funding, the project would actually die. So that's when we started applying for funding.” (Empoweru, D-3, II)

Second, two of the Optimizers (Empoweru and HealthQ) also had exposure to the same local incubator that acted as a catalytic event in reinforcing Permanent Hustlers' reliance on a uniformly bricolage-heavy trajectory. But these Optimizers only encountered this incubator after experiencing their international catalytic events and, as such, did not start to reinforce their bricolage behaviors or entrenching into their local context, like Permanent Hustlers upon interacting with this incubator. Rather, they maintained their resource seeking focus. For example, HealthQ decided use the money it obtained from this local incubator to hire “someone of high profession who we had to pay to build such technologies” (G-3, II), rather than settle for accessible, free contacts in accessing such expertise (as was often advised by the incubator). Further, the fact that the local incubator promoted ventures' embedding in the local academic

community and encouraged using its free knowledge at hand prompted one of our informants to observe how such incubator's practices at times represented obstacles to ventures' development:

“[Local incubator], it had more academics on board that wanted us to do things that academic way. And as you understand, academia and industry, in most cases, they clash on elements of timeline...They want to research for years and years. They want to perfect everything before it goes out. That approach was different [from what we learned at other events].” (Empoweru, D-1, II)

Opting Back Into Bricolage

Despite their steady employment of more and more resource seeking behaviors following their catalytic event experiences, we found that the Optimizers eventually *opted back into* bricolage again, increasing these behaviors in several resource categories. Interestingly, this happened around the time they had received external funding of USD 20,000 or more, usually in the form of grants from international acceleration programs. They usually obtained these grants one to three years after their catalytic event experiences (see Appendix D for timelines). Further analysis of Optimizers' resource mobilization behaviors by resource category revealed that they opted back into bricolage when (1) it could efficiently complement and build upon the resource base they had already acquired via resource seeking (for the resource category capacity), and (2) when it was necessary to overcome limitations, such as when they faced a lack of marketplaces or regulatory infrastructure (for authorities and approvals, as well as users and data).

Optimizers opted back into bricolage behaviors to mobilize capacity, most commonly in the form of free expert advice, that remained high or increased while they simultaneously engaged in resource seeking behaviors (e.g., paying high fees for expertise). Given the complementarity of “capacity” resources like expertise, they are particularly suitable for simultaneous mobilization with bricolage in combination with standard resource seeking. Youhealth, for instance, established a relationship with a European university's professor who guided the team in basic research activities for free (a manifestation of bricolage), even after the venture had

obtained substantial funding. This free guidance complemented the standard resources Youhealth would later acquire, such as paid assistance from laboratory technicians in Uganda (a manifestation of resource seeking).

Optimizers occasionally resorted to renewed bricolage behaviors to mobilize users and data, as well as authorities and approvals, because Uganda did not have any regular marketplaces for these resources. In these resource categories, our informants recalled, it was expedient to leverage network contacts at hand or engage in related bricolage behaviors to obtain the resources needed around the time of clinical trial preparation. For instance, Motherry leveraged the network contacts they had at hand to be accepted into the local “community” of hospitals:

“The hospitals, yes. Because we had the letter from [institution in Uganda], and from [another institution in Uganda]...when we presented this letter, it was easy for us to get accepted into our community. So, I think because we came from the right channels.” (Motherry, E-1, II)

Similarly, two of four ventures in this group reported occasionally opting back into bricolage to mobilize certifications, approvals, or patents. In light of their contextual limitations, such as undefined approval processes, corruption, and nepotism, obtaining authorizations often necessitated a refusal to be constrained by their current local system’s limitations, by finding workarounds or engaging network contacts at hand:

“If you know people already working in these areas—so, for us, we really do leverage on [local incubator], which makes it very easy for them to make clear demands, and when we meet those demands, we get approvals immediately. Because sometimes you can meet this board and then they make demands you’re very clear [on] and then the communication—back and forth communication can take you almost a period of like 6 months, 8 months. So, with the help of these organizations that we have worked with before, it’s very easy for us to have, like, that back and forth reduced maybe to 3 months, so that you can have the approvals.” (HealthQ, G-3, II)

The existence of resource endowments created by prior resource seeking behaviors ultimately enabled the decisions to opt back into bricolage. For instance, our informants reported how they felt empowered by their network ties, the fruits of earlier resource seeking for liaisons. Intentionally building up their networks in the early days of their ventures played a particularly vital role in optimizing subsequent bricolage behaviors, along with increased skillfulness in making use of them.

“But we have developed quite a network of dedicated people that work with us—who actually, guide us, sometimes pitching with them. So, that supportive network, which basically didn’t exist when we started...Let’s say we are stuck somewhere, let’s say regulation-wise; we just call up one of the ventures and ask, like, ‘How do you go about this?’ And that can actually remove a blocker in tasks.” (Empoweru, D-3, II)

“I was...at a conference...That’s where we were able to get partners from [one university] and [another university]. And with these ones, we have been able to access facilities that have helped us to test our devices [in their laboratories for free].” (Motherry, E-1, II)

“But now, we could be more in partnerships [relevant for both network bricolage and resource seeking] because of the network, and we’re trained to know a bit more and also to know about the bigger vision with the networks.” (HealthQ, G-1, II)

Ultimately, Optimizers’ resource mobilization trajectories translated into better technology development outcomes compared to Permanent Hustlers’ outcomes. This is a result of these ventures’ decisions to align with high standards, opt out of bricolage early, and opt back into bricolage, when and where it was a complementary behavior to their overarching focus on resource seeking. As such, Optimizers demonstrated the ability to dynamically adapt their resource mobilization behavior as their ventures developed, leveraging what was at hand when the venture’s circumstances dictated it, augmenting resource seeking and opting out of bricolage as their ventures formalized and their prototype grew more refined, and finally opting into bricolage again as they advanced towards commercialization.

3.5. Discussion

3.5.1. Theoretical and Practical Implications

Through this study, we sought to contribute to the literature on entrepreneurial resourcefulness by illuminating how early-stage technology ventures combine resource mobilization behaviors as they develop in resource-scarce contexts, and with what outcomes. While inherited knowledge would suggest bricolage as the appropriate response to resource scarcity (Desa & Basu, 2013), the particular resource needs of early-stage technology ventures operating in these contexts pose a conundrum: How can they satisfy their substantial and sophisticated resource needs in a local context that lacks the standard resources and infrastructure to meet them while avoiding the pitfalls of bricolage (e.g., Kickul et al., 2018; Stinchfield et al., 2012)? Extending

Baker and Nelson's (2005) seminal insights on the notion of selective bricolage, our findings reveal that, rather than describing ventures' resource mobilization in terms of one dominant, static behavior (e.g., Duymedjian & Rüling, 2010; Stinchfield et al., 2012), or dissecting the performance implications of bricolage versus resource seeking in isolation (e.g., An et al., 2020; Stenholm & Renko, 2016; Stinchfield et al., 2012; Wu et al., 2017), venture development outcomes can be better understood with an eye on the combined patterns of resource mobilization behaviors. These patterns become particularly salient when studied over time, accounting for the "processes, sequences, and mechanisms by which events unfold[ed]" (Aguinis & Bakker, 2020, p. 2). This study makes three primary contributions to the literature on entrepreneurial resourcefulness.

First, our study contributes to the literature on selective bricolage and its association with new venture outcomes. Whereas prior literature reports overall positive effects of selective bricolage on venture growth (Baker & Nelson, 2005), we identify two patterns of selective bricolage among our sampled ventures, with different outcomes in terms of venture development. Specifically, Optimizers achieved higher technology development through their dynamic alternation of resource mobilization behaviors, thereby benefiting from both the performance-enhancing effects of resource needs' optimal fulfillment (Bradley, Shepherd, et al., 2011), and the selective adoption of bricolage at multiple points in time (Baker & Nelson, 2005; Bojica et al., 2018). In contrast, Permanent Hustlers were less dynamic and, although progressively seeking more standard resources as they developed, generally held onto bricolage as a primary response to resource scarcity.

These findings attest to the importance of studying bricolage and resource seeking concomitantly, and doing so in a dynamic way (Kickul et al., 2018; Stinchfield et al., 2012), as attributing performance outcomes to either behavior alone would have been misleading. Moreover, we highlight that selective bricolage is a multifaceted and dynamic concept which

requires to be studied over time: If we had reduced selective bricolage to the “occasional” usage of bricolage and had only evaluated the average levels of respective resource mobilization behaviors in ventures’ early development, the nuance of their interplay and how they enable each other would have been lost, and the differences in respective groups’ development outcomes hard to discern. In that sense, these findings also offer an enrichment to the conceptualization of resourcefulness as a “broad[er] set of capabilities” (Bradley, 2015, p. 2) where entrepreneurial resourcefulness could also involve the capability to reevaluate and alternate resource mobilization behaviors (Desa & Koch, 2014) in sequencing bricolage and resource seeking in a mutually enabling way.

Second, our findings further extend scholars’ understandings of ventures’ transitions in their resource mobilization responses to resource scarcity in several ways. Foremost, we document ventures *opting out* of bricolage for reasons beyond their cash positions (Baker & Nelson, 2005), while they still faced resource scarcity in their environs (Desa & Basu, 2013), a dynamic iteration of selective bricolage unaccounted for by prior theorizing on resourcefulness. We also enhance scholarly understandings of resource mobilization behavior dynamics in terms of ventures *opting into* bricolage, helping to validate the idea that bricolage is not only a response to resource scarcity, but can be actively selected into upon substantial resource endowments (Bojica et al., 2018; Desa & Basu, 2013). We show that higher performers (Optimizers) opted into bricolage specifically in resource categories where bricolage either complemented and built upon the fruits of resource seeking, or was needed to overcome infrastructure limitations (e.g., with respect to capacity, users and data, as well as authorities and approvals). The dynamics of our sampled ventures’ abilities to opt in and out of bricolage behaviors over time also suggest that selective bricolage can unfold in more structured ways than extant literature has described to date, and as such may be used strategically by founders (Baker & Nelson, 2005).

In our data, the experiences of distinct catalytic events helped to explain how ventures' behaviors evolved in responding to resource scarcity. Our findings echo recent work demonstrating that inexperienced, early-stage entrepreneurs tend to increase their resource seeking behaviors after receiving awards (B. Zhao & Ziedonis, 2020)—indeed, both groups of ventures increased resource seeking to a varying degree following their catalytic events. Still, we extend this work by illuminating that seemingly similar catalytic events can result in a marked resource mobilization bifurcation depending on the nature and sequencing of such events. While the experience with the local catalytic events validated and reinforced bricolage as a response to resource scarcity for Permanent Hustlers, the experience with the international catalytic events led Optimizers to opt out of many bricolage behaviors even while still facing significant resource scarcity. We further highlight the importance of event sequencing, as the same events appeared particularly formative for future resource mobilization trajectories in ventures' early days—potentially sensitive periods in their development (Johnson, 2007; Simsek et al., 2015)—but had limited to no effects on resource mobilization behaviors if occurring subsequent to other events. As such, our findings on the role of catalytic events contribute to ongoing discussions on why individual ventures react differently to the same adverse conditions (Powell & Baker, 2014b) and why their reactions to these conditions may change over time (Baker & Nelson, 2005).

Third, our study emphasizes the subjective nature of ventures' spatial contexts as a key element of entrepreneurial resourcefulness in resource mobilization behaviors. Indeed, all of the ventures we examined notably reinterpreted their resources spaces, from their immediate environs to a global context. This resembles the concept of “changing border orientations,” which Welter and colleagues (2018, p. 30) describe as an element of resourcefulness. As such, our findings add to the ongoing conversation about the role of context in entrepreneurship (Welter, 2011; Welter et al., 2019; Welter & Baker, 2020), and particularly about the role of

spatial boundaries in entrepreneurial resource mobilization (Cheung & Kwong, 2017; Korsgaard et al., 2018). While the notion of ventures reinterpreting their resource spaces mirrors scholarly understandings of the socially constructed nature of resource surroundings and endowments (Powell & Baker, 2014a; Sonenshein, 2014), and of the fluidity (Baker & Welter, 2018) and mobility of contexts (Zahra et al., 2014), it questions the boundaries, and hence, the very meaning of a “resource-scarce context.” When knowledge, money, and goods flow amply beyond national borders, where and how can we draw the line between one context and another? While the spatial context played an important role in shaping early-stage technology ventures’ resource mobilization behaviors, exclusively examining their locations would not have explained the bifurcation between resource mobilization trajectories. Instead, our study underscores the importance of analyzing *multiple* contextual layers (Welter, 2011), and by so doing “acknowledg[ing] the diversity, heterogeneity and multiplicity required to adequately contextualize...entrepreneurship” (Welter & Gartner, 2016, p. 156): Our analyses show that the temporal sequence of catalytic events, which ventures experienced, altered their lens toward subsequent resource mobilization behaviors. Our data thus points to the potential agency of entrepreneurs in constructing their own contextual reality by engaging with their environment (Emirbayer & Mische, 1998) and in alternating resource mobilization behaviors. This also highlights that resourcefulness is not only a function of the scarcity or munificence of a given entrepreneur’s environment, but also their enactment of the latter through different resource mobilization behaviors.

Our findings contain important practical implications for early-stage technology ventures operating in resource-scarce contexts. First, early-stage technology entrepreneurs and organizations dedicated to supporting them should gain awareness of the resource mobilization behaviors they can adopt at different points in time. This involves scrutinizing the potential lasting influence of external events on the ways in which venture teams operate. Second, our

findings suggest that, while defining and pursuing optimal resources via resource seeking may yield desirable organizational outcomes, ventures should not abandon bricolage entirely, but should instead alternate its use dynamically. Third and finally, our findings and those of similar, earlier studies are not confined only to ventures operating in resource-scarce contexts, but should be considered for those operating in resource-rich contexts as well. Indeed, all entrepreneurial ventures frequently confront resource constraints (Davidsson et al., 2017; Desa & Basu, 2013; Grichnik et al., 2014), making resourcefulness a prudent choice (Misra & Kumar, 2000), especially when unexpected circumstances and crises perturb ventures' routines (Nelson & Lima, 2020).

3.5.2. Limitations and Future Research Avenues

As common in contextualized research (Zahra et al., 2014), we subjected our findings to careful scrutiny in an attempt to rule out possible alternative explanations. We acknowledge that, although we sampled for similar starting positions, ventures can still differ by, among other variables, team size at founding (see Table 11), which can have meaningful implications on their growth (Eisenhardt & Schoonhoven, 1990). However, our analyses did not identify any pattern in the effects of initial team size on performance outcomes. Notably, the venture that ranked fifth in performance (Empoweru) had six founding team members, whereas the best performing venture (Motherry) started with only one. The reconstruction of past events also demonstrated that there was no meaningful self-selection of ventures into specific types of catalytic events, as we were able to demonstrate that they all initially applied to similar programs and contests and then serendipitously “bump[ed] into opportunities” (EI-4).

As is the case with most case-based research, our small sample size and context specificities limit our results' generalizability. For instance, while some could argue that the nature of medical technology “stacks the odds” against ventures engaging in bricolage, we show that, at least in resource-scarce contexts such as Uganda, bricolage is a very important part of

entrepreneurial resourcefulness in technology development: foremost in refusing to enact local limitations, but also when deployed in a dynamic way and in selected resource categories vis-à-vis resource seeking. However, we invite future research to investigate the resource mobilization trajectories of ventures in different industries and countries, and with different levels of experience on their entrepreneurial teams. It would be interesting to see if researchers uncover similar findings in other contexts characterized by resource scarcity combined with high resource needs, such as the energy, utilities, transportation, or construction industries located in low and lower middle income countries.

We also acknowledge that, although all the ventures we sampled were relatively young when we first approached them, our sample may still be subject to a survivor bias; we may have been unable to observe other trajectories that did not permit even early-stage technology venture survival in Uganda's resource-scarce context. For example, it is possible that ventures that never reinterpreted their resource spaces, or did not embark on their journeys with high levels of bricolage, were never able to advance beyond their initial findings. Similarly, the early stage of our sampled ventures means that we cannot make claims about performance outcomes beyond their early technology development. While our technology development score adds to the diversity of outcomes that can be measured in early-stage technology entrepreneurship, future research could examine the implications of diverse and divergent resource mobilization trajectories for growth and financial performance.

Our data on resource mobilization behaviors, while longitudinal, also relies only on accounts of past events collected from various sources at two points in time. While this research methodology aligns with that of other research examining new venture emergence (e.g., Fauchart & Gruber, 2011), and with best practices for reducing recollection bias (see Ozcan & Eisenhardt, 2009), we encourage future research to observe venture developments in real time. More generally, while we attempted to reduce potential distortions through data triangulation

and the careful choice of interview settings and question wordings, we cannot ensure that this eliminated all possible biases associated with semi-structured interviews. Also, while we made sure that independent medical device specialists rated our ventures' underlying technological complexity (part of our technology development score), imperfect technological details stemming from ventures' attempts to protect their intellectual property, as well as experts' prior experiences and sub-specializations (D. Li, 2017), still had the potential to introduce bias into these measures.

Finally, we suggest that future studies should consider adopting broader perspectives on resource mobilization trajectories by investigating the way resources are configured (Eisenhardt & Martin, 2000), allocated within the organization (Lovallo et al., 2020), or otherwise managed (Sirmon & Hitt, 2003; Sonenshein, 2014). Such investigations could include analyses of entrepreneurial resourcefulness in terms of entrepreneurs' skillfulness (Zott & Huy, 2007) and ventures' dynamic capabilities (Boccardelli & Magnusson, 2006; Townsend & Busenitz, 2015) in alternating between resourcing behaviors. Taking this line of investigation further, dynamic resource mobilization of technology ventures, which often requires shifts in direction as ventures develop, could provide an interesting new lens to further explore entrepreneurial pivoting and strategic change (Grimes, 2018; Kirtley & O'Mahony, 2020). Beyond that, given that ventures' growth orientations (Cassar, 2004; Lin et al., 2020) have been found to affect subsequent resource mobilization efforts, investigations of ventures' (social) missions and how they relate to resource mobilization trajectories may be another promising avenue for future research (Bacq & Janssen, 2011; Bradley, Shepherd, et al., 2011; Bradley, 2015). Finally, we are intrigued by the prospect of future research that adopts a context-centric perspective, that is mindful of entrepreneurs' subjective perceptions of the resources in their environs (Baker & Nelson, 2005; Dolmans et al., 2014), and that further unpacks how entrepreneurs co-create their

contexts (Baker & Welter, 2018; Welter et al., 2019), or reinterpret them altogether (Zahra et al., 2014).

3.6. Conclusion

Our study shows that entrepreneurial resourcefulness in resource-scarce contexts goes beyond bricolage. Observing ventures with high resource needs in such a context allowed us to nuance the notion of resourcefulness across space and time. We highlight (1) the significance of studying both the sequence *and* combinations of bricolage and resource seeking in understanding a venture's technology development; (2) the vital role of early catalytic events in ventures' dynamic responses to resource scarcity; (3) the importance of accounting for contextual fluidity such that resource mobilization behaviors are not only a function of contextual scarcity or munificence, but also of entrepreneurs' reinterpretation of their resource spaces. By focusing on the dynamic resource mobilization behavior trajectories of seven early-stage technology ventures in the resource-scarce context of Uganda, and showing the fluidity with which entrepreneurs redefine their contexts to seek resources from across the world, we also raise the question of what local environmental resource scarcity truly means in the wider context of a globalized economy. In total, our findings shed new light onto the development of technology ventures that face the challenge of getting more for less in helping those that need it the most, and invite possible conceptualizations of resourcefulness as a dynamic way of combining resource mobilization behaviors and enacting context.

4. Essay III – Building Bridges: How Early-Stage Technology Ventures in Resource-Scarce Contexts Form Ties With Foreign Resource Holders

4.1. Introduction

Mobilizing resources controlled by other actors is a challenging endeavor for any early-stage entrepreneurial venture (Stinchcombe, 1965; Villanueva et al., 2012)—yet exacerbated when resource holders are situated abroad. This is a challenge faced by technology ventures operating in the resource-scarce contexts of many low and lower middle income countries whose chosen industry (see Fernhaber et al., 2007) and technology require substantial resource stocks that are not available locally.

Liaising with resource holders abroad is more difficult than with resource holders at home (Bell et al., 2012; Johanson & Vahlne, 2009; Reuer & Lahiri, 2014), thanks to high levels of information asymmetry, institutional distance, and economic nationalism (Bell et al., 2012; Reuer & Ragozzino, 2014; S. Zaheer, 1995). To mitigate at least some of the burdens associated with foreign tie formation—the establishment of interactions between a focal venture and a foreign organization¹⁷—new ventures may turn to their existing domestic ties for help (Mäkelä & Maula, 2008). Indeed, the number and diversity of their domestic ties can increase ventures' odds of forming foreign ties (Al-Laham & Souitaris, 2008; Montoro-Sanchez et al., 2018). More specifically, domestic partners can build bridges across borders to reduce information and geographic chasms by introducing, referring, and/or endorsing the focal venture to foreign resource holders (Bell et al., 2012; Mäkelä & Maula, 2008).

¹⁷ We distinguish between the focal venture, that is, the venture in question, and the other parties to which it is directly connected, that is, the tie alters (see Ozdemir et al., 2016).

An emerging research thread investigates the role such domestic networks play in foreign tie formation (e.g., Al-Laham & Souitaris, 2008; Montoro-Sanchez et al., 2018; Shi et al., 2014). However, extant literature contains surprisingly few insights on alternative foreign tie formation pathways that early-stage ventures can pursue to acquire the resources they need from foreign resource holders, less so when these venture teams lack prior international experience and access to international networks (see Johanson & Vahlne, 2009). Understanding the varied means by which they can liaise with foreign resource holders and acquire resources, like technological know-how and funding, is particularly important for ventures operating in contexts where even their domestic networks might face constraints, as is the case for many technology ventures that emerge and operate outside of the “Silicon Valley and the... ‘Silicon this’ and ‘Silicon that’ facsimiles around the world” (Welter & Baker, 2020, p. 3). In resource-scarce contexts, ventures’ domestic networks often lack the professional investors (Mäkelä & Maula, 2008) and international alliance partners (Al-Laham & Souitaris, 2008) that prior work on foreign tie formation commonly hinges on. With our theories largely drawn from resource-rich contexts, we have yet to understand how resource-hungry early-stage technology ventures in resource-scarce contexts can compensate for the shortcomings in their proximate networks on their quest for foreign resources. Taken together, prior research (1) positions domestic ties as a useful medium for the facilitation of new ventures’ resource mobilization efforts abroad, yet (2) remains silent on alternative pathways to liaise with foreign resource holders, much less on the outcomes they yield. The challenge of accessing foreign resource holders is especially potent for less-well-endowed early-stage technology ventures with substantial and sophisticated resource needs. We aim to address this gap by asking: *How do early-stage technology ventures in resource-scarce contexts form ties with foreign resource holders, and with what effects?*

We ground our theorizing on this subject in inductive data analysis, using a multiple-case study design (Eisenhardt, 1989; Yin, 2013). Relying on semi-structured interviews and fieldwork, we

examine the foreign tie formation behaviors of 10 early-stage medical technology ventures in Uganda. We selected the medical technology industry in Uganda because it epitomizes a context in which ventures have a strong need to liaise with foreign resource holders. In contrast to most prior research settings, where ventures receive backing from domestic venture capital investors (e.g., in Finland) who help them raise additional money abroad (Mäkelä & Maula, 2008), or can use domestic partnerships (e.g., in Germany) to seek supplementary resources like research capacity abroad (Al-Laham & Souitaris, 2008), our sampled ventures had to approach foreign resource holders from the outset if they wanted to progress. To date, there is no domestic venture capital sector in Uganda, angel investment is rare, and so is sophisticated machinery and technological know-how (Center for Development Alternatives, 2018; Global Entrepreneurship Monitor, 2014). The local medical technology industry is in its infancy, with immature regulatory frameworks and deficient research and production infrastructure, which exacerbates local early-stage ventures' general needs to seek resources outside of the country.

Our findings reveal two distinct approaches that the early-stage technology ventures we observed followed to liaise with resource holders abroad. These approaches are associated with divergent levels of foreign resource mobilization success. We measure foreign resource mobilization success, here in the form of foreign financial capital and research affiliations, to account for important drivers that motivate ventures to attempt to form foreign ties. Ventures that engaged in a strategic approach to form foreign ties, proactively and deliberately approaching resource holders abroad rather than relying on introductions and referrals, endorsements, and/or other signals from their domestic ties, tended to build networks with more, and more desirable (i.e., providing large amounts of resources at once) foreign resource holders. The networks they formed by building these ties increased their likelihood of acquiring foreign resources. In contrast, ventures that approached foreign tie formation opportunistically, and that foremost relied on their domestic ties in a more path-dependent way, tended to build

networks with fewer, and fewer desirable ties, ultimately yielding less foreign resources. We explain these differences in foreign resource mobilization success with the broader range of resource holders contemplated by more successful ventures, as well as the deliberate choices they made to identify and contact ideal targets. Rather than accepting the limitations of their domestic networks' boundaries, successful ventures took matters into their own hands, proactively building the foreign networks they needed.

By unravelling how early-stage technology ventures in a resource-scarce context liaise with foreign resource holders, our study makes three important contributions at the intersection of both international entrepreneurship and network literatures. First and foremost, we outline alternative behaviors that can help ventures acquire foreign resources, moving beyond prior research that has positioned domestic networks as the go-to solutions for foreign tie formation (e.g., Al-Laham & Souitaris, 2008; Montoro-Sanchez et al., 2018; Shi et al., 2014). Our data reveals that pursuing a strategic approach, that relies less on domestic ties and instead involves proactive foreign network building, can create larger networks with more desirable ties, and eventually yield more foreign resources. This finding speaks to the importance of agency in tie formation (e.g., Vissa, 2012) and resource mobilization efforts (e.g., Hallen & Eisenhardt, 2012). While extant literature traditionally assumes path dependency in network development (e.g., Gulati, 1995; Milanov & Fernhaber, 2009; Milanov & Shepherd, 2013; A. Zaheer et al., 2010), we show the importance of proactive entrepreneurial behaviors that transcend the paths readily accessible via existing domestic networks. Second, we extend international entrepreneurship research, which has to date largely fixated on international market entry and scaling rather than internationalization for the sake of resource mobilization (Filatotchev et al., 2016; Keupp & Gassmann, 2009). By measuring foreign resource mobilization success as a primary outcome of ventures' behaviors, we broaden the set of outcome variables in this research tradition. Third, we add to emerging research on the influence of context in

entrepreneurial networking (Lamine et al., 2015; Sorenson & Stuart, 2008) by examining venture networks in lower income economies that are known to be “more important for new business activity...than in developed economies” (Danis et al., 2011, p. 394).

4.2. Theoretical Background

New ventures typically rely on resources possessed by resource holders outside their immediate spheres of control (Villanueva et al., 2012). When domestic resource holders and the assets they provide cannot meet a new venture’s needs, it can turn to resource holders abroad, by raising capital from foreign investors (Bell et al., 2012), accessing knowledge from foreign partners (Lindstrand et al., 2011; Tsang, 2002), or increasing its reputation through associations with high-status, foreign organizations (Yamakawa et al., 2013), for example. Acquiring these or other resources abroad requires that ventures first liaise with one or more foreign resource holders; we hereafter refer to the establishment of these interactions (Gulati, 1995) as *foreign tie formation* (see Montoro-Sanchez et al., 2018).

4.2.1. New Ventures’ Liabilities of Foreignness, Outsidership, and Their Remedies

Forming ties abroad is burdensome, and attempts are less likely to succeed than efforts directed towards forming ties domestically (Bell et al., 2012; Johanson & Vahlne, 2009; Reuer & Lahiri, 2014). Besides being new and small (Baum, 1996; Stinchcombe, 1965; Stuart, 2000), early-stage ventures often suffer from a “liability of foreignness” (S. Zaheer, 1995; S. Zaheer & Mosakowski, 1997) when trying to tap into *foreign* networks, as well as a “liability of outsidership” when trying to tap into *new* networks (Coviello, 2006; Johanson & Vahlne, 2009).

New ventures lack prominence and legitimacy, especially abroad (Bell et al., 2012; S. Zaheer, 1995)—deficits that can hinder any attempts they make at liaising with foreign resource holders. These resource holders do not have ready access to information that might help them predict whether resources invested in a venture would likely be put to good use. This is a symptom of

the asymmetrical spread of information between resource holders and seekers, particularly across meaningful geographical distance (Bell et al., 2012; Malhotra & Gaur, 2014; Reuer & Ragozzino, 2014; Sanders & Boivie, 2004; S. Zaheer, 1995). Thus, it is difficult for foreign resource holders to predict how ventures will act and perform, yet the forces that usually mitigate this uncertainty—like mutual acquaintances enforcing good behavior and providing information—rarely extend across national boundaries (Bell et al., 2012; Engel et al., 2017; Hite, 2005). This obstacle is particularly salient when ventures from lower income countries, often associated with high uncertainty, approach foreign resource holders (J. Li & Fleury, 2020; Yamakawa et al., 2013). Resource holders also often give preference, when selecting the beneficiaries of their resources, to *homophilous recipients* (McPherson et al., 2001; Podolny, 1994; Rogan & Sorenson, 2014), entities they believe are similar to them thanks to, for instance, shared cultural traits or legal and financial institutions, or exhibit a *home bias* (French & Poterba, 1991; Ke et al., 2010) towards geographically proximate entities (Bell et al., 2012; Devigne et al., 2018; Ghemawat, 2001; Malhotra & Gaur, 2014; Obstfeld, 2005; Reuer & Ragozzino, 2014; Sanders & Boivie, 2004; S. Zaheer, 1995).

Prior research suggests multiple means for ventures to overcome liabilities of foreignness and outsidership while mobilizing foreign resources. By adopting the business practices and legal frameworks of targeted resource holders, firms can show conformity and similarity, potentially reducing both broad uncertainty and the specific effects of home bias (Bell et al., 2012; Bell & Rasheed, 2016). Such “mimicking” (Bell et al., 2012) of resource holders’ behaviors and compliance with their rules can manifest, for instance, in the form of cross-listings on prestigious foreign stock exchanges (Temouri et al., 2016). Management teams’ previous international experiences often facilitate the execution of this approach (Hursti & Maula, 2007). To overcome liabilities of foreignness, ventures can also search for resource holders who are particularly likely to consider them as legitimate, as is the case when resource holders are

familiar with the venture's industry or market (Bell et al., 2012; Moore et al., 2012). Besides, ventures can strive to let potential resource providers hear about their good governance practices, or other favorable attributes (Bell et al., 2012). The power of such *signaling* behaviors to overcome foreign resource holders' reticence is frequently emphasized in extant literature: Ventures can signal, among other things, their organizational virtues, including their integrity, empathy, warmth, or courage (Payne et al., 2013), as well as their management teams' compositions, including whether or not it comprises returnees, who worked or studied abroad and then returned to their home country (W. Li et al., 2016).

However, extant literature's insights on how to mitigate the challenges of foreign resource mobilization largely draw on studies of, and apply to, older and larger organizations—firms that are mature enough to qualify for initial public offerings, “foreign direct investment, cross-border acquisitions, cross listings, and foreign portfolio investment” (Bell & Rasheed, 2016, p. 104). For new ventures in their early stages, extant literature largely offers only one remedy: reliance on their networks (e.g., Lindstrand et al., 2011; Shi et al., 2014). An emerging thread of research specifically examines the role that the domestic ties, which ventures typically possess and foster in their early days, can play in mitigating these challenges (Al-Laham & Souitaris, 2008; Mäkelä & Maula, 2008; Montoro-Sanchez et al., 2018; Shi et al., 2014). For instance, Al-Laham and Souitaris (2008), as well as Montoro-Sanchez and co-authors (2018), find that the number of domestic contacts a venture possesses can increase their likelihood of forming international alliances with entities like universities, suppliers, or consultants. This research stream also suggests that domestic network diversity (Montoro-Sanchez et al., 2018) and ventures' advantageous network positions, like centrality and brokerage (Shi et al., 2014), can drive foreign tie formation, for instance to establish joint ventures.

The positive impact domestic networks can have on foreign tie formation is at least in part attributable to the market knowledge and advice these ties can impart to a venture, readying it

for cross-border investments (Lindstrand et al., 2011; Mäkelä & Maula, 2008). Ventures' domestic tie alters can also help to forge links to targeted tie alters abroad, connecting a focal venture to their own contacts (Mäkelä & Maula, 2008), or endorsing and certifying them towards foreign third parties (Bell et al., 2012). By so doing, the focal venture can overcome its outsider status and capitalize on the enhanced trust that these links to foreign networks can engender (Johanson & Vahlne, 2009). Visible affiliations with high-status domestic partners can further signal a venture's quality and legitimacy towards international stakeholders (Mäkelä & Maula, 2008; Reuer & Ragozzino, 2014).

This line of research on the benefits of domestic ties for ventures' foreign tie formation has one attribute in common: They investigate domestic networks in resource-rich contexts, where ventures are backed, for instance, by Finish venture capitalists (Mäkelä & Maula, 2008), American institutional investors (Reuer & Ragozzino, 2014), or German research partners in domestic high-tech clusters (Al-Laham & Souitaris, 2008). It is not clear if early-stage ventures in resource-scarce contexts can or should attempt to make similar use of their substantively different domestic networks. Nor are there any clearly outlined alternative pathways to foreign tie formation for these ventures to employ within extant research streams.

4.2.2. Network Behaviors in New Tie Formation

International entrepreneurship scholars have increasingly incorporated network perspectives into their theorizing (see Ahmad & Dimitratos, 2017; Denk et al., 2012; Johanson & Vahlne, 2009; Sedziniuskiene et al., 2019 for literature reviews and conceptualization). Network-based entrepreneurship literature does offer valuable insights on the behaviors early-stage ventures can deploy to aid in their foreign tie formation efforts that bear equal examination—yet provides few directions for ventures in disadvantageous starting positions.

Like international entrepreneurship literature, network research emphasizes the importance of signals and of leveraging existing ties in building networks. When an organization's

characteristics are difficult to assess from outside, it can make an effort to send signals (Spence, 1973) to their tie formation targets, informing them on relevant features or events which increase chances of liaising. These signals can convey a wide-ranging set of information, including but not limited to management experience levels (Plummer et al., 2016), relevant operational activities (Plummer et al., 2016), previous successes (Courtney et al., 2017), prestige and network positions (Stuart, 1998), and affiliations with existing tie alters (Stuart et al., 1999; see also O. Colombo, 2021 for a literature review on signaling in new venture financing). Such affiliations may convey attributes like a venture's quality (Blevins & Ragozzino, 2018; Hallen, 2008; Plummer et al., 2016; Stuart et al., 1999), reliability (Plummer et al., 2016), or resource access (Gorman & Sahlman, 1989; Jain & Kini, 2000; Plummer et al., 2016) to desired tie alters. Besides, organizations can use their existing ties to (1) alert potential new tie alters that they exist in the first place (Eisenhardt & Schoonhoven, 1996), (2) reduce uncertainty for tie alters evaluating them (Hallen, 2008; Stuart, 1998) by providing information (Reuer & Devarakonda, 2017), and eventually (3) build up their reputations (Petkova, 2012) and legitimacy (Plummer et al., 2016; Stuart et al., 1999).

The key mechanisms at play when existing ties and their signals promote the formation of new ones can be summarized into introductions and referrals, endorsements, and signals of visible affiliation. *Introductions and referrals* involve the creation of novel, direct connections between a focal firm to a new tie alter (Burt, 2000) through a third party with connections to both, which often positively affirms the focal venture's quality to promote trust during initial contact (Batjargal, 2007; Gulati & Gargiulo, 1999; Vissa, 2012; J. Zhang et al., 2010). This mechanism has its roots in *tie transitivity*, that is, “the formation of ties on the basis of common acquaintances or partners” (Hallen et al., 2020, p. 1077). *Endorsements*—for instance in the form of certifications issued by a credentialing body (King et al., 2005)—similarly involve third party affirmations of a focal venture's quality, which that venture can exhibit to potential new

tie alters. *Signals of visible affiliation* describe the signaling of positive attributes of the focal firm towards new tie alters by mere affiliation with a third party, whereby the focal venture and tie alter might be connected through direct ties (i.e., immediate connections between entrepreneurs or their ventures and a tie alter), indirect ties (i.e., connections through third parties), or not at all (Courtney et al., 2017; Guerini & Quas, 2016; Gulati & Higgins, 2003; Ko & McKelvie, 2018; Ozmel, Reuer, et al., 2013; Sanders & Boivie, 2004; Shane & Cable, 2002; Spence, 1973; Stuart et al., 1999; Stuart & Sorenson, 2007).

Extant network literature promotes the use of existing ties and their signals for new tie formation, yet has devoted little attention to early-stage ventures with *disadvantageous* starting points—those that are too young to have much to signal and whose existing contacts are themselves relatively resource-deprived. Hallen and Eisenhardt (2012) are among the first to break out of this pattern, identifying an alternative pathway to the use of existing ties for less-well connected firms: In the absence of relevant strong direct ties, ventures can still form ties efficiently through *catalyzing strategies*. These strategies include, but are not limited to, arranging casual encounters prior to their negotiations with a target organization (i.e., “casual dating”) or proactively demonstrating their milestones (i.e., “timing around proofpoints”) (Hallen & Eisenhardt, 2012). Beyond such proactive tie formation efforts, new ventures may also engage in *sensegiving activities*, like the issuing of press releases or the deployment of meaningful symbols on their websites, to increase their likelihood of receiving industry media attention and, by garnering that attention, improve investors’ propensity to provide capital (Petkova et al., 2013).

Taken together, international entrepreneurship and network literatures outline several pathways that ventures hoping to form ties with foreign resource holders can pursue. However, extant research provides little guidance for early-stage technology ventures in resource-scarce contexts that find themselves in unenviable starting positions on this endeavor. International

entrepreneurship research suggests that mature organizations can demonstrate conformity with, and mimic business practices of the foreign organizations they wish to reach out to (e.g., Bell et al., 2012; Temouri et al., 2016). They can also send signals about their own organizational attributes and achievements to potentially improve targeted foreign organizations' knowledge of and trust in them (e.g., Payne et al., 2013). Younger ventures can leverage their domestic ties to facilitate the mobilization of foreign resources (e.g., Bell et al., 2012; Mäkelä & Maula, 2008). However, if a venture operates in a resource-scarce context, where their domestic networks are deprived of relevant resources and contacts, these approaches to foreign tie formation may not be relevant. Network research similarly suggests that ventures can signal their attributes to new tie formation targets (e.g., Courtney et al., 2017; Plummer et al., 2016) and/or leverage their existing (domestic) ties for new tie formation (e.g., Hallen, 2008; Stuart et al., 1999). However, with few exceptions, such as Hallen and Eisenhardt's (2012) catalyzing strategies and Petkova and colleagues' (2013) sensegiving activities, prior work on networks remains relatively silent on the options available to early-stage technology ventures with a short track record and a network that is itself resource-deprived. Thus, our study aims to investigate the pathways available for such ventures in mobilizing foreign resources, addressing the research question: *How do early-stage technology ventures in resource-scarce contexts form ties with foreign resource holders, and with what effects?*

4.3. Methods

In light of the questions that extant theory left us with, we grounded our theorizing in data by inductively analyzing multiple-case studies (Eisenhardt, 1989; Yin, 2013). As outlined in Essay II, we familiarized ourselves with the context (Flick, 2009), the medical technology industry in Uganda, by consulting 26 external informants with experience in the Ugandan entrepreneurial ecosystem (labeled continuously with EI-1, EI-2, etc. as in Essay II).

4.3.1. Research Context

Our research examines ventures within Uganda’s medical technology industry because it epitomizes a resource-scarce context in which ventures that wish to obtain sophisticated resources must form foreign ties early on. Domestic resource scarcity manifests on many levels, summarized by one of our external informants:

“I think the landscape is vast. Logistics [are] an issue. Talent recruitment is an issue. Access to funding is certainly an issue. What we see is also that, beyond basically friends and family, it’s very hard to get funding [for] companies. Banks are usually not willing to—there is no venture capital, as you know, out there.” (EI-2, see also Essay II)

Uganda’s low scores on the Ease of Doing Business (World Bank, 2018) and Global Competitiveness (World Economic Forum, 2019) indices show that it is an unfavorable environment for businesses, especially early-stage technology ventures, which often have substantial resource needs from day one. There is no domestic venture capital sector, angel funding is largely unavailable, and bank lending for new ventures is unusual and expensive (Center for Development Alternatives, 2018; Global Entrepreneurship Monitor, 2014). Large parts of the society do not support individuals’ aspirations to found their own technology ventures, either (EI-3). Doing business day-to-day involves navigating corruption (Hatchile Consult Limited, 2015; Transparency International, 2015, 2019), nepotism, and favoritism (EI-5). The situation is particularly dire for medical technology ventures that require access to high levels of skill, knowledge, materials, and sophisticated machinery. Yet, because Uganda’s medical technology industry is young, adequate local research and production facilities and essential knowledge and talent are particularly scarce (EI-1, EI-2), even in the capital Kampala, the center of most of the nation’s technological innovation. The nation’s few extant medical technology firms have largely exhausted local universities’ and technology institutes’ support capacities, and there are no high-tech clusters as those we have seen in prior research (Al-Laham & Souitaris, 2008). Consequently, early-stage medical technology ventures that seek to develop, test, and ultimately roll out new products must seek resources abroad by forming ties

with foreign resource holders—a common imperative in international tie formation from lower income to higher income markets (Yamakawa et al., 2013).

We also examine Uganda’s medical technology industry in our study because, as in other low or lower income markets (Batjargal et al., 2013; Busch & Barkema, 2020b), ventures operate under extreme uncertainty. Local regulatory frameworks and their execution are often underdeveloped (EI-1). For the nascent medical technology sector especially, protocols and responsibilities for managing original, proprietary technologies are entirely non-existent (EI-1, EI-4). In these uncertain circumstances, resource holders “are likely to shift emphasis from objective financial and operating data, which is lacking or not well understood, to indirect, secondary information sources that are better understood” (Sanders & Boivie, 2004, pp. 167–168), such as information provided by a venture’s network contacts. While networks are generally more important in lower income markets (Danis et al., 2011), the importance of introductions and referrals, endorsements, and signals of visible affiliation becomes particularly salient under uncertainty (Stuart et al., 1999).

4.3.2. Sample Selection

Our goal in compiling our sample was to ensure that all the cases we included would share a similar resource endowment and network starting point, yet display varied foreign resource mobilization outcomes. This led us to, first and foremost, confine our study to one industry (see Hallen & Eisenhardt, 2012), the medical technology industry.

To identify suitable ventures, we first screened multiple online databases, magazines, and registers of entrepreneurship award recipients, a process outlined in detail in Essay II. This yielded an initial list of ventures, which we then compared against a set of pre-defined criteria (Patton, 1990) to ensure that our case sample could provide meaningful insights into our research question (Eisenhardt, 1989; Eisenhardt & Graebner, 2007; Miles et al., 2013).

Entrepreneurs' initial resource endowments can influence their subsequent resource mobilization efforts (Baum & Silverman, 2004; Hallen, 2008), especially in the medical technology industry (Chatterji, 2009). Hence, first we determined that the ventures in our sample should have possessed comparable resource endowments, including human and social capital, at their foundings (see Ozcan & Eisenhardt, 2009). Specifically, we sampled for ventures whose (co-)founders (1) had no meaningful prior industry or entrepreneurial experiences when they founded their ventures, (2) had no meaningful international experiences or networks (see Johanson & Vahlne, 2009), and (3) had completed comparable academic degrees in Uganda. These criteria were important, our external informants revealed, because many entrepreneurs behind successful startups in Uganda are expats with international experience (EI-2, EI-7), giving them a potential advantage in foreign tie formation efforts. We also checked and confirmed that all of a venture's team members had comparable family backgrounds and no prior contacts with local authorities, and that none of the ventures in our sample demonstrated a notably distinct approach to navigating Kampala's challenging business practices (see Essay II). Limiting our sample to one geographical area (i.e., Kampala) further helped to ensure that the ventures in our study had access to similar local pools of resources (see Zott & Huy, 2007). Second, to make sure that we observed ventures that achieved meaningfully varied levels of foreign resource mobilization, we determined that the ventures in our sample should have obtained varied amounts of foreign funding at the time of our first interviews with them. Funding plays a key role in the growth of new ventures (Gilbert et al., 2006), and—for practical reasons—is easily visible prior to entering conversations with new ventures of interest, because they are often published in publicly accessible media outlets. Paired with similar venture starting positions, the variance in financial capital maximized our likelihood of being able to safely attribute venture outcomes to their distinctive resource mobilization and foreign tie formation behaviors. Third, we sought for ventures that had foreign ties, which—we quickly learned—was an easy criterion to fulfill. Given the limitations of the

Ugandan context, every venture in Kampala that we interacted with had established at least initial contact with several foreign resource holders. Responding to the country's unfavorable business environment, most ventures in our sample started interacting with foreign resource holders within the first one or two years of their existence and sourced upwards of 80% of their funding from foreign resource holders. Fourth and lastly, we sampled ventures with a maximum age of eight years at the time we initiated our data collection efforts (see Essay II).

As outlined in Essay II, the centrality of Makerere University to Kampala's entrepreneurial ecosystem helped to further homogenize our sampled ventures, with respect to the local human and social capital they had access to, and to their reliance on similar support organizations (see Zott & Huy, 2007).

We interacted with 21 Ugandan ventures in total, and shortlisted 12 that all confirmed they would participate in our study. Two ventures subsequently dropped out of the study. We eventually realized that three ventures did not fit our theoretical sampling criteria.¹⁸ However, we added three ventures to our list via snowball sampling, leaving us with 10 ventures in our sample when we started to conduct in-depth interviews with venture teams (see Table 18, compare Essay II).

¹⁸ One venture's co-founder was not from Uganda, one venture did not operate from Kampala, and one venture had paused their operative activity.

Venture (Pseudonym)	Founding Year	Team Size	Founders	Informants	Relevant Archival Data Sources
A. Youhealth*	2014	3 (3)	2	2 co-founders, 1 team member	Social media, self-description, website, online articles, budget
B. WLab*	2015	3 (6)	3	2 co-founders	Social media, company presentation / pitch deck, website, online articles
C. Womed*	2016	4 (3)	3	3 co-founders; 1 team member	Social media, website, online articles, conference report
D. Empoweru*	2015	6 (6)	3	3 co-founders	Social media, investment platform, website, online articles, budget, video
E. Motherry*	2016	5 (1)	1	1 founder, 3 team members	Social media, product development timeline, website, online articles, budget, conference report, business model canvas
F. Mcare*	2014	3 (3)	3	1 co-founder, 2 team members	Social media, online articles, grant applications, conference report
G. HealthQ*	2013	4 (6)	6	3 co-founders	Social media, investment platform, company presentation / pitch deck, website, online articles
H. NeoSys	2016	3 (2)	1	1 founder, 2 team members	Social media, company presentation / pitch deck, website, online articles
I. Trustly	2015	5 (2)	2	2 co-founders, 1 team member	Social media, investment platform, company presentation / pitch deck, website, online articles, budget, business plan
J. ChildTrack	2017	4 (4)	4	4 co-founders	Social media, website, online articles, conference report

* Also part of sample in Essay II | Team Size as of Fall 2019 (in brackets: at founding)

Table 18: Overview of Sampled Case Studies (Essay III)

4.3.3. Data Collection

As outlined in Essay II, at the outset of our data collection, we validated our sampled ventures' resource requirements, team compositions, and funding levels and sources by administering short pre-surveys, while conducting trust-building preparatory video calls. Our main data corpus consists of 50 semi-structured interviews with (co-) founders and team members of the sampled ventures (see Table 19), the transcripts of which total 663 single-spaced pages of transcripts (approximately 238,000 words). We conducted the bulk of these interviews within a first wave of data collection during a five-week field visit to Uganda in Fall 2019 (see Essay II for details on our interview procedures, see Appendix B from Essay II for the question catalogue that informed both studies). To validate our emerging findings and gather additional data, we conducted a second wave of interviews with seven of our sampled ventures.¹⁹ These

¹⁹ We did not conduct second-wave interviews with three venture teams because we had already gathered sufficient data on them during our research stay in Uganda, during which we spoke to their (co-)founders twice each. To ensure comparability of our measures, our analysis timeframe ends in 2019 for all of our cases.

interviews took place in Summer 2020 via online calls rather than in person, in response to the COVID-19-related travel restrictions in place at the time.

Informants	Time of Data Collection	Type	Length Range	Interviews	Informants
Venture informants	Summer 2019	Preparatory calls (virtual)	30 minutes	7	7
	Fall 2019 (Wave I)	Interviews (28 in person, 3 virtual)	20–110 minutes	31	29
	Summer 2020 (Wave II)	Follow-up interviews (virtual)	30–60 minutes	12	12
Total (per venture)				50 (3–7)	29 (2–4)
External informants	Summer & Fall 2019	Interviews (6 in person, 18 virtual)	30–80 minutes	24	26

Table 19: Overview of Interviews and Informants (Essay III)

Beyond the interviews, we gathered archival data (see Table 18) and field notes (182 single-spaced pages). We label venture (co-)founders and team members using the same conventions outlined in Essay II (e.g., A-1, A-2).

4.3.4. Data Analysis

During our analyses, we iteratively triangulated between our data, emerging constructs, and extant literature (Eisenhardt & Graebner, 2007). Consulting relevant literature throughout the entire analysis process (Eisenhardt, 1989; Eisenhardt et al., 2016; Miles et al., 2013), we continuously ensured to allow the “data themselves to speak” to us (Shepherd & Sutcliffe, 2011, p. 362) inductively.

First, we consulted the case study write-ups detailed in Essay II, which summarize our sampled ventures’ journeys. To capture the “interplay between action and structure in this framework that is best observed over time” (Gulati, 1995, p. 620), we further summarized ventures’ network evolutions from their founding, detailing year-by-year the ties they formed and tracing the points of connection between each of their ties.

Next, we inductively generated categories for cross-case analyses based on transcript coding (Grodal et al., 2020). The first author conducted this coding, with the second author challenging the resulting categorizations in her role as a “resident devil’s advocate” (Eisenhardt, 1989, p. 534). The key categories that emerged from our coding reflect the varied means ventures employed to liaise with foreign resource holders. We then juxtaposed the use of domestic ties

(i.e., using them for introductions and referrals, endorsements, or transmission of signals of visible affiliation) with more proactive approaches to foreign tie formation (e.g., cold-calling or reactive follow-ups with tie contenders who approached ventures following media mentions). While doing so, we noticed differences in ventures' strategic considerations during foreign tie formations (i.e., whether they deliberately planned to form new ties or opportunistically pursued openings when and as they appeared).

These key categories formed the basis of our subsequent cross-case analyses, in which we compared ventures' foreign resource mobilization success levels, and their association with foreign tie formation behaviors, then searching for underlying motivations and plans. We created visual maps, depicting their networks' evolution trajectories (Langley, 1999), to help us further organize our data and compare cases (see Appendix A for an example). As detailed in Essay II, we refined our emerging constructs and relationships iteratively, triangulating them with different data sources for internal validity (Eisenhardt & Graebner, 2007) and to stabilize our emerging framework (Grodal et al., 2020).

4.3.5. Measures

4.3.5.1. Ties with Foreign Resource Holders

Our study focuses on early-stage ventures' inter-organizational ties. We define these ties as interactions (Gulati, 1995) between a focal venture and another organization (i.e., the tie alter) on a dyadic level (see Ozdemir et al., 2016), encompassing all levels of commitment, cooperation, and exchange. We included ties between focal ventures and individuals if these individuals had clear associations with and representative functions for their organizations, as inter-personal relations often precede and accompany inter-organizational ties (Granovetter, 1985; Gulati & Westphal, 1999) and are thus important interim steps towards possible organizational resource mobilization. We excluded all other inter-personal ties (e.g., with team members' relatives).

We also distinguish between domestic and foreign tie alters. We consider the formation of ties between focal ventures and foreign tie alters as *foreign tie formation*. A *domestic tie alter* denotes an organization with (a) its headquarters and/or (b) meaningful representation and presence (e.g., through a subsidiary or an event) within a focal venture's country of origin. A *foreign tie alter* denotes all other organizations outside of the focal venture's country of origin. We opt for this differentiated view on domestic and foreign tie alters to reflect the reality of our sampled ventures: Many of the acceleration programs and pitching contests they participated in were hosted by non-Ugandan organizations, such as large international foundations or technology firms. These entities often sent representatives, permanently or regularly, to work with Ugandan ventures on-site, blurring the lines between a domestic and foreign organization on the ground. Through their presence on-site and their regular interaction with Ugandan organizations, these representatives have essentially overcome many of the factors that trigger the liability of foreignness we discussed in Chapter 4.2.1, such as home bias (French & Poterba, 1991; Ke et al., 2010) and the difficulties foreign entities often face when trying to access information on ventures from across borders (Sanders & Boivie, 2004). In our sample, domestic tie alters typically include universities, venture development organizations like incubators or accelerators, government agencies, and hospitals. Foreign tie alters typically include foreign universities, venture development organizations, foundations or other donors, and manufacturers.

The foreign tie formation behaviors we observed in our sampled cases were driven by a clear motivation: the quest for foreign resources. We consequently examined ventures' tie alters in light of the resources they held, including their financial, social, human, and other resources (Clough et al., 2019). Given our sampled ventures' needs for a variety of resources (e.g., funding, partnerships, technical know-how, or manufacturing capacity), as informants frequently reported, we purposefully kept our definition of resources broad in line with prior

work in this field (Clough et al., 2019), and thus framed every tie alter that could potentially provide any of these broad resources to a focal venture as a foreign resource holder.

4.3.5.2. International Tie Formation Approaches

In coding the ways ventures used their domestic ties, we relied on existing constructs as established within prior network research. Specifically, we defined domestic tie usage as an umbrella term that encompasses (1) introductions and referrals (e.g., Vissa, 2012), (2) endorsements (e.g., King et al., 2005), and (3) signals of visible affiliation (e.g., Stuart et al., 1999) from the focal venture’s domestic tie alter to a foreign tie alter target (see Table 20).

Construct	Textual Indicators	Representative Quote
	The focal venture’s self-reporting or archival data indicate that...	
(1) Introductions and Referrals	...the focal venture was introduced to a foreign tie alter by a common acquaintance that consisted of a focal venture’s domestic tie alter and/or the common acquaintance issued a positive assessment of the venture’s quality to said foreign tie alter.	“Because of my networks—so, I also work within the [specific health technology] space...So, I managed to meet the manufacturer of the [specific health technology] in the regional referral hospital. So, it is him who then introduced me to someone in [Europe] who does that one. So, it’s networks.” (NeoSys, H-1)
(2) Endorsements	...the focal venture’s domestic tie alter explicitly recommended or certified it to a foreign tie alter.	How they got to the [foreign accelerator] program: Before she knew about [local incubator], she came to [local incubator], to do research and have access to unlimited internet...Startups that applied used to get recommendations from [head of local incubator]. So, she sat down with him; he told her to apply, and he recommended her. (WLab, B-1; excerpt from interview notes)
(3) Signals of Visible Affiliation	...the focal venture’s affiliation with a domestic tie alter resulted in the formation of a new foreign tie through a signaling effect.	“So, [faculty member at a local university] initially met up with [faculty member at a foreign university]. So, [faculty member of a foreign university] read in his CV that he has something to do with [Mcare]. So, when we heard that, we first waited a bit for some time, and then we engaged her.” (Mcare, F-2)

Table 20: Coding Scheme for Use of Domestic Ties

Source: Authors’ synthesis of prior literature

For each venture, we determined a percentage denoting how often each venture used their domestic ties to liaise with foreign resource holders as a share of their total foreign ties with resource holders. While this figure cannot reflect every dynamic at play in any given venture’s foreign tie formation efforts—it notably disregards the number and diversity of domestic tie alters a venture formed—it is a useful approximation of the use of domestic ties that, combined with qualitative data, helps us understand ventures’ overarching foreign tie formation behaviors. We mainly differentiate, qualitatively, between strategic and opportunistic foreign tie formation approaches, categories that emerged inductively during our coding (see Table 21

and Appendix B), and for which we counted the evidence we identified in our data, per venture, in Table 22.

Construct	Textual Indicators	Representative Quote
	The focal venture's self-reporting indicates that...	
Strategic Approach	...the focal venture engaged in deliberate planning activities concerning its foreign tie formation efforts, aligning tie formation objectives with resource holder selection and deliberately planning when and how to approach whom.	Asked about their fundraising efforts moving forward: "We need a strategy. We found that we need to be in the faces of some of these people [foreign funders]. We need to be at the events that they attend. So, we are thinking of how we can invest some part of the company money to go to some of these events, actually meet these people, who are potential investors. So, we are thinking of re-strategizing. So, initially, I would go, pitching, like, to different firms, and different events." (ChildTrack, J-2)
Opportunistic Approach	...the focal venture spontaneously and/or reactively approached foreign tie formation, reacting to potential tie formation possibilities if and as they presented themselves.	Asked about which partners they approach, and where: "For us, it has been about building networks from wherever, and not like—somehow, opportunities are represented just through our networks." (NeoSys, H-1)

Table 21: Coding Scheme for Juxtaposed Tie Formation Approaches

Source: Authors' inductive data analysis

4.3.5.3. Foreign Resource Mobilization Success

In light of Uganda's resource scarcity, and the resulting importance of foreign resources to our sampled ventures, we concentrate on *foreign* resource mobilization success that emerges from foreign ties. We measure this by looking at two key resource categories, which emerged inductively during our analyses as critical input factors, and upon which our sampled ventures placed great value: foreign funding and research affiliations.

"I mean, the business of medical device development is capital intensive, you need a lot of money to develop your devices, to try them and test them. You need to invest that money." (Mcare, F-3)

"I think that inputs into [our product] have been partnerships, I would say from the different collaborators that we've been working with to make sure that we solidify the product. Those partners, those kind of connections in the private sector and academia have been very, very vital for us." (HealthQ, G-1)

Both resource categories, one consisting of financial capital and one of social capital, serve as proxies for our sampled ventures' overall foreign resource mobilization success levels, as different resource categories have been found to be strongly interrelated (see Clough et al., 2019).

Foreign Funding

We measure foreign resource mobilization success in terms of the amount of external financial capital that our sampled ventures raised from foreign resource holders, because this resource in particular is key for new venture growth (Gilbert et al., 2006). It is also fungible, and so it can be converted into other relevant resources that our sampled ventures seek, such as technical know-how, materials, or production capacity. It is clearly numerable, as well, and easily triangulated for data collection purposes, because our sampled ventures relied primarily on grants and prize money, their receipt of which was frequently reported in online magazines and venture platforms.

Foreign Research Affiliations

Given the knowledge-intensive nature of the industry our sampled ventures operate in, our informants placed high value on affiliations with relevant research institutions (e.g., universities and/or medical institutes) and/or corporations (e.g., pharmaceutical and/or medical device companies). We measure foreign research affiliations in terms of the existence of ties that were designed as mid- to long-term collaborations, in which both parties collaborate to tackle a joint project, between focal ventures and organizations with expertise in the medical technology industry. This includes but is not limited to concerted research activities aimed at scientific discovery and publications. However, this excludes non-recurring programs or service agreements, through which our sampled ventures received limited-duration support, with no collaborative efforts towards joint goals.

4.4. Tie Formation with Foreign Resource Holders

Foreign resource holders played key roles in satisfying ventures' needs across all 10 cases we observed. While domestic resource holders offered some assistance—for instance by assembling initial prototype materials, locating testing facilities, or promoting ministerial

approvals—the bulk of the resources ventures required was not available locally. All ventures were thus forced into sidestepping the resource scarcity of their proximate contexts by seeking resources abroad. Notably, every venture in our sample turned to foreign resource holders within their first two years of operations, with the exception of Trustly, which waited until its third year.²⁰

“It’s so challenging. So, all [ventures] focus on competitions—, these small competitions that will give you what I call peanuts, five thousand US dollars. That is the money. So rare to get ten thousand. We must work enough, if you’re going to a competition that is going to give you ten thousand in Uganda. We don’t have any [competition that gives you ten thousand] here. [These competitions] must be regional [i.e., beyond Uganda].” (Youhealth, A-2)

“But then as the funds ran out, we had to try to apply for different opportunities in other countries. Because here in Uganda, there was no way you could apply for a funding opportunity, because they didn’t exist...So, we thought of the very many opportunities out there that we had to tap into.” (WLab, B-2)

“The ecosystem lacks talent...and lacks the natural, technical capacities to produce...the precise level we wanted. We sourced, we looked, and no one had the capacity...So, we had to look out.” (HealthQ, G-1)

“So, we always fall short with working within the country, and that’s when we had to look out beyond our country.” (HealthQ, G-3)

In line with prior research that has emphasized the importance of networks to resource mobilization efforts, especially in resource-scarce contexts (Danis et al., 2011), our informants unanimously emphasized the key roles their networks played in both their domestic and foreign resource mobilization efforts. We observed a clear commitment among all of our informants to introducing their ventures to both domestic and foreign potential tie alters by “putting [themselves] out there” (Womed, C-1), because of the resource access potential of such ties.

“So, we were able to...meet these guys [foreign investors], talk to them. It wasn’t a success, but at least we reached out, and that means broadening our circle as well. Because when they know about you, they will tell someone else about you, and you have a higher chance.” (Youhealth, A-1)

“I tried to live with my already-existing network to be able to keep work going forward. So, I would say it’s a constant. Like, where necessary, I try to engage the people in my [domestic and foreign] network to be able to figure out the best direction to go forward with our product.” (WLab, B-1)

“So basically, it is knowing someone who knows someone who knows someone, and then the whole circle comes in focus.” (Mcare, F-1)

²⁰ Although there were slight differences in exact points of time or underlying inspiration that made ventures look abroad, our data did not show any systematic variation between ventures related to these factors.

“Innovators, I mean, it's not easy for them to approach certain partners on their own because, first of all, they're just starting out and they have no real backbone or anything to say that you can trust this individual. So, those are partnerships that are usually bridged by either [local incubator] or other incubation hubs who kind of have that standing with, say development organizations...or international universities...the [local incubator] team is usually quite involved in helping them build those linkages with different organizations. So, that's one way that they're able to kind of make those links with huge organizations that they would not have been able to on their own.” (EI-4)

While all cases involved relatively few instances in which domestic ties were used for foreign tie formation—a slightly counterintuitive observation given the centrality of domestic networks in previous research on foreign tie formation (e.g., Al-Laham & Souitaris, 2008; Montoro-Sanchez et al., 2018; Shi et al., 2014)—our findings reveal two distinct approaches that our sampled ventures employed to liaise with foreign resource holders, each of which had implications on early-stage technology ventures’ foreign resource mobilization success. These different approaches across cases became apparent when we examined how much ventures relied on domestic ties, as opposed to alternative pathways of forming ties with foreign resource holders, and how they approached this endeavor. As we show in Table 22, domestic ties clearly played a negligible role in several ventures’ foreign tie formation efforts (e.g., HealthQ, ChildTrack, Empoweru, and Motherry); only 8% or less of their total foreign ties originated from domestic network introductions and referrals, endorsements, or signals of visible affiliation. These ventures demonstrated particularly proactive foreign tie formation behaviors, approaching foreign resource holders of their own initiative and without utilizing any existing connections. These behaviors were paralleled by highly pronounced strategic planning activities, for which we identified evidence in our interview data. Among the remaining ventures in our sample, several relied significantly more frequently on their domestic ties to form foreign ties (WLab, NeoSys, and Trustly), with up to 33% of their total foreign ties resulting from domestic networks. They also demonstrated less proactivity in reaching out to foreign resource holders, favoring an opportunistic approach in which they waited for and seized upon opportunities that presented themselves. Although we noted multiple gradations in how ventures liaised with foreign resource holders and with what effects, our data show that,

overall, less domestic tie reliance and greater proactive and strategic behaviors corresponded to greater overall foreign resource mobilization success, as represented through the proxy of foreign funding and research affiliations obtained. Greater domestic tie reliance and more opportunistic approaches corresponded, conversely, to lesser overall foreign resource mobilization success (see Appendix B for a list of representative quotes on either approach).

	Evidence of International Tie Formation Approach			Total Number of Ties with Foreign Resource Holders	Foreign Resource Mobilization Success (Financial Capital) ²¹		Foreign Resource Mobilization Success (Social Capital) ²¹	
	Share of Foreign Ties Via Domestic Ties	Strategic Approach	Opportunistic Approach		Ties with Foreign Resource Holders (Successful Transfer)	Foreign Funding in USD (% of Total)	Ties with Foreign Resource Holders (Successful Transfer)	Number of Research Affiliations
G. HealthQ	2%	xxx		41	8	>150k (83%)	6	6
J. ChildTrack	6%	xxxxxxx		36	7	125-150k (86%)	1	1
D. Empoweru	0%	xxxxx		16	2	125-150k (92%)	0	0
F. Mcare	36%	xx		11	3	75-100k (98%)	1	1
E. Motherry	8%	xxxx	x	26	3	50-75k (57%)	8	8
B. WLab	9%		xx	23	2	50-75k (91%)	0	0
A. Youhealth	0%		x	17	2	25-50k (81%)	0	0
H. NeoSys	33%		xx	9	1	<25k (100%)	0	0
I. Trustly	11%		x	9	1	<25k (39%)	0	0
C. Womed	0%		xx x	11	0	<25k (0%)	0	0

Sorted by amount of foreign funding obtained | All figures reflect results as of Fall 2019 | **Share of Ties Via Domestic Ties:** Share of foreign ties formed as a result of domestic tie alter introductions and referrals, endorsements, and/or signals of visible affiliation | **x:** Statement from venture informant indicating either a strategic or an opportunistic approach to forming foreign ties | **↔:** Statement from venture informant indicating an intermediate approach to forming foreign ties, between strategic and opportunistic | The number of research affiliations equals the number of resource holders because each affiliation consists of a dyadic relationship between a focal venture and a resource holder (i.e., affiliation partner) | Abbreviations: k = 1,000; USD = United States Dollar

Table 22: Foreign Tie Formation Approaches, Associated Network Sizes, and Foreign Resource Mobilization Success

We theorize that the ventures in our sample that relied less on the introductions and referrals, endorsements, and signals of visible affiliation from their domestic networks, instead pursuing a strategic approach to foreign tie formation, built larger foreign networks, which contained more desirable resource holders (i.e., providing large amounts of resources at once). This network composition helped them to mobilize more resources than their peers who formed fewer, and fewer desirable foreign ties. We explain the higher foreign resource mobilization

²¹ In our analyses, we also discounted each resource mobilization success measure for venture age, but found that age did not explain the observed differences. We therefore opted to show total funding and total research affiliations per venture and not per venture and year.

success with the larger range of resource holders considered by successful ventures and the tie formation behaviors they deliberately deployed: Successful ventures often defined when, why, and with what sort of entities they sought to form ties before identifying and reaching out to specific, relevant resource holders on their own, proactively building foreign networks that met their precise needs. The latter group’s lesser resource mobilization success, meanwhile, reflects their reactive approach to pursuing tie formation opportunities that their domestic networks offered them. This functionally limited their foreign tie formation efforts to boundaries defined by their domestic networks. We capture these relationships in Figure 7.

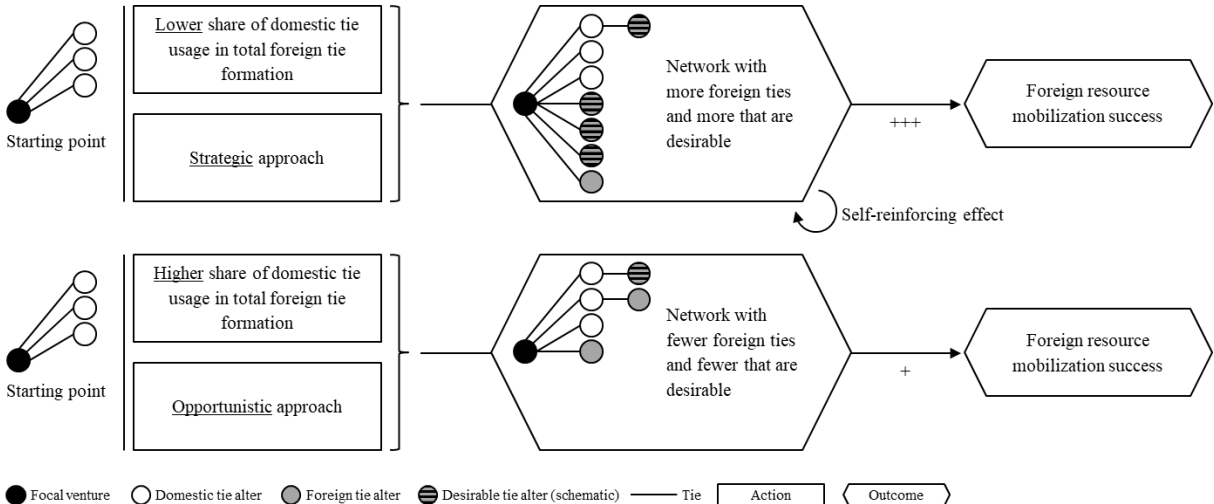


Figure 7: Comparative Use of Domestic Networks for Foreign Tie Formation and Foreign Resource Mobilization

4.4.1. Strategic Approach with Lower Reliance on Domestic Ties

The ventures in our sample that were comparably more successful in mobilizing foreign resources tended to form a smaller proportion of their new foreign ties through introductions and referrals, endorsements, or signals of visible affiliation from domestic networks. Instead, they used a broad range of proactive means to approach foreign resource holders with whom they had had no prior connections. HealthQ, ChildTrack, Empoweru, and Motherry epitomized this trend, as they all obtained high levels of financial, social, or both forms of capital from foreign resource holders, but formed 0% to 8% of those foreign ties with the aid of their domestic networks (see Table 22). Notably, a local incubator program referred ChildTrack to a global foundation; a local incubator connected Motherry’s founder with a foreign university;

and the local university HealthQ's co-founder had connections to invited them to present their venture to a foreign university:

“An international partner? Yes, they are also there. This is an institution that has also given us a platform. So, most of them have been publishing our success stories on their website, and so many international partners come to Uganda, and they came to this place, so they also recommend...So, we have been able to meet. We've met several of them.” (Motherry, E-1)

“So, I travelled with him and the team [from the local university] and we were just having a trip for a week to [a foreign university] doing the workshop. We were also able to pitch and meet a few people who thought our innovation was very interesting.” (HealthQ, G-3)

Rather than purely relying on the prospects of being connected to their domestic networks' tie alters, however, successful ventures proactively initiated new ties, purposefully “build[ing] the network” (HealthQ, G-1) they desired.

“We use that power of the network to reach out to every other person we've met, to make sure you take that next step that bring certification and work on market entry.” (HealthQ, G-1)

“It's all about strategizing and also looking around you. It's not a must that, if you have a good idea, it should be Uganda.” (HealthQ, G-1)

“When we have needs, we look at the company needs, and then we seek them out. We move to their offices. They don't have to look for us; we look for them, because we need them.” (ChildTrack, J-2)

The different means most frequently mentioned to proactively form new foreign ties were: participation in events that foreign resource holders would be attending, activation of prior foreign contacts, cold-calling and -emailing foreign resource holders, application for grants and competitions, and the use of foreign tie alters, once established, to obtain introductions and referrals, or endorsements to other, new foreign resource holders (see Table 23). Although by far not unique to the most successful ventures, we observed these behaviors more frequently in cases with higher overall foreign resource mobilization success.

Means Deployed by Sampled Ventures*	Representative Quotes
Participate in events	<p>“So, we realized that this other community, outside community [abroad], was as excited about our project as we were. So, that's how we made it a point to engage in as many, what should I put, in conferences, seminars, workshops. There's something in Nairobi: Apply. There is something here, there...That is how we got to build the network.” (Empoweru, D-1)</p> <p>“How do you look for [domestic or foreign] partners?...Most of them we got them through forums and conferences.” (Motherry, E-1)</p> <p>“There was a symposium focusing on engineers as health professionals. So it was through this that I was able to get more partners that were coming from all over the world, from the UK, from Africa, and others. It was from there that we had to collaborate getting all those.” (Motherry, E-1)</p> <p>“The contact was through, one of us was attending a TED Talk in [Africa]...So, that's where he met the creative director of [a design company in Europe]. And then we started building a relationship from there. And then, we went further, vetted.” (HealthQ, G-1)</p>
Activate prior solicitants	<p>“So, I think one of the things is we were already in touch with some of them [foreign investors]. So, it should be a matter of re-approaching them. Because some of them approached us when we were not ready. So, some of the contacts we already do have.” (Empoweru, D-3)</p> <p>“Other [foreign] investors, they reach us directly after getting to know of what we do [online through Motherry's media presence], then they contact us through emails, and they do a follow up.” (Motherry, E-2)</p> <p>“It was just right after [the announcement that HealthQ received a prize]. Yeah. So, [a foreign university] reached out. They came to office.” (HealthQ, G-2)</p>
Cold-call and -email	<p>“It's tough [to get foreign strategic partnerships]. Like I said, we reach out. We just email people and say: ‘Do you have time? Can we meet?’” (HealthQ, G-1)</p> <p>“So, we tried to go online to identify a company that we could hire to build the product we wanted, and it was very hard, very, very difficult...In terms of when to call, they would pick up in German, and then when you say you can't speak German, you want to speak English, they have to connect you to some party they have somewhere else who speaks English.” (HealthQ, G-3)</p> <p>“As young people, we are trying to create a difference... So, it is always not easy to get them [domestic or foreign consultancies], because they are very busy people, but we approach them physically. We get meet-ups with them, but sometimes we do email exchanges with them. So, it depends.” (ChildTrack, J-2)</p>
Apply for grants/competitions	<p>“Yeah, we keep on applying for [domestic or foreign] grants. We check for grants online. We keep on applying.” (Motherry, E-3)</p> <p>“So, that's how we crossed paths with most of these people [foreign strategic partners], pitching for grants and trying to share the value, targeted pitching, sharing what we're doing.” (HealthQ, G-1)</p>
Use foreign tie alters' introductions and referrals, or endorsements	<p>“How do you look for [domestic or foreign] partners? So, how we are looking for them? It's through conferences, through visiting their websites, but most of them we got them through also a partner, like partners giving you another partner.” (Motherry, E-1)</p> <p>“Get connections from other funders, telling us we should speak to [foreign] venture capitalists: ‘Can you create meetings for us?’ And they do create a few of these meetings, as well.” (HealthQ, G-1)</p> <p>“This collaboration with an institution like [a foreign university]...is a huge network for us, to also feel we are affiliated with such an institution.” (HealthQ, G-3)</p>

* Other than using domestic ties | Sorting does not indicate order of frequency

Table 23: Means of Proactive Foreign Tie Formation

Prior to forming their new ties, successful ventures engaged in strategic planning efforts. One of our informants recalled: “We had to be so strictly strategic on what we want and how to get there” (HealthQ, G-1). This entailed making decisions on why, when, and with whom venture teams would attempt to form new foreign ties, and considering how to align new tie foreign formation with ventures' overarching objectives and priorities.

[Asked about domestic and foreign partnerships] “So, partnerships...We are looking at de-risking. So, just want to reduce the risk, maybe related to clinical practice or clearance. So, we look for a person in that area who has done, who has developed a product and had it tested, went through clinical trials and approved them.” (Empoweru, D-1)

[Asked why they currently seem to focus on seeking domestic partners] “There will be stages when we [again] engage a lot more with international companies. But currently, since we are developing the product within this space, we are currently engaging a lot more with the local partners.” (Empoweru, D-3)

[Asked how they coordinate partnerships] “We know that once we set our goals, we say, this year, we need to achieve this. How are we achieving this? So, we look at the means of achieving this. We know that if we are looking at maybe improving the accuracy of our device, or we are focusing on contraction, how are we going to be able to achieve this? We have enough expertise. We have all the tools that are needed to do this. If we don't have them, how do we get them? So that's how we keep track of [the partnerships].” (Motherry, E-1)

“So, what we are looking out for now, we are looking into production. So, if we have to produce our device, we want to get a partner that we could be able to work with and produce our devices at a cheap, affordable price. That's what we are looking out for. And then, we are also looking at engaging him for the long term. But in the long run, we also want to be able to build the capacity and be able to start now manufacturing, or set up our plant and we do our manufacturing here. That's our long term. Our long term is to be able to make sure that we do everything from here. That's what we are looking at. So, if we could get those partners that can build our capacities and get some resources, that can be able to help us set up, assembling and manufacturing our products from here. That's what we are looking out for.” (Motherry, E-1)

“For every partnership, we go into it with an objective, and at that time we realize that there's something that is going to get us to the next step...So, that's one, but it's not the ultimate goal, because it's one thing to talk to the big player and it's another thing to make sure that big players now get extra funding to you.” (HealthQ, G-1)

[Asked how they prioritize fundraising activities abroad] “You look at the company finances. You prioritize, and that question has come up before, because some of the events, we have to finance ourselves to participate. So, the company has to invest in you to actually travel. So, we look at the finances that are available, and we also look at the core objectives, like I have shared before. So, as of now, our decisions are made along those lines.” (ChildTrack, J-2)

We find that this deliberate venture planning of objectives, timelines, and partner selection criteria corresponds with the creation of larger foreign networks, including the formation of more foreign ties per year than other ventures (see Table 22). ChildTrack, for instance, built a remarkably large network of foreign ties within two years of their inception, forming 18 such ties per year on average, according to our data. By the end of our data collection period, we recorded that they had accumulated 36 foreign tie alters, including foundations, development agencies, accelerators in Europe and North America, manufacturers in Asia and Africa, a hospital in another African country, a law firm in Europe, and several other organizations from different industries in Europe. Similarly, HealthQ formed 41 foreign ties with foundations, development agencies, accelerators, pharmaceutical companies, and research institutions in Europe, North America, and other African countries; as well as with manufacturers in Europe and several other organizations from different industries in North America and Europe.

These ventures' networks contained more desirable resource holders, providing larger amounts of (financial) resources at once. HealthQ, for instance, proactively reached out to a European foundation that provided them with a sizeable grant, which made up almost half of their entire budget. In another example, Motherry established multiple research affiliations at once through a conference the team attended, which was hosted by one of their existing foreign partners. Unlike their more opportunistic peers, who maneuvered between the tie alters their domestic networks could introduce them to and so found themselves limited by their domestic ties' reach,²² these ventures also considered reaching out to a broader range of foreign resource holders and picked and chose the resource holders that they found most promising in a more targeted tie formation effort.

Prior research suggests that networks with many tie alters, and primarily resource-rich tie alters (Baum et al., 2000; Stuart et al., 1999), are essential to secure resource access. As such, we were not surprised to find that the ventures in our sample with larger foreign networks, and more desirable tie alters therein, raised higher amounts of financial capital and, in three out of four cases, secured one or more research affiliations. This positive relationship often appeared to be self-reinforcing. Once successful ventures had formed their first foreign ties, those connections helped them expand their international networks further by making introductions and referrals, and/or endorsements for the ventures to further foreign resource holders, often within their geographic context or sector. Our informants reported that having a foot in the door of a particular country in the form of an existing foreign tie often helped them to form further ties in that context:

“And usually when you have an international collaborator or partner, you stand a higher chance than applying with an institution in Uganda. That is for political reasons sometimes.” (EI-8)

²² We borrow from Gulati and colleagues (2011) in defining reach as “the extent to which an organization’s network connects it to diverse and distant partners” (p. 208).

Similarly, tie alters from specific sectors appeared to foster additional tie formation within the same sector. Our data showed several instances in which foreign foundations introduced, referred, or endorsed a focal venture to another foreign foundation, or ties to a foreign design or manufacturing firms facilitated the formation with more foreign design or manufacturing firms. In one case, a foreign research institution connected a venture to another foreign research institution. These homophilious introductions and referrals, and endorsements acted in the successful ventures' favor: Once they had established ties with desirable tie alters by carefully selecting and approaching them, these very connections increased the likelihood of meeting further relevant foreign resource holders that shared existing tie alters' characteristics.

All of this shows how a strategic approach of building foreign networks deliberately and proactively, rather than an extensive reliance on domestic network introductions and referrals, endorsements, and signals of visible affiliation, led to greater levels foreign resource mobilization for some of the early-stage technology ventures in our sample.

4.4.2. Opportunistic Approach with Higher Reliance on Domestic Ties

The ventures in our sample that had comparably less success in mobilizing foreign resources tended to form a higher proportion of their new foreign ties through introductions and referrals, endorsements, or signals of visible affiliations provided by their domestic networks. We also observed relatively fewer proactive initiations of foreign ties through the various means we identified among their more successful peers (see Table 23). WLab, NeoSys, and Trustly epitomized this approach—each relatively less successful in mobilizing foreign financial and social capital, and forming a sizeable share of foreign ties through their domestic networks (between 9% and 33%, see Table 22). Two local incubators and Makerere University, most of our sampled ventures' founders' alma mater, played prominent roles in these ventures' foreign tie formations.

“Let's say at the national level, if we can attach ourselves to one of the big persons in the [local incubator] club, that alone will be good for us to be able to move to the next step.” (WLab, B-2)

“And there’s also the name when you’re writing grants and you’re coming from [local research and design institute], it gives you an edge.” (NeoSys, H-2)

Using their domestic ties as a major vantage point for foreign tie formation, less successful ventures were keen to explore tie formation opportunities that might arise from within their domestic networks, and so reported engaging in fewer strategic planning activities to identify and target foreign resource holders abroad who might fit their needs. For instance, one of Trustly’s co-founders explained that, in order to keep the venture afloat on a daily basis, they adopted a short-term perspective, focusing on immediate benefits from tie alters rather than longer planning horizons.

[Asked how they coordinate partnerships] “Honestly, no. I don’t like... We all just sat down and said, ‘Okay.’ Like, this is what say we’d bring to the table. Like, but we never, ever sat down and said, ‘Okay, these are the [foreign or domestic] funders we need to bring on board.’ Like, it wasn’t systematic. Most of them have been because I think all of us we’re being... in the company, we are very good at networking and meeting people and going out there. We don’t have, like, a strategic approach to gaining partnerships.” (NeoSys, H-1)

[Asked about which partners they approach where] “For us, it has been about building networks from wherever and not like/ somehow opportunities are represented just through our networks.” (NeoSys, H-1)

[Asked how they coordinate partnerships] “So the strategy was always about what are the immediate outcomes for these [foreign or domestic] partnerships more than the long term, because as a young company, I am looking at every day.” (Trustly, I-1)

“Specific approach [about domestic and foreign partnerships]? No, I wouldn’t say that.” (Trustly, I-1)

These ventures’ reliance on domestic network introductions and referrals, endorsements, or signals of visible affiliations meant they functionally relinquished the option of selectively targeting and proactively approaching foreign tie alters, like their peers did. The pool of resource holders that WLab, NeoSys, and Trustly considered in their foreign tie formation was narrower, given the teams either considered fewer partners outside their reach, or had less time to dedicate to proactive tie formation because a large part of their efforts went into pursuing linkages through domestic ties. As a result, their foreign networks tended to be smaller and contained fewer desirable ties than their peers’ (see Table 22).

All of this shows how an opportunistic approach and greater reliance on domestic ties to form new foreign ties, rather than a strategic approach, led to lesser levels of foreign resource mobilization success for some of the early-stage technology ventures in our sample.

4.5. Discussion

4.5.1. Theoretical and Practical Implications

Our study sought to illuminate how early-stage technology ventures liaise with foreign resource holders when resource holders in their resource-scarce local contexts cannot satisfy their needs. Our findings offer important insights on how ventures can overcome the liabilities of foreignness and outsidership to mobilize foreign resources (Bell et al., 2012; Johanson & Vahlne, 2009; J. Li & Fleury, 2020; S. Zaheer, 1995): In our sample, early-stage technology ventures in resource-scarce contexts that strategically used *fewer* introductions and referrals, endorsements, and visible signals of affiliation from their domestic networks for foreign tie formation, and instead proactively initiated foreign tie formations themselves, tended to have *greater* success in mobilizing foreign resources. Conversely, ventures that used their domestic networks *more* often to form foreign ties, and pursued those ties opportunistically, tended to have *less* success in mobilizing foreign resources. Our study makes three contributions to the intersection of international entrepreneurship and network literature.

First, we outline an alternative pathway for early-stage technology ventures to approach foreign resource holders beyond the use of their domestic networks, that, in our sample, corresponded to greater foreign resource mobilization success—thereby extending prior research that has largely ascribed a prominent position to domestic networks in new ventures' foreign tie formation (e.g., Al-Laham & Souitaris, 2008; Montoro-Sanchez et al., 2018; Shi et al., 2014). We specifically differentiate between one strategic approach—involving lower reliance on domestic networks, and yielding greater foreign resource mobilization success—and one opportunistic approach—involving higher reliance on domestic networks, and yielding lower

foreign resource mobilization success. We explain the higher foreign resource mobilization success with a larger reach to potential resource holders and deliberate selection thereof. In contrast, less successful ventures' higher reliance on their domestic networks, as prior research predicted, "limit[ed] the search to a narrower segment of the opportunity space" (Vissa, 2012, p. 497), and reduced "the mutual fit between the entrepreneurs' venture and the target" (Vissa, 2012, p. 499). Our findings also resonate with Ozcan and Eisenhardt's (2009) observation that firms that "take long jumps" (p. 269) to more distant partners—in their study, between industry rather than geographic contexts—build more successful alliance portfolios than those that rely on "only local ties based on existing relationships" (p. 269).

This study's insights thus speak to the importance of agency in tie formation and resource mobilization (Hallen et al., 2020; Tasselli & Kilduff, 2020). Extant research traditionally examines how (domestic and foreign) networks evolve, as a matter of almost pre-determined course, around focal ventures, and how network sizes, structures, positions, or other characteristics will necessarily affect ventures' tie formations and resource access (e.g., Lindstrand et al., 2011 in international entrepreneurship literature; Blevins & Ragozzino, 2018; Milanov & Fernhaber, 2009; Milanov & Shepherd, 2013 in network-based entrepreneurship literature). These prior works thus disregard key nuances in ventures' behaviors that can make or break their (desirable) tie formation success (Hallen et al., 2020). For example, Al-Laham and Souitaris (2008) find that new ventures centrally located in local clusters, in which their domestic partners maintain many international ties, will receive a boost in their foreign tie formation efforts. Shi and colleagues (2014) find that structural advantages within a venture's domestic networks increase its chances of liaising with foreign partners. While these prior findings have substantially advanced understandings of foreign tie formation, they do not acknowledge or explain the ways that ventures may choose to strategically maneuver within and beyond their networks, or how or why ventures that start in similar positions can yield

divergent outcomes. In disentangling the differences in early-stage technology ventures' foreign tie formation behaviors, we follow a more recent line of research that brings agency into the picture. For instance, our study extends Vissa's (2012) insights on entrepreneurial networking styles, whereby entrepreneurs who focus on managing their existing ties (network-deepening) initiate fewer economic exchanges compared to entrepreneurs who focus on adding new ties (network-broadening). Hallen and Eisenhardt (2012) outline an alternative to the use of existing ties, to wit, catalyzing strategies. Our study contributes additional means of tie initiation, thereby expanding current knowledge on agentic behaviors and catalyzing strategies for ventures with particularly disadvantageous network starting positions (Hallen & Eisenhardt, 2012).

By linking the different behaviors ventures deploy when forming foreign ties to their foreign resource mobilization success levels, we also contribute to research summons to investigate the outcome implications of agentic behaviors (Hallen et al., 2020). Our results specifically confirm an intuition that Hallen and colleagues (2020) detail in their recent literature review: "The network trajectories of such entrepreneurs [using the right behaviors] are more likely to involve distant tie formation to more desirable partners than might be available within their local network neighborhood" (p. 1090).

Second, we extend international entrepreneurship research—to date rarely investigating how ventures mobilize foreign resources (Filatotchev et al., 2016; Keupp & Gassmann, 2009)—and contribute to its intensifying integration into network research (Ahmad & Dimitratos, 2017; Coviello, 2006; Sedzinauskiene et al., 2019). Although both traditions have laid the groundworks for dialogue with each other, Ahmad and Dimitratos (2017) lament that "the use of a network perspective to explain international entrepreneurship is still in its infancy" (p. 473). Our study contributes to emerging theory at this nexus and beyond by illuminating not only the outcome implications of ventures' networks, but the behaviors that led to them. In measuring

foreign resource mobilization success (here in terms of financial and social capital) as our study's outcome variable, we also acknowledge an important driver of ventures' internationalization activities that has received little attention in the international entrepreneurship literature (Keupp & Gassmann, 2009): their desires to acquire foreign resources.

Third and lastly, our study acknowledges “the role of the settings themselves in shaping patterns of interorganizational [*sic*] affiliations“ (Sorenson & Stuart, 2008, p. 271). We purposefully selected a research context, the medical technology industry in Uganda, that compels ventures to seek foreign resources in their earliest stages of development. The context's extreme combination of resource scarcity and high resource needs helped us understand how foreign tie formation can unfold when domestic networks are deprived of resources themselves. Our study thereby contributes to emerging research on international resource mobilization in lower income markets (Kiss et al., 2012), the impact of context on entrepreneurial networking (Lamine et al., 2015; Reuber et al., 2017; Sorenson & Stuart, 2008), and the particularities of networks in lower income countries, in which they are often used to overcome institutional voids (Batjargal et al., 2013) and to create “conditions under which unexpected discoveries are enabled and nurtured” (Busch & Barkema, 2020b, p. 3).

As is suggested in contextualized research (Zahra et al., 2014), we subjected our findings to careful scrutiny to detect possible alternative explanations. First, our arguments are based on a broad association we observed in our data between tie formation behaviors and foreign resource mobilization success. However, our data reflect a nuanced reality, as not all 10 of our sample cases conformed to the overarching patterns we observed. Three cases were particularly exceptional, and deserve further scrutiny to rule out alternative theoretical explanations. Mcare diverged from the general patterns we observed because a large share of its foreign ties derived from its domestic network, yet it achieved relatively high levels of resource mobilization

success, both financial and social capital. At the same time, we found evidence of a strategic approach in two informant statements. This may reflect the fact that the venture has been seamlessly integrated into a research group at the local university since its inception, with one co-founder and two team members working as research assistants. The team was consequently able to submit funding applications in the university's, rather than their venture's, name. This organizational embedding helped Mcare to secure a sizeable foreign research grant that is not available to purely commercial ventures located outside of universities and drastically bolstered Mcare's foreign resource mobilization success, skewing them away from the general patterns we observed. For Youhealth and Womed, we did not observe *any* introductions and referrals, endorsements, or signals of visible affiliation from their domestic networks to form foreign ties, yet they were both relatively unsuccessful in mobilizing foreign resources. However, neither exhibited any signs, per our data, of engaging in strategic planning behaviors, which are integral to our theory of how ventures' deliberate foreign tie formation choices helped to bolster their foreign resource mobilization success.

Second, we carefully analyzed whether the ventures in our sample that mobilized more foreign resources had better initial resource endowments, or superior products and/or market traction. Stuart and Sorenson (2007) note this endogeneity problem in prior work: "If prominent affiliates only accept pairings with actors of high quality, however, the estimated endorsement effects may simply reflect otherwise unmeasured heterogeneity in the quality of ventures" (p. 217). While this concern certainly deserves further attention in advancing and testing our emerging theory, we minimized the chance that such factors might affect foreign resource mobilization outcomes by sampling ventures with similar ages, founding team characteristics, industry affiliations, and markets.

Our findings are also relevant to practitioners. We offer entrepreneurs operating in resource-scarce contexts a potential pathway to overcome their disadvantageous starting positions

through a strategic approach for foreign tie formation. While extant network research paints gloomy pictures of ventures in such a context, trapped by limited domestic networks with few ways out, we offer guidance outside the traditional rich-get-richer and poor-get-poorer narrative. We encourage entrepreneurs in these conditions to strategically plan for foreign tie formation early on and to proactively approach desirable tie alters abroad, as overly relying on domestic networks will likely result in smaller and less beneficial networks. Agentic network behavior may be challenging “in terms of time, resources, attention, psychological discomfort, or awareness” (Hallen et al., 2020, p. 1090), but it pays off.

Domestic venture development organizations and other intermediaries that seek to assist entrepreneurs in their foreign tie formation efforts should act with caution. While such organizations certainly play essential roles in supporting venture resource mobilization at home and abroad (Armanios et al., 2017; Plummer et al., 2016), we encourage them to not only provide introductions and referrals, and endorsements to new ventures to aid in their foreign tie formation efforts, but also to animate their independent quest for new partners abroad.

4.5.2. Limitations and Future Research Avenues

As with most case-based studies, our findings cannot be widely generalized. Our small sample size—confined to the niche context of the medical technology industry in Uganda with all of its unique economic, regulatory, cultural, and other idiosyncrasies—and the relative measurement we use to compare our sampled ventures’ outcomes, suggest the need to test our findings on larger scales in the future. Our sampling was further limited by the reliance on online searches for suitable cases (e.g., we only learned about ventures that had received prior attention in media outlets with a digital presence), and by survivor bias, as we only sampled ventures that were still active when we initiated our data collection.

Moreover, our data, while longitudinal, relied only on accounts of past events collected from multiple sources at two points in time. While this is in line with prior work that examines new

venture emergence (e.g., Fauchart & Gruber, 2011), and though we performed a number of steps to reduce recollection biases in our data (see Ozcan & Eisenhardt, 2009), we encourage future research to observe ventures in real time. We also drew our data from semi-structured interviews, which are prone to a number of potential biases (e.g., imperfect informant memories, social desirability, and/or retrospective rationalizations). While we endeavored to minimize potential distortions through data triangulation and careful interview procedures, we cannot ensure that our controls eliminated all biases in the ultimate data set (see also limitations in Essay II).

The constraints of qualitative data collection and inductive analysis led our study to disregard several aspects of foreign tie formation that deserve closer attention in future research. Notably, we did not account for (1) the types and length of ties formed, such as high- or low-commitment partners (Hallen & Eisenhardt, 2012) and exploration or exploitation alliances (H. Yang et al., 2014); (2) unobserved dynamics of tie formation, like learning (Milanov & Fernhaber, 2014) or signaling effects, which our informants may not have been aware of (Plummer et al., 2016); (3) tie alters' characteristics, such as their sector affiliations, sizes, or prestige and status, which could have additional signaling effects (Gulati, 1995; Hallen, 2008; Plummer et al., 2016) or “work in tandem” (Stuart et al., 1999, p. 321) with resource acquisitions; (4) non-financial or -social resource categories, a common limitation in entrepreneurship research (Clough et al., 2019); and (5) tie formation efficiency, that strives to reduce high-effort searches and failed tie formation attempts (Hallen & Eisenhardt, 2012).

Future studies should also take a broader perspective on the underlying tie formation directions in international entrepreneurship. The formation of foreign ties through domestic networks represents no more than one quadrant in a matrix of four different directions: domestic-to-foreign, domestic-to-domestic, foreign-to-domestic, and foreign-to-foreign. The effects of these varied tie formation directions on resource mobilization bear ample future research.

4.6. Conclusion

When domestic resources are meager and resource holders far away, early-stage technology ventures in resource-scarce contexts are left with few options to satisfy their substantial and sophisticated resource needs. Ventures in such contexts may feel tempted to turn to their domestic networks for help in their foreign tie formation endeavors. However, our findings show that relying *less* on domestic ties while strategically and proactively initiating foreign tie formation with resource holders to which ventures have no prior points of contact can lead to *more* foreign resource mobilization success. Conversely, relying *more* on domestic ties while pursuing an opportunistic approach can lead to *less* foreign resource mobilization success. By shedding light on how early-stage technology ventures form foreign ties on their quest for vital resources, we hope to advance research towards a more holistic understanding of entrepreneurs' resource mobilization and networking behaviors on the international stage.

5. Discussion and Concluding Remarks

This dissertation was inspired by the plethora of entrepreneurial ventures attempting to address the grand challenges of our time, such as poverty alleviation, the arrest and/or reversal of climate change, and the provisioning of adequate healthcare services around the world. Addressing these challenges is humanity's greatest task, as established in the United Nation's Sustainable Development Goals (United Nations, 2020). Entrepreneurs often play pioneering roles in their efforts toward these goals. However, they often do so while operating under severe resource constraints (Desa & Basu, 2013; Grichnik et al., 2014).

Through this dissertation, I sought to shed light on the various means by which entrepreneurs mobilize resources in immediate contexts of resource scarcity. Entrepreneurial resource mobilization has received ample scholarly attention in recent decades, but the research body is highly fragmented. It also offers few insights for entrepreneurs starting out in resource-scarce local contexts, often with low initial resource endowments, on how they can and should mobilize resources in order to fuel their endeavors effectively. Specifically, extant literature does not address how ventures can combine different resource mobilization behaviors over time, what the outcomes of those behavioral constellations may be (Stinchfield et al., 2012), or how ventures seek resources across national borders (Bell et al., 2012) when the circumstances dictate it.

At the highest level, this thesis provides a sense of the breadth of resource mobilization behaviors that entrepreneurs can potentially deploy, the ways they can combine these behaviors, and these behaviors' and combinations' outcomes. I find that, in contexts of local resource-scarcity, the early-stage technology ventures I observed achieved better technology development outcomes when they increasingly deployed resource seeking and dynamically alternated between lower and higher levels of selective bricolage over time, with external events

prompting shifts in resource mobilization behaviors. High levels of resource seeking were only possible because ventures reinterpreted their resource spaces, directing their attention towards global resource pools. In liaising with resource holders globally, my evidence suggests that ventures enjoyed more success in mobilizing foreign resources when they did not overly rely on their domestic networks to help them form ties with foreign resource holders, but instead strategically and proactively formed ties beyond their domestic networks' reach.

Reviewing the findings of both of my empirical studies together (Essays II and III), it is noteworthy that three ventures in my sample that made use of dynamic and proactive resource mobilization behaviors consistently scored among the top five cases for technology development and foreign resource mobilization success outcomes. These findings highlight the importance of entrepreneurial agency in the navigation of challenging contexts. My insights also speak to the multifaceted nature of contextual considerations in entrepreneurship research (Welter, 2011; Welter & Gartner, 2016). Specifically, my analyses support the notion that context is spatially elastic (Korsgaard et al., 2018; Welter et al., 2018), in that it depends on the entrepreneurs' interpretations of their boundaries. In addition to the spatial dimension of context, my analyses highlight another contextual layer that influences ventures' resource mobilization: Based on the sequence of events ventures were exposed to, they experienced their own contextual reality and adopted different responses to resource scarcity accordingly.

Taken together, my dissertation emphasizes the nexus of entrepreneurial agency in dealing with context (Baker & Welter, 2018; Garud & Giuliani, 2013; Welter & Baker, 2020). Entrepreneurs operating under local resource scarcity are not merely products of their immediate contexts; they retain the power to make what they will of their context (Baker & Nelson, 2005), and to maneuver between local and foreign resource spaces in order to mobilize resources (Welter et al., 2018). As such, my dissertation refutes simplistic rich-get-richer and poor-get-poorer views, often implied within prior work that emphasizes the importance of strong initial resource

positions to subsequent resource mobilization (e.g., Hallen, 2008; Shane & Stuart, 2002). I contribute to scholarly understandings of entrepreneurial resource mobilization and resourcefulness, entrepreneurial networking, and the role of context in both. I hope that this dissertation can further enlarge entrepreneurs' toolkits for tackling grand challenges, both within and beyond resource-scarce contexts.

5.1. Key Findings and Theoretical Implications

5.1.1. Entrepreneurial Resource Mobilization: A Literature Review and Research

Agenda (Essay I)

The first essay (Chapter 2) in this dissertation contributes to the body of research on entrepreneurial resource mobilization as a whole by synthesizing said body into an organizing framework and outlining directions for future research. Extant research centers around seven resource mobilization mechanisms, which conceptually overlap: networks, markets, signals, narratives and symbols, resource seeking, bricolage, and bootstrapping. I bring clarity to the literature by clearly differentiating and defining these mechanisms, and showing their points of relation and/or overlap. The enhanced clarity on resource mobilization mechanisms as depicted by prior research, and specifically the juxtaposition of resource seeking with bricolage (Essay II) and the prominence of networks (Essay III) informed the empirical work that followed in this dissertation.

In the literature review, I also detail extant findings on the antecedents, contingency factors, outcomes, and contextual factors related to each mechanism. Understanding the richness of inherited knowledge represented an important prerequisite for the design of the empirical studies underlying Essays II and III. For instance, the ambiguous outcome implications of bricolage, as identified by reviewing prior work on the subject, inspired me to examine, in more detail, under which conditions bricolage yields more or less favorable results. Similarly, the

existing contextual considerations that previous research has studied, such as geography and resource availability, informed the nuanced incorporation of context in Essays II and III.

Beyond that, by organizing extant literature, that is otherwise fragmented and often only implicit about its theoretical grounding, this essay may help to facilitate a more integrated accumulation of knowledge in the future. Such future research may benefit from the guiding questions I lay out in this essay. Specifically, I encourage scholars to make the associations between distinct resource mobilization mechanisms more explicit, as I do in Essays II and III, also to help reveal what is yet uncharted territory that calls for the theorization of new mechanisms. Promising future research avenues also lie in the diversification of variables examined as antecedents, contingency factors, outcomes, or contextual factors. For instance, most studies have to date examined context in terms of ventures' institutional environments (e.g., Desa, 2012) and the munificence of their regions or countries (e.g., Le Ngoc & Nguyen, 2009), leaving a rich set of contextual factors yet to be explored (Welter et al., 2019; Welter & Baker, 2020). I also call for a stronger integration of agency (Hallen et al., 2020; Tasselli & Kilduff, 2020) into research on entrepreneurial resource mobilization, including its impact on the ways entrepreneurs shape and navigate their contexts (Baker & Welter, 2018; Welter et al., 2019).

5.1.2. Beyond Bricolage: Early-Stage Technology Venture Resource Mobilization in Resource-Scarce Contexts (Essay II)

The second essay (Chapter 3) in this dissertation advances scholarly understandings of entrepreneurial resourcefulness as a response to resource scarcity (Bradley, 2015; Corbett & Katz, 2013; Powell & Baker, 2011) in three ways: First, while extant research frequently positions bricolage as the go-to solution for ventures operating in resource-scarce contexts (Busch & Barkema, 2020a; Desa & Basu, 2013), my data reveal that the ventures I observed followed two distinct trajectories of resource mobilization behaviors, neither of which relied

solely on bricolage, yielding distinct technology development outcomes. Prior research has pointed at the possibility that the selective deployment of bricolage in combination with resource seeking yields favorable organizational outcomes (Baker & Nelson, 2005). I extend this notion of *selective bricolage* by showing how its dynamic deployment over time can affect venture outcomes in terms of technology development: Higher performing ventures dynamically opted out of and back into selective bricolage while pursuing high levels of resource seeking; lower performing ventures were less dynamic in their approach and maintained continuously high levels of selective bricolage.

Second, I offer novel insights into the factors that may lead a venture to deploy one resource mobilization behavior over another (Baker & Nelson, 2005; Desa & Basu, 2013). Ventures' opting out of bricolage can in part be explained by their early experience of an international catalytic event. My data shows that ventures in this group later opted into bricolage again, around the time they received substantial resource endowments, a finding that emphasizes the fact that bricolage can be more than just a response to resource scarcity (Bojica et al., 2018; Desa & Basu, 2013). Importantly, the sequence in which ventures experienced these catalytic events appeared to affect their subsequent behaviors, with earlier events having more of an apparent impact, suggesting a higher susceptibility to initial formative events (Johnson, 2007; Milanov & Fernhaber, 2009).

Third, this essay underscores the importance of spatial and temporal contexts (Welter, 2011; Welter et al., 2019; Welter & Baker, 2020) in the study of entrepreneurial resourcefulness. In terms of the spatial context, resource seeking activities of ventures in my sample often took place abroad, which required ventures to *reinterpret their resource spaces* from local to global. This spatial reinterpretation is a prime example of entrepreneurs "doing" their context (Baker & Welter, 2017) to facilitate resource mobilization behaviors. My study thus deepens understandings of the social construction (Powell & Baker, 2014a; Sonenshein, 2014), fluidity

(Baker & Welter, 2018), and mobility of context (Zahra et al., 2014). The temporal context of this essay manifests itself in the sequence of catalytic events with which ventures enacted and constructed their contextual realities (Welter et al., 2019), explaining, in part, the bifurcation between resource mobilization trajectories. Examining the spatial dimension alone could not have explained the different behaviors as observed in my sample, emphasizing, once more, the need to acknowledge the rich and multifaceted nature of context over time (Welter, 2011; Welter & Baker, 2020; Welter & Gartner, 2016).

5.1.3. Building Bridges: How Early-Stage Ventures in Resource-Scarce Contexts

Form Ties with Foreign Resource Holders (Essay III)

The third essay (Chapter 4) in this dissertation makes three contributions to the intersection of international entrepreneurship and network literatures. First, I offer fresh insights into the remedies ventures can pursue against the liabilities of foreignness and outsidership that can complicate foreign resource mobilization efforts (Bell et al., 2012; Johanson & Vahlne, 2009; J. Li & Fleury, 2020; S. Zaheer, 1995). Specifically, my essay expands the repertoire of remedies available to early-stage ventures that seek to liaise with foreign resource holders, but cannot count on their constrained domestic networks to help them in doing so (e.g., Al-Laham & Souitaris, 2008; Montoro-Sanchez et al., 2018; Shi et al., 2014). I find that ventures can deploy a strategic approach that relies less on their domestic networks, or an opportunistic approach that relies more on these networks, to their foreign tie formation efforts. The strategic approach is associated in my data with higher levels of foreign resource mobilization success than the opportunistic approach. I ascribe this higher level of success to an extended reach to potential resource holders abroad, that is not restricted to “a narrower segment of the opportunity space” (Vissa, 2012, p. 497), as well as the deliberate selection of resource holders with a mutual fit (Vissa, 2012). Interestingly, the tendency of more successful ventures to rely less on their domestic networks ‘at hand’ is reminiscent of the resource mobilization behaviors

among high-performers in Essay II: In deploying selective bricolage with varying intensities, and increasingly turning to resource holders for standard resource acquisition, three top-performing ventures from the second essay can be found among the five cases mobilizing most foreign resources in Essay III.

In line with recent calls for research that considers entrepreneurial agency and its outcome implications for network formation (Hallen et al., 2020), and consistent with observations in Essay II, my findings emphasize the importance of agency in both ventures' tie formation and resource mobilization efforts. This essay also advances the study of networks in international entrepreneurship (e.g., Lindstrand et al., 2011), using an entrepreneurial agency perspective to detail further means of tie initiation and catalyzing strategies for less-well-endowed ventures (Hallen & Eisenhardt, 2012).

Second, outlining the ways that early-stage ventures form ties with foreign resources holders, I contribute to the narrow body of research on international resource mobilization, a largely neglected field within international entrepreneurship research (Filatotchev et al., 2016; Keupp & Gassmann, 2009). I also feed into the emerging conversation to integrate international entrepreneurship with network research (Ahmad & Dimitratos, 2017; Coviello, 2006; Sedzinauskiene et al., 2019). Measuring foreign resource mobilization success in terms of funding and research affiliations obtained, I provide additional outcome variables for consideration in future studies on international resource mobilization.

Third, in line with Essay II, I advance understandings of spatial context in the study of networks (Lamine et al., 2015; Reuber et al., 2017; Sorenson & Stuart, 2008). My evidence demonstrates how the extreme juxtaposition of local resource scarcity with medical technology ventures' substantial and sophisticated resource needs prompted foreign resource mobilization activity, entailing different approaches to liaise with foreign resource holders. This essay also adds to network research in the context of low and lower middle income countries where networks have

been found to compensate for institutional voids (Batjargal et al., 2013) and to facilitate the discovery of unexpected opportunities (Busch & Barkema, 2020b).

5.2. Key Avenues for Future Research

Scholars have dedicated tremendous attention to the study of entrepreneurial resource mobilization in recent decades. In my first essay (Chapter 2), I synthesize the resultant body of research, lending it structure and clarity in terms of resource mobilization mechanisms theorized, but never conclusively delineated and defined, to date. I also outline directions for future research in that essay, calling above all else for an explicit alignment of future work with these distinctly demarcated resource mobilization mechanisms and for a more comprehensive study of antecedents, contingency factors, outcomes, and contextual considerations. Essays II (Chapter 3) and III (Chapter 4) begin to address some of these calls for research. First, I explicitly connect both empirical essays with the respective resource mobilization mechanisms they address (i.e., networks, bricolage, resource seeking), and make a foray into the linkage of research on resource seeking and networks in Essay III. Besides, in my study of combined resource mobilization behaviors over time (Essay II), I uncover a novel antecedent in describing the effect of early catalytic events that can explain, in part, ventures' subsequent resource mobilization trajectories. I also offer fresh insights into the multifaceted, subjective, and malleable nature of context by showing how entrepreneurs can reinterpret their resource spaces (Essay II and III), at times subjectively creating their own context through the sequence in which they experience influential events (Essay II). These insights also speak to the bidirectional relationship between context and resource mobilization: While ventures' resource mobilization behaviors are influenced by the context they operate in (Essays II and III), these very behaviors, in turn, also shape ventures' interpretation of their context (Essay II). At the nexus with context, I also outline ways in which entrepreneurs' agency can affect organizational outcomes. Finally, I expand the range of outcome metrics available to entrepreneurship scholars

by introducing a technology development score (Essay II) and a measure to approximate ventures' levels of foreign resource mobilization success (Essay III). Beyond the contributions of this dissertation, much remains to be researched and my findings raise more points for future study. Below, I outline four future research topics that appear particularly urgent in light of this dissertation's insights.

First, I encourage entrepreneurship scholars to continue their explorations of novel resource mobilization mechanisms that have yet to be theorized. Importantly, rather than identifying and defining new mechanisms from the ground up, future research can build on existing knowledge and carve out nuances in existing mechanisms, as I have started doing, that help us deepen our understanding of the myriad of observable resource mobilization behaviors. In my second essay, for instance, I add important nuances to the notion of *selective bricolage*—denoting the deployment of bricolage in selected resource categories only rather than consistently across all resource categories and projects (Baker & Nelson, 2005)—by describing under what circumstances, in what resource categories, and with what effects it can unfold over time.

Second, Essay II describes catalytic events as antecedents of distinct resource mobilization trajectories among the ventures I observed, but stops short of, for instance, unraveling the cognitive underpinnings of each resource mobilization behavior involved in these trajectories (e.g., Michaelis, Scheaf, et al., 2020). Could some entrepreneurs be more prone than others to engage in certain resource mobilization behaviors, for instance because they are subject to a particular mindset, as prior research suggests some are (e.g., Grichnik et al., 2014; Halme et al., 2012; Lin et al., 2020)? Could such a mindset change over time? If so, how? Prior research also notes that venture growth, international orientation, and social orientation can all affect resource mobilization (Bacq & Janssen, 2011; Cassar, 2004; Lin et al., 2020). This suggests the need for additional research on how such factors relate to resource mobilization behaviors and outcomes. To uncover the full spectrum of factors driving entrepreneurial resource mobilization, future

studies could build on imprinting literature (Johnson, 2007; Milanov & Fernhaber, 2009; Milanov & Shepherd, 2013), exploring how exposures to formative events, like the catalytic events I describe, environments, or networks can shape future behaviors in lasting ways. In my second essay (Chapter 3), for instance, I point to the possibility that early catalytic events imprinted the sampled ventures when they were most susceptible to it, setting them up for distinct resource mobilization trajectories and the respective outcomes they entailed. Establishing a conceptual link with entrepreneurial learning (e.g., Harrison & Leitch, 2005) represents another potential avenue to enrich future research on entrepreneurial resource mobilization.

Third, as my studies' temporal considerations validate, entrepreneurial resource mobilization is not a one-time endeavor, nor is it a static process (Dolmans et al., 2014; Sullivan & Ford, 2014). When examining the antecedents of resource mobilization, future studies should therefore consider how ventures' choices and behaviors evolve over time. To do so, scholars may find it beneficial to enumerate at the start of their research collection periods and then consistently monitor the resources that ventures possess, the resources they need, and the resources that remain after their needs are met—commonly referred to as *resource slack* (Bradley, Wiklund, et al., 2011; George, 2005). Such resource positions are “transient and multidimensional” (Dolmans et al., 2014, p. 512) and continuously influence ventures' resource mobilization behaviors (Dolmans et al., 2014). This particular insight raises intriguing questions like: How do dynamic levels of resource needs and endowments interact? Are there levels of resource slack at which entrepreneurs stop mobilizing resources? That last potential research question may seem counterintuitive, as accumulating ever more resources typically leads to better organizational outcomes (Bradley, Shepherd, et al., 2011; George, 2005; Rosenbusch et al., 2013; Sullivan & Marvel, 2011), helping ventures to stay competitive (Wernerfelt, 1984). However, a healthy level of resource constraints can yield positive organizational outcomes

(Bradley, Wiklund, et al., 2011; Katila & Shane, 2005; Musso & Schiavo, 2008), promoting the idea that ventures should find their “optimal level[s] of slack” (Bradley, Shepherd, et al., 2011, p. 1073) and “a balance between the exploitation of existing resources and the development of new ones” (Wernerfelt, 1984, p. 180; see also Bloodgood et al., 2013). Failing to find this balance could lead to detrimental and long-lasting consequences, given the role resource endowments play in the success of resource mobilization efforts (De Rassenfosse & Fischer, 2016; Shane & Stuart, 2002)—analogous to “a high tree in a low forest; since it will get more sun, it will grow faster and stay taller” (Wernerfelt, 1984, p. 174). Future studies on the interplay between resource slack and resource mobilization could benefit from a dual perspective, juxtaposing resource mobilization with resource deployment (Makadok, 2001).

Fourth, I emphasize the need to deepen our understanding of the nexus between context and entrepreneurial agency (Baker & Welter, 2018; Welter & Baker, 2020). The study of resource scarcity, which is at the core of this dissertation, calls for considerations of the “inventive and creative agency of entrepreneurs dealing with what are often turbulent, hostile, and resource-constrained institutional contexts” (Baker & Welter, 2018, p. 368). Both Essay II and Essay III are revealing in that regard, as they underscore the notion that entrepreneurs can influence their fates by deciding (1) what to make of their immediate contexts (Baker & Nelson, 2005); (2) in how far they strive to shape their contexts (Welter et al., 2019); and (3) how they subjectively interpret their contexts to start with (Zahra et al., 2014). The examination of the interplay between context and entrepreneurial agency is not new. Pfeffer and Salancik (1978) point out that “organizations may use political means to alter the condition of the external economic environment” (p. 190; see also Emirbayer & Mische, 1998). However, there is still ample room and need for future research to continue this research vector, building on the emerging body of theory on “the interplay of entrepreneurship, places, and time” (Welter & Baker, 2020, p. 16). Contextualizing my research in the medical technology industry in a sub-Saharan African

country proved particularly suitable to examine this interplay in my dissertation. As such, I encourage future scholars to continue to follow calls within the field to study entrepreneurship in diverse African countries (George, 2015; George, Corbishley, et al., 2016; Vermeire & Bruton, 2016) or other low and lower middle income countries (Bruton, Filatotchev, et al., 2013; Smallbone et al., 2014). After all, these regions are home to half the global population (World Bank, 2019b) and a large share of global entrepreneurs (Bosma et al., 2020).

5.3. Practical Implications

The centrality of resource mobilization within the entrepreneurial process (Shane & Venkataraman, 2000) means that this dissertation's findings have strong potential practical implications for entrepreneurs, entrepreneurial support organizations, and educators alike. Following the “moral imperative...to guide business leaders, employees, and stakeholders with systematic, unbiased, and empirically robust evidence on mechanisms with which to tackle the...global problems confounding us” (George, Howard-Grenville, et al., 2016, p. 1893), this dissertation aims to extend the toolkit available to entrepreneurs who work on solving grand challenges while operating in resource-scarce contexts.

When faced with the choice between (a) compromising on quality by “making do” (i.e., bricolage), and (b) the difficult quest for standard resources (i.e., resource seeking) in contexts where those resources may not exist, my research suggests that technology entrepreneurs should deploy a *dynamic* approach. Evidence from my second essay (Chapter 3) shows a positive effect of high resource seeking engagement when complemented with alternating levels of “making do” on technology development outcomes. Such a continuous quest for standard resources, such as VC funding, standardized materials, certified laboratories, or paid experts appears to foster time-efficient technology development. However, I still encourage entrepreneurs to be conscious of potential circumstances under which the resources at hand can productively

complement this quest. This could be the case, for instance, for resources that are not easily available on marketplaces, like patient data, access to clinics, or regulatory approvals.

When choosing to opt for standard resources, technology entrepreneurs in local resource-scarce contexts face a strong imperative to look to foreign resource holders. As access to these resources can play a major role in the development of their technologies (see Essay II), it is important that these ventures find effective approaches to forming ties with relevant foreign resource holders, such as investors, acceleration programs, or manufacturers. I encourage entrepreneurs, particularly those with limited international experiences and exposures, to *proactively* approach resource holders abroad, rather than waiting for introductions from their domestic partners. Supporting organizations, meanwhile, should recognize that, while introductions and referrals, and endorsements to foreign resource holders can help local ventures, they should also be encouraged to proactively venture out beyond these connections.

Numerous ventures working on grand challenges will unquestionably face resource scarcity at some point, if not consistently throughout their operations, and there is a number of contingency factors in resource mobilization that entrepreneurs can hardly change, such as ethnicity, gender, or company age. In light of this unenviable starting position, entrepreneurs in resource-scarce contexts need a fulsome list of the potential behaviors they can employ agentically to accomplish favorable resource mobilization outcomes and to respond to the challenges their environment dictates. My dissertation may help to build that catalogue of options. From among all the possible options they could explore, I especially encourage entrepreneurs to consider actively shaping their environments and proactively and deliberately drawing on global resource pools to improve their resource mobilization outcomes.

5.4. Conclusion

The mobilization of resources is central to every entrepreneurial endeavor. Operating under resource scarcity complicates this already challenging task. The purpose of this dissertation was thus to advance scholarly understandings of entrepreneurial resource mobilization in resource-scarce contexts and to provide fresh and actionable insights (George, Howard-Grenville, et al., 2016) on the struggles faced by many ventures in need of resources to tackle grand challenges across the globe.

This dissertation starts with a contribution to the entrepreneurial resource mobilization research landscape by organizing extant mechanisms into a framework that unveils relevant conceptual linkages and gaps. I further outline directions for future research—some of which I begin to address in the two empirical essays included in this dissertation. Specifically, I extend theory on entrepreneurial resourcefulness by identifying and describing two resource mobilization trajectories with different performance implications, suggesting that dynamic alternations, and the event sequences that prompt them, can have meaningful effects on early-stage ventures' technology development outcomes. I also find that a strategic approach to foreign tie formation, whereby ventures proactively initiate new ties and rely little on their domestic networks for help, can boost foreign resource mobilization success—adding to research on international entrepreneurship and networks. My findings speak to the importance of entrepreneurial agency in ventures' resource mobilization behaviors in resource-scarce contexts. Importantly, these contexts are constructed by the ventures themselves, such that ventures define their own resource spaces and build their own realities based on the sequence of events they experience.

I encourage future research to take these insights further, building on the emerging convergence of scholarly conversations on resource mobilization, entrepreneurial agency, and context. Most importantly, I hope to inspire entrepreneurs in resource-scarce contexts who have found the

courage to tackle grand challenges of our time to find resourceful answers to their contexts' adversities, and to reach their fullest potential.

6. References

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7. Appendices

7.1. Appendix Essay I

Appendix A: List of Articles Included in the Literature Review

Author(s) and Year	Title	Primary Resource Mobilization Mechanism(s)	Cited in Clough et al. (2019)
Aldrich & Kim, 2007	Small worlds, infinite possibilities? How social networks affect entrepreneurial team formation and search	Networks	✓
Armanios et al., 2017	How entrepreneurs leverage institutional intermediaries in emerging economies to acquire public resources	Networks	
Au & Kwan, 2006	Start-up capital and Chinese entrepreneurs: The role of family	Networks	
Batjargal & Liu, 2004	Entrepreneurs' access to private equity in china: The role of social capital	Networks	
Bhagavatula et al., 2010	How social and human capital influence opportunity recognition and resource mobilization in India's handloom industry	Networks	✓
Blevins & Ragozzino, 2018	An examination of the effects of venture capitalists on the alliance formation activity of entrepreneurial firms	Networks	
Burns et al., 2016	Enrolling stakeholders under conditions of risk and uncertainty	Networks	
Chua et al., 2011	Family involvement and new venture debt financing	Networks	✓
Du et al., 2015	Do social capital building strategies influence the financing behavior of Chinese private small and medium-sized enterprises?	Networks	
Grossman et al., 2012	Resource search, interpersonal similarity, and network tie valuation in nascent entrepreneurs' emerging networks	Networks	✓
Haeussler et al., 2012	Strategic alliances and product development in high technology new firms: The moderating effect of technological capabilities	Networks	
Hallen & Eisenhardt, 2012	Catalyzing strategies and efficient tie formation: How entrepreneurial firms obtain investment ties	Networks	✓
Hallen, 2008	The causes and consequences of the initial network positions of new organizations: From whom do entrepreneurs receive investments?	Networks	✓
Hegde & Tumlinson, 2014	Does social proximity enhance business partnerships? Theory and evidence from ethnicity's role in us venture capital	Networks	✓
Hsu, 2007	Experienced entrepreneurial founders, organizational capital, and venture capital funding	Networks	✓
Huang & Knight, 2017	Resources and relationships in entrepreneurship: An exchange theory of the development and effects of the entrepreneur-investor relationship	Networks	✓
Jayawarna et al., 2011	New business creation and regional development: Enhancing resource acquisition in areas of social deprivation	Networks	
Jonsson & Lindbergh, 2013	The development of social capital and financing of entrepreneurial firms: From financial bootstrapping to bank funding	Networks	
Kotha & George, 2012	Friends, family, or fools: Entrepreneur experience and its implications for equity distribution and resource mobilization	Networks	✓
Le & Nguyen, 2009	The impact of networking on bank financing: The case of small and medium-sized enterprises in Vietnam	Networks	
Lee et al., 2019	Effects of structural, relational and cognitive social capital on resource acquisition: A study of entrepreneurs residing in multiply deprived areas	Networks	
Leung et al., 2006	The use of networks in human resource acquisition for entrepreneurial firms: multiple "fit" considerations	Networks	✓
Lin et al., 2020	International networking and knowledge acquisition of Chinese SMEs: The role of global mind-set and international entrepreneurial orientation	Networks	

Lindvert et al., 2017	Struggling with social capital: Pakistani women micro entrepreneurs' challenges in acquiring resources	Networks	
Mäkelä & Maula, 2008	Attracting cross-border venture capital: The role of a local investor	Networks	
McNamara et al., 2018	Large-scale events as catalysts for creating mutual dependence between social ventures and resource providers	Networks	
Miozzo & DiVito, 2016	Growing fast or slow? Understanding the variety of paths and the speed of early growth of entrepreneurial science-based firms	Networks	
Mollick, 2014	The dynamics of crowdfunding: An exploratory study	Networks	
Newbert & Tornikoski, 2013	Resource acquisition in the emergence phase: Considering the effects of embeddedness and resource dependence	Networks	
Ozdemir et al., 2016	Reaching and acquiring valuable resources: The entrepreneur's use of brokerage, cohesion, and embeddedness	Networks	
Ozmel et al., 2013	Strategic alliances, venture capital, and exit decisions in early stage high-tech firms	Networks	✓
Rooks et al., 2016	The context of social capital: A comparison of rural and urban entrepreneurs in Uganda	Networks	✓
Semrau & Werner, 2014	How exactly do network relationships pay off? The effects of network size and relationship quality on access to start-up resources	Networks	
Shafi & Johan, 2020	Investment ties gone awry	Networks	
Shane & Cable, 2002	Network ties, reputation, and the financing of new ventures	Networks	✓
Shane & Stuart, 2002	Organizational endowments and the performance of university start-ups	Networks	✓
Sullivan & Ford, 2014	How entrepreneurs use networks to address changing resource requirements during early venture development	Networks	
Vanacker & Forbes, 2016	Disentangling the multiple effects of affiliate reputation on resource attraction in new firms	Networks	
Villanueva et al., 2012	Resource mobilization in entrepreneurial firms	Networks	✓
Vissa, 2011	A matching theory of entrepreneurs' tie formation intentions and initiation of economic exchange	Networks	✓
Vissa, 2012	Agency in action: Entrepreneurs' networking style and initiation of economic exchange	Networks	✓
Y. Wang, 2016	Bringing the stages back in: Social network ties and start-up firms' access to venture capital in china	Networks	
P. Wang, 2020	Broadening versus reinforcing investor portfolios: Social structure and the search for venture capital investors	Networks	
Wuebker et al., 2015	The strength of strong ties in an emerging industry: Experimental evidence of the effects of status hierarchies and personal ties in venture capitalist decision making	Networks	✓
Yli-Renko et al., 2002	Social capital, knowledge acquisition, and knowledge exploitation in young technology-based firms	Networks	✓
J. Zhang et al., 2010	Entrepreneurial resource acquisition through indirect ties: Compensatory effects of prior knowledge	Networks	
Y. Zhang, 2015	The contingent value of social resources: entrepreneurs' use of debt-financing sources in western china	Networks	
J. Zhang & Wong, 2008	Networks vs. market methods in high-tech venture fundraising: The impact of institutional environment	Networks / Markets	
J. Zhang et al., 2008	A contingent model of network utilization in early financing of technology ventures	Networks / Markets	✓
Ahlers et al., 2015	Signaling in equity crowdfunding	Signals	✓
Backes-Gellner & Werner, 2007	Entrepreneurial signaling via education: A success factor in innovative start-ups	Signals	✓
M. G. Colombo et al., 2015	Internal social capital and the attraction of early contributions in crowdfunding	Signals	
De Rassenfosse & Fischer, 2016	Venture debt financing: Determinants of the lending decision	Signals	
Gartner et al., 2012	Financing the emerging firm	Signals	
Haeussler et al., 2014	How patenting informs VC investors – the case of biotechnology	Signals	
Islam et al., 2018	Signaling by early stage startups: US government research grants and venture capital funding	Signals	
Ko & McKelvie, 2018	Signaling for more money: The roles of founders' human capital and investor prominence in resource acquisition across different stages of firm development	Signals	

Kromidha & Robson, 2016	Social identity and signalling success factors in online crowdfunding	Signals	
Moss et al., 2015	The effect of virtuous and entrepreneurial orientations on microfinance lending and repayment: A signaling theory perspective	Signals	✓
Oo et al., 2019	User entrepreneurs' multiple identities and crowdfunding performance: Effects through product innovativeness, perceived passion, and need similarity	Signals	
Plummer et al., 2016	Better together? Signaling interactions in new venture pursuit of initial external capital	Signals	
Robson et al., 2013	Credit-rationing and entrepreneurial experience: Evidence from a resource deficit context	Signals	
Söderblom et al., 2015	Inside the black box of outcome additionality: Effects of early-stage government subsidies on resource accumulation and new venture performance	Signals	
S. Yang et al., 2020	What signals matter for social startups? It depends: The influence of gender role congruity on social impact accelerator selection decisions	Signals	
Allison et al., 2015	Crowdfunding in a prosocial microlending environment: Examining the role of intrinsic versus extrinsic cues	Narratives and Symbols	✓
Becker-Blease & Sohl, 2015	New venture legitimacy: The conditions for angel investors	Narratives and Symbols	
Chen et al., 2009	Entrepreneur passion and preparedness in business plan presentations: A persuasion analysis of venture capitalists' funding decisions	Narratives and Symbols	✓
Clarke, 2011	Revitalizing entrepreneurship: How visual symbols are used in entrepreneurial performances	Narratives and Symbols	
De Clercq & Voronov, 2009	The role of cultural and symbolic capital in entrepreneurs' ability to meet expectations about conformity and innovation	Narratives and Symbols	
Kirsch et al., 2009	Form or substance: The role of business plans in venture capital decision making	Narratives and Symbols	
Lounsbury & Glynn, 2001	Cultural entrepreneurship: Stories, legitimacy, and the acquisition of resources	Narratives and Symbols	✓
Martens et al., 2007	Do the stories they tell get them the money they need? The role of entrepreneurial narratives in resource acquisition	Narratives and Symbols	✓
Navis & Glynn, 2011	Legitimate distinctiveness and the entrepreneurial identity: Influence on investor judgments of new venture plausibility	Narratives and Symbols	
Parhankangas & Ehrlich, 2014	How entrepreneurs seduce business angels: An impression management approach	Narratives and Symbols	
Petkova et al., 2013	No news is bad news: Sensegiving activities, media attention, and venture capital funding of new technology organizations	Narratives and Symbols	
Pollack et al., 2012	Preparedness and cognitive legitimacy as antecedents of new venture funding in televised business pitches	Narratives and Symbols	
Zott & Huy, 2007	How entrepreneurs use symbolic management to acquire resources	Narratives and Symbols	✓
Forbes et al., 2006	Entrepreneurial team formation: An exploration of new member addition	Resource Seeking	
Kalnins & Chung, 2004	Resource-seeking agglomeration: A study of market entry in the lodging industry	Resource Seeking	
Baker & Nelson, 2005	Creating something from nothing: Resource construction through entrepreneurial bricolage	Resource Seeking / Bricolage	✓
Desa & Basu, 2013	Optimization or bricolage? Overcoming resource constraints in global social entrepreneurship	Resource Seeking / Bricolage	✓
Keating et al., 2014	Riding the practice waves: Social resourcing practices during new venture development	Resource Seeking / Bricolage	
Stinchfield et al., 2013	Learning from Lévi-Strauss' legacy: Art, craft, engineering, bricolage, and brokerage in entrepreneurship	Resource Seeking / Bricolage	✓
Sunduramurthy et al., 2016	Doing more with less, systematically? Bricolage and ingeniuring in successful social ventures	Resource Seeking / Bricolage	
An et al., 2020	Configurations of effectuation, causation, and bricolage: Implications for firm growth paths	Bricolage	
Baker et al., 2003	Improvising firms: Bricolage, account giving and improvisational competencies in the founding process	Bricolage	✓
Baker, 2007	Resources in play: Bricolage in the Toy Store(y)	Bricolage	
Bojica et al., 2018	Bricolage and growth in social entrepreneurship organisations	Bricolage	

Busch & Barkema, 2020a	From necessity to opportunity: Scaling bricolage across resource-constrained environments	Bricolage	
Desa, 2012	Resource mobilization in international social entrepreneurship: Bricolage as a mechanism of institutional transformation.	Bricolage	✓
Di Domenico et al., 2010	Social bricolage: theorizing social value creation in social enterprises	Bricolage	✓
Duymedjian & Rüling, 2010	Towards a foundation of bricolage in organization and management theory	Bricolage	
G. Fisher, 2012	Effectuation, causation, and bricolage: A behavioral comparison of emerging theories in entrepreneurship research	Bricolage	✓
Garud & Karnøe, 2003	Bricolage versus breakthrough: Distributed and embedded agency in technology entrepreneurship	Bricolage	
Kickul et al., 2018	Catalyzing social innovation: Is entrepreneurial bricolage always good?	Bricolage	
Ladstaetter et al., 2018	The merits and limits of making do: Bricolage and breakdowns in a social enterprise	Bricolage	
Nelson & Lima, 2020	Effectuations, social bricolage and causation in the response to a natural disaster	Bricolage	
Sarkar, 2018	Grassroots entrepreneurs and social change at the bottom of the pyramid: The role of bricolage.	Bricolage	
Servantie & Rispal, 2018	Bricolage, effectuation, and causation shifts over time in the context of social entrepreneurship	Bricolage	
Stenholm & Renko, 2016	Passionate bricoleurs and new venture survival	Bricolage	
Tasavori et al., 2018	Resource bricolage and growth of product and market scope in social enterprises	Bricolage	
Wierenga, 2020	Uncovering the scaling of innovations developed by grassroots entrepreneurs in low-income settings	Bricolage	
Ebben & Johnson, 2006	Bootstrapping in small firms: An empirical analysis of change over time	Bootstrapping	✓
Grichnik et al., 2014	Beyond environmental scarcity: Human and social capital as driving forces of bootstrapping activities	Bootstrapping	
Vanacker et al., 2011	A longitudinal study on the relationship between financial bootstrapping and new venture growth	Bootstrapping	
Waleczek et al., 2018	Start-up financing: How founders finance their ventures' early stage	Bootstrapping	
Winborg & Landström, 2001	Financial bootstrapping in small businesses	Bootstrapping	✓
Agarwal et al., 2020	Managing dilemmas of resource mobilization through Jugaad: A multi-method study of social enterprises in Indian healthcare	Other / Not specified	
Aggarwal et al., 2015	Evaluating venture technical competence in venture capitalist investment decisions	Other / Not specified	
Baum & Silverman, 2004	Picking winners or building them? Alliance, intellectual, and human capital as selection criteria in venture financing and performance of biotechnology startups	Other / Not specified	
Becker-Blease & Sohl, 2007	Do women-owned businesses have equal access to angel capital?	Other / Not specified	✓
Beckman et al., 2007	Early teams: The impact of team demography on VC financing and going public	Other / Not specified	
Bengtsson & Hsu, 2015	Ethnic matching in the U.S. venture capital market	Other / Not specified	✓
Bertoni et al., 2019	Self-selection of entrepreneurial firms in thin venture capital markets: Theory and empirical evidence	Other / Not specified	
Block et al., 2014	Trademarks and venture capital valuation	Other / Not specified	✓
Calic & Mosakowski, 2016	Kicking off social entrepreneurship: How a sustainability orientation influences crowdfunding success	Other / Not specified	
Cassar, 2004	The financing of business start-ups	Other / Not specified	
Chan & Parhankangas, 2017	Crowdfunding innovative ideas: How incremental and radical innovativeness influence funding outcomes	Other / Not specified	
M. G. Colombo et al., 2019	The geography of venture capital and entrepreneurial ventures' demand for external equity	Other / Not specified	
Cornelius & Gokpinar, 2020	The role of customer investor involvement in crowdfunding success	Other / Not specified	

Drover et al., 2014	Take the money or run? Investors' ethical reputation and entrepreneurs' willingness to partner	Other / Not specified	✓
Eckhardt et al., 2006	Multistage selection and the financing of new ventures	Other / Not specified	✓
Greenberg & Mollick, 2017	Activist choice homophily and the crowdfunding of female founders	Other / Not specified	✓
Grilli & Murtinu, 2018	Selective subsidies, entrepreneurial founders' human capital, and access to R&D alliances	Other / Not specified	
Guerini & Quas, 2016	Governmental venture capital in Europe: Screening and certification	Other / Not specified	
Guzman & Kacperczyk, 2019	Gender gap in entrepreneurship	Other / Not specified	
Hanlon & Saunders, 2007	Marshaling resources to form small new ventures: Toward a more holistic understanding of entrepreneurial support	Other / Not specified	✓
Harrison et al., 2010	Determinants of long-distance investing by business angels in the UK	Other / Not specified	
Hsu, 2004	What do entrepreneurs pay for venture capital affiliation?	Other / Not specified	✓
Huy & Zott, 2019	Exploring the affective underpinnings of dynamic managerial capabilities: How managers' emotion regulation behaviors mobilize resources for their firms	Other / Not specified	
Katila et al., 2008	Swimming with sharks: Technology ventures, defense mechanisms and corporate relationships	Other / Not specified	✓
Khoury et al., 2015	Navigating political hazard risks and legal system quality: Venture capital investments in Latin America	Other / Not specified	
Kodithuwakku & Rosa, 2002	The entrepreneurial process and economic success in a constrained environment	Other / Not specified	
Kolympiris et al., 2011	Spatial collocation and venture capital in the US biotechnology industry	Other / Not specified	
Lanahan & Armanios, 2018	Does more certification always benefit a venture?	Other / Not specified	
Lo, 2015	Selling science: Resource mobilization strategies in the emerging field of nanotechnology	Other / Not specified	
Miller & Wesley, 2010	Assessing mission and resources for social change: An organizational identity perspective on social venture capitalists' decision criteria	Other / Not specified	
Orser & Riding, 2006	Women entrepreneurs and financial capital	Other / Not specified	✓
Schwienbacher, 2013	The entrepreneur's investor choice: the impact on later-stage firm development	Other / Not specified	
Townsend & Busenitz, 2015	Turning water into wine? Exploring the role of dynamic capabilities in early-stage capitalization processes	Other / Not specified	✓
Walthoff-Borm et al., 2018	Equity crowdfunding: First resort or last resort?	Other / Not specified	
Warnick et al., 2018	Passion for entrepreneurship or passion for the product? A conjoint analysis of angel and VC decision-making	Other / Not specified	
Williamson, 2000	Employer legitimacy and recruitment success in small businesses	Other / Not specified	
Wry & Lounsbury, 2013	Contextualizing the categorical imperative: Category linkages, technology focus, and resource acquisition in nanotechnology entrepreneurship	Other / Not specified	
Wry et al., 2014	Hybrid vigor: Securing venture capital by spanning categories in nanotechnology	Other / Not specified	
E. Y. Zhao & Lounsbury, 2016	An institutional logics approach to social entrepreneurship: Market logic, religious diversity, and resource acquisition by microfinance organizations	Other / Not specified	
H. Zhao & Lu, 2016	Contingent value of political capital in bank loan acquisition: Evidence from founder-controlled private enterprises in China	Other / Not specified	
B. Zhao & Ziedonis, 2020	State governments as financiers of technology startups: Evidence from Michigan's R&D loan program.	Other / Not specified	

Appendix A.1: Included Articles, Classification of Primary Resource Mobilization Mechanism(s), and Inclusion in Clough et al. (2019)

7.2. Appendix Essay II

Appendix A: Overview of External Informants

External Informant (Pseudonym)	Organization Type	Location	Main Interview Topics				
			Entrepreneurial Ecosystem & Business Environment	Resource Mobilization	Medical Technology Industry	Institutional Framework	Sampled Ventures
EI-1	University	Uganda	✓	✓	✓	✓	✓
EI-2	Venture Capital Fund	Germany	✓	✓		✓	
EI-3	Incubator	Uganda	✓	✓			
EI-4	Incubator	Uganda	✓	✓	✓	✓	✓
EI-5	Ministry	Uganda	✓		✓	✓	
EI-6	Incubator	Uganda	✓	✓	✓	✓	✓
EI-7	Venture Capital Fund	Netherlands	✓	✓		✓	
EI-8	Research Institute	Uganda	✓	✓	✓	✓	(✓)*
EI-9	Incubator	Uganda	✓	✓			
EI-10	Foundation	Uganda	✓	✓			
EI-11	Accelerator	Kenya	✓	✓			
EI-12	Accelerator	Uganda	✓	✓			
EI-13	Impact Investor	Uganda	✓	✓			
EI-14	Accelerator	Germany	✓	✓	✓		
EI-15	Incubator	Uganda	✓	✓	✓	✓	✓
EI-16	Incubator	Uganda	✓	✓	✓	✓	✓
EI-17	Incubator	Uganda	✓	✓	✓	✓	✓
EI-18	Research Institute	UK	✓	✓			✓
EI-19	Research Institute	UK	✓	✓			✓
EI-20	Accelerator	Germany	✓	✓			✓
EI-21	Development Fund	Uganda	✓	✓			
EI-22	Ministry	Uganda	✓			✓	
EI-23	Venture Capital Fund	Japan	✓	✓			
EI-24	Angel Investor Network	Uganda	✓	✓			
EI-25	Venture Capital Fund	Kenya	✓	✓			
EI-26	Venture Capital Fund	USA	✓	✓		✓	

* Relevant for venture sampled in Essay III only | Sorted by order of mention in text | All external informants have prior experience in Uganda | Abbreviations: UK = United Kingdom; USA = United States of America

Appendix A.1: External Informants and Their Organizations, Locations, and Main Interview Topics

Appendix B: Interview Guide

Wave I	
Personal Details	<i>If not clarified through preparatory video call:</i> Could you tell me about yourself, what's your role at [company name] and since when are you working there?
	<i>If not clarified through preparatory video call:</i> Is this your only job or do you have other jobs / projects ongoing?
	<i>If not clarified through preparatory video call:</i> What is your background? What did you study, where did you work before?
Company & Technology History	<i>If interviewee is co-founder:</i> When you founded the venture, what was your overall goal?
	<i>If interviewee is co-founder:</i> What were the steps you thought you needed to follow in order to get there?
	What are the key milestones of [company] so far? Why do you perceive these events as most important?
	Could you briefly walk me through the history of your venture; When did your journey start and what happened since then? [use DIN A3 print-out]
	<i>If interviewee is co-founder:</i> Have your initial ambitions or plans changed over time? If so, why?
Resource Mobilization	What did you need to develop [company name] into what it is now?
	Looking back, who were the most important supporters that helped [company name] move forward, who helped you in what way?
	<i>Repeat for priorities 1-n:</i> When did you approach [resource holder], why and how?
	How did you learn about [resource holder]? [use DIN A3 print-out]
	<i>Pointing at 'gaps' in DIN A3 print-out timeline:</i> Are there additional resources or support you obtained in between? From whom? (How) did you identify and approach [resource holder]? [use DIN A3 print-out]

	Who else was on your 'wishlist' that you haven't reached out to or where it didn't work out? Why not?
	How would you describe your interactions with [selected resource holders upon successful resource access]?
	What were the expectations of [resource holder] towards you? What was the underlying agreement or 'deal' between you?
	How do you position your venture towards resource holders [investors / grant providers / mentioned key sources]? Do you have a feeling for what 'works' and what doesn't? What are their key concerns versus 'hooks' that get their attention and interest?
	<i>If grants / competitions:</i> Could you tell me more about how you applied for the grant / the prize?
	Looking back, which resource deals and interactions did [company] spend most energy on? How much time and effort was invested and what did you receive?
	Are there any examples where [company] invested little time and efforts for a large amount of resources?
	Which resource inflows had the highest impact on bringing [company] forward? How exactly did you use them to advance [company] or the technology behind?
	How did you approach the financing of your company?
	In how far did the approach change over time – and if so, how? Why / why not?
	<i>If a particular strategy is noticeable:</i> When and how have your ideas on the financing approach formed, how did you come up with your approach?
	What are the next steps to advance your technology / new venture and how do you plan to get the required support for it?
Resource Endowments and Personal Situation	How would you assess the role of your personal environment (such as your family, close friends, and community) in obtaining resources?
	What is / was the role of your professional environment in obtaining resources?
	In how far could you leverage any previous professional experience?
	What would you do if this start-up didn't exist or if it didn't succeed?
Environment	What does it take for an entrepreneur in Uganda to succeed?
	How would you assess the access to financing for entrepreneurs in Uganda, especially for earlier stage technology companies like yours?
	I understood from previous expert conversations that the Ugandan business environment is not always easy to operate in. How do you cope with the challenges that it imposes?
	How would you describe the business environment in Uganda? What's the role of the government and its ministries when it comes to Uganda's entrepreneurial scene?
	What's special about how Ugandans do business? Have you ever encountered differences towards other people's business styles?
Wave II	
Introduction	How did it go and what happened since the last time we spoke in October / November 2019?
	How is [name of venture] affected by the COVID-19-crisis? Anything that you changed because of it?
Performance Measures	We've slightly touched on this last time, but let me ask again. When you started [name of venture], what was your objective: Who was your target group and how big was the market you wanted to serve?
	Have these objectives changed up until today and if so, how?
	Where do you stand with [name of technology]? Are there any news on the status of your prototype and clinical validation?
	Have you received any additional funding since we last spoke in October / November 2019?
	Do you have a rough estimate of how many women / mothers / neonates you have served to date?
Resource Mobilization	We discussed this a bit last time, but I'd like to get your view on this again: What are the different input factors [name of venture] has needed along its way so far?
	When we last spoke, you told me how you [insert meaningful instance of <i>resource seeking</i>] – can you tell me a bit more about why you chose to do so? And why at that point in time?
	When we last spoke, you told me how you [insert meaningful instance of <i>bricolage</i>] – can you tell me a bit more about why you chose to do so? And why at that point in time?
	From my initial interviews, I understood that navigating the official authorities isn't always easy – you have to know someone in the Ministry, pay people to process your requests, government grants sometimes favor specific families... Is this something that you sometimes encounter as well and if so, how do you handle this?
	<i>Only for selected ventures:</i> Last time we spoke, I understood you faced big obstacles, especially when it comes to raising the funds you need to proceed. Could you tell me more about how you handle these obstacles? Has anything changed in the past months?
	Since we last spoke, how did you advance [technology / clinical pilot / ...]? Why? Why not?
	<i>Prompt discussion on what input was needed for each advancement.</i>
	In terms of things that you needed in the past months: What else was on your 'wishlist' that you haven't obtained or where it didn't work out? Why not?
Interpretation of Resource Space	I understood that in order to get the different input factors you need, you are not only relying on Uganda but are also looking abroad. When did you decide to look abroad?
	Is there any specific point in time you could name?
Journey and Stimuli	Last time, you mentioned [insert first stimulus] – could you tell me again what happened then and why? Did this event change anything for you in the way you managed [name of venture]?

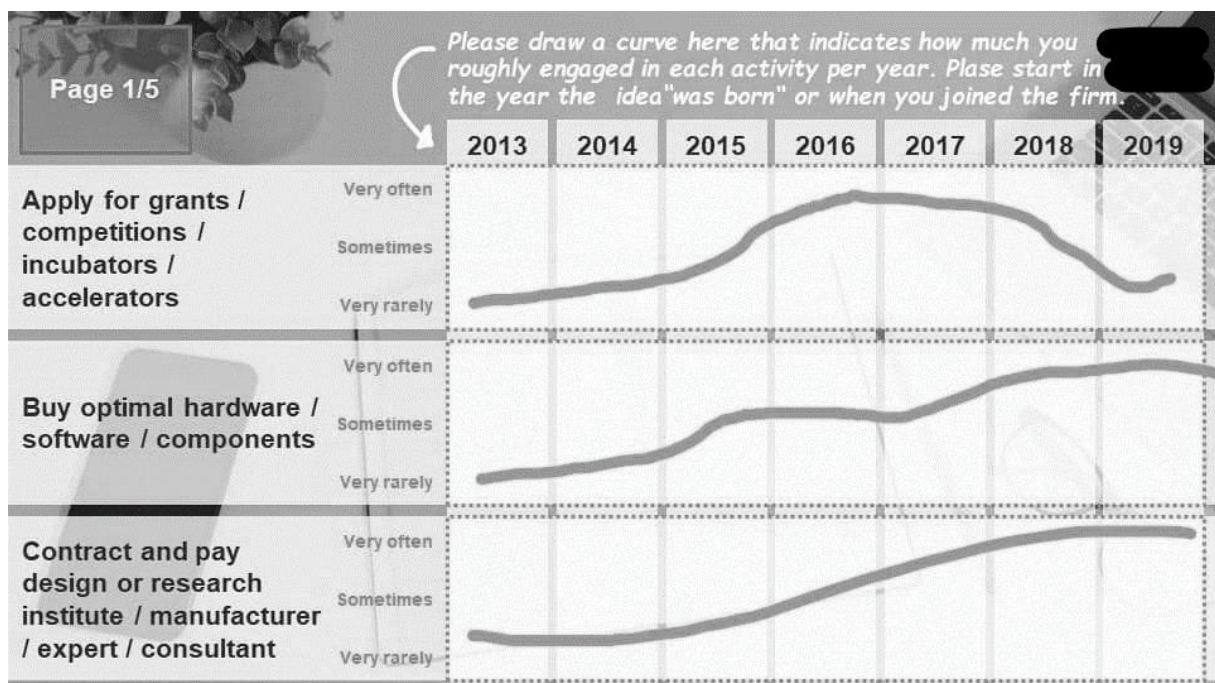
	Last time, you also mentioned [insert second stimulus] – could you tell me again what happened then and why? Did this event change anything for you in the way you managed [name of venture]?
	I have tried to summarize your company journey and activities graphically – let’s have a quick look together. [Walk through high-level steps of graphical timeline] Is there anything you would like to correct or add in this graph?
	Did you notice any changes in the way you managed the activities or sourced the different input factors in [name of venture] over time? If yes, were there turning points you could pinpoint?
Network Approach	Let’s move on to the last topic before we end this interview: I understand that [name of venture] has a range of supporters or partners that you interact with – you’ve mentioned for instance [names of tie alters]. How regular would you say are your interactions with them? When and why are you in touch? When and why are you <u>not</u> in touch?
	Last time, we also discussed how you found your various partners and supporters and I understood there are two ways you make new connections: <u>One</u> – you find them and you approach them and <u>Two</u> – They find you and they approach you (for instance if they saw you on social media). What role does each of these two ways play for [name of venture]? Why?
Outlook	What’s next? Can you give me a brief outlook on the next steps for [name of venture]?

Appendix B.1: Question Catalogue per Data Collection Wave

Appendix C: Bricolage and Resource Seeking Activity Sets

Bricolage	Resource Seeking
a. Use facilities / working space for free (e.g., at university)	h. Apply for grants / competitions / incubators / accelerators
b. Use rudimentary / sub-optimal components (e.g., for prototyping)	i. Buy optimal hardware / software / components
c. Get someone’s expertise / guidance / support for free	j. Contract and pay industrial design institute / manufacturer / expert / consultant
d. Leverage friends / family / connections to get something you need	k. Pay for access to clinic / patients / data / principal investigator
e. Work for free / during free time / have another job on the side (you or team members)	l. Pay salaries / allowances to team member(s) or yourself
f. Bootstrap / pull out of your pockets	m. Search or contact investors / donors
g. Use workarounds / convince someone when hitting a roadblock	

Appendix C.1: Activity Sets Based on Informants’ Own Wording



Appendix C.2: Example of a Graphical Template and Curves Drawn by an Informant on Their Mobile Phone

Appendix D: Combined Evidence for Ventures' Resource Mobilization Trajectories

Venture	Resource Category	2013	2014	2015	2016	2017	2018	2019
A. Youhealth	Funding		B/R	B/R	B/R	B/R	B/R	B/R
	Team		B/	B/	B/	B/	B/R	B/R
	Capacity		B/	B/R	B/R	B/R	B/R	B/R
	Material & Space		B/	B/	B/R	B/R	B/R	/R
	Liaisons		/	/	/R	/	B/R	/R
	Users & Data		/	/	/	B/R	/R	B/R
	Authorities & Approvals		/R	/R	/R	/R	/R	/R
B. WLab	Funding			/R	B/R	B/R	B/R	B/R
	Team			B/	B/R	B/R	B/R	B/R
	Capacity			B/	B/R	B/	B/	B/
	Material & Space			B/R	B/R	B/R	B/R	B/R
	Liaisons			/	/	/R	/	/R
	Users & Data			/	/R	/R	/R	B/R
	Authorities & Approvals			/R	B/R	B/R	B/R	B/R
C. Womed	Funding				B/R	B/R	B/R	B/R
	Team				B/	/	B/R	B/
	Capacity				B/R	B/	B/R	B/R
	Material & Space				B/	B/R	B/	B/R
	Liaisons				/R	/	/R	/
	Users & Data				B/R	/	B/R	B/R
	Authorities & Approvals				/R	/R	/R	/R
D. Empoweru	Funding			B/R	B/R	B/R	B/R	/R
	Team			B/	B/	B/	/R	/R
	Capacity			B/	B/R	B/R	B/R	B/R
	Material & Space			B/R	B/R	B/R	B/R	/R
	Liaisons			/R	/R	/R	/R	/R
	Users & Data			/	/	/R	/R	/R
	Authorities & Approvals			/R	B/R	B/R	B/R	B/R
E. Motherry	Funding				B/R	B/R	B/R	B/R
	Team				B/	B/R	B/R	/R
	Capacity				B/R	B/R	B/R	B/R
	Material & Space				B/R	B/R	B/R	B/R
	Liaisons				B/R	/R	/R	/R
	Users & Data				/	/R	B/R	/R
	Authorities & Approvals				/R	/R	/R	/R
F. Mcare	Funding		B/R	B/R	B/R	B/R	B/R	B/R
	Team		B/	B/	B/	B/R	B/R	B/R
	Capacity		B/R	B/R	B/R	B/R	B/R	B/R
	Material & Space		/R	B/R	B/R	B/R	B/R	B/R
	Liaisons		B/	B/	B/	B/	B/R	B/R
	Users & Data		/	/	/	/	/R	/R
	Authorities & Approvals		/R	/R	/R	B/R	B/R	B/R
G. HealthQ	Funding	B/R	B/R	/R	/R	/R	/R	/R
	Team	B/R	B/R	/R	/R	/R	/R	/R
	Capacity	B/R	B/R	B/R	B/R	B/R	B/R	B/R
	Material & Space	B/R	B/R	B/R	B/R	B/R	/R	B/R
	Liaisons	/R	/	/	/	/	/	/R
	Users & Data	/	/	/R	/R	/R	/R	B/R
	Authorities & Approvals	B/R	/R	/R	B/R	B/R	B/R	B/R

Greyed out area indicates year(s) prior to venture inception | B: Evidence for bricolage activity in interview transcripts and/or archival data in a given year; R: Evidence for resource seeking activity in interview transcripts and/or archival data in a given year

Appendix D.1: Evidence of Bricolage and Resource Seeking by Resource Category and Venture over Time

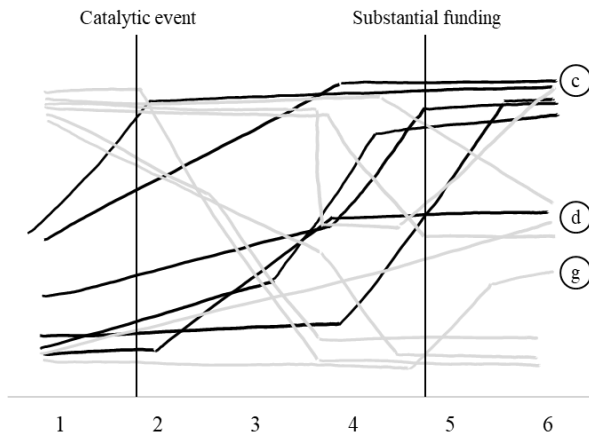
Venture	Activity Set: Bricolage	Activity Set: Resource Seeking							Activity Set: Resource Seeking							
		2013	2014	2015	2016	2017	2018	2019	2013	2014	2015	2016	2017	2018	2019	
A. Youhealth	a.		B	B	B	B	B	h.		R	R	R	R	R	R	
	b.						B	i.				R	R	R	R	
	c.		B	B	B	B	B	B	j.		R		R	R	R	
	d.		B	B	B	B	B	B	k.				R	R	R	
	e.		B	B	B	B	B	B	l.							
	f.								m.					R	R	R
	g.								Other		R	R	R	R	R	R
	Other		B	B	B	B	B	B								
B. WLab	a.			B	B	B	B	B	h.			R	R	R	R	R
	b.								i.			R	R	R	R	R
	c.			B	B	B	B	B	j.			R				
	d.			B	B	B	B	B	k.			R				R
	e.			B	B	B	B	B	l.							
	f.				B	B	B	B	m.							R
	g.			B	B	B	B	B	Other				R	R		R
	Other				B	B	B	B								
C. Womed	a.				B	B	B	B	h.			R	R	R	R	R
	b.					B	B	B	i.				R		R	R
	c.				B	B	B	B	j.							
	d.				B	B	B	B	k.							
	e.				B	B	B	B	l.							
	f.				B	B	B	B	m.					R		
	g.								Other				R	R	R	R
	Other				B	B	B	B								
D. Empoweru	a.			B	B	B	B	h.			R	R	R	R	R	R
	b.			B	B			i.				R	R	R	R	R
	c.							j.				R	R	R	R	R
	d.			B	B	B	B	B	k.							R
	e.			B	B	B			l.						R	R
	f.								m.					R	R	R
	g.			B	B	B		B	Other				R	R	R	R
	Other			B	B	B	B	B								
E. Motherry	a.				B	B	B	B	h.			R	R	R	R	R
	b.				B	B			i.			R	R	R	R	R
	c.				B	B	B	B	j.					R	R	R
	d.						B	B	k.					R	R	R
	e.				B	B	B		l.							
	f.				B	B	B	B	m.				R	R	R	R
	g.								Other				R	R	R	R
	Other															
F. Mcare	a.							h.		R	R	R	R	R	R	R
	b.			B				i.		R	R	R	R	R	R	R
	c.		B	B	B	B	B	B	j.							R
	d.		B	B	B	B	B	B	k.							R
	e.		B	B	B	B	B	B	l.						R	R
	f.		B	B	B	B	B	B	m.		R	R	R	R	R	R
	g.			B		B	B	B	Other		R	R		R	R	R
	Other						B	B								
G. HealthQ	a.		B	B	B			h.		R	R	R	R	R	R	R
	b.							i.		R	R	R	R	R	R	R
	c.							j.		R	R	R	R	R	R	R
	d.	B						k.								R

e.	B	B						l.		R	R	R	R	R
f.								m.	R					R
g.	B							Other	R	R	R	R	R	R
Other	B	B	B	B	B	B	B							

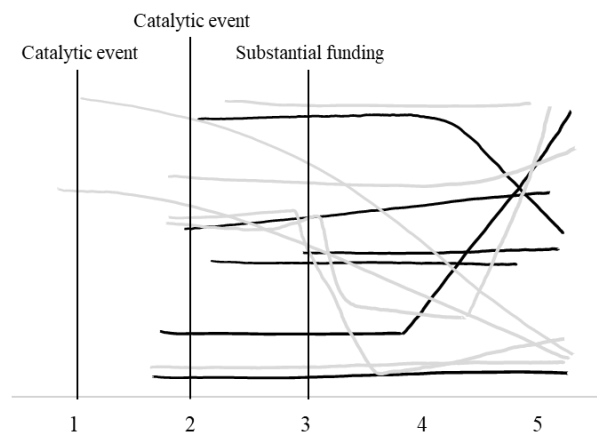
Greyed out area indicates year(s) prior to venture inception | B: Evidence for bricolage activity in interview transcripts and/or archival data in a given year | R: Evidence for resource seeking activity in interview transcripts and/or archival data in a given year | For activity set numbering (a., b., c., etc.) see Appendix C.1

Appendix D.2: Evidence of Bricolage and Resource Seeking by Activity Set and Venture over Time

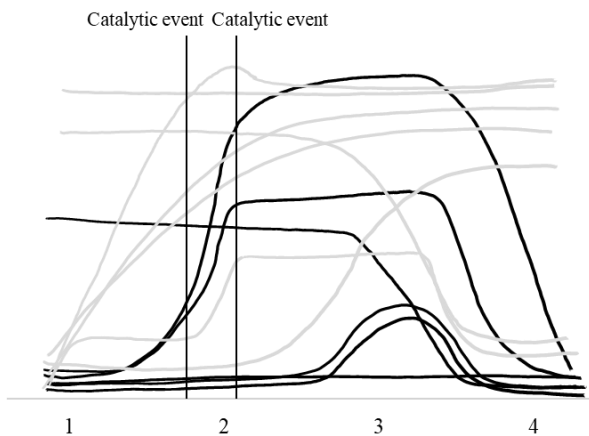
A. Youhealth



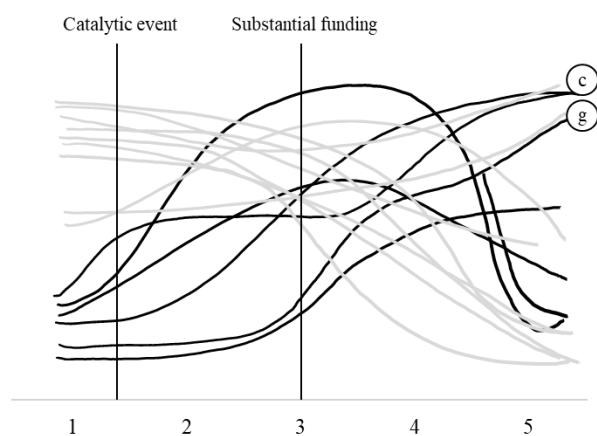
B. WLab



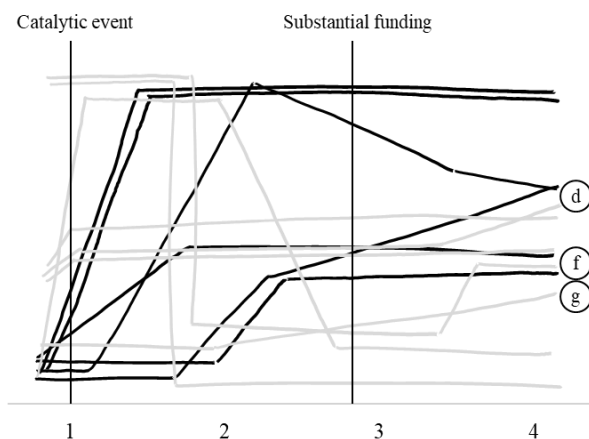
C. Womed



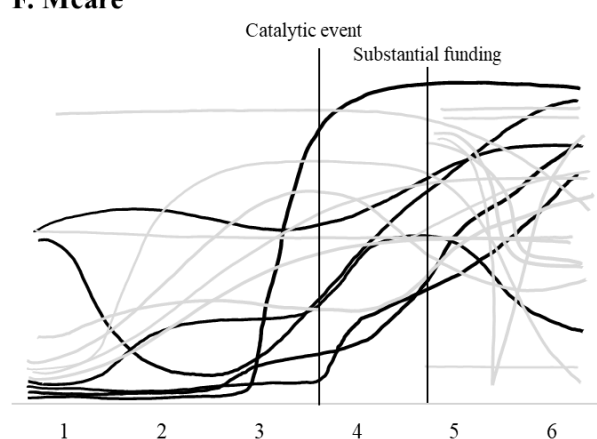
D. Empoweru



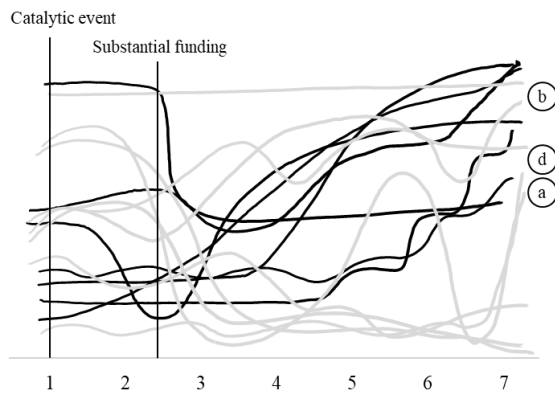
E. Motherry



F. Mcare



G. HealthQ



X-axis: Venture age in years, Y-axis: Number of activity sets deployed in a given year | —: Resource Seeking; —: Bricolage | For activity set numbering (@, ⓐ, ⓑ, etc.) see Appendix C.1, only shown for Optimizer ventures opting into bricolage after substantial funding | Informants' graphs are based on triangulations of all meaningful responses received per venture (i.e., when more than one curve per activity per venture was available, we included all curves with deviating tendencies). | Note: Empoweru reportedly reduced grant applications, the quest for investors and donors, as well as the payment for access to clinic / patients / data / principal investigator over the past one to two years, explaining the few decreasing resource seeking curves. For Womed, the two highest resource seeking curves represent the venture's quests for funding, and for investors/donors, respectively.

Appendix D.3: Consolidated Informant Drawings on Resource Mobilization Activities

Evidence by Resource Category								
Bricolage	Funding	Team	Material Capacity & Space		Liaisons	Users & Data	Authorities & Approvals	Overall Evidence
A. Youhealth	Low	Low	Moderate	Low	None	Low	None	Moderate
B. WLab	Low	Low	Low	Low	None	Low	Low	Moderate
C. Womed	Low	Moderate	Moderate	Low	None	Low	None	Moderate
D. Empoweru	Low	Low	Low	Low	None	None	Low	Low
E. Motherry	Low	Low	Low	Low	Low	Low	None	Low
F. Mcare	Low	Low	Low	Low	Low	None	Low	Moderate
G. HealthQ	Low	Low	Low	Low	None	Low	Low	Low

Evidence by Resource Category								
Resource Seeking	Funding	Team	Material Capacity & Space		Liaisons	Users & Data	Authorities & Approvals ²³	Overall Evidence
A. Youhealth	Moderate	None	Moderate	Low	Low	Low	n/a	High
B. WLab	Moderate	Low	Low	Low	Low	Low	n/a	Moderate
C. Womed	Moderate	None	Low	Low	Low	Moderate	n/a	Moderate
D. Empoweru	High	Low	Moderate	Low	Low	Low	n/a	High
E. Motherry	Moderate	Low	Low	Low	Moderate	Low	n/a	High
F. Mcare	Moderate	Low	Low	Low	Low	Low	n/a	Moderate
G. HealthQ	Moderate	Low	Moderate	Low	Low	Low	n/a	High

Evidence by Resource Category: High: > 10 mentions, Moderate: 5-10 mentions, Low: <5 mentions, None: 0 mentions (All per 10,000 transcribed words) | **Overall Evidence:** High: > 20 mentions, Moderate: 10-20 mentions, Low: <10 mentions (All per 10,000 transcribed words)

Appendix D.4: Evidence of Ventures' Overall Bricolage and Resource Seeking Intensity by Resource Category

²³ During the coding process, we noticed that a differentiation in the category "authorities and approvals" as a manifestation of resource seeking was not relevant. Driven by the nature of an industry that requires certification and approvals, all ventures sought these very authorizations by interacting similarly with regulatory bodies.

Appendix E: Technology Development Outcomes

	Technology Development Achievements				Complexity Scores (Expert Rating Averages) ²⁴							Performance Score
	Clinical Pilot Completion	Clinical Trial Approval	Clinical Trial Funding	Patenting	Total	Age (Years)	Novelty	Research Intensity	HW Design Complexity	SW Design Complexity	Total	
E. Motherry	1.00	0.0	1.0	1.0	3.00	4	3.00	2.25	2.25	2.25	2.44	1.83
G. HealthQ	0.33	1.0	1.0	0.5	2.83	7	4.50	4.00	4.00	3.25	3.94	1.59
A. Youhealth	0.33	0.0	1.0	1.0	2.33	6	4.00	3.50	3.75	4.00	3.81	1.48
F. Mcare	0.67	1.0	1.0	1.0	3.67	6	2.50	2.75	1.50	n/a	2.25	1.38
D. Empoweru	0.33	0.0	1.0	1.0	2.33	5	3.50	2.50	2.50	2.50	2.75	1.28
B. WLab	0.33	0.5	0.5	0.0	1.33	5	3.00	3.25	3.00	2.25	2.88	0.77
C. Womed	0.33	0.0	0.0	0.0	0.33	4	2.50	3.00	n/a	2.50	2.67	0.22

Sorted by outcome score | **Clinical Pilot Completion:** 0.0: Not started, 0.33: Start imminent (alternatively: extensive laboratory testing completed), 0.67: Started (alternatively: extensive laboratory testing completed and extensive datasets analyzed), 1.0: Completed; **Clinical Trial Approval:** 0: No, 0.5: Partly, 1: Yes; **Clinical Trial Funding:** 0: Not obtained, 0.5: Obtained in part, 1: Obtained; **Patenting:** 0: Not obtained, 0.5: Obtained in part, 1: Obtained; Complexity Score comprises the average of four independent medical technology experts' ratings | Abbreviations: HW = Hardware; SW = Software

Appendix E.1: Ventures' Technology Development Achievements, Ages, Complexity Scores, and Resulting Outcomes

²⁴ We developed our own complexity scores, in part based on Youssef and Hyman's (2009) medical device complexity model and in part based on Broekel's (2017) overview on the measurement of technological complexity, because no measurement framework suitable for our purposes existed during our data collection and analysis periods (see Bartelmes et al., 2009) for a review of medical technology assessment methods). For detailed expert rating inputs see Appendix E.2.

Venture	Scale Minimum (1)	Scale Maximum (5)	Expert 1 Rating (Dec 2019)	Expert 2 Rating (Dec 2019)	Expert 3 Rating (Dec 2019)	Expert 4 Rating (Jun 2020)
Novelty						
A. Youhealth	<i>The medical device is not novel but rather</i>	<i>The medical device is novel.</i>	5	4	2	5
B. WLab	<i>represents an adaptation or replication of an existing technology</i>		3	1	4	4
C. Womed	<i>(e.g., adapted to a local setting).</i>		3	1	2	4
D. Empoweru			4	2	3	5
E. Motherry			2	3	3	4
F. Mcare			1	2	4	3
G. HealthQ			4	5	4	5
Research Intensity						
A. Youhealth	<i>Development of the device can entirely draw on existing medical knowledge.</i>	<i>Development of the device requires substantial research activities in addition to existing medical knowledge.</i>	5	3	2	4
B. WLab			3	1	4	5
C. Womed			3	1	3	5
D. Empoweru			2	2	2	4
E. Motherry			2	1	3	3
F. Mcare			1	1	5	4
G. HealthQ			4	5	4	3
Hardware Design Complexity						
A. Youhealth	<i>Device production requires basic input materials and basic or no specific production facilities.</i>	<i>Device production requires highly sophisticated input materials and production facilities.</i>	5	4	3	3
B. WLab			3	1	4	4
C. Womed			n/a	n/a	n/a	n/a
D. Empoweru			2	3	3	2
E. Motherry			2	2	3	2
F. Mcare			1	1	2	2
G. HealthQ			4	5	4	3
Software Design Complexity						
<i>Note: We do not always know with certainty whether the teams used existing software elements or developed it themselves. Therefore, we assume that both the development and the acquisition of complex software justifies a high rating given it may have been expensive, and/or complex to create an interface with and/or complex to adapt to the technology's very purpose.</i>						
A. Youhealth	<i>The underlying software requires development / purchasing of no or very simple algorithms.</i>	<i>The underlying software requires development / purchasing and adaptation of complex algorithms, for instance incorporating machine learning features.</i>	4	4	4	4
B. WLab			1	2	4	2
C. Womed			3	1	4	2
D. Empoweru			2	2	3	3
E. Motherry			1	2	3	3
F. Mcare			n/a	n/a	n/a	n/a
G. HealthQ			2	5	3	3

Appendix E.2: Complexity Score Expert Rating Template and Results

Appendix F: Catalytic Events

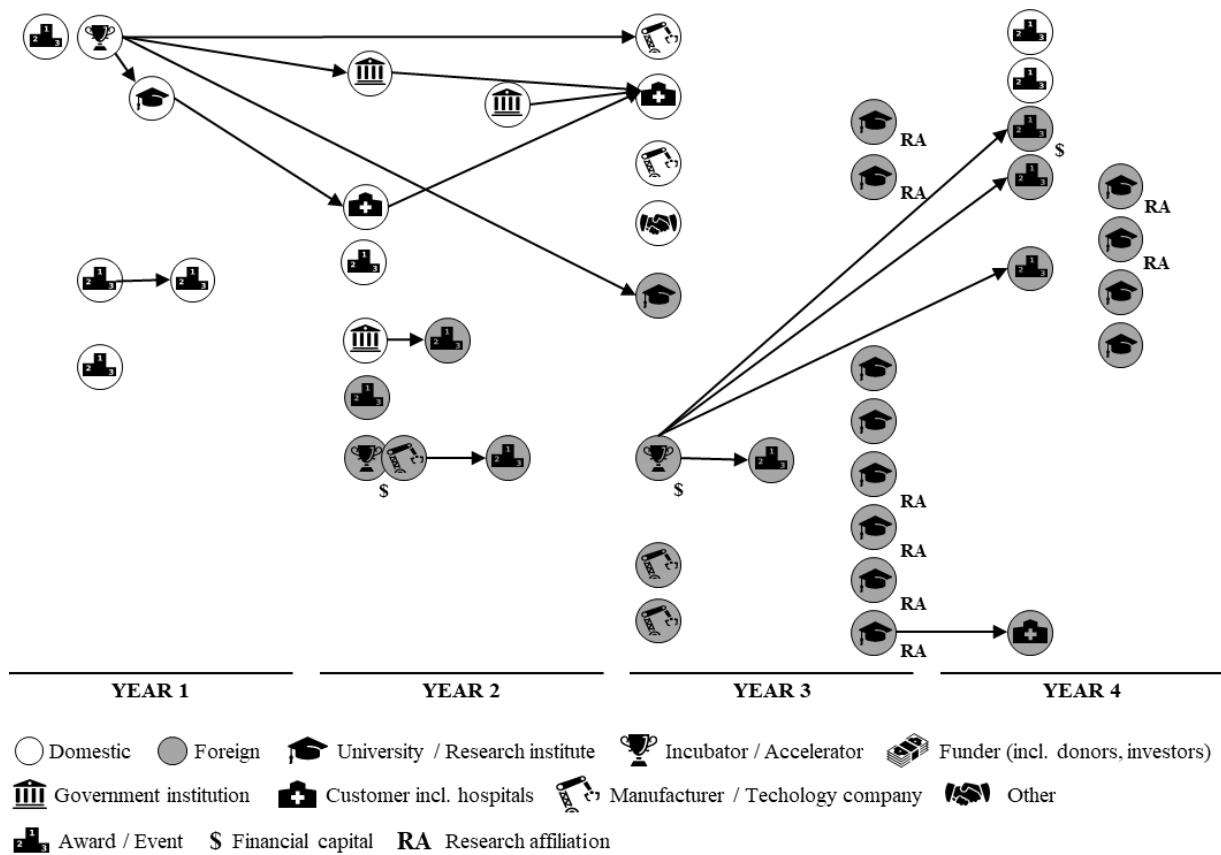
Effect	Representative Quotes
1. Confidence ("something could come out of it")	"That didn't have a prize, though it built our confidence. It showed that what we're doing is really impactful to society." (Youhealth, A-1, II)
	"Well, considering it was our first funding opportunity. I think it changes how we looked at ourselves as a team at that time...Because for me, I'm like, if someone is willing to invest in you a whole [sum of prize money] which is a lot of money...I'm like, it has to count for something." (WLab, B-1, I)
	"We looked at this as a milestone that is going to lead us somewhere...Given the certificate, it's also something worthy showing off...They really played a role, a big role, in encouraging us." (WLab, B-2, I)
	"Someone believes in us—someone who's willing to risk their money for this." (Empoweru, D-1, II)
2. Recognition & Exposure ("put us out there")	"Why we decided to send out proposals? What should I say after [the award]...Because we realized that we are filling a big gap in the market...So generally, we needed to dedicate more time to this and get it moving...While we improvised, we needed to be convinced, first of all that the concept works, so we're just trying to test the concept." (Empoweru, D-1, II)
	"For us, being able to win that prize was a confirmation that we want something that is can be recognized something great, something that can have an impact. So, it was that first prize that gives you a momentum of realizing, 'Okay, this can take you somewhere.'" (HealthQ, G-3, II)
	"[The award] didn't have a prize, so we just got a recognition." (Youhealth, A-1, II)
	[Local incubator] also provided platforms where you can pitch a product for more funding (WLab, B-1, I; excerpt from interview notes)
	"They put us all out there. I think [our contact at the awarding organization] talked to everyone he found about us...[the award] opened many doors of opportunity for us, because now the local people got to believe in us." (Empoweru, D-1, II)

	<p>“And [the incubation and the mentorship] also opened doors for us—an opportunity to be able to showcase our innovation into many forums, wherever they had access to.” (Motherry, E-1, II)</p> <p>“And actually, this again boosted us, because [the incubator] got us to a chain of other professionals that are doing maternal health.” (Motherry, E-1, II)</p> <p>“[The award] put us to a point where people got interest[ed].” (HealthQ, G-1, II)</p> <p>“So, these awards have been motivation and putting our product out there for more players and stakeholders in this field to recognize the product that we are building.” (HealthQ, G-3, II)</p>
3. Formalization & Structure (“stepping stone”)	<p>“The [Ugandan institute], of course, also gave us, for the very first time, a little money to begin with.They brought us to the whole point of, ‘We need...to register our company.’” (Womed, C-2, II)</p> <p>“[The award] and [incubator]—especially [the incubator]—was for us to move from invention to innovation, and it was a stepping stone from just a school project.” (Mcare, F-1, I)</p> <p>“So, eventually, when we won this prize, then we had to say, okay, we have won this money, this is prize money...So, we decided to say... ‘We have to agree to bring back money together,’ and we incorporate this company...then be able to create a structure...as we started [HealthQ], [HealthQ] was an innovation we were doing from campus. And after us winning our first prize with [award organization], we realize that we could then incorporate a company.” (HealthQ, G-3, II)</p>
4. Insights (“understanding the context”)	<p>“We joined [local incubator] and they were really helpful, did the mentorship and design thinking. A lot of things and that is when we were like: ‘Okay we can do this.’” (WLab, B-2, I)</p> <p>“In the first place, [local incubator] was introducing us into the context of Human Centered Design and which was very important for us to be able to start engaging our stakeholders and the users at the early stage of development of our product. This helped us to be able to re-understand who our users are, understand their problem and now start to designing a product that is fit for their needs.” (Motherry, E-1, II)</p> <p>“I mean, we were overshooting back then, given the landscape of the ecosystem. I think that was because we weren’t experienced and we didn’t have knowledge of what we were going into. So, I remember you cut under budget, you cut very unrealistic timelines then because we didn’t have enough experience and know exactly what is required. The good thing is, the team kept pushing and as when we went back and understanding the context of what we’re trying to deliver, that’s how we got to know that it’s a bigger kind of set up and we have to learn a few different aspects of skills and also be relevant in the field we are trying to go into.” (HealthQ, G-1, II)</p> <p>“We had a budget like 6000 something. And [incubator] told us, ‘I think you people do not know what you’re trying to build, I think you’re underestimating the costs’.” (HealthQ, G-3, II)</p> <p>“Particularly for health innovations, I guess they never really/ Most of them being technology based and not necessarily coming from people who are in the field of health, we have like computer scientists working on applications, that some of them are not really aware of the processes of getting a health device or a health technology on the market and how long it will take. So, initially when they start, they’re all very enthusiastic, they have this idea which is very great until they start working [in our incubator] that they realize actually there’s a lot you have to do.” (EI-4)</p>
5. Resource Seeking (“start pushing”)	<p>“There was another competition...We were runners-up, and I think our first prize was 5,000 USD. So, this is where we started pushing, trying to source for funds from outside the country.” (Youhealth, A-1, II)</p> <p>“Then, because of [local incubator], first of all, that stuff alone is to give us the encouragement and every opportunity that came around, that would encourage us to apply for it and that is when we were able to apply for that grant...And we told ourselves that, ‘Even when this grant is done, we shall keep pushing and applying for other grants,’ because we saw the real problem that women were facing, and we wanted to address it. So, what I can tell you is, yes, [the incubator] really did wonders for us.” (WLab, B-2, I)</p> <p>There was one particular instance that “gave us a boost to apply outside”: Gaining admission into an incubator. The incubator was one of the first competitions they applied for. They got into its bootcamp, then kept on building [the prototype] and applying. (Womed, C-2, I; excerpt from interview notes)</p> <p>“Why we decided to send out proposals? What should I say after [award]?...We were just fresh graduates and we were actually part-time...So, the funding was to help us commit more time and be a little bit comfortable to work on this venture full-time.” (Empoweru, D-1, II)</p> <p>“We realized that we are feeling a big gap in the market...This was a global issue. It was important that we came up with a solution as fast as possible. So basically, we needed resources to make some major leaps...So generally, we needed to dedicate more time to this and get it moving.” (Empoweru, D-1, II)</p>

Appendix F.1: Additional Representative Quotes for Effects Observable Upon Catalytic Events

7.3. Appendix Essay III

Appendix A: Tie Formation Analysis by Year



Appendix A.1: Exemplary Tie Formation Analysis for Motherry

Appendix B: Strategic Versus Opportunistic Approach in Foreign Tie Formation

Venture	Strategic Approach	Opportunistic Approach	Representative Quotes
A. Youhealth		X	“So, currently we’re looking for [foreign] investors, trying to reach out through different circles, and we’ll see if maybe something comes up...So, we drop them emails, pitch to them, try to let them know what we are doing, and in case they are interested they can reach out to us and maybe have a discussion about funding.” (A-1)
B. WLab		X	Margaret is proactively seeking coaching and networking opportunities. Initially, she asked me [interviewer and author of this study] to connect her with Medtech experts in Germany. She might come visit Germany again in spring next year and has asked me whether I knew any Africa-relevant actors in my network around Munich that I could introduce her to. (B-1; excerpt from interview notes)
		X	“So, with this whole [foreign accelerator] program, it was an eye-opening program for us, introducing us to different [foreign] investors, telling us about which specific investors we should look at and how we should approach the investors. What do we really need to do before we approach our investors and what exactly do we need from them? So, it was a very good program.” (B-2)
C. Womed		X	[Asked about his network’s value for the venture] “There is having a useful network. Having a big useless network, well, that’s a very bad word, but also having a small useful network. Me, I’ve tried to position myself always in this way of, I put myself out there. I try to go for meetups, events, startup events, computer events, to get to meet people.

		That helps because even now the job that I am doing right now, I got it because of my network, because I have been giving a lot of talks about machine learning and giving trainings. That's how these guys identified me and then they reached out to me to recruit me." (C-1)
	X	"It's good to have that local network, but also good to know your international networks." (C-1)
	X	"So, we came together and then just started applying here and there and whenever we would go to apply for [domestic or foreign] competitions, where we would not win the money, we would at least win some bit of incubation and that also exposed us to more solutions, exposed us to more [domestic or foreign] people, more networks, more connection until where we are right now." (C-2)
D. Empoweru	X	[Asked about fundraising going forward] "So that is a part of the strategy. After clinical trials we have eliminated most of the risk. And we can actually take on [inevitably foreign] investment funding. Get financing actually. Yeah investment financing and we can also get good partnerships. So that yeah the partners is able to invest resources into whatever part of the bargain it is. And we hope by the time the patent will be coming too. So, we can also start licensing. Yeah. That is, that is the plan, like yeah - investors, partnerships, licensing." (D-1)
	X	[Asked about domestic and foreign partnerships] "So, partnerships... We are looking at de-risking, like we have said. So, just want to reduce the risk, maybe related to clinical practice or clearance. So, we look for a person in that area who has done, who has developed a product and had it tested, went through clinical trials and approved them. So yeah, that may be the person to partner with...who can help us...How can they help us reduce the risk." (D-1)
	X	"Now we started a bit of selection on what...we applied to [mostly applied abroad]. Yeah. And then it became more strategic." (D-3)
	X	[Asked why they currently seem to focus on seeking domestic partners] "There will be stages when we [again] engage a lot more with international companies. But currently since we are developing the product within this space, we are currently engaging a lot more with the local partners." (D-3)
	X	"For example, if your goals do not align with the person that is funding [usually foreign]. That's, that's a no-go area. Because their, their expectation and goals divert so much. Hm, some do not have maybe good intentions. They may...basically want the idea for them." (D-3)
E. Motherry	X	[Asked how they coordinate partnerships] "[We] decide...according to the need design, needs and services available." (E-2)
	X	[Asked about the time investment of attending conferences] "Mostly we look at also conferences, which are in our line of work, not every conference. Because there are so many conferences around. If you are to attend conferences, then it means that you will spend most of your time at conferences, which means you lose time for work and doing the groundwork, which is the most important." (E-1)
	X	[Asked how they coordinate partnerships] "We know that once we set our goals we say this year, we need to achieve this. How are we achieving this? So, we look at the means of achieving this. We know that if we are looking at maybe improving the accuracy of our device, or we are focusing on contraction, how are we going to be able to achieve this? We have enough expertise. We have all the tools that are needed to do this. If we don't have them, how do we get them? So that's how we keep track of [the partnerships]." (E-1)
	X	"So now what we're looking out for are [domestic or foreign] partners that are already in this line, who are already into manufacturing medical devices and those ones, whose mission it is to also work with others and help them build their ventures around the same line of products. So what we are looking at is that we have our vision, we have objectives. So we want to see which other partners have their vision that aligns with our objective so that we will be able to approach them and see how we can work with them." (E-1)
	X	[Asked about the time investment of attending conferences] "But we also found attending such events, they always bring connections to other people that are doing sort of related to work in this field. So you come to see what they are doing and how you can improve maybe the business model." (E-2)

F. Mcare	X	[Talking about another venture] “But he's moving all over the world, collaborations, right? But we're not seeing the fruit of the collaboration, and we need the device to get working. So he has marketing partnerships. But what is lacking are the research partnerships. That's the thing.” (F-2)
	X	“The recent [domestic and foreign] partnerships come in when you are identifying the problem...But at the same time, it's important to deal with the market research, the little business bit. So I'd say this should be hand in hand, but the starting place is always that research angle. I should say they should move hand in hand, but I'm still learning.” (F-2)
G. HealthQ	X	[Explaining their approach to forming partnerships, almost exclusively foreign] “It always depends on the type of partnership you have with an organization. Not every grant, not every money is the right money for you then that's why some are stressed.” (G-1)
	X	[Asked about how they initiated research collaborations with foreign partners] “So, we had to be so strictly strategic on what we want and how to get there.” (G-1)
	X	[Asked about latest foreign acceleration program] “For every partnership, we go into it with an objective and at that time, we realize that there's something that is going to take us to the next step. So, over time, I've learnt to, yes, I'm open for training in policy, in processes, but also to look at opportunities where they're very minimal...If we look at these more successful places. Yes, [foreign accelerator] was a small step, but also successful step, but actually opened up a huge door into us being able to sit with partners, being able to sit with folks like [foreign foundation] and getting [foreign accelerator] open up all these doors to other big players and us having a two-way communication to these big players. So that's one, but it's not the ultimate goal, because it's one thing to talk to the big player and it's another thing to make sure that big players now get extra funding to you and do you know, at what the point of penetrated market.” (G-1)
H. NeoSys	X	[Asked about which partners they approach where] “For us, it has been about building networks from wherever and not like – somehow opportunities are represented just through our networks. Because [foreign foundation] was a [North America]-funded organization, so that means most of the networks or the grants will come through the [North America]. But then also like [Asia] is also.../ we found a partner there. We've done some work with them, but we are also trying another one in [Europe] because of the different networks that we are building and trying to establish just so we can survive in the market and learn as much as we can.” (H-1)
	X	[Asked how they coordinate partnerships] “Honestly, no. I don't like...We all just sat down and said okay. Like, this is what say we'd bring to the table. Like, but we never ever sat down and said ‘Okay these are the [foreign or domestic] funders we need to bring on board.’ like it wasn't systematic. Most of them have been because/ I think all of us in the company we are very good at networking and meeting people and going out there. We don't have like a strategic approach to gaining partnerships.” (H-1)
I. Trustly	X	[Asked how they coordinate partnerships] “So the strategy was always about what are the immediate outcomes for these [foreign or domestic] partnerships more than the long term. Because as a young company, I am looking at every day.” (I-1)
J. ChildTrack	X	[Asked about fundraising going forward] “We need a strategy, we found that we need to be in the faces of some of these people [foreign funders], we need to be at the events that they attend, so we are thinking of how we can invest some part of the company money to go to some of these events, actually meet these people who are potential investors. So, we are thinking of re-strategizing, so initially, I would go pitching, like to different firms, and different events.” (J-2)
	X	“We are also thinking of...there is a strategy that some companies use, you know, they have people who do PR [public relations] for them, in Europe. So, if we actually have people who can help us do that kind of PR, we can see how we can work with them, I think for me personally, I have discovered that we need to be in the face of that person we want to approach, but sometimes the person we want to approach is not here, they are somewhere else, so...” (J-2)

X	“We invest in preparation of these [foreign] pitches, we invest money and time and we don’t take it for granted, but it is a worthwhile investment.” (J-2)
X	[Asked how they prioritize fundraising activities abroad] “You look at the company finances, you prioritize, and that question has come up before, because some of the events, we have to finance ourselves to participate, so the company has to invest in you to actually travel, so we look at the finances that are available, and we also look at the core objectives like I have shared before. So, as of now, our decisions are made along those lines. So, finances and the viability, the potential to raise money, for example, you can invest \$50 to raise \$200, that’s a plus.” (J-2)
X	[Asked about foreign funder] “We have had people come from abroad to come and talk to us about investment and we take all these calls...or any budget you want, there is no cap and they have all these interests that are so different from what [ChildTrack] is, and we’ve had to turn down such investors, because you see that at the end of the day, the company is going to lose itself, you get caught up in sell-sell-sell-sell, they don’t care whether the product is good enough, they just want sales-sales-sales.” (J-4)
X	[Asked how they look for expertise domestically or abroad] “When we have needs, we look at the company needs, and then we seek them out, we move to their offices, they don’t have to look for us, we look for them, because we need them.” (J-2)
X	[Asked about a foreign partner] “So we want to know how can we permanently benefit from them or have a partnership where we both benefit. Even in other developments we can/ [ChildTrack] has quite a vision and the objectives are quite big and we’re not going to make only ultrasound machines. We hope to make other different diagnostics.” (J-1)

Appendix B.1: Representative Quotes for Strategic Versus Opportunistic Approaches