# From Necessity to Opportunity: Scaling Bricolage across Resource-Constrained Environments

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## ABSTRACT

***Research summary:*** Enterprises in low-resource contexts often rely on bricolage (i.e., making do by applying resources at hand to new problems). However, bricolage has traditionally been regarded as a way to temporarily get by, potentially constraining growth if continued over time. This has been explained by factors such as limited development of learning competencies. Surprisingly, we encountered a social organization appearing to use bricolage to scale extensively into a variety of locations. This puzzling observation prompted our research question: Can bricolage be scaled, and if so, how and why? We embarked on a process study of this organization, leading to a novel conceptual model of scaling bricolage: as a low-cost replication process of heuristics, enabling fit with a diversity of local environments, as well as cross-unit learning.

***Managerial summary:*** How do organizations emerge, survive, and scale in resource-scarce environments? Traditional scaling models tend to rely on considerable financial resources and/or fail to be truly sustainable. In contrast, we identified and studied an organization in Sub-Saharan Africa that we argue used simple rules to scale bricolage – making the best out of what is at hand – successfully in low-resource contexts. Our paper provides a novel conceptual model of scaling bricolage: as a low-cost replication process of heuristics, enabling fit with a diversity of local environments, as well as cross-unit innovation and learning.

**Keywords:** Bricolage; heuristics; low-resource environments; replication; Sub-Saharan Africa.

## INTRODUCTION

Enterprises in low-resource contexts tend to operate under extreme scarcity. Achieving their objectives often depends on the extent to which they can apply existing resources to new use—a pattern of behavior known as bricolage (Baker and Nelson, 2005; Steffens, Senyard, and Baker, 2009). Bricolage enables enterprises to not only access the resources needed to put their ideas into practice, but also to discover new ways to address previously unmet needs at low cost (Anthony, Johnson, and Sinfield, 2008; Bacq et al., 2015).

The bricolage approach has traditionally been identified as strategically relevant for new enterprises or early-stage companies, but is potentially also important for multinational firms exploring new, low-resource markets on small budgets or when employees take on new challenging tasks or projects with limited or no additional resources (Halme, Lindeman, and Linna, 2012). Bricolage can thus be a process for both forming an initial strategy using minimal resources and forming a strategy that goes beyond the bounds of current activities (Ott, Eisenhardt, and Bingham, 2017).

However, bricolage has traditionally been regarded as a way to temporarily "get by" and as negatively affecting growth and performance if continued more broadly over time (Baker and Nelson, 2005; Sonenshein, 2014), due to factors such as managers spreading their efforts too thin and an inability to develop learning capabilities (Baker, Miner, and Easley, 2003; Johannisson and Olaison, 2007; Miner, Bassoff, and Moorman 2001; Sonenshein, 2014).

Surprisingly, in our research on entrepreneurship in resource-constrained environments, we encountered a social organization—Community Org (CO)—which out of necessity appeared to scale to a large variety of settings using bricolage. Analyzing this "extreme case" (Eisenhardt, Graebner, and Sonenshein, 2016), we sought to understand how this organization seemed to be able to resolve the paradox of consistently using bricolage while being able to scale successfully, thus prompting our research question: Can bricolage be scaled, and if so, how and why?

To answer this question and capture the process of bricolage in this new context, we used an inductive case-study approach (Eisenhardt et al., 2016). Theory-building from cases can effectively reveal new concepts and logics of organizing (Flick, 2009), unpacking complex patterns over time (Sonenshein, 2014; Sonenshein, 2016; Yin, 2003). We focused on CO, an organization set up in Bridgetown, an impoverished township in the Cape Flats in Cape Town (South Africa), which subsequently expanded to other resource-constrained locations. Addressing the intricate problems that drug addicts and other vulnerable people in these townships faced, CO developed education, incubation, and IT-training programs in areas where most

people lacked formal employment. In 2018, it had scaled to 20 locations worldwide, without losing its bricolage approach—in fact, seemingly leveraging it to scale successfully.

Having studied this intriguing organization in depth and over time, our paper offers several theoretical contributions. First, by developing new process theory on how and why bricolage can be scaled, we resolve the paradox between bricolage and scaling. The organization we studied helped develop and operate a large number of outlets that delivered their services in a similar way; that is, it *replicated* (Winter and Szulanski, 2001; Winter et al., 2012) its approach. The organization extracted simple yet effective rules ("heuristics"; Bingham, Eisenhardt and Furr, 2007; Bingham and Eisenhardt, 2011; Ott et al., 2017) from its operations at home that guided the identification, selection, and implementation of opportunities, and transferred these to other locations and countries (Winter et al., 2012), while contextualizing them to local settings (Williams, 2007). This focus on replicating bricolage heuristics enabled carefully selected parties in a variety of settings to identify and reap local opportunities for value creation (Baker and Nelson, 2005), as part of an overall low-cost scaling strategy that enabled adaptation/innovation at both the local and organizational level. Our new inductively derived process theory helps us understand how and why barriers to scaling bricolage as traditionally identified—such as lack of learning, of effectiveness, and of quality standards (Baker et al., 2003; Baker and Nelson, 2005; Johannisson and Olaison, 2007; Miner et al., 2001)—can be overcome by replicating bricolage heuristics in a low-cost way, enabling fit with a diversity of resource-constrained contexts.

In turn, our findings on this social organization may also help us better understand a well-known empirical puzzle in the management literature: why so few social enterprises scale up (Fosfuri et al., 2016; Light, 2008). Social enterprises typically have limited resources and face a great variety of local contexts in terms of the needs of users across social, cultural, and institutional settings, requiring local fit (Austin et al., 2006; Fosfuri et al., 2016; Zahra et al., 2008). Traditional social organizations using a bricolage approach will likely face similar barriers to scaling as traditionally observed, such as managers spreading their efforts too thin and an inability to develop learning capabilities (Baker and Nelson, 2005). However, as our process model shows, bricolage heuristics can be replicated at low cost, while being adaptable to a variety of settings and enabling learning at the local and organizational levels. Hence, social organizations following this process approach might successfully overcome the traditionally observed barriers to scaling.

Importantly, social organizations can be seen as an interesting "extreme" case, where our insights may also apply to other organizations that aim to innovate and scale at low costs across a variety of contexts. Indeed, prior literature has shown the importance of bricolage for small as well as large, multinational

companies, for example, to facilitate innovation in resource-constrained contexts (Halme et al., 2012; Linna, 2013). However, in this literature, bricolage is usually seen as a local source of low-cost innovation. By showing how innovation-enhancing bricolage can be replicated at scale across a diversity of resource-constrained contexts, we enhance our collective understanding of how an approach of low-cost innovation (see Anderson and Markides, 2007; George, McGahan, and Prabhu, 2012; Radjou, Prabhu, and Ahuja, 2012; Simanis and Hart, 2008) can be scaled across settings, transcending locally disconnected initiatives and benefits.

## THEORETICAL BACKGROUND

### *Bricolage*

Low-resource contexts are typically characterized by a shortage of financial, human, and material resources, constraining local production, exchange, and consumption (Chliova and Ringov, 2017; Linna, 2013). This resource scarcity may entail a lack of employees with the right formal skills (human resources), a lack of adequate facilities (material resources), and a lack of capital (financial resources). Refusal to accept these limitations is often the starting point of bricolage, on which enterprises in such contexts often rely (Linna, 2013; Phillips and Tracey, 2007).

Building on early work (Levi-Strauss, 1967), bricolage has been conceptualized and later operationalized as comprising three elements: (1) making do: a bias toward action, disregarding the limitations of commonly accepted definitions of practices, material inputs, and standards; (2) using resources at hand: relying on existing and previously undervalued or underused but readily available resources rather than purchasing new ones; and (3) combining resources to apply to new problems: reusing and applying resources differently than originally intended or used. In short, bricolage is about questioning resource constraints and utilizing what is at hand (Baker and Nelson, 2005; Halme, Lindeman, and Linna, 2012; Perkmann and Spicer, 2014). This contrasts with resource-seeking approaches focused on goal-directed acquisition of resources to planned applications (Desa and Basu, 2013).

In fact, entrepreneurship has been defined as "the process by which individuals — either on their own or inside organizations — pursue opportunities without regard to the resources they currently control" (Stevenson and Jarillo, 1990: 23), which can happen either via resource-seeking (e.g., raising investment or grant funding) or via making the best of what is at hand (bricolage). For entrepreneurial firms, approaches such as experimentation, creativity, bootstrapping, and improvisation often play a major role (Brown, Davidsson, and Wiklund, 2001; Stevenson, 1983), and bricolage often overlaps with approaches such as

improvisation (Cunha et al., 1999). However, as "deliberate and substantive fusion of the design and execution of a novel production" (Miner et al., 2001: 314), improvisation differs from bricolage (Baker et al., 2003; Miner et al., 2001) for two reasons: (1) Actors practicing bricolage may plan well ahead, whereas improvisation implies temporal and substantive convergence of design and execution, with actors designing and enacting the pattern in the same activity (Baker and Nelson, 2005; Baker et al., 2003; Desa, 2013); and (2) bricolage is limited to resources readily at hand, whereas improvisation is not necessarily limited in this sense and often focuses on novelty (Baker and Nelson, 2005; Gong, Baker, and Miner, 2006). A related concept such as bootstrapping similarly not only includes elements of bricolage (e.g., the creative use of resources), but also targets resource-seeking (Desa, 2011; Gong et al., 2006).

Born out of necessity (Duymedjian and Rueling, 2010), bricolage may facilitate new idiosyncratic combinations and innovation (Di Domenico, Haugh, and Tracey, 2010; Halme et al., 2012).
Some companies have therefore used bricolage intentionally as a design philosophy (Carstensen, 2011; Louridas, 1999) and it has been applied across a variety of settings: from early-stage enterprises (Baker and Nelson, 2005) to multinational for-profit companies operating in resource-constrained environments (Halme et al., 2012). It is particularly relevant in emerging industries and in crowded, competitive markets, where declining resources favor firms with strong bricolage abilities, contrary to competitors requiring exactly the right types and levels of resources and forced to forgo opportunities (Baker and Nelson, 2005). Employees taking on challenging new tasks without additional resources may also use bricolage, and their jobs evolve accordingly. In these settings, bricolage becomes an important mechanism for early-stage exploration and exploitation, enabling employees to make unusual and unexpected use of a variety of amateur skills and resources at hand (Baker and Nelson, 2005). However, bricolage has generally been seen as a way to temporarily get by, potentially reducing firm performance over time and at scale (Baker and Nelson, 2005; Sonenshein, 2014).

### *Barriers to scaling bricolage*

Previous research has shown that after a period of bricolage activities, resource-seeking approaches start to prevail (Baker and Nelson, 2005; Desa and Basu, 2013). Whereas bricolage has typically been associated with early-stage growth, at later stages, three factors potentially cause bricolage to constrain growth (Baker and Nelson, 2005; Sonenshein, 2014). First, a bias for action often causes key actors to spread efforts too thin. Although positive in the short term, it may lead to ineffective tinkering, wasting efforts, and a lack of focus and strategic planning when the organization expands (Baker and Nelson, 2005; Miner et al., 2001),

thus becoming a bottleneck to growth. The second factor is an inability to develop learning competencies, due to a lack of cumulative solutions: The focus on forming "improvisational competencies" may deter the building of organizational capabilities, because solutions are usually regarded as merely temporary (Baker et al., 2003; Miner et al., 2001). Local second-best solutions emerging from bricolage may deter the adoption of more permanent solutions (Baker et al., 2003; Johannisson and Olaison, 2007; Miner et al., 2001). For example, bricolage resulted in emergency solutions to the Apollo 13 crisis, which were not transferred to later launches (Senyard et al., 2014) and might have enabled learning along the way. Being focused on temporary and local ad hoc solutions may limit the ability to transfer and improve solutions beyond the specific context, thus limiting learning (Baker and Nelson, 2005). Third, the initial focus on satisficing rather than on optimizing and interactions with suppliers providing substandard inputs (Senyard et al., 2010; Senyard et al., 2009) often leads to the "easiest possible solution" rather than consistently high-quality solutions, which are necessary at large organizations. Firms with high levels of bricolage therefore tend to have difficulty meeting quality standards, which limits the scope of products to those audiences that are open to accepting sub-standard quality – constraining growth to other audiences.

In sum, understanding the process of bricolage for enterprises in resource-constrained environments is crucial (George et al., 2012). However, despite its importance, whether (and if so, why and under which conditions) bricolage can be scaled is doubtful (Baker and Nelson, 2005; Sonenshein, 2014), thus prompting our research question: Can bricolage be scaled, and if so, how and why?

## METHODOLOGY

Inductive theory-building approaches are particularly useful for studying processes (Sonenshein, 2014; Yin, 2003). To better understand the scaling process, we identified an enterprise that satisfied two key indicators of scaling—significant expansion and growth, in terms of opening multiple sites over time, and of expanding the target group it served, in terms of the number of clients (Desantola and Gulati, 2017; Josefy et al., 2015; Uvin, Jain, and Brown, 2000). From inception, CO opened at least one hub per year, growing its client base by at least 30% per year.

Organizations with social goals serve well as "extreme cases" (see Eisenhardt et al., 2016) for studying strategic phenomena such as scaling, because social problems, needs of target groups, partner characteristics, and so on tend to be context-specific, and often solutions cannot be readily scaled to other locations. Hence, even if organizations have a good understanding of local problems and needs in their initial location, they will typically have problems scaling, because the same understanding may not apply in

the new location (Austin et al., 2006; Busch, 2014). Hence, to explore the fundamental tension of scaling – that as an organization scales and the variability in the contexts it operates in increases, locally adapting becomes more important– our social organization, Community Org (CO), served as an intriguing "extreme case," in particular, because this organization appeared to scale using bricolage.

CO was a social enterprise working effectively with local communities in resource-constrained settings (i.e., settings in which people are lacking employable skills, adequate training, and financial resources; Chliova and Ringov, 2017; Linna, 2013). CO focused on information technology (IT) skills training and, more generally, reducing inequality through access to basic education, aiming to offer a pathway to eventual employment. In 2018, CO and its affiliates had over 100,000 graduates.

CO started in 2008 in South Africa's impoverished Cape Flats, addressing local challenges such as drug addiction. CO initially developed simple IT training modules, teaching community members to use social media to share their stories online and connect with like-minded people worldwide. Toward the end of our study, the central hub had a training center providing courses on social media and related subjects, an enterprise incubator for starting and supporting new enterprises, a community work division providing counseling, a products division offering social-media and market-entry consulting, a research institute co-publishing papers with outside academics, a networks division coordinating partners worldwide, and a consulting arm advising companies and governments. Internal documents show around 30% of CO revenues came from sponsorships, and 70% were self-generated. In addition, CO identified organizations and individuals that might enhance its mission, and developed partnership agreements with them. Local organizations often complemented their own services with components of CO's approach and formed a new "hub" in their own location (e.g., a hospice integrated CO's education methodology into its day-to-day operations).

After exploring CO's initial base in Cape Town, we studied the organization's scaling efforts in Sub-Saharan Africa, where scaling is particularly challenging due to weak formal institutions and a shortage of resources (e.g., skilled labor) (Busch and Barkema, 2019; George et al., 2012). For early-stage dynamics to have occurred recently enough for respondents to accurately recall important events (Huber and Power, 1985), we focused on hubs/outlets that had been operating for at least one and at most five years at the start of our study. We also studied the background of hub leadership teams, who came from local communities and had local experience. All hubs shared CO's mission and applied its methodology locally. The initial four hubs were located in Windhoek (Namibia), Iringa (Tanzania), and two districts in Johannesburg (South Africa). To better capture emerging patterns and enhance generalizability across Sub-Saharan Africa, we

incorporated two additional hubs: Gabarone/Botswana and Kampala/Uganda, which had already been part of our earlier extended data collection and satisfied the selection criteria. In total, we collected data about all active CO key hubs in Sub-Saharan Africa founded before 2013, located in low-resource areas and facing the challenge of surviving with limited resources. Local community members ran them all.

At the end of our study, four of the hubs remained in business/survived (Nadolska and Barkema, 2014) and accrued additional customers for CO (Desantola and Gulati, 2017), whereas two hubs (Johannesburg 1 and Gaborone) had closed/exited. The comparing and contrasting of "successful hubs" that remained in business with "failed hubs" that exited (e.g., Winter et al., 2012) enabled new insights into when and why the organization's scaling efforts were successful. "Discontinued" is a radical measure of failure. However, our interviews showed that the management team and local partners alike regarded the two disbanded efforts as unsuccessful attempts to transfer CO's approach (the other four were widely regarded as successful), which triangulated this "objective" measure.

Table 1 provides an overview of CO's central hub, as well as the six external hubs.

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***Data collection***

We collected data from January 2012 to June 2018. The first author collected data in three waves: at CO's headquarters in Bridgetown, at hubs, and with other stakeholders, such as universities. We applied between-method triangulation using interviews, archival data, and observations.

We conducted 54 interviews. We first interviewed six local academics, investors, and entrepreneurs to gain contextual information and to better understand the potential scope of the research. We then conducted four interviews with company representatives, and 44 semi-structured interviews with CO's management team, employees, hub leaders, partners, and community members. Consistent with the literature (Ozcan and Eisenhardt, 2009), we first focused on primary actors responsible for high-level decisions. We then "snowballed" for participant recruitment (Flick, 2009), by asking interviewees to recommend whom we should interview next. To increase interviewee trust, we immersed ourselves in the local community and offered incentives for after the study, such as feedback on scaling plans and workshops on business modeling.

Interviews typically took 50–120 minutes. We taped and transcribed when possible (Eisenhardt, 1989). When interviewees preferred not to be recorded, we took handwritten notes. The initial topic guide for staff and the management team was theoretically sensitized (Flick, 2009) using the strategy and entrepreneurship

literatures. We focused on the organization's emergence and scaling (e.g., "Which challenges did you face over time, and how did you tackle them?"), as well as context. The interview guide for external partners and hub leaders followed the same logic, using the same sections, but questions were adapted to context (e.g., "How does your hub relate to the organization?"). To trigger retrospective inspection, we asked respondents to remember specific events such as the opening of a new hub (Flick, 2009). We re-interviewed key actors during later rounds about new developments.

The topic guide was problem-focused but loosely framed to allow new ideas to emerge, and we combined question-and-answer sequences with narrative portions, facilitating within-method triangulation (Flick, 2009). We adapted the topic guide when new insights emerged from the data (Flick, 2009; Yin, 2003). To overcome potential retrospective bias, we asked participants not to answer questions that related to events of which they had no clear memory, and supplemented interviews with observation (e.g., team meetings and workshops) (Miller, Cardinal, and Glick, 1997). We also analyzed archival data (263 pages) including growth plans, strategy reports, presentations, meeting minutes, and public information (e.g., online profiles) to contextualize the data. Purposive sampling enabled us to focus on the scaling process and increased the robustness of emerging insights (Eisenhardt et al., 2016).

***Data analysis***

We first analyzed CO's Cape Town hub case history (Eisenhardt and Graebner, 2007), and then the case histories of individual scaling efforts ("hubs") and the chronology as it emerged from the data (Eisenhardt, 1989). As we compiled the data, we focused on process patterns of time-ordered events, effects, and respective relationships (Sonenshein, 2014), in within-case and cross-case analyses. We used the constant comparative method to detect similarities and differences between scaling efforts ("hubs") (Flick, 2009). We used a coding process related to our initial question on scaling and later on bricolage, to better understand the key issues and to identify the underlying social processes (Strauss and Corbin, 1990). We identified first-order concepts (e.g., "encouraging partners to engage people with lack of formal skills") and assembled them into higher-order themes such as "instilling labor heuristics." Then, we grouped these themes into aggregate dimensions (e.g., "transferring bricolage heuristics") to form the basis of our emergent framework (Flick, 2009). Table 2 shows how we moved from data to theoretical concepts for the core mechanisms.

We went back and forth between our data and emerging theoretical anchors (e.g., related to bricolage) until we reached theoretical saturation (Flick, 2009). To improve consistency and transferability, we discussed emerging insights with colleagues and industry experts, during multiple extensive visits and

regular interaction with local parties over the course of the study (e.g., using Skype). Toward the end of the study, we asked CO's founder to critically evaluate our findings (Flick, 2009). We integrated this feedback into our final conclusions.

## FINDINGS

CO emerged out of Bridgetown, in Cape Town's Cape Flats, a sandy stretch of land on the outskirts of the city. The Cape Flats are a legacy of the Apartheid area and face challenging conditions, such as run-down buildings and high drug-related crime rates (data assembled from archival information, interviews, and local observations). A 2011 census showed less than 5% of the population had achieved grade 12 or higher, around a quarter had "some secondary" education, and most had "no schooling" or "some primary" education (Statistics South Africa, 2012). Across Cape Town, around one third of learners between grades 10 and 12 dropped out of school due to factors such as teenage pregnancy and a lack of sufficient funds (Western Cape Government, 2016). Household surveys reported that 23% of adults earned a permanent salary, with youth unemployment rates exceeding 50% (de Swardt et al., 2005).

In this context, CO established its central hub and developed an approach that it scaled to different locations ("hubs"). Although our research interest focused on scaling, studying CO's gestation period helped us understand the patterns behind its scaling process and core activities. Figure 1 depicts the conceptual model that emerged from our data of the process of how CO developed and transferred its bricolage activities.

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## EMERGENCE OF THE BRICOLAGE APPROACH

CO's founder, Marlon, grew up in Cape Town during the Apartheid era, when gangs and crime were on the rise due to high unemployment rates and social inequality. Raised by a single parent, he was inspired to study IT to improve his life chances. He had never owned a computer before but started teaching fellow students and used the money to support his family, including a younger brother involved in a local gang. Marlon realized that although community members in the local Bridgetown area had lost hope, the solution to the community's problems actually resided in those people. He described the situation as follows:

> Imagine a community where people have lost all hope. The Cape Flats are known for high levels of unemployment, poverty, drug addiction . . . our journey started with the idea of "if we can change one person's life by sharing a story of hope, and then inspire others, that's what it's all about."

Thus, in 2008, building on the work of his father-in-law, a local pastor, Marlon mobilized 14 local community members, mostly ex-gang members, to set up an organization they would incorporate in 2009 as Community Org (CO). CO started with a simple IT-training program to give community members the opportunity to learn transferable skills and share their stories, hoping they would find employment or set up their own enterprises later. A management team member illustrated that it was about "teaching them computers . . . using social media to tell their story. That was really the only thing they had, their story."

CO started engaging community members (e.g., former drug addicts or ex-convicts) who were considered as lacking formal skills or even as "unemployable"—for example, former gang members—to become contributors ("champions") without having to have formal qualifications. A staff member discussed that "when I started here, I did not have a certificate. People in this part of town don't do 'certificate.' They just said, 'You are here, just start and tell your story, you will develop, you will teach, and we develop together.'"

Another staff member explained that "there wasn't much here, lots of gangs and broken hearts… [they] looked around and said, 'Everyone can bring something to the table, let's have an open mind.'" This approach was born out of necessity, after more formal resource-seeking approaches (e.g., funding proposals) were unsuccessful:

> We tried writing proposals. . . [but] most of the people that we were working with were gang members . . . it was just not a very appealing group of people…so nobody wanted to give us any money…That made us realize, maybe we could think about how we can create value [differently]. (Founder)

People often started as participants in training programs and grew into teaching and management roles. A staff member stated that he "grew up here, in a rough neighborhood. . . . I was taking the program, I stayed, now I can help other people in the community."

CO made do with discarded or underutilized materials such as old computers and facilities. The founder, Marlon, illustrated:

> There was this old computer that was stuck in the ceiling of an organization nearby. We took it from the ceiling, and [also] borrowed the old computers from people who didn't use them. That's what we used for the training. . . [And] we saw there was an unused storage room in [the local center]. We asked, "Can we use it? We will clear it out." That's where we did our trainings.

CO also started doing "pop-up trainings" in old but easy-to-access spaces (e.g., garages), and repurposed an open-source e-learning solution of the local university, turning its unutilized chat function into a

messaging component of CO's activities. According to internal documents and interviews, CO built its mobile counseling solution based on this chat function.

Thus, rather than regarding the scarcity of money, skills, and an educated workforce as a limitation, CO's team engaged community members without formal skills as teachers, and used discarded, underused, or undervalued materials for training. This approach of *questioning resource constraints* and *utilizing what is at hand* resembles the logic of bricolage (Baker and Nelson, 2005; Desa and Basu, 2013). CO made do with previously underutilized local community members and resources, applied material and human resources readily at hand, and recombined them for new use (e.g., former drug addicts telling their stories as teachers). It became a general approach and way of thinking ("mindset") that gave a broader orientation to how to approach challenges, and essentially reversed "waste" and released energy, potential, and hope.

***Developing bricolage heuristics***

To structure its approach, CO started to develop simple rules of thumb on how to operate, making the best of what was locally available, at low cost. These rules guided behavior, leaving room to experiment, captured in artifacts such as a "user manual" (a collection of simple rules; Bingham and Eisenhardt, 2011; Bingham et al., 2007). The manual included suggestions for issues such as "ways to collaborate with whoever comes here," as well as a low-cost budgeting approach (see below).

An example of a simple rule that became part of CO's operating model as a low-cost way to overcome resource constraints was the "multi-generational model." The simple rule was that bigger projects need to usually involve three "generations" of members: an experienced one, a relatively experienced one, and a new one who just joined the team. Generations of previously underappreciated community members were encouraged to grow into their roles, acquire appropriate skills and knowledge at their own pace, and experiment on the fly, guided by more senior members. This enabled them to add and recombine skills along the way (i.e., to practice "skills bricolage"; Desa and Basu, 2013). The founder described the benefits of this simple yet effective (low-cost) rule, which was subsequently captured in written form for other partners as well:

> [It] enables young people to draw wisdom from the elders, whereas youth with their passion and energy reinvigorate activities…even if they don't have clear skills yet. It also provides the opportunity for older adults to invest in young people by leveraging their experiences. This means that all tasks will have multiple generations who will participate and lead. When the first generation of our team working on a project is not available, then the other two generations will be available to assist and take over.

This provided a constant inflow of readily available human resources, previously seen as not useful, due to traditional notions of "valuable skills." Often without formal skills or training, staff and clients were free to build their knowledge and skillsets on the job, and to identify and support the next cohorts of "champions." A staff member said, "All of us went through it. Now we select the next generation and grow with it…we all learn along the ride [rather than being formally trained]." This approach turned out to be an effective way to develop local capacity in an environment where formal skills were lacking. A staff member explained that "by doing this, we develop a big internal pool of technology consultants that deliver on our services."

Thus, CO developed simple, low-cost rules, based on a strong awareness of the local context and its constraints, overcoming traditionally perceived limitations. The literature refers to simple rules that guide the identification, selection, and implementation of specific opportunities chosen from a set of possibilities, as heuristics (Bingham and Eisenhardt, 2011; Bingham et al., 2007). We thus labeled this theme *developing bricolage heuristics*, which we define as "the structuring of simple low-cost rules based on questioning preconceived resource limitations" (see Table 2). These "bricolage heuristics," which were later transferred (see below), allowed CO to identify and leverage local opportunities for value creation by using local resources (skills, technology, information, staff), enabling low-cost ways of operating.

In sum, CO initially used bricolage when its funding proposals were unsuccessful. However, surprisingly, as we discuss below, CO pragmatically identified opportunities for transferring its bricolage heuristics to other locations, which became the foundation for its scaling process.

## TRANSFER OF THE BRICOLAGE APPROACH

After starting up in Cape Town, CO expanded to Namibia, Nigeria, Tanzania, and other locations. A management team member explained that "we quickly expanded into many different locations, working with local organizations and community leaders." The team started identifying elements that had worked locally and developed them for expansion. Several mechanisms emerged from our data, which we discuss below.

### *Selecting aligned partners at low cost*

To be able to *identify potential partners*, the team asked visitors, former clients, and people they met at conferences to recommend potential "champions" (individuals or organizations embedded in their respective communities) who could leverage their mission in other locations. The team also leveraged individuals who

attended CO's programs and moved back into other communities. Thus, it identified potential partners at low cost. Internal reports and interviews documented CO's focus on *assessing the receptiveness* to its bricolage approach, that is, the willingness of a potential partner to consider or accept these new suggestions and simple rules. The central team assessed potential partners' receptiveness using both face-to-face and online interactions. An initial Skype call or visit enabled the team to explore potential collaboration and understand the context, to see if and how CO's approach might be effective in that particular setting. A staff member explained that "we meet the people, we see what they have, we see where we can help; it helps us to help them."

Managing director René, whose father (the local pastor mentioned above) supplied CO's first office space for free, stated that "the most challenging thing is . . . when we collaborate with a local community organization, [that] the heartbeat is the same . . . They [need to] believe in it." Indeed, CO's scaling process stalled when potential partners expected monetary resources from the start (either from CO or from other sources); in the words of a staff member, "going to apply for funding and waiting for the funding to come . . . it's never going to work...it's not sustainable."

The former hub leader of the "failed" Johannesburg 1 hub reflected self-critically that they "were focused more on bringing in the resources." In Botswana, another scaling effort that did not work, CO's founder observed the repercussions of selecting partners that were not receptive to CO's approach:

> They used the approach from traditional business: have the budget, so you rent, and you spend…we didn't play to our strengths. We were not looking for how to make the best out of what's there, to be intentional. Then, when it came to crunch-time with regard to finances, instead of re-thinking the model, they went further down the path with the expensive model they had. They were used to receiving catered food. They paid for rent. They did not leverage networks to minimize costing, people were not that engaged, not contributing. They then had to take out loans to sustain the efforts. They [also] spent a lot of money on activating marketing. Most hubs don't have marketing budgets, they use word of mouth, which engages people. Here in Botswana, there was money spent on radio, etc. It diverted focus from doing to talking [and eventually failed].

Correspondingly, the former leader of the Botswana hub reflected that "we failed to read the environment although we had a fantastic idea and product."

Interviews and observation revealed that although initially CO occasionally supported funding proposals, over time—and based on failed scaling efforts—it learned to only accept partners that were open to its approach, and to filter out individuals and organizations uncommitted to creatively engaging local communities and making the best of available resources in creative ways.

In the strategy literature, simple rules of thumbs for choosing an opportunity, such as which types of partners to target, have been referred to as "selection heuristics" (Bingham et al., 2007). They narrow the range of opportunity choices by specifying which partnerships to pursue and which to ignore, and thus help provide focus. CO embarked on defining heuristics for partner selection at low cost. We thus captured this step as *selecting aligned partners at low cost*.

***Transferring bricolage heuristics***

CO used simple, low-cost ways to transfer its approach to old and new hubs. For example, it leveraged conferences that its team members attended, to also visit potential locations of new hubs; it connected its partners—and potential or existing hubs—to local events to give them an "excuse" to visit CO's HQ; and it leveraged "virtual check-ins" via Skype and other low-cost technology such as its internal online platform and social-media channels. For example, CO coordinated with hubs in Namibia and Tanzania almost daily through social media. In South Africa, Mixit, the local networking platform, was an effective, low-cost, and commonly used way to communicate; in other countries (e.g., Namibia), social-media platforms such as Facebook fulfilled a similar role.

The "instilling" was made easier by focusing on low-cost technology that was accepted by local communities and was locally entrenched, to "interact with people [where] they anyways are" (founder), which did not require additional resource investment. A staff member explained that "we realized that rather than coming up with new fancy technology, we should use the technology people anyways use, like simple mobile phone[s] or sometimes Facebook, and integrate our services into these, to really be part of peoples' lives."

By contrast, failed efforts focused less on community acceptance and more on cutting-edge technology. For example, a staff member mentioned the example of "a tech solution which was driven by . . . internal resources, not community . . . we did not ask them first what they actually needed. People did not use it." Consequently, CO encouraged its team to leverage existing, locally entrenched technologies, rather than to come up with its own sophisticated solutions.

The outcomes of our data analysis indicated that from the outset, CO encouraged partners to engage unemployed people and unused materials and to question resource limitations. A partner observed that "they were going in[to] different countries . . . and said, 'Look, this is a simple way you can take whatever you have and make it count with the people you love.'" A management team member highlighted that CO structured ideas "on what potential ways that can work are—and then people can run with them the way it

makes sense to them." Yusuf, Tanzania's hub leader, a local chicken farmer who developed the ambition to help Tanzania's youth develop their potential, described how CO inspired his thinking:

> [They taught me to] start from where you are and use the resources you have, that's how things happen [now] . . . looking at what we have . . . It's the realization that we can make things happen [ourselves]. It's inspired. You can do things on your own. It gives you dignity. It's the opposite of being in need, of being a victim.

Thus, CO encouraged others to leverage available, previously undervalued or underused resources to address new issues. This approach resembles transferring the logic of bricolage (Baker and Nelson, 2005) and motivating others to use it in their own context. How did CO operationalize this approach? As we discuss below, CO transferred heuristics with regard to labor/skills, materials, and networks. These "procedural heuristics"—simple rules that specify the actions to be taken to capture and execute chosen opportunities (Bingham and Eisenhardt, 2014)—emerged in three categories:

*Labor/skills-related heuristics.* CO went beyond just inspiring a more abstract change in perspective: it started to articulate and share simple low-cost rules with partners, such as concrete suggestions on how locally available (labor) resources at hand could be engaged productively. CO shared a course methodology that included how IT skills training could be learned and taught by people without previous skills in this domain. Simple rules guided behavior, leaving room for partners to experiment locally, captured in a simple "user manual."

Audrey, the hub leader of Johannesburg 2 and once a pastor (who integrated CO's skills-development section into her hospice's portfolio), recollected how low-skilled people grew into their roles, for example, by taking a simple course and staying on as the new teachers of that course. Also, CO shared its multi-generational approach, which became a low-cost way for hubs to engage local low-skilled (and previously economically undervalued) people in the development of hubs and enabled the creation of an effective labor pool in an environment characterized by a lack of formal skills and education.

*Material-related heuristics.* CO encouraged making the best use of material items such as unused spaces; for example, a simple rule was that *if you see an unused garage, ask if you can use it (for free) for training and events in case you need it*. CO also transferred its simple heuristics for project budgeting in order to institutionalize a "making the best of what is at hand approach"—to, in the words of the founder, "always try first to not use money as long as it does not compromise the experience or quality." Those simple budgeting steps were to (a) *Write down what you need*; (b) *Ask yourself for each budget item: Is this really needed? Is there an alternative? Can you redesign the program without it and with what you have*

*here already?* and (c) *If you really need it, can you have access to it, or do you know someone who has access to it?*

For example, in one project we observed, a video camera was among the items on the list. The steps here were: *Do you really need the camera, or is there an alternative that we have here already? If you really need the camera, do you have one yourself or do you know someone who has a camera that you can use?* Only if both questions were answered negatively, and only in the absence of a viable (less costly) alternative, would a purchase be considered. The founder explained the underlying idea:

> The idea is that we say, "always look for alternatives. Do you really need to buy what you say you need to buy? Is there another way to do it? Do we have it already here in some way? If not, do you know someone who has it? And so on." It guides people along the journey of nudging them to use small budgets and really utilize what and who is around. It's also a feeling of "victory" for the person whenever they find a solution—it's a good feeling to sense that you solved a problem.

The implementation of simple rules such as the budgeting approach happened via daily conversations, meetings, when talking with new partners, and when reflecting on the bigger picture. A management team member observed:

> We talk about this in our daily conversations, in personal stories, in our WhatsApp groups. We ask people to relate it to themselves and what they do. "How can you apply this to everything you do, your own 'personal budgeting' approach?" And we also relate it to our bigger themes. For example, if our theme for this year is about "growing exponentially," we ask people to think about how they can grow their area without needing a bigger budget. For example, say you grow something from hundred to two hundred people. Yes, you need more space now. But then our people will first ask, "is there a way how we can use the outside space, for example?" Then you can grow without big change in budget.

*Networks-related heuristics.* While CO employed previously economically undervalued people directly (see *labor-related heuristics*), the lack of access to the "right" people also meant the team highlighted the importance of outside stakeholders to tap into additional existing resources by engaging previously undervalued or underused networks more broadly. Interviews and documents show CO encouraging hubs to leverage networks; for example: *if you meet a person somewhere, think if there could be new ways of how they could provide value, and ask them if they want to get involved.* An example was local advisory boards and mentorship programs with locally available people, often in unconventional ways. A hub leader shared with us how, before engaging with CO, she would only have looked at top companies to acquire advisors. Alternatively, applying CO's approach, she thought about which people around her might have useful characteristics that she would not have considered previously, such as an empathic local mother whom she pulled in as an advisor for questions about emotional support for community members. Other examples were

about how to engage people visiting the community, included in the manual as "ways to collaborate with whoever comes here." As Tanzania's hub leader reflected, "When you look at things from that perspective, the world looks very different, and our partnerships are very different."

Thus, developing and transferring heuristics capturing bricolage (which we labelled "bricolage heuristics") enabled CO to scale to different locations at low cost. Importantly, the simple rules that CO transferred left room for local adaptation and innovation as an integral part of the process, as we discuss below.

***Creative application of heuristics***

CO encouraged partners to contextualize its heuristics (i.e., to apply the same heuristic in their specific context, i.e., to "fill in the blanks" on how exactly it should be applied) or, alternatively, to adapt these heuristics (i.e., change the heuristic itself). As we discuss later, after contextualizing or adapting them, hubs often (a) transferred learnings back to CO, helping it to adapt or extend "central" heuristics, and (b) transferred learnings across hubs.

*Contextualizing heuristics.* Locals often used heuristics that CO transferred to them, but depending on the context, experimented with how to apply them. Local fit often happened by contextualizing the heuristic without needing to change the heuristic itself. Dennis, the hub leader in Uganda, discussed how he implemented and contextualized the simple rule of not asking outside companies to supply materials (and instead looked at his own community for people who might be able to provide or design them). He contextualized the simple rule based on the resources at hand in his local community:

> There are different challenges in different contexts, but…when you are someone here who perhaps finished half of secondary school only, now [after implementation of CO's approach] you think: "I can be part of designing this room. Then I can be part of designing the homepage. Then, I can build my own business." Nowadays, we have people who set up everything you can imagine [depending on their respective background].

Our analysis of observations, interviews, and documents revealed similar patterns across hubs. The Tanzania and Namibia hubs used excess food from churches, unused old buildings, and discarded printers, without waiting for funding. Tanzania's hub leader, Yusuf, shared an example of how he took the heuristic, "look for mentors inside your community," and applied it to his own setting:

> Normally, when I think about mentoring, I think about trying to get a big-shot company person to share their experience with the community. Now, I ask the local person who had a tough time to share what they learned on their journey. I ask them how they think they can contribute.

We observed self-directed, creative behaviors across hubs becoming a way to do things when applying CO's heuristics locally, including the use of old bottles as LEGO blocks for education exercises, people creating their own jobs (e.g., "sanitary pad salesperson"), the creation of sticky notes based on available adhesive and papers at hand, and creative application of the mobile counseling solution.

*Adapting heuristics.* In addition to applying heuristics locally (often in creative ways that focused on experimenting within the scope of the heuristic itself), local hubs also *adapted* heuristics, that is, changed the simple rule if it did not fit the context. For instance, a local hub facilitated an online basic-skills training course that students could attend using the computers available in the local training room. The hub initially used a heuristic to train in a low-cost location using discarded computers, through a sequence of steps: students were supposed to watch an instruction video on the online platform first, and then do the individualized exercises below the video (similar to MOOC courses). However, the initial approach had a "flaw": the facilitator realized that students, according to the brief, needed earphones, which would be expensive, because earphones were not readily available locally. Hence, she thought, "Do we really need earphones? Or can I log on to the platform as a student, and project the video to the whole room using the beamer we have here? The subsequent, innovative solution was to show the videos to all students at once, after which they did the exercises on their individual computers (as we discuss later, this local adaptation was later shared with other hubs, as well as with the center, and led to an adaptation of the heuristic—and related learning—across settings).

Thus, rather than simply transferring strictly codified knowledge (see Winter and Zollo, 2002), CO inspired partners to make the best of what was at hand, using its heuristics (Bingham et al., 2007), which left space for local contextualization and adaptation. This happened in the following ways: (1) Because most heuristics, that is, simple rules, were broad, they allowed for contextualization and local creativity in how to apply them in a specific setting; and (2) heuristics were changed to fit local needs if they were not broad or suitable enough to fit the specific context. Hence, rather than trying to reduce ambiguity and discouraging local experimentation and relying on the template precisely (Bradach, 1998; Winter and Szulanski, 2001), CO inspired partners to contextualize and adapt its heuristics—and consequently to exploit idiosyncratic local opportunities—by creatively making the best of what was at hand. Local application and contextualization of simple rules, adjusted to fit local circumstances, were built into the model rather than reduced, as tends to be the case in traditional scaling models (see Beckman and Zeyen, 2014; Brickley and Dark, 1987; Ketchen, Short, and Combs, 2011).

Although CO encouraged hubs to synchronize its model with local realities, it also (a) stimulated hubs to report back their key learnings (leading to the adaptation and extension of organizational/"central" heuristics) and (b) to share among hubs (peer-to-peer learning), as we discuss below.

***Learning: Hubs to CO ("central" extension and adaptation) and across hubs (peer-to-peer learning)***

Encouraged by CO, hubs shared this knowledge with CO and other hubs, which we refer to as "learning." This learning unfolded between the focal hub and the center (leading CO to extend or adapt its "central" heuristics), as well as between hubs (peer-to-peer learning).

*Adapting or extending "central" heuristics.* CO continuously *adapted* its heuristics based on new information and insights from local bricolage efforts, engaging in a learning process. Hubs and team members were consistently encouraged—for example, through conversations—to relay what they learned back to the central team, which then integrated these insights into its activities. The founder explained, "We always change things when we see something works or doesn't work, and we put in place things that work. That helps improve, be productive with what's there." For example, with regard to the earphones-based training mentioned above, CO central adapted the heuristic that previously did not consider the relatively high cost of headphones in some locations.

This happened across all scaling steps. For example, CO adjusted its simple rules regarding what makes a good partner, especially based on bad experiences: a rule to "look for partners that can complement us" would be changed to "look for partners who can complement us and are open to our approach." CO also picked up new heuristics: when the team observed a local hub that enabled local artists to display their work in their training rooms where they welcomed international people, CO's team adopted this simple rule in Cape Town and other locations ("have local artists display their work in the rooms we have"), resulting in international people buying the paintings.

In addition, it used creative examples of hubs' local *contextualization* of heuristics (i.e., hubs "filling in the blanks" in different ways) to expand its repertoire of examples of how simple rules (in their parlance, "guidelines") could be applied. For example, observing the creative use of discarded spaces in its hubs (e.g., Tanzania using space in hotels and peoples' homes, based on the general heuristic to "use discarded spaces creatively whenever you can") helped CO develop new training modules in cost-effective ways, implementing these specific solutions in its central location.

CO not only updated its approach (instead of taking a fixed template for granted; Winter and Szulanski, 2001), but also transferred these lessons to other partners, either by (a) adapting the heuristic or (b) adding

different examples to existing heuristics. The bricolage approach also enabled continuous creative applications and adaptations of simple rules and learning based on feedback from clients, as well as from other stakeholders who experimented with CO's model.

Moreover, learning not only happened between individual hubs and "CO central," but also across hubs.

*Peer-to-peer learning across hubs*. Hubs interacted with each other in multiple ways, for example, using a simple internal webpage enabling them to store and exchange insights. Johannesburg 2's hub leader, for example, highlighted that on the internal wiki page, she "might find something that Namibia is doing that we could use in [Johannesburg], and that Cape Town [HQ] didn't even work on," such as how to use discarded spaces differently (i.e., how to contextualize particular heuristics). Hub leaders were also frequently connected to learn from each other's experimentation efforts in terms of how heuristics could be adapted. Take, again, the earphones-based training mentioned above: in addition to CO central, a number of hubs took over that hub's solution to use videos at the beginning after learning about it from the hub's leader. (Importantly, they did not take it over from CO central, but from the particular hub, i.e., directly learning from each other). In other words, they learned to adapt the heuristic that previously did not consider the high cost of headphones in some locations.

In sum, the organization engaged in a continuous learning effort: CO's core team constantly extended (i.e., added examples of possible applications) and adapted (i.e., changed) its heuristics based on local experimentation in a low-cost way, and hubs shared among each other. CO encouraged constant experimentation to learn about new ways to make its approach more effective, circumventing the problem of excessive risk aversion when established routines prevail (Teece, 2007).

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Insert Table 2 about here

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## CONCEPTUAL MODEL

Thus, CO delivered its approach to a substantial number of outlets in a variety of locations; that is, it *replicated* (Winter and Szulanski, 2001) its approach. Previous research has shown the replication of a company's successful activities can be a main driver of growth (Winter et al., 2012). It entails developing a successful template (i.e., a working example or set of activities) that is copied across locations (Jensen and Szulanski, 2007; Rivkin, 2001; Winter and Szulanski, 2001).

A central tension in this regard is between, on the one hand, the need to reproduce the template precisely (due to complexity, i.e., the interrelatedness of routines, and the implied causal ambiguity) and, on the other

hand, the need to change the template based on the local context (adaptation) (D'Adderio, 2014; Winter et al., 2012). This "replication dilemma" (Winter and Szulanski, 2001) differs across settings: for organizations whose "formula" for success is sufficiently well understood (e.g., for many fast food franchises), exact replication is often beneficial (Szulanski and Jensen, 2008; Winter and Szulanski, 2001) due to the known recipe and way of organizing operations, especially when scaling across relatively homogenous environments (Winter et al., 2012). Thus, the focus there is often on preserving the interplay of tightly coupled routines, with little pressure to innovate. For organizations operating in fast-moving—or a diversity of—environments, however, continuous adaptation and innovation (terms often used interchangeably in the replication literature) becomes paramount (D'Adderio, 2014; Williams, 2007).

Recent research (D'Adderio, 2014) suggests that in such settings (e.g., in the computer hardware industry) where local units often have high levels of specialized expertise, replication and adaption can unfold over time, in an interplay with organizational communities and artefacts (e.g., explicit and detailed sets of rules or lists that can help reflect and support knowledge and assumptions). This can lead to shifting goals over time in terms of "replication" and "adaptation/innovation"—for instance, initially replication, and then local innovation—requiring the organization to prioritize the (often competing) goals of replication and innovation over time (D'Adderio, 2014). However, little is known about how this balance unfolds over time for organizations scaling to very different settings, and researchers have emphasized the need to further explore and understand the role of context for replication (D'Adderio, 2014). This is particularly relevant because, as Winter et al. (2012) recognized, part of the empirical support for replication—rather than adaptation—has come from studies with limited variation in contexts (e.g., local cultures) to which organizations scaled.

The overall context in which CO operated was very different from the one traditionally analyzed in this literature: a severely resource-constrained environment, with a broad diversity of settings and local needs (in cultural, institutional, and economic terms). CO responded by using a low-cost bricolage approach, which was replicated—with simple rules being contextualized and adapted—to a variety of local environments.

The basis for CO's operations was a bricolage approach—based on resourcefulness, transcending limitations, and creatively using what is at hand—rather than looking for specific resources. By developing heuristics, that is, simple yet effective rules that guide identification, selection, and implementation of unique, local opportunities chosen from a set of possibilities (Bingham et al., 2007; Bingham and Eisenhardt, 2011), CO was able to capture and later transfer its bricolage approach in a low-cost way, overcoming resource constraints. This approach enabled CO to scale to a variety of settings with diverse

local needs (which CO could not possibly fully understand a priori), effectively and efficiently supporting local partners to reap local opportunities.

Starting with the initial template, CO used (sets of) heuristics that did not appear to represent the "tight coupling" or interrelatedness of the complex bundles of routines of prior work (e.g., D'Adderio, 2014; Winter and Szulanski, 2001). The heuristics tended to be simple and broad (Bingham and Eisenhardt, 2007), leaving room for the creative application by local units, which applied, experimented with, and adapted the bricolage heuristics. In turn, this triggered continuous learning beyond the focal hub, through unit–unit interactions, as well as between local units and the center, improving performance over time. An example were the earphones discussed above: a particular heuristic ("teach people in a previously underutilized space with the help of discarded computers and earphones so that they can listen to the video") was adapted by a local hub ("don't use earphones but play the clip to everyone at the same time at the beginning of the session"). This innovation was subsequently shared with some other hubs, as well as with CO central.

Based on our findings, we propose a process model of how organizations can scale bricolage through replication to a variety of settings, by developing and transferring bricolage heuristics in a low-cost way (Figure 1). As a first step, CO developed a low-cost bricolage approach; that is, it *developed a set of simple heuristics* that served as a "template." Then, it started *selecting aligned partners at low cost* nationally, across Africa, as well as globally, using rules of thumb, such as which type of partners to target, narrowing the range of opportunity choices by specifying which ones to pursue and which ones to ignore ("selection heuristics"; Bingham et al., 2007). Once a receptive partner was found, CO embarked on *transferring bricolage heuristics*, encouraging partners to creatively use discarded materials and previously economically undervalued people and questioning resource limitations using simple rules (e.g., the budgeting approach) that specified actions to be taken to choose local opportunities ("procedural heuristics"; Bingham and Eisenhardt, 2014). This approach focused the attention of local hubs on how selected opportunities could be captured effectively and efficiently, while leaving space for local contextualization of heuristics.

In other words, we identified bricolage heuristics as a particular type of heuristic, enabling local customization by design, which, by "making the best out of what is at hand," seems particularly useful in frugal settings (Bingham and Eisenhardt, 2014). *Contextualizing* these heuristics (i.e., interpreting them with regard to locally available resources/adding "examples" of how they can be applied) was often sufficient to fit a local environment, given their relatively broad scope. However, if not, they often would be adapted locally, that is, local *innovation* (or adaptation of heuristics). In both cases—contextualization and

innovation—the emerging insights were often shared among hubs (peer-to-peer-learning), as well as between the focal hub and CO, for example, in the case of the earphones solution discussed above.

In sum, in addition to the contextualization of broad heuristics to local settings, this low-cost scaling process also enabled local- and organization-level innovation and learning.

***Broader applicability of CO's approach***

CO also supported the application of its low-cost model to governments and to companies, as documented in interviews, partnership agreements, and observations. This included one of the world's largest media and entertainment groups, aiming to improve its community engagement and innovation across contexts. Another example is one of Africa's largest financial services groups, which used the approach to engage schools and communities across the continent for recruitment purposes and in an effort to increase the efficacy of its CSR activities across a variety of settings and with limited budgets. The founder of CO, Marlon, also gave the example of one of the continent's largest banks:

> With the current technological changes, [the bank] is concerned that they have lots of people and branches that will not be needed any more. They asked us, "We have over 200 branches, thousands of people, how can we do something with them so that we don't need to let them go? And even with the branches, we have 600 square meter spaces now, but we only need 200 square meters now." We said, "ok, let's see what else your space and people could do. You have always seen yourself as a bank, and your people as bankers. Let's see how we can look at what you have here and see it from a different angle." We are about to integrate different solutions with them that engage their staff on levels like them educating other people about finances, and to use the space for other things like for financial trainings and new things that they could do.

In other words, the bank used CO's approach as a low-cost strategy to promote local- and organization-level innovation and learning. CO also co-founded a center, the "[Name of for-profit company] lab," focusing on how the CO model might help for-profit organizations contribute to the UN's Sustainable Development Goals (SDGs) as part of their CSR efforts. It also applied its model with the idea to facilitate service provision and innovation at governments and local councils. For example, it collaborated with the South African government to help schools use space in creative ways, and with local governments in the US to help engage diverse communities.

In sum, CO also applied its model to companies and governments with the intention to help advance innovation, talent retention, community engagement, and CSR activities across diverse contexts (and typically using low budgets). And, in the words of CO's founder, "to reduce the risk for them of trying new things and do it with some impact even if resources are not there."

## DISCUSSION

In this paper, we inductively developed new theory on the process of scaling bricolage via replication, leading to several theoretical contributions. First, we provide new insights into the conditions under which bricolage is scalable. Second, we show how and why developing, transferring, and adapting bricolage heuristics can help overcome high replication costs, as well as traditional trade-offs between replication and innovation, in diverse, resource-constrained contexts.

### *I. How and under which conditions bricolage is scalable*

Our study extends previous bricolage research that has shown that although bricolage is often born out of necessity, it can be used intentionally (Di Domenico et al., 2010; Duymedjian and Rueling, 2010). However, a prevailing assumption in the literature is that bricolage is rarely scalable, because it can limit the development of learning capabilities as well as reduce organizational focus (Baker and Nelson, 2005; Sonenshein, 2014). For example, in Baker and Nelson's (2005) seminal study, none of the companies using "parallel bricolage" (i.e., more extensive bricolage) grew. Thus, companies tend to reject bricolage in favor of resource-seeking approaches once they mature (Baker and Nelson, 2005; Desa and Basu, 2013; Sonenshein, 2014). However, by replicating its approach of reframing the value of previously discarded resources across different settings, CO overcame the traditional barriers to scaling bricolage. Thus, our findings challenge three assumptions in the literature:

*Ineffective efforts and lack of focus.* Previous research suggests bricolage often fails to work over time, because the bias for action, although positive in the short term, can make relevant actors spread their efforts too thin, leading to ineffective tinkering, wasted efforts, and distraction (Aldrich, 1999; Lanzara, 1999; Bechky and Okhuysen, 2011; Chao, 1999; Miner et al., 2001). However, CO achieved focus by developing and transferring simple heuristics at scale and over long periods of time. These results build on findings in the strategy literature indicating organizations tend to translate their experiences into heuristics that help focus attention and save time (Bingham et al., 2007; Gavetti and Rivkin, 2007; Ott et al., 2017). In fact, companies sometimes scale by designing simple rules to unblock bottlenecks to growth: For example, Google developed and scaled simple rules for hiring engineers when "talent" was their bottleneck, and Cisco scaled simple rules for acquisitions when "new products" were their bottleneck (Bingham and Eisenhardt, 2014).

CO developed bricolage heuristics to leverage previously underused resources, enabling it to maintain focus and increase effectiveness, for example, by developing simple rules for reporting insights online and

for feeding back knowledge. Moreover, by supporting locals to make do themselves, CO's management team avoided spreading itself too thin, thus overcoming major barriers to scaling.

*Inability to develop learning capabilities due to lack of cumulative solutions.* The bricolage literature suggests a high proliferation of second-best solutions limits organizations to adopting solutions emerging from bricolage more broadly and going down the learning curve as they scale, considering these solutions instead merely locally and temporary (Baker et al., 2003; Johannisson and Olaison, 2007; Miner et al., 2001; Moorman and Miner, 1998). However, by developing low-cost, simple rules that enabled aggregating key insights, and by transferring them to a diversity of settings while promoting contextualization and adaptation (and feedback on the respective insights) over time, CO developed central learning abilities related to making the best of whatever was at hand.

*Limited quality due to over-embeddedness and reliance on substandard inputs.* The literature suggests firms with high levels of bricolage might have difficulty developing high-quality products and services, due to factors such as a reliance on substandard inputs and interaction with less demanding customers (Senyard et al., 2010; Senyard et al., 2009). By contrast, our findings show how simple rules can enable self-directed and innovative behavior while providing guidance that keeps behavior (and quality) focused (Brown and Eisenhardt, 1997; Miner et al., 2001). In the case of CO, this approach led to continuous improvements of contributions, particularly by those previously perceived as less effective (e.g., labor contributions by former drug addicts). The model, which implies learning within and across hubs, generally facilitated improvement in quality over time, for example, with regard to heuristics that were shared via the partner "toolbox" (consisting of simple rules such as how to go about appointing a local advisory board).

In all, CO developed and transferred simple rules that helped initiate and sustain bricolage in focused ways. Opportunities came from local interactions (i.e., local bricolage) and of local people acting as champions to teach previously economically undervalued people how to run the model. This approach goes beyond one-time solutions and disconnected efforts of local bricolage (Baker and Nelson, 2005), as the focal organization fostered conditions and competencies for continuously applying and adapting bricolage heuristics across a variety of contexts, overcoming limitations such as lack of learning, effectiveness, and innovation (Baker and Nelson, 2005; Sonenshein, 2014). This approach also enabled CO to tackle a major issue identified by prior bricolage research, namely, that necessity-based bricolage might be important for initial growth, but that at a certain point, it may constrain growth (Bojica et al., 2018; Kickul et al., 2017).

Hence, rather than only being a strategy of last resort (Sonenshein, 2014) or to increase the depth of impact (Desa and Koch, 2014), bricolage may be scalable "at breadth." We therefore build on Baker and

Nelson's (2005) broad suggestion that firms may differ in their capacity to apply bricolage and show how it can be applied over time and at scale. Our findings may be transferable to other organizations and contexts, because bricolage has been applied to both small and large organizations in order to help mobilize resources, enter new geographic areas and industries, and trigger local and organization-level innovation (Halme et al., 2012; Linna, 2013).

***II. How and why bricolage heuristics can help overcome the replication dilemma***

We contribute to the replication literature an understanding of how and why simple rules (Bingham et al., 2007; Bingham and Eisenhardt, 2014) can be effective in balancing replication and change as complementary goals in both the short and long term, in a variety of low-resource contexts. Low-cost bricolage heuristics may enable organizations to overcome the "replication dilemma" (D'Adderio, 2014) by integrating and stimulating change, that is, contextualization and adaptation, at the core of the model.

When organizations grow by replication (Winter et al., 2012), they often feel the pressure to adapt processes and systems to fit local contexts (Williams, 2007). The central tension is between the need to reproduce the template exactly (due to complexity and causal ambiguity) and the need to synchronize the template with the local context (i.e., adaption/innovation; D'Adderio, 2014; Winter et al., 2012). In settings such as food franchises, the focus is often on preserving tightly coupled routines, with little incentive to innovate (e.g., Winter and Szulanski, 2001). In companies operating in fast-moving industries (e.g., high-tech companies) with high levels of local expertise, adaptation based on local knowledge often becomes important to cope with fast-changing environments (D'Adderio, 2014; Williams, 2007). However, greater product and technological complexity often implies stronger causal ambiguity, which in turn supports the pressure to copy exactly (so that the value of the initial template can be preserved). These pressures—both to replicate and to change—often form contrasting goals. Organizations may find a balance between these two goals by dynamically prioritizing one over the other, where priorities of which goal takes precedence can shift over time (D'Adderio, 2014).

However, a gap exists in our understanding of how this balance unfolds over time for organizations operating in very different settings (D'Adderio, 2014). Our model shows how an organization operating in a diversity of low-resource contexts developed and transferred bricolage heuristics, enabling low-cost replication and local fit through an iterative process. Rather than prioritizing one goal over the other at various points in time, for instance, first replication and then innovation later (D'Adderio, 2014), the in-built nature of change, through contextualizing and adapting heuristics, enabled CO to simultaneously integrate

replication and change/innovation at the core of the model, *in both the short and long term.* Thus, organizations operating in such settings may see replication and change not as competing goals, but as complementary. Part of the reason is that the original template, based on bricolage heuristics, may not represent the (same) tight coupling or interrelatedness of the complex bundles of routines and the high causal ambiguity observed in prior work (D'Adderio, 2014; Winter and Szulanski, 2001), but rather an in-built change dynamic (from the very beginning), whereas the set of simple rules may be easier to grasp, contextualize, and adapt, helping to overcome resource constraints and capture the diverse contexts.

This builds on prior work in the strategic management literature, which shows heuristics can be important for strategies such as internationalization (Bingham and Eisenhardt, 2014), enabling the responsiveness and flexibility necessary to capture novel opportunities, while promoting efficiency through guiding and partially constraining behavior (Bingham et al., 2007). By developing and transferring bricolage heuristics based on resourcefulness, transcending limitations, and using what was at hand, CO was able to expand in a low-cost way, overcoming resource constraints, and adjust to a variety of local settings. The heuristics were extended and adapted across hubs (peer-to-peer learning) and between hubs and CO. We observed that this transfer appeared to be supported by strategically fostering (the quality of) social relationships of CO's central hub with local individuals and partners (e.g., *selecting aligned partners at low cost*) as well as between individuals of different "generations" within the organization (see *transferring bricolage heuristics*), potentially influencing cognitions and actions of individuals to support transfer processes (Ployhart and Moliterno, 2011; Salvato and Vassolo, 2018). Future research could provide additional, important insights into these and other mechanisms at the micro-level explaining the transfer of simple rules; we encourage such future work.

Whereas previous replication research has focused on how companies can reduce ambiguity and uncertainty by minimizing local idiosyncrasies and specifying operations such as procurement in precise ways (e.g., Winter and Szulanski, 2001), CO's model did not try to limit local idiosyncrasies and uncertainties but rather leveraged them, building continuous contextualization and adaptation of the template (defined by bricolage heuristics) into its approach.

### *III. Overcoming the costs of replication for enterprises with social goals*

The insights emerging from our study also help us understand a major puzzle in the management literature: why social enterprises often fail to scale up (Busch and Barkema, 2019; Fosfuri et al., 2016; Light, 2008). These organizations typically face localized, complex social issues and limited resources,

requiring substantial local adaptation (Austin et al., 2006; Beckmann and Zeyen, 2014; Zahra et al., 2008). Particularly in social contexts, the often-implicit assumptions that "there is one best solution globally" or "center knows best" can be harmful, because social problems tend to be locally embedded (economically, culturally, and institutionally), and therefore typically need contextualized, innovative solutions rather than general ones (Busch and Barkema, 2019). Also, social enterprises typically have limited resources. Traditional replication may therefore typically be both too costly and inappropriate, that is, potentially harmful, making successful scaling of social organizations challenging from a replication perspective. Alternatively, our new process model suggests how both constraints may be overcome by a low-cost process of replicating bricolage heuristics, enabling local contextualization, as well as, additionally, local and organization-level innovation. Thus, the insights of our study also contribute to an understanding of how the relatively high costs of replication may be overcome (Winter et al., 2012) in creative ways for social organizations, particularly in resource-constrained settings.

Our insights can potentially be extended to other organizations aiming to innovate and scale up at low cost, across a variety of contexts, for example, to the literature on "frugal innovation" and "jugaad innovation" (Anderson and Markides, 2007; Radjou, Prabhu, & Ahuja, 2012; Simanis and Hart, 2008; Webb et al., 2010), by elucidating the process of how frugal or jugaad ("make do" in Hindi) innovation may be scaled across a diversity of resource-constrained contexts, for instance, by MNCs.

***Practical implications***

Our findings have several practical implications. First, knowledge is limited concerning how organizations strive to emerge, survive, and scale in resource-scarce environments (George et al., 2012). Apart from intriguing exceptions such as the Bangladesh Rural Advancement Committee (BRAC), which has catered to more than 100 million people in more than a dozen countries by transferring a template with adaptations (Davis, 2013), examples of both social and for-profit organizations having successfully scaled in low-resource contexts are scarce, and we know surprisingly little about how and under which conditions scaling works in resource-constrained environments (Chliova and Ringov, 2017). Myriad scaling strategies have been developed in these contexts, from employing local community members as salespeople to reducing package sizing. However, these models often rely on considerable financial resources and/or fail to be truly sustainable (Dees et al., 2004; Weber et al., 2012). CO not only engaged local people at partner hubs, but also did so while making the best of what was at hand. This finding will likely be of interest to companies aiming to expand to a variety of settings at low cost, to innovate or repurpose their engagement of staff,

local communities, and spaces, and to think about alternative ways to leverage idiosyncratic, local resources for sustainable advantage (see Barney, 1991; Wernerfelt, 1984).

Second, the new insights from our study are relevant for supporting institutions such as governments and enterprise incubators, which may be nudged to focus less on (over-) supplying resources and instead on developing or supporting platforms that facilitate making the best of what is at hand, aiming to strengthen local communities in the process. This approach could help locals create their own "smart luck" (serendipity) based on local resourcefulness rather than passively waiting for resources to come along (Busch & Barkema, 2020).

Third, social enterprises aiming to scale to resource-constrained environments might benefit from a clear process of how resources at hand can be used to grow over time. Social enterprises often fail to scale, because they usually know a particular context well but fail to adapt this knowledge to other contexts (Busch and Barkema, 2019). We show how a process of scaling bricolage can be navigated from scratch and used as a process to leverage what local communities understand works—and what does not—in local contexts.

Fourth, companies seeking to pursue social goals may benefit from better understanding how to support local partners at scale rather than to prescribe solutions from the center in detail. Organizations such as Healthline (telemedicine), The Hub (co-working space for social entrepreneurs), or Kickstart (irrigation pumps) have used similar approaches. Indeed, internal documents and interviews suggest CO's partner organization in Uganda was able to scale CO's model into four different locations, with CO essentially seeding the bricolage model itself through its local hubs.

Fifth, the theory in this paper suggests a shift in thinking among funders and companies, away from conceptualizing poor people as "beneficiaries" and pushing resources into low-resource contexts, to appreciating that many resources, including human resources, may already be there. As discussed, instead of supporting a handout mentality, this shift in thinking may facilitate local resourcefulness at scale both by new and existing organizations. However, importantly, organizations need to find a balance between engaging locals productively versus potentially exploiting them.

### *Limitations and further research*

Naturally, our study also has limitations, which provide fertile ground for further research. First is the issue of generalization. Our inductive process study focused on only one organization. However, as an "extreme case" of an organization that scaled through bricolage, it is an appropriate and highly interesting case to study (Eisenhardt et al., 2016). Scaling bricolage via replication helped the organization scale to and adapt

to/innovate across different circumstances—an issue relevant for both social and for-profit organizations. Interestingly, a high degree of variation across contexts does not appear to be typical of organizations explored in previous research, and hence adaptability was less important in those contexts (e.g., Winter et al., 2012). This finding suggests an important boundary condition for our new theory: organizations scaling across settings with (at least) substantial differences. Further research could provide more insight into the external validity of our theory and of its boundary conditions, for instance, with regard to for-profit organizations aiming to innovate and scale up at low cost across a variety of resource-constrained contexts.

Moreover, given strategic management scholars' increasing interest in understanding how companies may contribute to creating social value (Ansari et al., 2012; George et al., 2012), the findings may be relevant beyond this study's immediate context. Further research could develop and test propositions in different contexts and for different types of organizations (e.g., companies aiming to shift toward a more impact-focused model; Zollo et al., 2016). Further research could also explore how governments might adopt these approaches and explore its social impact; for example, CO's approach is currently being considered a promising model for engaging unemployed migrant youth in Texas.

Second, scaling bricolage may have hidden costs. Zollo and Winter (2002) argue that maintaining abilities might often cost more than their net overall value. Further research could tackle questions such as the conditions under which scaling bricolage becomes a liability, including for local communities through under-investment of resources.

Third is the issue of path dependency and sequence. Is the local practice of bricolage a necessary precursor to scaling bricolage, or could organizations directly implement scaling bricolage, for example, through vicarious learning from other organizations? Is local experimentation a necessary step? Or can other potential antecedents be identified? Future research could also explore the micro-foundations of scaling bricolage. What types of simple rules are helpful in isolation or as a bundle? Does the answer change over time, and if so, how and why?

## CONCLUSION

In this paper, we developed a novel theory on the process of how organizations successfully scale bricolage through replication, shifting mindsets and aiming to unlock the potential of previously economically undervalued resources. We hope the theoretical and practical implications of this paper will inspire further research on this important topic.

**Acknowledgements**: We are indebted to Gerry George, Kathleen Eisenhardt, Oana Branzei, Dimo Ringov, Andrew Fultz, Sarah Ashwin, Tuukka Toivonen, Nicolas Friederici, Marc Van Essen, Gordon Pechthold, Bruce Lamont, Susan Hill, Stefano Brusoni, Tazeeb Rajwani, and the participants of several workshops at the University of Oxford, Strathmore Business School, and the Academy of Management Annual Meeting for their very helpful comments on earlier versions of this paper. We are grateful to editor Alfonso Gambardella and the reviewers for their extremely helpful feedback.

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Table 1. Characteristics of Community Org and key hubs

| | **Center (Cape Town)** | **Johannesburg 2** | **Windhoek** | **Iringa** | **Kampala** | **Gaborone** | **Johannesburg 1** |
|---|---|---|---|---|---|---|---|
| **Description** | Center and main hub | New Johannesburg hub | Key hub in Namibia | Key hub in Tanzania | Key hub in Uganda | Initial hub in Botswana | Initial hub in Johannesburg |
| **Structure** | Training center (e.g., courses on social media, entrepreneurship), technology incubator (e.g., tools, mentorship, advice), community work (e.g., mobile counselling), products & services (e.g., consulting), research institute (e.g., co-publishing), networks division. Employed around 52 community members. | Four local "champions" running local training center | Five local "champions" running local training center | Around 15 people (full time and part time) involved in training center | Around 20 people part time | Two former bankers running training center | Local entrepreneur running local training center |
| **Situation** | Trained over 8000 people in its Cape Town location. | Remained in business. (Trained around 110 people annually.) | Remained in business. (Reached around 500 people annually.) | Remained in business. (Reached around 100 people annually.) | Remained in business. (Trained over 300 people annually.) | Exited. | Exited. |

Table 2. Representative evidence

| | **Developing bricolage heuristics** | **Selecting aligned partners at low cost** |
|---|---|---|
| **Dimension 1** | Questioning resource constraints. "Nobody wanted to give us any money. We thought we were doing great work but people just didn't understand what we were doing. That made us realize, maybe we could think about how can we draw value [differently]." (Founder) "The founder started to see the need just to give them some kind of computer training because [he] is coming from that background. But then I think they realized that they could actually use the digital tools to tell their stories and they then started to tell their parents and their friends about it...That somehow caused [CO] specifically to see the opportunity to do more for the community. The people who have first been impacted, they actually asked, 'Can't we do this for others?'" (Management team member) "So, it was really just going against the grain, going against everything that you should do, and we were kind of like, 'We don't want to do it that [regular] way. Let's see what happens.'" (Founder) | Identifying potential partners at low cost. CO's team used events and conferences they anyways attended to connect with potential partners (Observation). CO's team leveraged former team members and clients to open new hubs once they moved back into their own communities (Observation). "We find partners in very inexpensive ways, like talking to lots of people and asking them who could fit. Or ask people who work with us if they know someone. Then we do a Skype or something, and usually we can go through the process." (Founder) |
| **Dimension 2** | Utilizing what is at hand. "My dad knew that [founder] did something with computers, he wasn't sure what. He said, 'please take them and do a class or do something with them.' At the same time, many of them did not complete school and we wanted them to finish." (Management team member) "Everyone is...growing into their roles and responsibilities. Nobody came in with, 'Because you can do that, that is yours." (Management team member) "The women said, 'Wow, these guys are always on their phones, what are they doing?' So, they [CO team] started talking about blogging and Facebook and all this. The women asked them, 'What about us? Aren't you going to do anything with us?'. That's when they started the 'mom's program'...So, they didn't have a full background in 'this is how you teach someone.'" (Management team member) "They didn't have a structured way of how it must be done…they needed to teach them social media...they needed to tell their story online, all these things and however way they wanted to teach them, they could." (Management team member) "We used the garage of someone, we used old things that people didn't need or didn't use." (Staff member) | Assessing receptiveness. "We...chose people that would add value to the culture of [Community Org]. So, that's how the hubs operate." (Founder) "The big challenge comes in when in some cultures people...[are] saying, 'Listen, we're not going to fail you, but it is a no-go.' It's difficult to get people to think ahead, and that is why a big thing is always going to be about the mindset thing." (Founder) "[Joint] values and interest in the community, that's something that's extremely critical. The skills development can come, that's probably almost secondary." (Staff member). "If [Community Org] chose you, they have people that are part of their community, who will do anything because they want to be part of it." (Management team member) "I think [successful partners]...see early on what they kind of get into...once they...take ownership of it, then success will automatically happen. But when people don't really see that vision, they don't get that. Then it's really difficult." (Staff member) "We had many talks together [with the CO core team]...and we saw that we can understand each other...we know we want the same, and that feels good." (Hub leader, Johannesburg 2) |

Table 2 (continued). Representative evidence

| | **Transferring bricolage heuristics** | **Creative application** |
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| **Dimension 1** | Instilling labor/skills-related heuristics. CO provided manuals on how to make the best out of (labor) resources at hand. (Observation) "There is always going to be three generations in a [project]…So, if you look at it, I started it, and there was someone else at Tanzania to work closely with me, who is now taking [on] a second generation, and now that person has to find someone that they can work with - the third generation…the only time that I can move away is when the fourth generation joins." (Founder) "Having the younger generations understanding the toolbox...that allows us to do things beyond our borders…they grow into it." (Staff member) "Like everybody...they transferred it to the next generation [who developed skills along the way]…it's a feeling of 'we are in it together'." (Founder) "Social media will be taught now by the people who passed last year . . . they're the new champions." (Hub leader, Johannesburg 2) | Contextualizing heuristics. "We are now going into communities…asking ourselves, 'Why don't we try to do it with the local partners, the local youths, not always the ones [big organizations] that seem obvious?'…We work with many local people now." (Hub leader, Namibia) "They gave us a picture of what's possible...when you are now someone who does not have education, but then knows that they can do everything, they start developing graphic design, they start being curious about different things they could learn. That's when they start building their skillsets. That's when you see things happen." (Hub leader, Uganda) "They [CO] came over, and discussed with us how the model works, [and] which people could be interesting to work with. That made us go through the options [and apply them accordingly]." (Hub leader, Namibia) |
| **Dimension 2** | Instilling material-related heuristics. "[We tell them]: You can utilize the space that they have and you can, in time, convert it into something that more or less feels like the heartbeat of [Community Org]." (Founder) CO provided simple rules on how to make the best out of whichever resources were are at hand, such as unused garages. (Observation) Simple budgeting steps: 1) Write down what you need; 2) Ask yourself for each budget item: Is this really needed? Is there an alternative? Can you redesign the program without it and with what you have here already?; 3) If you really need it, can you have access to it, or do you know someone who has access to it? (Observation) | Adapting heuristics. "They showed us how you can use spaces, and make something with it. You can be creative. We borrowed the ideas from [CO], and then adapted it [sic] to the next level. Now, everything you see on the homepage, that's them [locals]." (Hub leader, Uganda) Hubs creatively adapted heuristics, for example, related to training programs. (Observation) "It needs to be something people use anyways, or nobody will use it, ever. See what they use, then adapt to it." (Management team member) |
| **Dimension 3** | Instilling networks-related heuristics. Engaging outside stakeholders in resourceful ways, such as recruiting an empathic mother as advisor. (Observation) CO's team encouraged hubs to leverage broader networks, for example, on how to make the best out of engaging visitors. (Observations) "[We found that] technology could play a bigger role by just getting everybody up to speed continuously and giving people access to that intellectual knowledge that's there... encouraging them to see how they can effectively use it for the benefit of our organization...for example: 'What do you do if you meet somebody for the very first time who's interested and wants to know what we're doing?' or 'How can I see the potential for collaboration?' or 'How can we just draw value from our relationship?'...So, one of the things that we started doing late last year was...code our context." (Staff member) | |

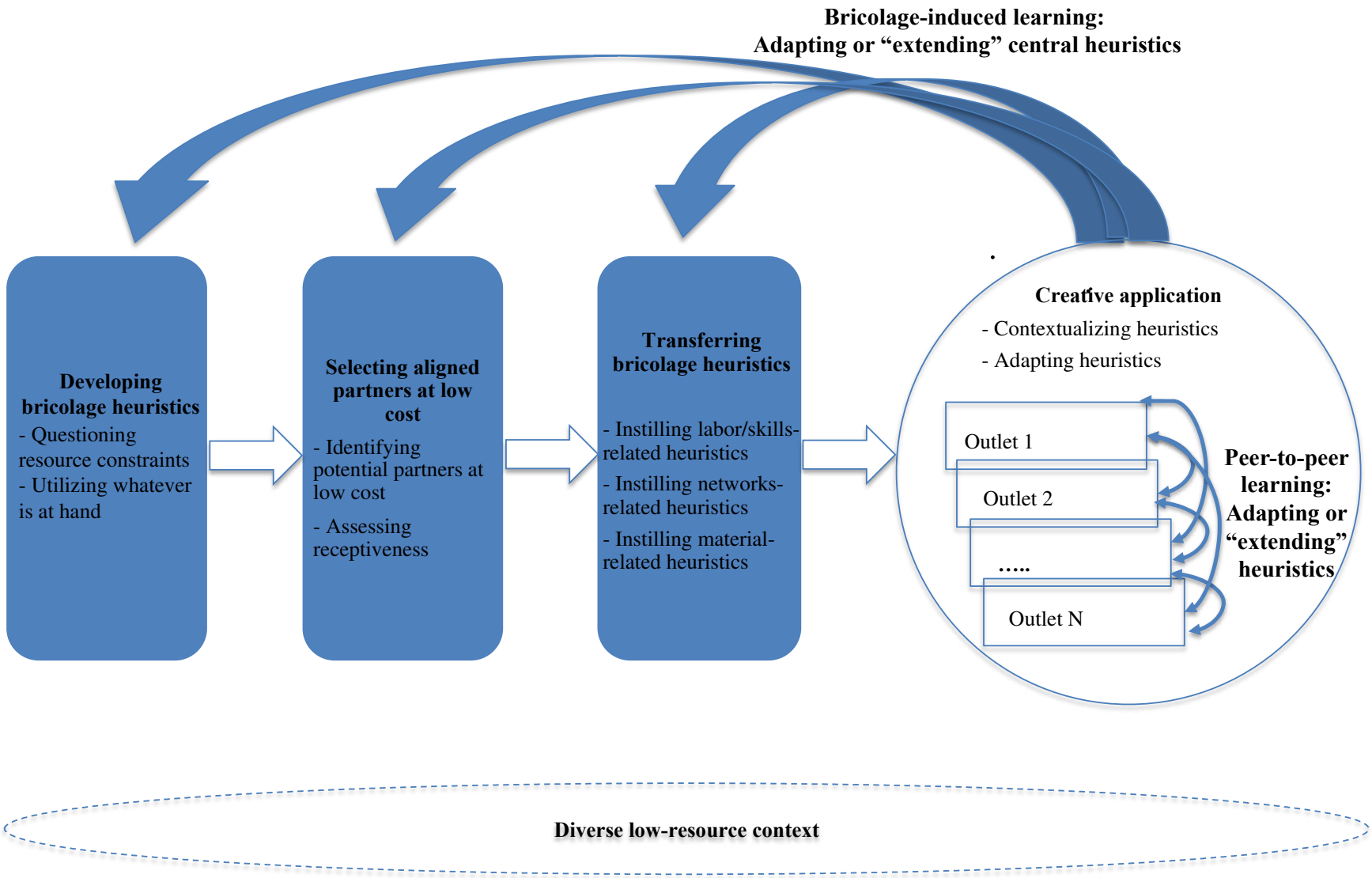


Figure 2. Scaling bricolage via replication