Finding your feet in constrained markets:
How Bottom of Pyramid social enterprises adjust to scale-up-technology-enabled healthcare delivery

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Accepted for Publication in

Technological Forecasting & Social Change

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Highlights

1. We demonstrate that entrepreneurial adjustments are guided by whether social firms prioritize alleviating constraints internal to the firm or those that customers face.

2. We identify that such dynamic prioritization of constraints influence how firms mobilize resources and use operating routines from inception to market establishment.

3. By pursuing resource mobilization strategies and operating routines, firms generate 'depth' impact i.e. by expanding the number and type of activities or 'breadth' impact

4. We develop a process model for scaling-up social firms, by developing propositions and by discussing implications.

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Abstract:

Scaling social impact is a challenge that innovative social firms operating in resource-constrained Bottom of Pyramid markets must address while also ensuring profitability. However, how scaling occurs is scarcely understood. By building on the case studies of two healthcare social enterprises located in India, we make four important contributions to the understanding of the scaling up process. First, we demonstrate that entrepreneurial adjustments are guided by whether social firms prioritize alleviating their internal constraints or those faced by customers. Second, we show how such dynamic prioritization of constraints influences how firms mobilize resources and use operating routines from inception to market establishment. Third, we illustrate how, by pursuing resource mobilization strategies and operating routines, firms generate a 'deep' impact by expanding the number and type of their activities or a 'broad' one by increasing their membership base and/or geographic area. Finally, our findings show that the prioritization of internal or customer constraints leads firms to establish different sequences of elements of institutional legitimacy—i.e., normative, regulatory, and cognitive ones. We conclude by presenting the development of a process model for scaling-up social firms, by developing our propositions and by discussing the implications of our findings.

Keywords: Bottom of Pyramid; Scaling-up; Social impact; Healthcare; Entrepreneurial adjustment.

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1. Introduction

Bottom of Pyramid (BoP) markets consist of billions of very low income individuals (Schaefers et al., 2019) who live predominantly in emerging markets, with more than 70% of them being located in Asia (Pitta et al., 2008). A systematic review of the BoP literature found that a market can be classified as BoP when its average per capita income is of up to US$1,500 or US$2,000 per annum (expressed on an internationally comparable 'purchasing power parity' basis), or if its poverty threshold is US$1 or US$2 per day (Kolk et al., 2014). Due to their resource constraints, BoP markets feature significant unmet needs, including access to quality-of-life-improving products—such as power generators and air conditioners (Schaefers et al., 2019)—or services, such as financial services and healthcare (Kuriyan et al., 2008).

Due to these unmet needs, BoP markets (Prahalad & Hart, 2002) are considered ideal settings for the cultivation of technological innovations suited to provide new or different value propositions in regard to the available services or products (Anderson & Billou, 2007; Wiprachtiger et al., 2019). To successfully offer such value propositions, these markets require the concurrence of three core entrepreneurial principles: a service solution, a technology, and sustainability through the effective use of the limited resources (Reynoso et al., 2015). Scaling the level of social impact, however, is a key challenge faced by innovative social firms operating in resource-constrained BoP contexts (Bloom & Smith, 2010). The study of social ventures that provide services in BoP markets is particularly interesting for the following reasons (Schaefers et al., 2018).

Compared to other startups and established service providers in urban markets, social ventures are affected by relatively low levels of customer bargaining power, low competitive

rivalry, and low new entrant threats; conversely, they do have limited resources and need to have a social impact while ensuring operating profitability. Charitable organizations or NGOs differ from social ventures because they usually only have social goals. Social ventures often also face absent, weak, or failed physical infrastructure, financial and legal systems, and human resources that do not play their expected roles (Mair & Marti, 2009; Desa, 2012).

Limited research has been conducted, however, on the processes whereby BoP market social ventures achieve scale. Desa & Koch (2014) represent a notable exception in the nascent social innovation literature as they identify minimum critical specifications, demonstrate the importance of resource mobilization (e.g., the recruitment of human resources) and of operating routines (e.g., the setting up of guidelines and processes), and highlight some entrepreneurial adjustments made by firms to overcome scaling barriers.

Desa & Koch (2014), however, did not explicitly factor in the role played by the constraints faced by firms (e.g., access to financial and human capital) and customers (e.g., low purchasing power) in scaling-up and how these constraints guide the ways in which firms mobilize their resources and use their operating routines to generate the desired social impact. Similarly, Gollakota et al.'s (2010) proposal of a two-phase strategy (cost management, then benefits management) to create a sustainable advantage for BoP firms also does not consider the role played by the constraints faced by firms and customers and the challenge presented by scaling up while creating social impact. Ansted & Dent's (2015) framework of BoP best practices and business models also does not factor in consumer constraint.

The omission of constraints such as access to resources (abundant vs. limited) is relevant (Hockerts & Wüstenhagen, 2010), as these are found to influence, among other things, organizational creativity in established firms (Sonenshein, 2014). Interestingly, indications are emerging that constraints drive firms to make entrepreneurial adjustments that, in turn, help

them to innovate in ways suited to translate those constraints into long-term success (Singh & Chaudhuri, 2009; Ray & Ray, 2010).

Bringing together the literature on social innovations, firm and customer constraints, long-term scaling of social impact, and BoP firm strategy and entrepreneurial adjustments reveals an unresolved research question regarding the scaling up of social innovations. To investigate this, we formulated two research questions: "How does a social venture scale-up affect BoP markets?" and "How do firm and customer constraints influence the entrepreneurial adjustments it makes over time?"

We endeavored to answer these questions by conducting a study of healthcare delivery in BoP markets, and we focused on India for the following reasons. First, social ventures that provide technology-enabled healthcare in rural areas need to overcome resource and infrastructural constraints while serving large, impoverished, and dispersed populations in remote areas. For example, in India, more than 450 million rural residents do not have access to quality healthcare (Meher & Patro, 2014), with women being especially vulnerable (Fletcher-Brown et al., 2017). Second, potential customers can only avail themselves of inadequate healthcare facilities and services and have a limited ability to pay for them (Gollakota et al., 2010). Third and last, the healthcare domain is a context that lends itself to the study of social innovations in BoP markets, especially those that are enabled by technology (Mechael, 2009), because entrepreneurs increasingly enter this market with the aim of providing different value propositions (e.g., affordability, shorter waiting times, or greater convenience) over the existing healthcare services or products.

By analyzing two illustrative social enterprises located in India—iKure Techsoft and Neurosynaptic Communications—we make three important contributions to the knowledge of how firms generate social impact in BoP markets. First, we demonstrate that entrepreneurial adjustments are guided by whether firms are trying to alleviate their own internal constraints or

those faced by their customers. Second, both internal and external constraints guide how firms use multiple types of resource mobilization strategies and operating routines from their inception to their establishment in the market. Third, by using resource mobilization strategies and operating routines, firms have different forms of social impact—deep and broad. A deep impact can be generated by expanding the number and type of activities using economies of learning and connectedness (see Dieleman & Sachs., 2008) while a broad one can be created by increasing the membership base, geographic area, or working budgets by pursuing economies of scale (see Hitt et al., 1997; Prahalad, 2006). Finally, our findings show that the prioritization of internal and customer constraints leads firms to establish different sequences of elements of institutional legitimacy—i.e., normative, regulatory, and cognitive ones. Building on our findings, we propose a process model for the scaling-up social impact in BoP markets and develop propositions. Then, we discuss the managerial implications of our findings.

2. Literature Review

2.1. Social entrepreneurship at the bottom of the pyramid

The impact and scalability limitations of traditional BoP institutional setups have led to the emergence of social entrepreneurship as an alternative approach suited to counter this state of affairs. Social entrepreneurs act as agents of change and social enterprises as organizational entities that consider the BoP segment as a customer and deliver both social and economic value (Seelos and Mair, 2005; Mair and Marti, 2006, Luke and Chu, 2013; Goyal et al., 2015). Social entrepreneurship emphasizes innovation and risk orientation along with the market efficiencies of the commercial enterprises and the last-mile capabilities of the NGOs at the BoP (Luke and Chu, 2013). However, social entrepreneurs face multiple challenges across their entire lifecycles (Bhatt et al., 2019; Goyal et al., 2016). Some prominent such challenges are related to financial resource scarcity, leadership issues, institutional and regulatory environment

weaknesses, scalability dilemmas, impact assessment difficulties, etc. Rosca et al. (2020) analyzed how women entrepreneurs engage in social entrepreneurship processes in BoP environments and took an effectuation perspective to investigate the entrepreneurial journey and decision-making logics employed at various stages of the venture development.

Research on healthcare social entrepreneurship in BoP settings is limited, with a few exceptions. Esposito et al. (2012) studied hospitals providing services in India, and emphasized the need to focus on product/service offerings that are affordable, accessible, and available and lead to awareness among the masses, the need to engage the BoP across the value-chain, and local capacity building. In their study of social enterprises in the Indian healthcare sector, Agarwal et al. (2018) found that social enterprises build both their normative and regulative legitimacies prior to their cognitive one. Normative legitimacy is established by educating and enhancing the skill sets of the local BoP populations; while regulatory legitimacy is attained by collaborating with multiple stakeholders. Once these forms of legitimacy are established, social enterprises are able to draw upon their cognitive legitimacy to grow organically by using hub and spoke models, setting up public-private partnerships, or sharing best practices (Agarwal et al., 2018).

As a follow-up study, Agarwal et al. (2020) performed an event structure analysis to investigate three social enterprises in the Indian healthcare sector in order to identify the organizational dilemmas encountered by social entrepreneurs during their evolution process. The authors identified four key practices—multiplying assets, leveraging human capital, building social embeddedness, and providing affordable quality—in which social entrepreneurs engage to manage any dilemmas that may occur in emerging market settings.

2.2 Constraint-driven technology-enabled service innovation for the bottom of the pyramid

In emerging economies, social and communal service innovation plays a different role because the end goal more explicitly concerns social benefits, rather than purely economic ones (Reynoso et al., 2015; Ramani et al., 2017). In BoP contexts, service innovations mirror social ones (Phills et al., 2008) because they engage communities rather than relying solely on firms; they therefore have the potential to lead to lasting social change by providing novel solutions endowed with long-lasting value for society as a whole. Importantly emerging economy social ventures help to address market failures (Zahra et al., 2008; Prahalad, 2005). BoP markets are characterized by chronic shortages of resources that affect production, exchange, and consumption (Linna, 2013). Hence, those social enterprises that engage in social and communal service innovations in BoP contexts are likely to face resource constraints, while their customers are also plagued by constraints in terms of accessibility and affordability. Hence, such innovations can be considered as resource-constrained due to being developed in emerging economy contexts, which are characterized by lower purchasing power, a lower understanding of technology, and lower investment resources.

Service innovations that create new markets differ along two primary dimensions: the type of benefit they offer and their degree of service separability. The type of benefit on offer may be a new core service—such as the high-quality and affordable cataract surgeries offered by Aravind Eye Care in India (Rangan & Thulasiraj, 2007)—or a new delivery option capable of revolutionizing customer access to a core service; for example, the provision of medical consultations over video link (telemedicine). Separability is related to the degree to which a service needs to be produced and consumed simultaneously (Berry et al., 2006).

Especially in the early stages of social innovations and to create consumer demand, firms may need to establish alliances with other intermediaries, such as NGOs that have established

relations with local communities (Ramani & Mukherjee, 2014). Social innovations are focused on generating mutual benefits for both the recipient communities and the commodity providers, rather than maximizing the profits of the innovating firms. In this regard, Bessant & Maher (2009) emphasized co-creation in the context of service innovation (with the involvement of users, suppliers, etc.). There is growing evidence of co-creation in healthcare; for example, learning from radically different contexts via "probe and learn" approaches as in the case of the Aravind eye clinics in India (Prahalad, 2006), and in experimentation involving workable technological solutions such as telecare.

Any technology-enabled service innovation must overcome four general uncertainties before it can be successful: technological feasibility, commercial viability, organizational appropriability, and social acceptability (Hall & Martin, 2005). In the past, technological advances had limited impact on the people at the BoP; however, many of these individuals have since adopted technology into various aspects of their daily lives, thus exploiting the new opportunities it provides (Friedman, 2006). For example, mobile technology provides rural communities not only with access to new knowledge but also with products and services that had previously relied on virtually impracticable physical distribution channels (Reynoso et al., 2015).

An appropriate BoP technology focuses on the optimal use of local resources to benefit the poor (Schumacher, 1973) and needs to fit the constraints of the context (Pansera & Owen, 2015), the resource base of the final user, and the pertinent user and task characteristics (Goodhue & Thompson, 1995). A new technology must also be compatible with income levels, resource availability, existing modes of production, existing technologies, and costs, in relation to the community for which it is designed (Stewart, 1977).

Moreover, technology-based service innovation processes encompass many informal and iterative elements that are influenced by extra-organizational factors such as prevailing policies

and cultural values (Barlow et al., 2006). Essen (2009) noted that the existing studies on service innovation neglect the informal and unpredictable dimensions of the technology-based service innovation process, as well as its sensitivity to informal and unpredictable factors, many of which can be beyond the organization's control—such as cultural norms and social acceptance (Hall et al., 2011). The analysis of these kinds of constraints—which are faced by firms focused on technology-enabled service innovation along with the BoP population they seek to serve—is particularly promising in the healthcare service context because users, technology, policies, and cultural values are integral to its delivery.

2.3 Technology-enabled service innovation in healthcare delivery

IT currently helps deliver many traditional services, including healthcare (Lanseng & Andreassen, 2007; Varshney, 2007; Junglas et al., 2009; Akter et al., 2013). Technology-enabled social innovations are becoming increasingly relevant in BoP markets as they help deliver low-cost, quality healthcare to large populations who often live in rural and remote areas (Srivastava & Shainesh, 2015). Rapid advances in information and communication technology (ICT) make it possible for service innovation to inform the design of business models (Yang & Hsiao, 2009). For IT-enabled services, the use of ICT is not simply a tool (Chao et al., 2007); it is the core of the provided service.

The rapid development of mobile ICT also fuels innovations in the healthcare industry—often in the context of developed countries—and has the potential to improve patient care (Siau, 2003). Tele-health services (Lanseng & Andreassen, 2007; Essen, 2009; Lockamy III & Smith, 2009), remote healthcare monitoring (Blount et al., 2007), and integrated or pervasive healthcare service delivery (Varshney, 2007; Yang & Hsiao, 2009) are illustrative examples of this.

Using mobile technology, healthcare professionals can also seamlessly access patient and medical information and enter it into centralized databases, independent of the healthcare

worker's location or context (Haux, 2006; Chatterjee, S. Chakraborty et al., 2009). Chatterjee et al. (2009) identified portability as a necessary and sufficient condition for the use of and satisfaction with mobile technology usage in healthcare. Other important factors are device reliability and the quality of service of the technology.

A key factor in implementing an e-Health solution is an appropriate design, which implies that the technical features must fit the local context. Moreover, the technology needs to be reliable, flexible, mobile, ergonomic, and user-friendly, and—if relevant—it needs to have a high image quality. When implementing e-Health, issues among individuals and between organizations can occur due to technical support and logistical problems (Hage et al., 2013).

For patients in BoP markets, accessing healthcare services is a not always easy or an option because of their lack of resources or their fear of loss of income while undergoing treatment. Thus, firms providing healthcare services in BoP markets must ensure that their value propositions are strong enough to motivate people to use them. Akter et al. (2013) confirmed that both perceived service quality and perceived trust predict the continuance intentions of BoP consumers in regard to e-Health services. Similarly, motivating healthcare workers to use technologies requires training and demonstration of benefits (Wu et al., 2007). These considerations also extend to the challenge of scaling-up social ventures in BoP markets encumbered by resource constraints.

2.4 The challenge of scaling social impact and the need for entrepreneurial adjustments

A key challenge that social ventures face when addressing market or government failures in resource-constrained contexts is linked to their ability to scale-up their social impact (Bloom & Smith, 2010), which concerns the process of expanding or adapting their output to match social needs (Desa & Koch, 2014). Scaling can be achieved by two ways (Uvin, 1995): (i) by increasing impact breadth, which builds upon economies of scale (Prahalad, 2005) whereby the cost of production is reduced as the social product or service is replicated in multiple geographic

locations; and (ii) by enhancing impact depth, which involves adding new products or social-service activities to the operational range, is similar to horizontal diversification, and builds upon economies of learning and connectedness (Dieleman & Sachs., 2008).

Dees et al.'s (2004) framework determines the adequate 'scaling path' for a given social innovation in relation to readiness, receptivity, resources, risk, and returns. Bradach (2010) suggested generic approaches such as the use of the Internet to scale impact by disseminating campaigns, or the facilitation of networks and collaboration by using intermediaries to broker information between supply- and demand-side actors. Bucher et al. (2016) relatedly provided a narrative description of the scaling options available to a private healthcare service provider set up in rural Argentina.

To achieve impact depth or breadth, firms make entrepreneurial adjustments, which concern how entrepreneurs incorporate new information over time when making decisions about business ventures (Parker, 2006). Entrepreneurial adjustments are important for organizational growth (Shepherd et al., 2011) and are particularly relevant for those social ventures that aim at scaling their social impact, because they continuously need to balance economic and social goals (Desa & Koch, 2014). Thus, social ventures will make certain degrees of effort, wait for and obtain signals from the users and the environment in regard to their needs, and then adjust to achieve more impact (Parker, 2006).

Although the above literature provides some practical guidance, there is limited knowledge of how ventures achieve scale when confronted by social or economic institutional voids (Mair & Marti, 2009; Desa, 2012). Desa and Koch (2014) suggested that, to scale their impact, social ventures require capabilities in social innovation, design for affordability, and market penetration, or a set of minimum critical specifications. Different forms of resource mobilization approaches (e.g., optimization or bricolage) and organizational routines (e.g., ostensive or performative) mediate the effects on scaling breadth and depth of the capabilities

and minimum critical specifications mentioned above (Desa & Koch, 2014). Hence, social ventures are prompted to develop suitable resource mobilization strategies and operating routines—to overcome any barriers to scaling their social impact—by their need for entrepreneurial adjustments. In this context, social ventures may take an optimization-based approach or bricolage to mobilize resources. The former approach involves the acquisition of standard resources with proven capabilities related to the specific application for which the job is intended (Garud & Karnoe, 2003), while the latter pertains to the application of combinations of any undervalued and slack resources, which are often available cheaply or for free (Baker & Nelson, 2005).

3. Methods

3.1. Case selection and overview

To identify suitable social enterprises that were providing technology-enabled healthcare services in BoP settings in India, we collected news articles. Agarwal et al. (2018) noted that many entrepreneurs in India pursue social businesses by reaching the greatest number of beneficiaries to deliver a positive impact. Hence, India was considered an appropriate setting for our research. Out of the 16 social enterprises we identified, we selected iKure and Neurosynaptic by means of purposive sampling (performed through the Factiva business information and research tool) as they differed along two service innovation dimensions: (a) the type of benefit they offered and their degree of service separability (Berry et al., 2006) and (b) their service process matrix dimensions (e.g., resource intensity and degree of customization) (Schmenner, 1986).

We conducted an in-depth study (Yin, 2009) of these two cases. Both these social enterprises had started out with similar motivations, but had then made different entrepreneurial adjustments along the way, expanding into resource mobilization strategies and operating

routines that had eventually led to distinct forms of BoP social impact. Our case-study approach was appropriate as little had hitherto been uncovered empirically in regard to the scaling-up of technology-enabled healthcare delivery in BoP markets (Mair & Marti, 2009; Desa, 2012; Desa & Koch, 2014).

Table 1 summarizes iKure and Neurosynaptic according to the minimum critical specifications needed to have a social impact (Desa & Koch, 2014). In brief, iKure provided core services, which were largely inseparable and required a substantial involvement of healthcare professionals. Neurosynaptic, by contrast, offered more delivery benefits, which were separable due to videoconferencing facilities, but also implied a degree of inseparability because they relied on a certain degree of healthcare professional involvement. iKure's services featured a higher level of resource intensity and a higher degree of customization than those provided by Neurosynaptic.

Table 1: Social innovation, affordability, and market penetration: minimal critical specifications for iKure and Neurosynaptic

	iKure	Neurosynaptic
Social innovation	• Used a self-developed, low-bandwidth-dependent and user-friendly tablet-based system (WHIMS technology) to capture and record patient details. • Provided healthcare services in rural areas to reduce the need for patient travel. • Provided low-cost medical consultation, medicines, and diagnostics in one place. • Provided other services such as early child development screening.	• Used a self-developed portable Remote Health Delivery technology application (ReMeDi®), which drew just 2 Watts from a USB port and had low-bandwidth requirements. • ReMeDi® enabled the real-time measurement of vital parameters at rural healthcare centers. • ReMeDi® ensured the availability of the patients' information during teleconsultation with city hospital doctors.
Affordability	• Low patient cost—USD 1.5 per visit. • Made possible by the support of NGOs, private organizations, and sponsored research and by establishing care centers based on population density, existing facilities, and on an average family income of at least USD 2.5 per day.	• Charged partners (e.g., NGOs) a fee for its services (using a cloud-based service), which helped reduce its capital expenditure. • Relied on NGOs to deliver care, which kept its overall service costs low. • Low cost per consultation (USD 0.63-2.50) depending on type.
Market penetration	• Healthcare workers helped to spread awareness, achieve access, and overcome any local resistance. • Partners (NGOs) knew the local population and livelihood and were able to engage with the local community leaders.	• Scaled-up to a larger number of rural care centers by focusing on technology development and letting partners deliver the healthcare services. • A new cloud-based model meant that the implementation capabilities of its partners (NGOs) were no longer a prerequisite.

3.2. Data collection and analysis

We collected qualitative data from iKure and Neurosynaptic and triangulated them. We conducted semi-structured interviews (Brinkmann & Kvale, 2015) based on an interview guide informed by insights into the fitting of technology to contextual constraints (Goodhue & Thompson, 1995), the scaling-up of social ventures through entrepreneurial adjustments (Shepherd et al., 2011), and deep versus broad impact (Uvin, 1995). Our interview guide was flexible to be able to deal with, for example, any freely arising relevant topics. As we adopted a strategic choice approach (Child, 1972), our interviews and data analysis relied mainly on the senior managers' perspectives.

At iKure, we conducted three semi-structured interviews with the CEO (lasting 45, 90, and 120 minutes). During one of these sessions, we also interviewed two employees involved in software development to learn how the firm had developed its technological solution. To acquire first-hand insight into the services provided by iKure, and how those were being delivered, we visited a rural center and we interviewed workers, a doctor, other employees, and patients to acquire their perspectives. The documents we collected included presentations, published interviews, press articles, and blog posts, and the iKure website.

Similarly, at Neurosynaptic, we interviewed Mr. Rajeev Kumar, the COO, twice (for 60 and 80 minutes). We also interviewed a senior manager of the firm's largest NGO partner (45 minutes) to understand how Neurosynaptic worked. To learn about its operating routines, we visited a rural healthcare center where this NGO partner provided its services to interview staff and patients. We obtained and analyzed documents available on the Neurosynaptic website, including case studies and reports by academics and students. At least two researchers were involved in every interview and field visit.

All the interviews were recorded and transcribed and notes were taken for the field visits. We prepared two consolidated case documents consisting of the interview transcripts, the field

visit notes, and secondary material such as published interviews, press articles, blog posts, and relevant text taken from the website. These case documents were then shared with the key informants for validation. Concurrently with interview phase, we conducted a data analysis in order to ensure that we would be receptive to new results, thereby ensuring construct validity (Eisenhardt, 1989. The first step of such activity involved an in-depth analysis of the raw data (e.g., case documents), which we coded by means of a theory-guided strategy in the NVivo software. By coding common words, phrases, and terms, we were able to identify the first-order codes that expressed the views of the respondents in their own words. In the second step, we identified the links and patterns within the first-order codes. This iterative approach led to the formation of second-order themes that represented theoretically distinct concepts such as constraints faced, entrepreneurial adjustment, resource mobilization, operating routines, and types of impact. (Crabtree & Miller, 1999; Lofland et al., 2006; Gibbs, 2007).

Based on this, we derived a theory-informed description of how constraints influenced the entrepreneurial adjustments made and how they guided the ways in which our case firms mobilized resources and engaged in operating routines to achieve the desired scaling impact. Two researchers independently coded the case documents, achieving a 90.6% inter-rater reliability. Wherever differences in coding between these two researchers were found, the other three researchers were consulted until a consensus was reached.

Construct validity was ensured through the use of triangulated data, highly knowledgeable informants, an interview protocol, and a review of the case reports. Internal validity was warranted by the use of contrasting cases and knowledgeable key informants, and by pattern matching among cases (Yin, 2014; Eisenhardt, 1989). Gathering data on the case contexts ensured external validity. Reliability was ensured through the use of an established chain of evidence that included a case study protocol, the semi-structured interview guide, and the analysis of the interview transcripts (Yin, 2014).

4. Results – Similar motivations, different outcomes

Even though iKure and Neurosynaptic faced similar internal and external constraints (e.g., difficulties in providing care in rural areas, recruiting and training human resources, raising capital, as well as cultural differences), they had made different entrepreneurial adjustments to scale the social impact of their IT-based healthcare solutions:

− iKure had decided to operate a hub-and-spoke healthcare delivery model whereby the latter (rural healthcare centers) were connected to the former (an advanced healthcare clinic) using its proprietary patient data transfer software (WHIMS). A depth-scaling strategy characterized the outcome of iKure's entrepreneurial adjustments.

− Neurosynaptic had decided to sell and service a portable medical device (ReMeDi ®) that enabled rural healthcare providers (e.g., NGOs) to measure vital signs in real time and make them available during teleconsultations with city-based doctors who would then diagnose and make treatment decisions. A breadth-scaling strategy characterized the outcome of Neurosynaptic's entrepreneurial adjustments.

To understand the two distinct developments, we analyzed: (1) how the constraints had influenced the respective entrepreneurial adjustments, (2) how the entrepreneurial adjustments had guided resource mobilization strategies and operating routines, and (3) how resource mobilization and operating routines had facilitated the ways in which the implemented constraint-driven entrepreneurial adjustments were having different forms of impact.

4.1. iKure Techsoft: entrepreneurial adjustments leading to 'deep' social impact

iKure had been set up in 2010 with incubation support from the Kharagpur and Webel Venture Fund of the Indian Institute of Technology (IIT), an early-stage incubator established by the

government of West Bengal. The proprietors of iKure had ventured into healthcare service delivery motivated by their own family health-related tragedies, their understanding of the health-related problems found in rural India, and prior IT experience. iKure had started out by developing the Wireless Health Incident Monitoring System (WHIMS) software; a cloud-based and award-winning application[1].

4.1.1. *Recognizing constraints and developing the iKure business model*

iKure had considered WHIMS as a key means to address the severe constraints faced by the rural Indian population in accessing quality healthcare (limited offerings, long travel distances, strained household economy, etc.). However, iKure had soon realized that patients were facing bigger challenges that technology alone could meet. This had encouraged iKure to become involved in hands-on healthcare delivery—to this end, they had decided on a hub-and-spoke care delivery model, but had faced both financial and human resource constraints to make it work. To improve access and reach, iKure had decided to operate hub clinics in district towns served by the railway system. Moreover, iKure had decided to partner with NGOs to deliver care services in rural health centers (RHCs) located in neighboring villages (28 of which were in operation at the time of the interviews), thereby providing logistical support on the ground in rural areas.

iKure had initially designed its hub clinics with glass doors and appealing aesthetics, but had soon realized that this would increase costs and create the perception that their services were costly. Many villagers had initially been hesitant to visit the hub clinics, but the provision of affordable and accessible doctor consultations, medicines, and diagnostic tests had helped

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[1] WHIMS digitally links to various biomedical equipment and stores image-based data from the scopic and radiology procedures made available at the point of care. WHIMS also has the plug-and-play capabilities needed to work alongside existing healthcare management information system (HMIS). During the design phase, iKure had considered the fact that rural areas presented low user skill sets and limited infrastructure (low Internet bandwidths). The software-as-a-service (SaaS) defined the flows, processes, and the highest level of data encryption.

overcome this. For example, a primary care physician consultation, including basic medicines, cost Rs. 90, and other charges ranged from Rs. l0 to 100. Some diagnostic services were outsourced, but discounts meant that iKure patients could access these services more cheaply.

iKure had also faced human resources constraints. For example, recruiting doctors and healthcare workers in rural India had proven to be difficult. Sujay, the entrepreneur behind iKure, had then used his network to identify talented, young, and eager individuals interested in training as healthcare workers. Sujay had also identified qualified doctors from rural areas who were interested in practicing near their hometowns but lacked the resources needed to set up clinics themselves and faced competition from medical charlatans. Human resources were critical as each hub clinic employed up to six medical teams consisting of nine people. Five members of each team (a doctor, a nurse, a paramedic, and two health workers) were stationed at the hub clinic, while four (a doctor, a paramedic, and two health workers) traveled to the RHCs to assist local health workers employed and trained by iKure.

iKure soon realized the importance of investing time and effort to communicate the value and affordability of their care services. Connecting with and winning the villagers' trust was especially important as healthcare in India tends to be tied to local customs, and the village headmen needed to be convinced of the usefulness of iKure's services. To achieve this, iKure had decided to organize free temporary healthcare spot camps, have vans stocked with medicines travel across villages, and support the local and government-run public health clinics. Employing local people had helped in building relationships and overcoming any resistance linked to the negative perceptions held by villagers toward private firms. Establishing collaborations with hospitals to enable iKure patients to benefit from discounts also elicited goodwill toward the company.

4.1.2. Entrepreneurial adjustments through the dynamic evaluation of constraints

Figure 1 summarizes the dynamic process of the entrepreneurial adjustments that iKure had implemented guided by its need to balance internal and customer constraints, which, in turn, had determined resource mobilization and operating routines.
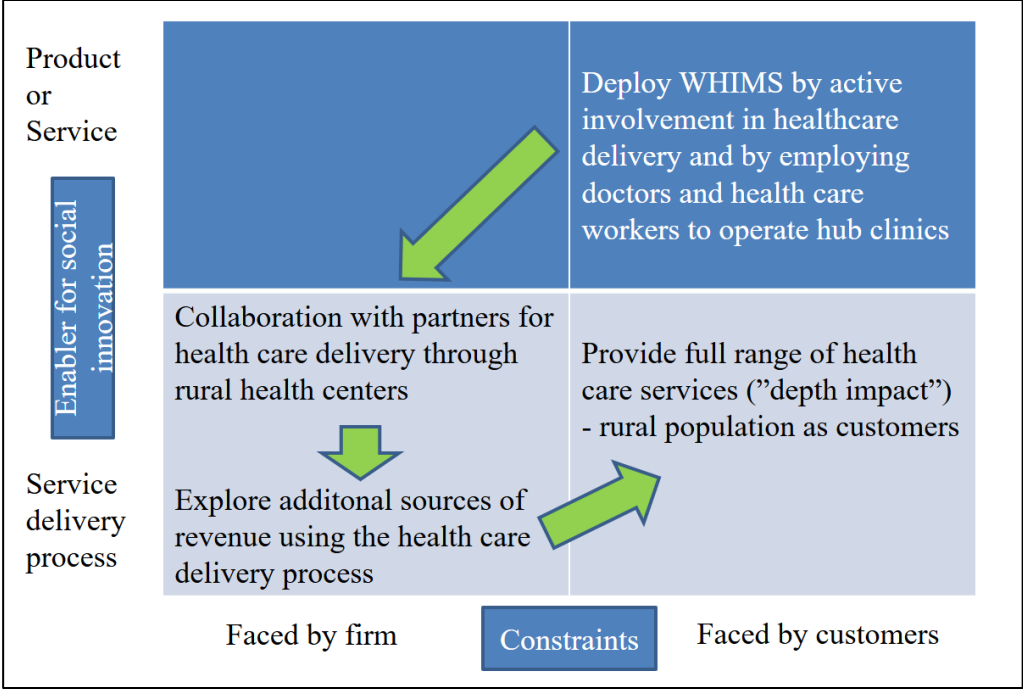
Figure 1: Constraint-driven entrepreneurial adjustments at iKure

Initially, iKure had prioritized customer (patient) constraints over its own, and considered the WHIMS technology to play a key role in alleviating them. Thus, the firm had become involved in healthcare delivery by recruiting doctors and healthcare workers and by deciding to run hub clinics. However, iKure had soon found itself facing severe constraints in delivering care services in the villages. Unless it would have found a way to alleviate such constraints and recognize the importance of healthcare delivery, iKure would have also not succeeded in alleviating customer constraints. As a result, it had decided to work with partner NGOs to run the RHCs.

As iKure was treating the patients as its end customers and had realized a need for a broader portfolio of services to cater to their needs, it had kept prices low and affordable to them. iKure had therefore started looking for alternate sources of revenue by utilizing the strength of its hub-

and-spoke healthcare delivery process. The solutions it had found included collaborating with leading universities to conduct commissioned research on healthcare outcomes, partnering with an eye care organization to provide low-cost eyeglasses, and collaborating with firms interested in discharging their corporate social responsibility (CSR) obligations by investing in iKure's healthcare service activities—for example, by supplying healthcare products for free or providing regular health screening to rural people.

As new partnerships were being established and iKure was starting to generate internal funds, the firm had decided to focus on providing as many healthcare services as possible to its end customers. iKure had considered providing one-stop key healthcare services as its patients could not afford to visit multiple venues for doctors, medicines, and diagnostics. Although the diagnostic services had initially been outsourced, iKure had soon realized the need to develop its own related in-house capabilities in order to build more credibility and to ensure faster turn-around times.

The provision of diagnostic services, however, would have required additional capabilities and financial resources. Thus, iKure had established a collaboration with a leading medical device firm to train rural youths as medical equipment technicians, with the prospect of possibly employing them. This arrangement had been mutually beneficial as the medical device firm had acquired technicians capable of operating its equipment in rural areas and iKure had acquired trained labor. iKure had also realized the need to motivate its doctors not to seek new employment. A solution had involved arranging ongoing professional education through a leading hospital chain—the same hospital chain with which iKure had reached an agreement to ensure that certain patients could be treated, depending on their needs, at discounted rates.

Once iKure had started working with multiple partners for CSR projects and with universities for commissioned research, and had improved its financial position, it had focused on delivering a full range of services to its rural customers. A key reason for this effort was that

the availability of multiple healthcare services at a single, easily accessible location was a primary requirement to alleviate the constraints faced by the rural population, thus minimizing wage loss and decline in health conditions.

4.1.3. *The influence of entrepreneurial adjustments on resource mobilization and operating routines*

While making the entrepreneurial adjustments needed to achieve the desired level of impact and dynamic prioritization of constraints, iKure had emphasized different types of resource mobilization (Table 2) and operating routines (Table 3) and had constantly balanced the alleviation of firm and customer constraints.

In the early phases, iKure had relied on bricolage to identify talented employees and local NGO partners. It had recruited motivated local men and women and master's degree holders in computer applications interested in working in healthcare, and had appointed acquaintances who shared the same vision. iKure had also determined the optimal composition of the teams—comprising doctors, nurses, paramedics, and healthcare workers—who could cost-effectively staff the RHCs. The above resource mobilization strategies had ensured the affordability of the services provided.

Later, as iKure was working on generating additional revenue sources through commissioned research and CSR funds, it had taken an optimization approach to resource mobilization by recruiting a senior employee from the US. This employee had background knowledge of the research needs of North American universities and had been engaged to establish contacts with such universities and pursue commissioned healthcare research projects based on data collected by iKure. Realizing the importance of keeping its doctors motivated, iKure had taken another optimization approach by ensuring that they would be involved in those research projects. iKure had also cooperated with Narayana Health, a leading Indian hospital chain, to continuously upgrade its own doctors' skills. These initiatives had been aimed at

ensuring the sustainability of iKure's social innovation. Similarly, identifying the right NGOs with which to work in different regions and involving local communities had facilitated iKure's market penetration.

iKure had developed processes suited to engage with local village headmen in order to arrange temporary healthcare spot camps to build awareness, and had sent vans loaded with medicines to build strong local bonds. It had also created guidelines for how its medical teams were to work, how its healthcare workers were to identify ailments, and how that information was to be reported through the WHIMS system. The above decisions had ensured the sustainability of the firm's social innovation.

iKure had relatedly developed processes to engage with companies for CSR funds and for the provision of additional services such as mother- and childcare, basic diagnostics, subsidized eyeglasses, and so forth. As such, it had established ostensive operating routines. Such decisions had been guided by the primary motive of, on the one hand, alleviating the constraints faced by the rural population in relation to accessing quality healthcare services at one location, and, on the other hand, ensuring that iKure could overcome its own human-resource and financial constraints.

Regarding the influence of entrepreneurial adjustments on operating routines, iKure had enacted performative routines aimed at identifying patient needs by organizing temporary healthcare spot camps, by engaging with local village headmen, and by interacting with staff at RHCs to learn about their challenges and support them. At the same time, iKure had developed standard processes for healthcare worker-patient interaction and for the engagement with leading medical device firms to train potential diagnostic technicians.

4.2. Neurosynaptic communication: entrepreneurial adjustments leading to 'broad' social impact

Incorporated in 2002, Neurosynaptic had started working with the Indian Institute of Technology, Madras, to address the healthcare challenges faced by people living in rural India, including poor-quality care services, long travel distances, and loss of wages. Such challenges had motivated the entrepreneurs behind Neurosynaptic to develop a remote health delivery solution called ReMeDi®[2].

4.2.1. *Recognizing constraints and developing the Neurosynaptic business model*

Finding a partner interested in delivering healthcare services through the ReMeDi® system had proved to be difficult. As a result, Neurosynaptic had decided to demonstrate its proof of concept by delivering the service itself with some support from a kiosk operator. While the developed technology was scientifically effective and had superior attributes, it did raise unexpected social uncertainties. The provision of healthcare through a common kiosk had appeared advantageous, as local villagers would come to it for a number of public services, such as land registration. However, the presence of other people had resulted in a lack of privacy, so Neurosynaptic had decided to set up separate centers to run the health clinics.

The low local availability of medicines had also threatened the use of the technology. This had forced Neurosynaptic to partner-up with a pharmaceutical company, thereby bypassing the distributor and ensuring direct delivery to the health clinics. Neurosynaptic had later built a pharmacy stock management module into *ReMeDi®*. Similarly, it had added a glucometer to

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[2] The *ReMeDi®* solution includes a portable medical device that draws just 2W of power from a USB port and enables the real-time measurement and storage of five vital parameters: electrocardiogram, blood pressure, temperature, oxygen saturation, and pulse rate, and captures auscultation sounds using an electronic stethoscope. *ReMeDi®* supports multiple simultaneous video consultations that work even on bandwidths as low as 32Kbps. It also works as an Electronic Medical Record (EMR) to store patient data. Finally, *ReMeDi®* can print out complete medical records, prescriptions, lab reports, and measurements with a standard PC printer. Importantly, all this information is made available during tele-consultations between rural healthcare centers and city-based doctors, who can then make clinical diagnoses and prescribe the appropriate treatments. The initial technology solution had been developed based on doctors' recommendations.

the system's diagnostic capabilities. As nurses had been found to perform too many tests and to prescribe medicines themselves to earn extra money, Neurosynaptic had developed a safety feature to limit the operation of the device to authorized personnel. The company had later filed to patent its safety device.

Even with separate clinics and the availability of medicines, when *ReMeDi®* had been deployed in 2006, the patients had been few and had later dropped to zero. Such experiences had helped the firm realize that its core capability was technology development and not healthcare delivery. Around 2007, Neurosynaptic had started discussions with possible NGO partners with the resources and experience needed to deliver healthcare services through *ReMeDi®*. Ultimately, Neurosynaptic had collaborated with World Health Partner (WHP), an NGO that ran telemedicine centers in villages through franchisees and had extensive expertise in delivering healthcare in rural India. At this point, Neurosynaptic had realized it needed funds to further improve its product, and has consequently secured soft loans from the Indian Technology Development Board.

4.2.2. *Entrepreneurial adjustments through the dynamic evaluation of constraints*

Figure 2 summarizes the entrepreneurial adjustments made by Neurosynaptic. Initially, it had faced internal constraints in demonstrating the value of *ReMeDi®* as it had lacked a service provider, so it soon became involved in healthcare delivery. During this service delivery process, Neurosynaptic had faced additional constraints as it had found that service delivery in rural areas required a deep understanding of local challenges and customs. *ReMeDi®* was also found to require improvements. Neurosynaptic had then sought both funding and experienced external partners capable of service delivery. When it had succeeded in this, Neurosynaptic had focused on improving its product, leaving the delivery of healthcare to its partners. Having deployed *ReMeDi®* in many rural telemedicine centers in India, Neurosynaptic had begun

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exploring opportunities to alleviate the constraints faced by its service providers, and had developed services on a cloud platform.

By the end of 2015, 60% of the centers using Neurosynaptic technologies were telemedicine ones whose franchisee had invested in setting up the infrastructure, computers, and software with help from Neurosynaptic and were connected to Delhi-based doctors. Neurosynaptic was also collaborating with private hospitals running telemedicine centers, such as Meenakshi Medical Hospital, Madurai. These partnerships proved to be successful, resulting in Neurosynaptic selling and deploying *ReMeDi®* in many regions in India, which in turn has generated social benefits by reaching a large population.
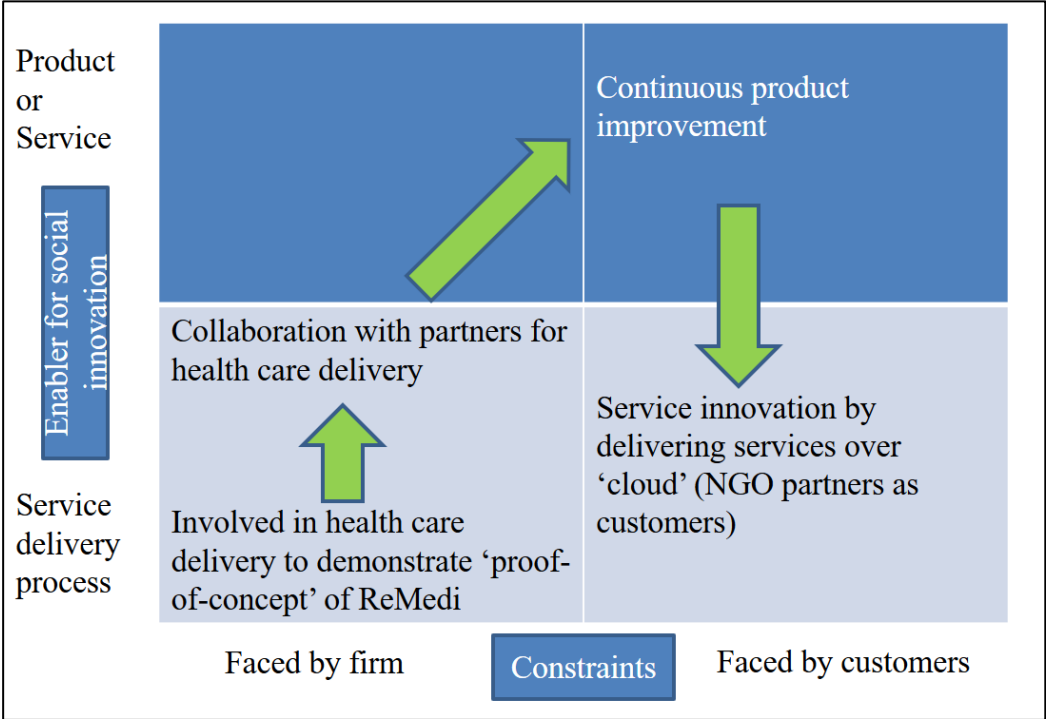
Figure 2. Constraint-driven entrepreneurial adjustments at Neurosynaptic

Up to 2015, Neurosynaptic's revenue model involved the sale, support, and customization of the software. After successfully deploying remote health services through large implementation partners, Neurosynaptic had started to focus on making the product more

affordable for its implementation partners and, hence, their patients. A cloud-based solution had brought down costs as the service providers only had to pay monthly rental for cloud usage. This had converted capital expenses into operating ones, thereby also enabling smaller organizations to deliver healthcare using *ReMeDi®* and as a result, increase the social impact.

4.2.3. The influence of entrepreneurial adjustments on resource mobilization and operating routines at Neurosynaptic

Neurosynaptic's resource mobilization (Table 2) had involved redeploying a service engineer to lead its production team because this person had brought in customer insights related to usability and affordability. This had helped fine-tune the design and plan the production and sourcing while taking into account the users' needs and social contexts. It had also exhibited bricolage patterns of resource mobilization related to engaging with an experienced NGO partner with experience in healthcare delivery in rural areas but not in telemedicine. At the same time, Neurosynaptic had looked for resident or female doctors on maternity leave as an opportunistic bricolage type of resource mobilization aimed at addressing the shortage of qualified doctors, who were crucial for the delivery of telemedicine services.

As Neurosynaptic was focusing on the product and facing constraints that were related more to funds than to the end customers—who were being served by competent NGOs and franchisees—it had taken an optimization approach to resource mobilization by hiring a senior executive for international business development. Later, Neurosynaptic had started focusing on the constraints of its immediate customers—i.e., the NGOs. Neurosynaptic's end objective remained 'broad' impact—i.e., ensuring that as many telemedicine centers as possible, both inside and outside India, used its products. To make that happen, it needed more NGOs to participate. However, both small and large NGOs were facing constraints due to high capital costs. Thus, Neurosynaptic had focused its efforts on service delivery innovation by making its

product available to its partners over the cloud, thus enabling them to avoid capital costs and pay based on usage.

While deciding on operating routines based on entrepreneurial adjustments, Neurosynaptic (Table 3) had engaged in performative routines aimed at improving its product by continuously encouraging employees to interact with end-users. Early experiences of misuse of the glucometer feature in its product had led Neurosynaptic to develop a safe device with proper authentication leading to the specific patent. Neurosynaptic had also engaged in ostensive operating routines by strictly adhering to quality standards and by developing joint action plans and standard operating procedures (SOPs) to help new partners in healthcare delivery.

We present our comparison of the resource mobilization and operating routines followed by iKure and Neurosynaptic in Tables 2 and 3, respectively.

Table 2: Resource mobilization at iKure and Neurosynaptic

	Resource mobilization at iKure	Resource mobilization at Neurosynaptic
Social innovation	• Hiring a US-based employee to build connections with top US and Canadian universities in order to conduct commissioned healthcare research using iKure-collected data. • Motivating iKure doctors by providing opportunities to learn by working on projects with US and Canadian universities and receive continuing education through collaboration with Narayana Health.	• Employing a field service engineer with a deep understanding of user needs and constraints to lead production.
Affordability	• Identifying, recruiting, and training as healthcare workers among local men and women, who also served as local service ambassadors. • Determining the optimal resource deployment at the hub clinics to efficiently serve rural healthcare centers	• Developing a portable medical device, which people could operate with little training. • Simplifying design and manufacturing by understanding the usability requirements of rural areas.

		• Focusing on future development efforts to launch cloud-based services
Market penetration	• Identifying NGOs to expand its presence in those regions in which it did not have local knowledge. • Engaging with local communities and employees of government PHCs to build trust.	• Roping in experienced NGOs to deliver healthcare services. • Employing a senior executive to focus on international business development. • Helping NGOs by identifying resident doctors in medical colleges who could spare some time to overcome resource shortages

Table 3: Operating routines at iKure and Neurosynaptic

	Operating routines at iKure	**Operating routines at Neurosynaptic**
Social Innovation	• Engaging with local village headmen, arranging temporary healthcare spot camps to build awareness, sending vans with medicines to rural areas in order to build strong local bonds. • Creating guidelines for the interaction of medical teams with patients and for healthcare workers to identify ailments and to capture and report such information using WHIMS.	• Encouraging employees to interact with end users in order to develop an understanding of the ground realities that could be translated into continuous design improvement from both the user friendliness and cost effectiveness perspectives.
Affordability	• Investing only in hub clinics and using existing village facilities as RHCs	• Designing product following the philosophy of continuous improvement using cost-effective but high-quality components.
Market penetration	• Adding services such as mother- and childcare, referral to larger and well-known hospitals for treatment (if needed), and providing subsidized eyeglasses beyond doctor consultation, basic diagnostics, and medicines.	• Jointly developing an action plan and standard operating procedures for service delivery with partners.

	• Gaining experience in different geographies by engaging in CSR projects funded by corporations.	

5. Discussion

Despite their similar objectives of providing affordable rural healthcare using technological innovations, iKure Techsoft and Neurosynaptic Communication had made different entrepreneurial adjustments influenced by whether they were prioritizing the alleviation of any constraints they were facing or the customers at a particular point in time and level of impact. Such entrepreneurial adjustments, in turn, had guided their resource mobilization and operating routines (Desa and Koch, 2014). While, having tried to deliver the care itself, Neurosynaptic had decided to limit its role to that of a technology service provider, iKure had successfully operated as a healthcare service provider. Both firms had used bricolage (Linna et al., 2013; Essen, 2009), had then taken an optimization approach in resource mobilization, and had engaged in both performative and ostensive routines. These differences in the relative prioritization of internal constraints had led the firms down different paths (different forms and sequences) in establishing their constituents of institutional legitimacy—i.e., regulatory, normative, and cognitive ones—thereby generating different forms of social impact. As mentioned above, institutional legitimacy can be conceptualized using three elements (Scott, 1995): regulatory legitimacy, which is linked to the means of attaining authorization or endorsement from actors such as regulatory agencies, governments, or other established partners; normative legitimacy, which is related to what is morally desirable and socially acceptable; and cognitive legitimacy which flows from rapid replication achieved by developing templates for organizational structures and actions (Agarwal et al., 2018).

Our results differ from those of Agarwal et al. (2018), who found that healthcare firms operating in BoP markets establish their normative and regulatory legitimacy before their cognitive one. Our findings show that iKure had initially prioritized customer constraints over internal ones, had decided to provide healthcare services on its own, and had hence established normative legitimacy first (employing local youths and training them and building local relationships and a regional focus), followed by regulatory (collaboration with other partners), and finally cognitive legitimacy by providing a full range of services. Further expansion to those regions in which they did not have local knowledge had initially required building partnerships with NGOs, followed by expanding its service portfolio. Conversely, Neurosynaptic had moved away from the direct provision of healthcare services as it had initially prioritized internal constraints over customer ones. It had hence initially established its regulatory legitimacy, followed by collaborating with partners and improving its services by employing human resources who understood the field conditions (normative legitimacy), and by ultimately providing cloud-based services and developing standard operating procedures as a form of cognitive legitimacy. This had been guided by the respective motivations of the firms to generate deep and broad impact.

5.1. Towards a model of scaling-up social ventures

As iKure and Neurosynaptic had followed different patterns of entrepreneurial adjustments guided by their own analyses and prioritization of firm constraints and customer ones, iKure and Neurosynaptic had engaged in different forms of resource mobilization and operating routines, thus eventually creating environments suited for the generation of deep and broad impact, respectively.

Based on our findings, we propose the conceptual model shown in Figure 3. Social enterprises that engage in technology-enabled social innovation for BoP markets need to develop some minimal critical specifications regarding social innovation, affordability, and

market penetration (Desa and Koch, 2014). In order to scale-up their services, these firms have to continuously analyze and dynamically prioritize the need to alleviate their own constraints or those faced by their users and customers, thus making the necessary entrepreneurial adjustments (Shepherd et al., 2011). Such entrepreneurial adjustments, in turn, will guide the resource mobilization strategies adopted and the operating routines enacted and will generate the desired forms of social impact; i.e., deep or broad. This leads us to propositions 1 and 2.

Proposition 1. Those social enterprises that initially prioritize internal constraints over customer ones will first establish their regulatory legitimacy, followed by their normative and cognitive ones to achieve broad impact.

Proposition 2. Those social enterprises that initially prioritize customer constraints over internal ones will first establish their normative legitimacy, followed by their regulatory and cognitive ones to achieve broad impact.

In developing this conceptual process model, we extend the findings of Ansted & Dent (2015), Desa & Koch (2014), and Gollakota et al. (2010) and contribute to the BoP innovation literature by highlighting the role of constraint-driven entrepreneurial adjustments in resource mobilization and operating routines to generate and scale-up the desired form of social impact (deep vs. broad). Thus, this research contributes to the body of literatures on technology-enabled social innovation (Gupta et al., 2020) and on service design in social entrepreneurship (Reynoso et al., 2015) by explicitly recognizing the role played by the dynamic prioritization of constraints by social enterprises as drivers for entrepreneurial adjustments. We further extend the literature on institutional legitimacy (Scott, 1995; Agarwal et al., 2018) by demonstrating the different sequence whereby different elements of institutional legitimacy are established based on how firms prioritize constraints and on the form of social impact they seek to create.
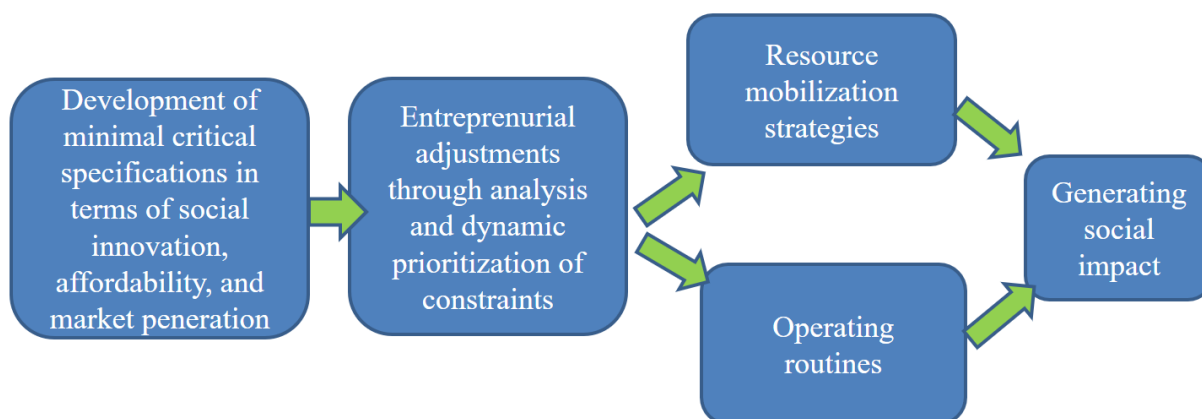
Figure 3: A conceptual model for the scaling-up of social ventures in BoP markets

6. Conclusions

Although the approach of enhancing access to livelihood-improving products and services at the BoP through the intervention of enterprises has gained momentum, it is important to understand the overlooked practical nuances. Specifically, if implemented inappropriately, this well-intentioned approach to tackle the bottleneck can end up neither creating opportunities for the BoP nor becoming financially self-sustaining for social enterprises. To help social ventures avoid any such inappropriate implementation, we set out with the objective of answering two important research questions—"How does a social venture scale-up its social impact in BoP markets? and "How do firm and customer constraints influence the entrepreneurial adjustments it makes over time?" Our findings demonstrate that the entrepreneurial adjustments made by social ventures to scale-up their social impact at the BoP are guided by whether they are trying to alleviate their internal constraints or those faced by their customers. The resulting prioritization leads firms to establish the elements of their institutional legitimacy in different sequences and determines how, from their inception, they use multiple types of resource mobilization strategies and operating routines to establish themselves in the market in order to generate different forms of social impact—deep or broad. To explicitly achieve the objective

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of this research, we proposed a process model for scaling-up social impact in BoP markets and develop propositions and then discussed the managerial implications of our findings.

The proprietors of social enterprises face multiple internal constraints linked to resources and to their aim to create desired levels of social impact, particularly at the BoP. Thus, these firms need to continuously balance their social and financial objectives. Our findings show managers that the dynamic prioritization of constraints faced by social ventures and their users or customers can indeed guide such firms to make the necessary entrepreneurial adjustments through appropriate resource mobilization and operating routines, thus establishing institutional legitimacy elements in different sequences to achieve the desired social impact at the BoP. The managers of social ventures should also take note that it may be prudent to focus on initially establishing one form of social impact—deep or broad—to guide their actions and to avoid any decision-making complexities. Once some level of deep or broad impact has been achieved, it may be possible to pursue both. However, more research is needed to understand the mechanisms by which firms could simultaneously pursue both forms of social impact.

As our research focused on only two technology-enabled social ventures delivering healthcare services, the generalizability of our findings would need to be confirmed by further research conducted across a variety of social ventures working in different sectors—such as sanitation, education, agriculture, and so forth. Future research could also validate our conceptual model and propositions. Moreover, under certain conditions, social ventures may be able to achieve both deep and broad impact. The operational management literature emphasizes that firms face trade-offs only when operating at the performance frontier and can possibly improve along multiple dimensions (Schmenner & Swink, 1998). Competitive progression theory also states that firms can cumulatively build the capabilities needed to improve quality, delivery, flexibility, and cost and that, once they have improved along multiple dimensions, they will face trade-offs (Rosenzweig & Roth, 2004). Innovation can potentially overcome the

need for such trade-offs. These theoretical concepts will hence benefit from further additional research in the social venture context.

There are further research opportunities to develop and validate constructs relevant to the scaling of social innovation, which can lead to theory building and testing in this nascent field of study. Future research could also focus on developing hierarchical planning models by considering strategic, tactical, and operational decisions in technology-enabled rural healthcare delivery networks. The strategic planning model for rural telemedicine network developed by Ishfaq & Raja (2015) is a step in that direction. Developing decision support systems that incorporate insights from our proposed model and data on patient profiles and needs can help technology-enabled healthcare service providers in BoP markets to make more informed decisions in regard to location, capacity, and resource planning and to help them achieve their desired impact.

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