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New business models for frugal innovation: Experience from an enterprise supporting sustainable smallholder Agriculture in Kenya.

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Abstract: Prior frugal innovation studies have highlighted their role in promoting ecological and social sustainability. The way enterprises coordinate a value proposition with the upstream and downstream value chain activities and a workable financial model are noted to be key in the delivery of innovations in low-income settings. However, the extant literature does not explicitly explain how enterprises combining socially oriented practices with economic rationality, successfully deliver their frugal innovation to low-income consumers. The current study thus contributes to this gap by employing the business model theoretical framework- via a single-case study design for a Kenyan enterprise supporting precision farming by serving smallholder farmers with digitally enabled low-cost soil sensors and interactive support services. Analysis of the case reveal four approaches that led to the successful delivery of the innovation: long-term focus, adjustable commitment, continuous experimentation, and the bricolage principle. In addition, digital technologies positively influenced the success of the soil sensors and respective business models. The study contributes to the literature streams around frugal innovation and social sustainability, by expanding knowledge around bringing frugal innovations to the market. Moreover, the study develops a framework of value creation and capture, in digitally enabled frugal innovation. This is of practical significance to enterprises engaging in frugal innovation in low-income contexts.

Keywords: Business model, digital technologies, frugal innovation, low-income, sustainability, sustained value.

1. Introduction

Bottom-of-the-pyramid (BOP) markets represent a massive proportion of those in developing countries. These market segments present opportunities for business, due to their rapid growth rates (George, McGahan, & Prabhu, 2012). Introducing specific forms of innovation and business models—which deliver superior value at extremely low cost—creates new markets and allows for competitive positioning (Mudambi, 2011). The literature on innovations to serve BOP consumers emphasizes the social nature and low-cost focus of the business models that deliver said innovations (Bendul, Rosca, & Pivovarova, 2017; Sinkovics, Sinkovics, & Yamin, 2014). Frugal innovations (FIs) have emerged as a result. FIs constitute a specific form of resource-constrained innovation that is faster, better and cheaper—one that targets more people using minimal resources (Prabhu, 2017). Weyrauch & Herstatt's (2016) concept origin perspective proposes three criteria that characterize FIs in both developing and developed markets: substantial cost reduction, core functionalities, and optimized performance level. The intention to develop low-cost, sustainable solutions to address society's immediate needs has led to the emergence of the frugal innovation discourse (Pisoni, Michelini, & Martignoni, 2018).

In Africa, Nakasone et al. (2014) have identified agriculture as a sector that could benefit significantly from the impacts of FI, since many households directly or indirectly depend on agriculture (Diao, Hazell, & Thurlow, 2010). Specifically, East Africa has been cited as a good example of how the combined attributes of its context and digital technologies (DTs) could revamp new business models for the evolution and diffusion of FIs in agriculture (Howell, van Beers, & Doorn, 2018). Innovative business models and sustainable financing are key to ensuring that innovations are affordable and accessible in resource-constrained environments (e.g. Chakravarthy and Coughlan, 2011; Parthasarathy, Aoyama, and Menon, 2015). According to Winterhalter et al.

(2017), new and innovative business models in BOP markets are an amalgamation of robust value propositions—emphasizing reduced costs with superior value and other aspects that enhance consumers’ willingness to pay for products and services (Winterhalter, Zeschky, Neumann, & Gassmann, 2017). Frugally innovated product redesigns, adaptation, and restructuring of traditional business models could be a way of meeting demand in low-income markets while ensuring enterprise viability (Zeschky, Widenmayer, & Gassmann, 2011). Frugal innovation thus involves both redesigning products and rethinking production processes and business models (Soni & Krishnan, 2014).

Prior studies have identified various features that emphasize the specificities of frugal business models (e.g. Rosca, Arnold, & Bendul, 2017). A free flow of information has been identified as another basic element in the democratization of innovation systems. The ever-increasing use of mobile phones and the internet, in developing countries, offers unprecedented opportunities for frugal business models that are enabled by knowledge sharing (Arocena, Göransson, & Sutz, 2015). Yet the current literature is limited in critical aspects of approaches to and descriptions of FIs and business models for FIs (Agarwal, Grottke, Mishra, & Brem, 2017). There is a lack of understanding around how small and emerging enterprises could successfully create and capture value through FI in low-income markets. Especially so, by leveraging prevalent digital technologies (Leliveld & Knorringa, 2018). Pursuant to the identified gap, the objective of this study is therefore twofold. First, it seeks to explore the ways in which an enterprise develops a business model to bring a frugal innovation to the market. Second, it illuminates the role of DTs within a frugal business model. This study draws empirically from the context of frugal innovation in Africa—employing the single case of an enterprise that targets smallholder farmers with digitally enabled low-cost soil sensors and associated services in Kenya. The study therefore seeks

to address the research question: *how does an enterprise achieve sustained value creation and capture through frugal innovation in low-income markets, and what role do digital technologies play?* The following sections provide a theoretical background of FI and business models. Next, digitally driven new business models are discussed, as an emerging phenomenon in FI. In Subsection 3.3, I provide background information on the case enterprise, its business models, and innovation. Section 4 discusses findings, while Section 5 concludes with the theoretical implications of the study. Limitations and possible future research avenues are presented in the final section.

2. Theoretical Background

2.1 Frugal innovation and the BOP

The world's population currently stands at approximately 7 billion people and is expected to grow to 9 billion people by 2050. Prabhu (2017) argues that it is required, for world economies to meet the needs of current and future populations, to put into action a radical and systematic innovation model—one that is rooted in principles of frugality and focuses on meeting the needs of many people, using drastically fewer resources. Due to this urgent need to meet the demands of a growing population while reducing our use of resources, the phenomenon of high-value resource constrained-innovation has gained popularity. Scholars have labeled the concept differently. Examples include: good-enough innovation (Christensen et al., 2006); cost innovation (Williamson, 2010); *jugaad* innovation (Radjou, Prabhu, & Ahuja, 2012); resource-constrained innovation (Ray & Ray, 2010); and frugal innovation (Zeschky et al., 2011). “Frugal innovation is the novel application of low-cost product and service design, while allowing new applications specifically targeting resource-constrained customers” (Zeschky, Widenmayer, & Gassmann, 2014). It refers to a type of market-based innovation, initiated in and around constraints (Zeschky

et al., 2014), wherein innovators with creative ideas serendipitously engage in changing institutional, technological and organizational constraints.

The literature is still divided on the role of FIs in sustainable development (Brem & Ivens, 2013; Prahalad & Mashelkar, 2010). Some scholars claim that FIs play a significant role in sustainability, as they offer the potential for economic efficiency under conditions of severe resource scarcity—that is, doing more with less for more people (Prahalad & Mashelkar, 2010). Yet the role of FI remains under some debate, despite extensive literature and empirical cases—mostly in the context of India (e.g. Hossain, Simula, & Halme, 2016; Radjou et al., 2012; Rao, 2013; Tiwari, 2017; Tiwari & Herstatt, 2012; Zeschky et al., 2011)—and the potential that the FI discourse offers around much-needed sustainable development. Several contentious issues are still to be addressed in the literature. Some of these problematic areas include: limited application of the business model perspective in understanding FIs. This is due to lack of a unified definition of the business model concept, with various definitions and conceptualizations having been presented (e.g. Chesbrough & Rosenbloom, 2002; Teece, 2010; Zott & Amit, 2010; Zott et al., 2011). This, I believe, limits theoretical contributions to the FI research stream. Many of the case studies of FIs are also from India (Pisoni et al., 2018). Cases of FIs that have been successfully delivered to the market in Africa are not well documented and are therefore limited in the current FI literature (Howell et al., 2018). Moreover—despite the critical role played by small and emerging local enterprises in supporting FI—the extant literature has paid far greater attention to the ways in which multinational enterprises (MNEs) implement and profit from the adoption of frugal approaches to innovation, in developing and emerging markets (Ray & Ray, 2010).

The relationship between FI and business models has been presented in some emerging literature streams, with scholars highlighting the specificities of frugal business models and their

features (Rosca et al., 2017). However, this literature does not clarify the approaches to attaining said business model features for FI. This study contributes to the identified gaps by examining a case of frugal innovation in the agricultural sector in Kenya. It aims to understand how the enterprise attained the business model (s) that successfully delivered the FI to the market, as well as the role played by digital technologies. Supply- and demand-side resource scarcity challenges have pushed firms in developing countries to engage in FI, with their business models strongly inclined towards environmental and social sustainability (Cunha, Rego, Oliveira, Rosado, & Habib, 2014). Business models for innovations in developing and emerging markets significantly differ from business models for innovations in advanced markets (George et al., 2012; Landau, Karna, & Sailer, 2016). Developing countries' conditions determine the nature of business models that firms adopt. Environmental dynamism, market unpredictability, and institutional uncertainty pose challenges. They also lengthen the period required to attain the desired business model for the diffusion of innovations (London & Hart, 2004). Furthermore, "markets are either poorly developed or do not exist" (Seelos & Mair, 2007, p. 52).

Within such contexts, business model experimentation plays a critical role in creating business models that foster the adoption and diffusion of FI (Andries, Debackere, & van Looy, 2013; McGrath, 2010; Sosna, Trevinyo-Rodríguez, & Velamuri, 2010; Trimi & Berbegal-Mirabent, 2012). Business models for FI focus on setting up value creation and capture mechanisms, to reach new customers with unparalleled value propositions. Most customers targeted are those in remote rural areas—locales that barely have access to public services and are often not served by mainstream businesses (Mair & Marti, 2009; Stephan, Uhlaner, & Stride, 2015; Tracey & Phillips, 2011). The FI business model discussion is thus dominated by creating

value for the local people and determining how to sustainably capture said value (Rosca et al., 2017; Sinkovics et al., 2014; Winterhalter, Zeschky, Neumann, & Gassmann, 2017).

2.2 Business Models and Frugal Innovation

Business model conceptualization varies, albeit within a convergence of conceptual themes. The various conceptions show that a business model is complex, multidimensional, and yet to be defined in a unified way (Tuli, Kohli, & Bharadwaj, 2007). Meanwhile, Osterwalder, Pigneur, & Tucci, (2005) have framed a business model as a conceptual tool for understanding a firm's business activities—which can therefore be a mechanism for analyzing, communicating, managing, comparing, and assessing performance and innovation. Thus, business models define the interaction of value proposition, value creation and delivery, and value capture. This implicitly influences organizational structuring for future promptitude and malleability (Osterwalder & Pigneur, 2010). Zott et al. (2011) later presented business models as mechanisms for capturing value created from various sources.

The specific roles and features of a business model, as relevant to this study, are noted in the literature. First, business models can support the strategic marketing of innovative processes, products, and services (Teece, 2010; Zott & Amit, 2008). Second, business models themselves can be innovated to provide a competitive advantage by changing the terms of competition (Demil & Lecocq, 2010; Johnson, 2010; Zott & Amit, 2010). In addition, the business model consists of key elements—i.e., value proposition, value creation and delivery, and value capture (Osterwalder & Pigneur, 2010a)—whose coordination is crucial for delivering innovations to the market (Teece, 2010). The elements are further made up of independent but integrated components. To some extent, changing certain components affects other elements and consequently determines the performance of the whole business model. The reason for drawing from the business model

theoretical perspective, to understand FIs at the BOP, thus stems from preceding expositions. Early studies on business models have confirmed that a firm's business model and its innovation activities are linked (e.g. Calia, Guerrini, & Moura, 2007; Chesbrough, 2007).

Management and strategy scholars have discussed the business model concept extensively, elucidating its key role in innovation. The literature gives the impression that viable business models are designed and put into effect straight from the drawing board, leading to positive competitive and performance outcomes for the underlying innovations. Contrary to this view, (Sosna et al., 2010, p. 384) argued that "in reality new business models rarely work the first time around." The design and implementation of a business model for new innovations demand venture alignment. Resource mobilization by managers is likewise required, along with the development of capabilities and competencies that advance learning and change (Sosna et al., 2010). As a result, a venture ends up with a specific business model—one that best meets its goals and objectives—after going through a process of planning, designing, testing, and re-testing of alternative business model variants, in response to market and environment factors (Henry Chesbrough, 2007; Sosna et al., 2010).

Spieth et al. (2016) relate innovation to the evolutionary nature of a business model. They suggest that business models cannot be predetermined, but that they emerge partially in response to environmental dynamism (Heij, Volberda, & Van Den Bosch, 2014; Schneider & Spieth, 2013). The extant literature suggests that, when emerging in dynamic contexts, firms are bound to experiment with different business models (Vendrell-Herrero, Parry, Opazo-Basáez, & Sanchez-Montesinos, 2018). Business model experimentation is a method for discovery driven, dynamic innovation around the business model, based on unknown assumptions, by testing and clarifying the results of the change (McGrath, 2010). BOP markets are highly uncertain, dynamic, and

complex (Kistruck, Webb, Sutter, & Bailey, 2015; Subrahmanyam & Gomez-Arias, 2008). It is therefore expected that rapid business model experimentation, insight, and evolutionary learning play a significant role in delivering innovations to the market (McGrath, 2010). This dynamic perspective of the business model conceptualizes the development of a business model as an "initial experiment," after exposure to customers, partners, and other key stakeholders within the ecosystem. The experiment is followed by continuous alterations—based on a trial and error process in which the business model is streamlined to fit the local context (Sosna et al., 2010). New business models are usually conceptualized during exploration, where managers are constrained by market uncertainty and environmental dynamism (Heij et al., 2014), leading to unpredictable business model outcomes. The uncertainty and unpredictability is exacerbated in BOP markets, due both to their inherent unique challenges (London & Hart, 2004) and to their institutional contexts, which rarely support economic activity (Kistruck, Webb, Sutter, & Ireland, 2011). According to Eyring & Johnson (2011), the extent to which new business model localization fits the local context, through testing is a critical factor in successfully delivering and enhancing the diffusion of innovations at the BOP.

2.3 Digital Technologies in Frugal Innovation

The recent digital revolution has radically changed the global innovation landscape, thereby creating opportunities for new business models and low-cost, yet high-performing, innovations that suit local conditions (Rao, 2013). DTs—such as mobile phones; geo-location; websites; ICT; and platforms for generating, storing, and processing data—have enabled innovators to design effective low-cost solutions that address location-specific problems in resource-constrained environments like the BOP (Linna, 2013; Howell et al., 2018). According to a study by (Howell et al., 2018), innovators in resource-scarce environments are taking advantage of opportunities that

are unfolding—due to the continued reduction in costs of general-purpose technologies and the increased availability of disruptive ICTs—to design FIs and new business models that are applicable in different economic sectors.

Changes in institutional conditions and advancements in ICT-enabled DTs have, therefore, created opportunities for emerging market entrepreneurial ventures. Entrepreneurs make use of these technologies and of the few resources at their disposal, combined with their ingenuity and improvisation, to develop goods and services for previously disenfranchised rural populations (Ahlstrom, 2010). Overall, there has been huge growth in mobile phone usage and ICT innovations (Avgerou, Hayes, & La Rovere, 2016). The significant increase in the availability and uptake of ICTs creates opportunities for big data usage in critical sectors, while platforms open up new venues for innovation (Nielsen, 2017). The use of DTs reduces innovation costs while allowing the accumulation of knowledge, with scale effects (Colledani et al., 2016). Yet the opportunities afforded by digital innovations, and the mechanisms through which the application of DTs enhances innovation and business success in developing countries, are under-researched phenomena (Nielsen, 2017). Nonetheless, (Lan & Liu, 2017) note that digitization and the advancement in big data analytics are key factors that are reshaping and restructuring modern firms' business models, in the context of digital enablement through FI. This allusion highlights the vital role played by DTs when firms experiment with different business models, under uncertainty and environmental dynamism, to ultimately achieve a viable business model. As previously noted, this study aims to explore business models in the context of frugal innovation, while elucidating the role of DTs. Using the case of Agripinto (a pseudonym)—a venture supplying low-cost soil sensors and associated services to smallholder farmers in rural Kenya—the study highlights how an initial mismatch between innovator problematization and the targeted

customers' "actual needs" led to recurrent business model trial and error, in which the key learning involved leveraging DTs.

3. Methodology

The study is based on a single-case study approach. Single-case studies are appropriate when the case is extreme, unique, and revelatory (Siggelkow, 2007; Yin, 1994). This case was therefore selected for theoretical reasons and due to the inductive and theory building nature of the study (Eisenhardt & Graebner, 2007). The author was responsible for case identification and selection, data collection, and analysis—while an outsider perspective was sought on the themes generated in data analysis, to ensure validity of the findings (Eisenhardt, 1989). A combination of data sources allowed for the documentation of changes in business model components over time (Andries et al., 2013). Any observed combination of Osterwalder & Pigneur's (2010) business model components was considered to be a specific business model. A trial with two or more such combinations at any given time, in contrast, was regarded as reflecting different business models (Andries et al., 2013). This clarity allowed for a clear demarcation between a completely new business model and an addition to said business model.

3.1 Case Identification and Selection

Given the study's focus, cases that serve its purpose are difficult to identify; they are rarely documented in this context. The identification of the case was facilitated by the fact that the author was working on a project in which he was conducting field work in Kenya and, thus, had the chance to engage with several entrepreneurs engaging in sustainable innovation. The case was therefore selected from an initial sample of 12 enterprises, within the framework of a broader project on sustainable innovations in developing countries. Case selection was made purely on a theoretical basis (Eisenhardt, 1989), after assessing whether the product and/or service offered by

the case enterprise qualified as a frugal innovation and whether the current business model(s) could be described as viable. The frugal innovation assessment was based on criteria suggested by (Weyrauch & Herstatt, 2016). See table 1, below, for the detailed assessment.

[Insert table 1 just about here]

In addition to the assessment criteria mentioned earlier, the case inclusion criteria was based on:

- (i) the case enterprise's main product-service offering qualifies for the criteria of frugal innovation;
- (ii) it is a commercially driven social enterprise, focusing on grass roots customers and working with the objective of achieving any of the sustainable development goals; and
- (iii) the enterprise has achieved or is close to achieving commercial viability, at the time of conducting the interviews.

3.2 Data Collection and Analysis

The study was mainly supported by empirical evidence from in-depth interviews with the two co-founders of the enterprise, from field observations, and from archival research (Ventresca & Mohr, 2017) based on internal documents, news articles, videos, and reports. Therefore, there was a triangulation of multiple data sources (Denzin, Lincoln, & Giardina, 2006). The author followed the enterprise for a period of two years (2018 and 2020), conducting in-depth interviews with both co-founders and discussions with employees during field visits. The data analysis was based on themes that emerged from the in-depth interviews and other sources of data (Nowell, Norris, White, & Moules, 2017), while following inductive theory building (Gioia et al., 2013).

3.3 Value Creation and Capture: Agripinto’s soil sensors and associated services.

3.3.1 Case Background and the Innovation

In 2016, Agripinto—a local precision farming venture—launched its soil sensors in Kenya, after undergoing various iterations, dating back to 2014, to ensure the smooth functioning of its sensor technology. Figure 1 shows a five-year historical overview of the evolution of Agripinto and its innovation.

Insert Figure 1 just about here

Started by three Kenyan entrepreneurs, the company successfully developed soil sensors that can give real-time information on nutrient status and other soil-related problems. The soil sensing technology is described as cheap, accurate, simple, and fast. It is currently supported by an interactive SMS service that provides instant soil status and recommendations, along with additional crop advisory services. Agripinto’s sensor technology is a form of disruptive innovation in Kenya. Conventional soil testing services are slow. They are beyond the reach of many smallholder farmers, are carried out only in towns, and require a sanitized and carefully administered process for accurate results—thereby creating institutional voids (Tracey & Phillips, 2011).

Degraded soils—due to farmers’ lack of knowledge regarding the condition of their soil and the best agronomic practices to undertake—were the major challenge that resulted in the birth of Agripinto’s innovation. Most smallholder farming activities are based on a combination of intuition and advice from agricultural extension workers or agro-dealers. Therefore, farmers lack knowledge on agricultural technologies that help them better understand their farm situations. The original Agripinto founder's idea emerged, based on developing a simple gadget that a farmer plugs into the soil. The farmer then instantly receives information on soil status, the best crops to plant,

and the type and quantities of fertilizers to apply. As the idea gained traction, the founder partnered with a colleague, who became a co-founder. According to Drechsel et al.(2001), many countries in Africa are facing severe soil fertility depletion challenges due to escalating soil nutrient loss. Recent technological revolutions have ushered in new opportunities for solving such problems. The upsurge in ICTs and cheaper digital sensors has significantly reduced the cost of coming up with cheaper and customized innovative solutions. The challenge of soil nutrient depletion calls for innovative solutions like Agripinto's sensor technology, which can provide accurate and real-time actionable information for farmers. In Kenya, conventional soil testing costs between 1500 to 2000 Ksh per sample. This is equivalent to approximately \$15–\$20, whereas Agripinto's soil sensing innovation costs just \$5 per session.

Conventional soil sampling procedures require trained personnel who can carefully follow the procedure to avoid contamination and interpret the results (Kotuby-Amacher & Koenig, 1999)—to an extent a rural farmer may find it difficult to follow the soil sampling procedures and to interpret the results. Agripinto's soil sensor technology provides an easy and faster alternative for conducting on-farm soil tests. The soil testing package comes with additional crop management advice and the delivery of recommended inputs as a "solution package." Soil analysis supports farmers in applying the correct amount of fertilizers. It thereby reduces input costs and the negative environmental impacts of synthetic fertilizers, while improving crop yields. The Agripinto solution works through a network of agents, who provide the soil testing services to farmers on behalf of the company. Soil testing and associated services are bundled around input provision, which allows soil testing costs to be factored into the prices of inputs through the "solution package." Bundling everything around inputs has assured innovation adoption and diffusion, while achieving Agripinto's objective. This approach did away with farmers' challenges around accessing

recommended inputs. The business model works in such a way that Agripinto conducts the soil testing and then provides the analysis results and input recommendations, which are jointly delivered to the farmers. As of July 2019, Agripinto had engaged more than 11,000 smallholder farmers.

3.3.2 Business Models by Agripinto

Agripinto's soil sensors are anchored on a value proposition that focuses on providing actionable information to farmers and farmer-focused businesses. Since its inception, the value proposition has remained the same. Yet, how the value is delivered to the targeted customers has evolved over time. Currently, the venture is operating with two business models: a business-to-customer model and a business-to-business model. By understanding farmers' mindsets and what drives their actions—which is key in co-creation (Prahalad & Ramaswamy, 2004)—the way in which the innovation has been presented to targeted customers has constantly changed. Observing how farmers interacted with the innovation, receiving feedback and learning, greatly influenced changes to both the innovation and the way it is delivered to target customers.

Initially, Agripinto started by designing an off-the-shelf soil-testing gadget for farmers to buy in retail shops and carry out the soil testing themselves. This model of supplying an off-the-shelf gadget to retail outlets for farmers to purchase did not work. Farmers failed to perceive the off-the-shelf gadget's value and thus were not willing to pay for it. Howell et al. (2018) have argued that a technology may have inherent value, yet failure by targeted customers to perceive its value may result in the innovating firm being unable to monetarily capture the value—thus affecting sustained value capture and leading to business model failure. Through continued interaction with customers, it turned out what Agripinto thought was the “customers problem” was not perceived as such by the farmers as target customers. Agripinto later realized the “real problem” was “where

and how" to get inputs and "where" to sell their farm produce. As a result, Agripinto abandoned the off-the-shelf gadget business model and introduced input recommendation services of soil testing. Agripinto delivered the new value proposition through a subscription model. In the monthly subscription model, farmers were required to buy the soil sensors from Agripinto and to simultaneously subscribe to the input recommendation and agronomic advisory services. In most African countries, agriculture is rain-fed. This makes farming activities and the associated income highly seasonal. This seasonality of income affected the subscription model, as farmers could not afford to pay their subscriptions on a monthly basis.

This challenge led to a model in which Agripinto started providing farmers with soil testing services and agronomic information, bundled around farm input recommendations and delivery. This model meant that Agripinto assumed the role of a farm inputs provider, collaborating with farm input providers. They did this by bundling their cheap sensors and agronomic information provision services around farm inputs, to offer what they referred to as the "*inputs bundle*." A product-service package of soil testing and analysis services, agronomic information, and input recommendations, was thus delivered to the farmer, along with the inputs. Using this model, the value proposition and delivery focused more on farm inputs provision, with the sensors and related services being a key part of the "input bundle." In this model, the costs of soil testing and analysis, agronomic information, and input recommendations were embedded in the total costs of delivering farm inputs and market information to the farmers.

Agripinto incorporated and leveraged digital technologies in aspects of developing the soil sensors, continued customer interaction as well as value delivery through instant messaging. From inception, the innovation was centered on cheaper digital sensors, which were efficient in detecting different parameters such as soil pH, temperature, and humidity with later access to platforms that

provide free access to data. These were key in the soil recommendations and provision of farm-specific information to both farmers and other businesses. Nielsen (2017) argued that DTs such as platforms open up new ventures for innovation. Meanwhile, participating in innovation attracts a bigger market. With the new "input bundle" model, Agripinto recruited influencer farmers and people as agents to introduce the solution and offer other complimentary services. Thus, the product-service offering included soil testing offered by the agents, soil analysis and recommendations delivered instantly to the farmer via short message service (SMS), and delivery of the recommended inputs. The model works in such a way that if a certain farmer wants their soil tested, the farmer simply sends an SMS to a five-digit number provided by Agripinto. The nearest agent would then be directed, also through messaging, to go and do the test, and relay the information to Agripinto—which does the analysis and provides recommendations instantly. After that, there is farmer aggregation and group delivery of recommended inputs. This reduces Agripinto's input delivery costs, while also lowering the farmers' logistical costs of securing inputs. To the farmers, this model appears as if they are getting free soil testing, recommendations and agronomic advice.

Changes to Agripinto's value creation and capture were based on experimenting with different models. Its customers and suppliers became "business partners," until Agripinto achieved a business model that ensured sustained value capture. This is synonymous with what (Henry Chesbrough, 2007) described as adaptive business model types. Moreover, the data Agripinto collects from farmers—combined with other data from different platforms to which they have access—has also created a market for data. Other farmer-centered businesses require this data to be able to serve farmers (their target customers) using exact information and ensure sound decision-making. This business model targets farmer-focused institutions such as banks, savings

and credit cooperatives, and fertilizer companies. Agripinto partners with these institutions to link them to farmers through accurate data and information. As this new business model, centered mainly on leveraging digital platforms and ICTs evolved—Agripinto created value by conducting data analytics for farmer focused businesses and organizations. Going forward, the venture sees greater revenue potential from this second model, which they have been able to use for cross-subsidization, thus lowering the costs of soil testing for smallholder farmers.

Overall, the key focus of the soil sensor solution has remained the same. What has changed over time, through the trial and error process, is the way the solution is presented to the targeted customers. Thus, the "how" part of offering the solution changed dramatically in a short space of time. With the incorporation of more DTs, the target market also expanded. The co-founder of Agripinto emphasizes that their current business models are viable and still offer room for learning and incorporating additional services. Yet he was quick to highlight that they are yet to break even on invested capital; they expect to do so within a period of two years. As a result of the introduction of this soil testing innovation and associated services, notable changes and impacts can be observed at both the local and industry level. According to Agripinto's co-founder, there has been a change in farmers' mindsets; they now understand the critical role of soil testing and how it contributes to the yields and ultimately incomes. This is exhibited by the growing number of farmers embracing the innovation. The number of engaged farmers grew from 2000 in 2017, to 11,000 by July 2019. From an early stage, Agripinto partnered with several public and private organizations. This, together with leveraging DTs, played a key role in bringing flexibility to the trial and error process. Partnerships created access to resources—for example, technical know-how—that were critical in developing the innovation. Low-cost DTs made experimenting with different business models relatively easier and cheaper.

4. Discussion

Based on the analysis, the case of Agripinto and its soil sensors reveals four approaches to the evolution of a sustained frugal business model in a digital enablement context at the BOP. These approaches are: adjustable commitment, continuous experimentation, long-term focus and the bricolage principle. Regarding adjustable commitment, the analysis reveals that Agripinto's core value proposition—which was the provision of real-time actionable insights to farmers, based on soil testing and analysis—did not change from very early on. There was a great amount of commitment to this value proposition, right up until a sustained value delivery and capture mechanism were discovered by trying out different business models. However, even though the core value proposition did not change, value delivery and capture changed dramatically. This was based on market knowledge developed over time; the flexibility to change certain components of the business model, brought about by DTs; and changing the solution narratives. When exploring approaches to business model development under uncertainty, (Andries et al., 2013) identified focused commitment as a strategy used by entrepreneurial ventures—wherein they commit to one business model for several years, from the very beginning. They related this concept to the aspect of path-deepening search (Ahuja & Katila, 2004), whereby ventures repeatedly experiment with the same model hoping for its viability over time.

In the context of frugal innovation at the BOP, the case enterprise's commitment to a certain business model turned out to be adjustable—based on other components of the business model—while, at the same time, still being committed to the core value proposition. The case of Agripinto reveals some peculiarities of BOP markets, which call for adjustability of commitment and flexibility to changes in certain components of a frugal business model. First, the nature of the consumers makes it difficult to understand their "real need." According to Alur & Schoormans

(2013, p. 190) “BoP consumers have very low purchasing power and consequently are very price sensitive,” markets are poorly developed or do not exist at all, (Seelos & Mair, 2007) and often lack infrastructure (Karnani, 2007). BoP customer needs and challenges can properly be understood through direct interaction and product testing, which could be costly. The innovation may be extremely affordable and offer the required performance levels, yet the targeted customers may still not perceive its use value (Howell et al., 2018). Thus, target customers’ use value perception is critical to the evolution, adoption, and diffusion of frugal innovations. The innovating venture should be able to monetize the value created, through increased consumers’ willingness to pay for the innovation. Business models incorporating cheaper DTs thus play a critical role in balancing use value and monetary value. Through adjustable commitment, the innovating venture would be at liberty to immediately adjust certain components of the business model, after initial assumptions have failed to yield expected results. The changes and adjustments are therefore fast and immediate, based on market knowledge and change flexibility necessitated by cheaper DTs, which reduce the cost of adjustment. Second, the BOP is characterized by rampant institutional challenges, making the business environment highly uncertain and dynamic. The evolutionary outcome of a frugal business model is thus unpredictable (Heij et al., 2014). The challenges of bad governance, poor infrastructure, and unstable institutions call for flexibility to adjust the business model commitment in FI in order to navigate these challenges (Klein, 2008).

In the case of Agripinto, after realizing that farmers were unable to perceive the value of the soil sensors in the initial business model, the venture had to immediately adjust. It was forced to find a way to present the same value proposition, in a manner that it believed would help farmers perceive the value: “...because initially, from a very early stage, my...thinking was we might just develop this electronic gadget and put it out to any farmer...[] and then you realize farmers won't

buy it. So, the 'how' of delivering all these technologies already changed. But the technology itself, I don't think it's going to change. Maybe more innovative ideas will be added on to it.” While the commitment to a given business model was adjustable, there was endurance and a show of commitment to the core value proposition—even though the venture was not breaking even on the invested capital. The commitment to the core value proposition lasted over a considerably long time period, with the hope that at some point the innovation would break even and be able to make profit. Thus, regarding the adjustable commitment approach to business model development, it could be concluded that the enduring mechanism is intrinsic to frugal business models, allowing for perseverance. Meanwhile, change flexibility allows a variety of business models to be pursued, until the most viable one is achieved: “*...financially we haven't broken even on the revenues.... []because, per farmer, our biggest costs are around marketing and training. And that will take maybe a couple of time. But we also understand that, because farmers tend to influence each other, so if we pick a good critical mass, we will eventually break even.*” Based on the above findings, the following proposition is made:

Proposition 1: Low-cost digital technologies allow flexibility to adjust business model commitment, which positively influence sustained value capture in frugal innovation.

During business model development, continuous experimentation is regarded as a focused learning strategy. It allows feedback to influence further learning, by observing how intended customers interact with the product during testing and piloting. By observing and receiving market feedback there is focused learning, which informs changes to the frugal business model in line with the feedback received and the observations made. After effecting the changes, the venture embarks on another experiment to see if the new assumptions incorporated into the business model still hold. This means that there is iterative experimentation, with feedback and learning going back and forth

until a business model—one that is in line with the business objectives—is attained. In the case of Agripinto, continuous experimentation was evident as they tested different business models, until they ended up with the current business models: business-to-customer and business-to-business.

The analysis shows that the experimentation process was rather additive and continuous, as opposed to simultaneous (Andries et al., 2013). Within a space of two years, the venture had experimented with four different business models. While the core value proposition remained the same, the delivery methods and the value capture mechanisms continuously changed. This was based on interactive feedback and on observing the manner in which targeted consumers interacted with the product offering. *“...that interaction with the end-user informs a lot. Because we've had to change a lot of things based on mainly going out interacting with farmers. That informed us on, for example, changing from having an off-the-shelf gadget that a farmer should buy to having agents who are even better trusted by those farmers to serve them.”*

Continuous experimentation resulted in focused learning and gaining crucial information through customer feedback, observations, and engaging with community members. Agripinto was able to learn about key cultural issues, such as trust, which are critical to conducting business at the BOP. Involving community members resonates with the concept of co-creation (Prahalad & Ramaswamy, 2004). Market-based solutions to BOP challenges are best developed with full participation of the people therein, who come onboard as partners in innovation. This approach can transform local economies and support the diffusion of frugal products, as trust and legitimacy issues are solved by collaborating with locals.

For Agripinto, collaborating with local influential people as agents and brand ambassadors—together with the application of ICTs through the interactive SMS service—ensured that certain business model components, changed dramatically. Focused learning occurred

through continuous experimentation, as the venture was driven by purpose and the experimentation process was repeatedly carried out to achieve a specific desirable business model. The dynamics of continuous experimentation and focused learning, as revealed in this study, show that—by continuously experimenting with various business models—a frugally innovating enterprise is exposed to business model diversity. This enables it to better create, deliver and capture value, through full commitment to a business model that best serve customers with varying needs (Vendrell-Herrero et al., 2018). The proposition below then follows:

Proposition 2: Continuous experimentation, in a digitally enabled frugal innovation context, creates diversity in value delivery. This positively influences value capture through optimal value delivery choices.

Long-term focus turns out to be an important approach in business model development for FI, at the BOP. This long-term focus applies mechanisms such as building partnerships for accessing key external resources. In the case of Agripinto, partnerships were forged in the early stages of business establishment, allowing the venture to access technical knowledge. Partnerships thus played a role in product design and prototyping, as well as in product market testing. The American Society of Mechanical Engineers—as a partner to Agripinto—was instrumental in providing technical support during product development. Netfund, a parastatal supporting green innovations in Kenya, provided the initial grant for market testing.

Moreover, at the BOP, outcomes of a given business model are very unpredictable and vague. This requires an entrepreneurial venture to be visionary and focused. The institutional environment is dynamic and uncertain—and payback periods for invested capital are considerably longer, compared to advanced markets. The process of creating a perception of value amongst the intended customers was slow and gradual, as was learning to understanding the market. An

analysis of the Agripinto case shows that long-term focus occurs through the mechanism of gradualism and comprehension: “...[] *but more and more you realize that farmers are really cost sensitive, they only want to cater for the most immediate thing. And there are people who serve farmers, who also don't have that farmer understanding. So, that experimentation needs a lot of time, a lot of capital. Which—if you're working with foreign investors—they could give you one year, or they will be very impatient.*”

Agripinto practiced patience while experimenting with various business models—with the belief that, at some point along the way, things will work out for the better. This is synonymous with the tenets of a long-term focus, where immediate rewards are foregone in favor of delayed gratification (Curtis Banks, Mcquater, Ross, & Ward, 1983). A preference for investing the few available resources, in anticipation of better rewards from the innovation's success in the long run, was quite evident in the Agripinto case. Thus, bricolage—making do, with available resources to create value for the targeted customers—turned out to be key. “*We tend now then, to reduce our ambition in execution. Just because we have to stay lean and spend resources in a constricted way. Even if you have this big vision of doing something, if I have money and would want to hire 10 software developers to launch the product in the next five months, but realizing you can't get those resources, then you hire one developer and launch the product in two years. So, we tend to reduce our ambition in execution.*” As the combination of a long-term focus and bricolage was evident, the following proposition is thus presented:

Proposition 3: A long-term focus strategy that employs bricolage increases a firm's operational efficiency, which positively impacts value creation and capture in frugal innovation.

This study has shown that frugal business model evolution, in digital enablement at the BOP, occurs through: continuous experimentation, long-term focus, adjustable commitment, and the

principle of bricolage. Table 2, in the appendix, shows the data structure with first order themes to aggregate themes and interview quotations.

[Insert Table 2 just about here]

5. Conclusion

In this study, I have analyzed how a frugal innovation evolved at the BOP, through the theoretical lens of business models. The study further reveals the role of digital technologies in frugal business model development. The analysis shows that the case venture employed four approaches to business model development in frugal innovation and that DTs were instrumental in, for example, ensuring flexibility around adjusting the commitment to a given business model. Low-cost DTs, such as digital platforms, mobile networks and mobile phones, enabled commitment adjustment by lowering the cost of experimenting. DTs also played an important role in the interaction between the venture and its customers, by facilitating feedback and enhancing learning. DTs were used as a mechanism to enhance value delivery—through the interactive SMS service for farmers and through the platform as a service for other farmer-focused businesses. Agripinto was able to position itself—and to bridge the information gap between farmers and other farmer-focused businesses—through provision of farmer specific data. DTs enabled the discovery and expansion of new knowledge boundaries, facilitating the development of the frugal innovation and its associated services. The application of DTs in Agripinto’s FI also required data manipulation, which led to the emergence of new business models—for example, the platform as a service business model. Therefore, drawing from evidence in the analysis of Agripinto, DTs play a critical in the diffusion of FIs in the market. DTs necessitate market creation and expansion through reaching many customers in different locations in a short space of time, irrespective of their location. Moreover, as highlighted before, DTs characteristics e.g. reduced transaction costs

(Howell et al, 2018), allow flexibility in changing certain components of the business model through costs reduction in business model experimentation and trial and error process, thus leading to sustained frugal innovation business models that increase diffusion of FI. In sum, DTs influence sustained value creation, delivery and capture in FI.

This study further reveals that the successful delivery of frugal innovations on the market is dependent on business models with strong emphasis on collaborations and partnerships (Musona et al, 2020), for example, with organizations and institutions with market experience, and co-creating solutions with customers (Howell et al, 2018). In the case of Agripinto, partnerships and collaborations allowed successful delivery of their innovation through jointly offering it with other products and services. Partnerships and collaborations create access to critical resources that otherwise would not be available. Frugal business models that allow balancing of use value (for customers) and monetary value (for the innovating venture) turned out to be key in delivering FIs. Such business models, for example, leverage digital technology characteristics to enhance close interaction with target customers, which increases market knowledge through a deep understanding of real customer needs and challenges they face. This is synonymous to the previously discussed concept of continuous experimentation as a focused learning strategy. Learning and incorporating customer feedback in developing the innovation and the business model ensures that FIs are brought to the market successfully. Additionally, the study emphasizes the role of business models that reduce marketing and customer training costs. In most cases, markets for FIs are either poorly developed or do not exist at all, thus require innovators to invest more in marketing and customer training to create product or service knowledge, perception of use value and thus foster diffusion. In this regard, business models that employ strategies such as working with local influential people, who are also customers contribute to reducing marketing

and training costs. Lastly, BoP consumers are low income earners, thus their purchasing power is heavily compromised (e.g. Alur & Schoormans, 2013), and this negatively affects their willingness to pay, making them highly price sensitive. This therefore means they are not willing to pay for products whose price they perceive to be high. Results of this study show that innovators under such conditions should aim lower prices by maintaining drastically lower costs, while mass producing and targeting many customers. This would increase sales and diffusion of FIs, leading to market driven venture growth.

5.1 Theoretical Implications

Through the business model perspective, this study makes novel contributions to the frugal innovation and sustainability literature streams by illustrating empirically how sustained value creation and capture is achieved at the BOP. The study makes four key contributions. First, it offers fine-grained insights into approaches and strategies in frugal business model development to successfully deliver FIs on the market. Andries et al. (2013) highlighted that firms operating under uncertainty practice simultaneous experimentation, i.e. testing various business models at the same time. In this study, the concept of experimentation is revealed, albeit in an additively continuous manner. The case venture continuously tested various business models. Through interacting with consumers and getting feedback, the venture shaped its business model by ‘adding to’ or altering the value proposition and delivery components of the existing business model. This occurred continuously—in a back-and-forth and serendipitous manner—until business models that meet the venture’s objectives were achieved. The analysis shows that—in dynamic, complex, and uncertain environments such as the BOP—business models are not static. Business model outcomes are very difficult to predict in such environments, thus requiring continuous experimentation. Continuous

experimentation, in turn, results in the adjustment of existing business model assumptions, as one's understanding of the market and business environment improves over time.

This study further illuminates the mechanisms through which the continuous experimentation approach occurs: focused learning, experimenting, and interactive feedback. This is where the study makes its main contribution regarding the experimentation approach to frugal business model evolution. Focused learning is a process in which a venture introduces its product or service in the market, and thus gains further understanding around what more needs to be done to improve the innovation's adoption and diffusion. As a result of learning from the market, changes to the product or service offering are effected in line with target market expectations. In focused learning, product prototypes therefore act as artifacts that facilitate thinking, understanding, learning, and re-communicating key features, concepts, and ideas. This is crucial in design thinking, to enhance the sustainable business modeling process (Geissdoerfer, Bocken, & Hultink, 2016). The mechanism of focused learning consists of activities that facilitate collaboration by connecting with various stakeholders within the business ecosystem. More ideas are thereby generated, by working with other business actors, comparing ideas, and accessing resources. These activities become critical in frugal business model development to successfully deliver FIs on the market.

The experimenting mechanism involves piloting before broad introduction, running small experiments that do not require a lot of capital, and the perception of no clear strategy in the initial stages. The whole concept is thus anchored around trying out new ideas. Interactive feedback is important in both focused learning and experimenting. It entails information and knowledge that is generated as a result of interacting with market players. The information may be either negative or positive. Yet it is crucial in adjusting or altering any of the business model components, such

that the business model ultimately creates value for the innovating firm, customers, and other stakeholders. Second, the study develops a framework of sustained value creation and capture through FI in a digital enablement context. We highlight the way DTs influence frugal business models. The propositions help guide entrepreneurs to succeed as sustainable businesses and frugal innovators, in complex and uncertain environments such as the BOP. Third, the study contributes to grassroots sustainable entrepreneurship by integrating sustainability with FI through FIs characteristics such as the focus on minimizing use of resources and solving social challenges. The studied case shows a clear social mandate in objectives, innovation and business model development proces, thus highlighting how FI is associated with social sustainability.

Lastly, as opposed to earlier findings (e.g. Andries et al., 2013) who identified focused commitment in business model development—this study identifies adjustable commitment in frugal business model development. This is likely a peculiar distinction between designing sustained value creation and capture for FI in a developing country context, versus business model development in developed countries. In a BOP and digital enablement context, an adjustable commitment to FI business models allows for variety and diversity in business models. It thus gives the innovating enterprise a high propensity to choose its ideal business model—which, in turn, shapes the path to the firm's long-term survival and growth. Additional approaches to business model development at the BOP could be identified: long-term focus and the bricolage principle. A long-term focus ensures that the firm remains visionary and moves toward achieving its goals in the face of uncertainty and vagueness around business model outcomes. Meanwhile, the bricolage principle is employed to ensure that innovative ideas are implemented with fewer and available resources, creating value for both the intended customers and the innovating firm.

5.2 Limitations and Future Research

While this study has opened new insights on the evolution of FI through the business model perspective, there are several limitations that may warrant caution when interpreting the results. It is worth noting that the interviews used as the primary source of evidence in this study were collected from two informants, who are the founders of the case enterprise. There is thus a possibility of response bias. The enterprise's co-founders as key respondents were responsible for making critical enterprise decisions. Thus, the respondents' narration of the historic events leading to the success of the enterprise and to its current business models provided in-depth knowledge as to how the business models and innovation evolved. Again, at the time of the interviews and observations, the enterprise was just two years into full commercialization of its operations. This means that the interviewees had a fresh memory of how they had developed the venture from an idea until its full commercialization. By July 2019, the venture was only two years into full commercialization and had engaged over 11,000 farmers. The venture was thus new and, hence, I am limited in fully claiming that the current business models are viable. There is a possibility that the case venture may adopt other business models or, rather, innovate the current ones. In dynamic and uncertain environments such as the BOP, business models are always innovated in line with external and internal factors (Chesbrough, 2010). The use of one-off data may also limit the generalizability of the findings to this context. Data collected over time in a longitudinal manner could help in overcoming this limitation.

Zeschky et al. (2014) have argued that innovators with creative ideas apply their ingenuity to engage in changing institutional, technological, and organizational constraints to come up with their innovations. Further studies—adopting a business model lens to explore how innovators engage in the highlighted changes—could make significant theoretical contributions. Studies

exploring bricolage, through a business model perspective in innovations at the BOP, could also help generate additional theoretical insights. Lastly, studies focusing on how entrepreneurs involved in sustainable innovations at grassroots level make sense of their activities and how this shape the venture development process will contribute to sustainable entrepreneurship theory.

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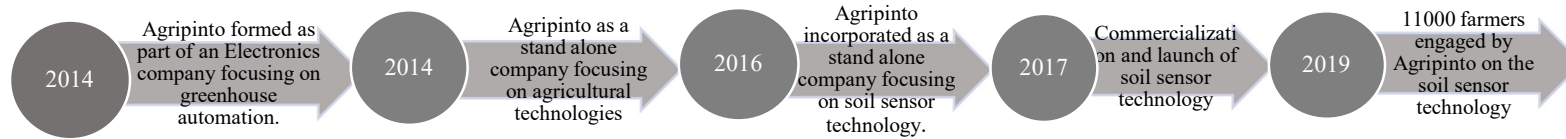


Figure 1. Five-year historical overview of Agripinto and its innovation.

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Table 1: Criteria for frugal innovation (Adapted from Weyrauch & Herstatt, 2016)

	Criteria for Frugal Innovation	AGRIPINTO's innovation	Does it qualify the criteria
1	<p>Substantial reduction in costs</p> <p>If the innovation has significantly lowered costs in terms of purchase price, use or total cost of ownership.</p>	<p>Cost reduction of 75% as compared to conventional lab soil testing services in Kenya.</p> <ul style="list-style-type: none"> - technology launched at a price of \$5. -leveraging fast spread of cheaper digital technologies in the global south, e.g. mobile phones. - conventional soil testing without complimentary services such as interactive SMS costs \$20. - reduce logistical costs in terms of input deliveries as the technology comes with group input delivery services based on soil requirements. 	YES
2	<p>Focus on core functionalities</p> <p>If the innovation mainly focuses on core functionalities required for its use and application in line with local conditions.</p>	<p>Focus on essential functions, i.e. simple plug-in gadget</p> <ul style="list-style-type: none"> -simple plug-in device. - farmer needs only the gadget and any type of a mobile phone. - suitable for rural context as farmers do not need to travel to access soil testing services. 	YES
3	<p>Optimum performance</p> <p>Ascertained performance level required for the purpose for which the innovation is intended and the local conditions.</p>	<p>Performance level fit the intended purpose optimally and local conditions</p> <ul style="list-style-type: none"> - soil test results instant and accurate through the interactive SMS service. - embedded additional services like weather and market data. - improved farmer resilience through advice and recommendations services. - farm specific soil condition data. 	YES

Table 2: Business model development approaches and interview quotations

Second level abstractive themes	Third level abstractive themes	Interview Quote
Comprehension		“Yeah, but more and more you realize that farmers are really cost sensitive, they only want to cater for the most immediate thing. And there are a whole lot of people who serve farmers who also don't have that farmer understanding. Yeah, so, we play in between.”
Delayed gratification		“So, on that front I think that, uh, in the next one or at most two years, we should have broken even on that front. With the farmers I think we just need patience and because at the end of the day we have to really work with farmers.”
Customer-centricism	Long-term focus	“The only language farmers hear is inputs. ... [] So, in our business we have sort of structured this, uh, the farmer centered business, which is delivering value, information and everything to farmers. And gradually we're still sometimes envisioning that we could make soil testing so cheap that every farmer does it. Because we know the value is in that data that we're extracting.” “And gradually by understanding the mindset of the farmer, you start looking at what really, uh, what, what drives them. And over time the one thing that we've seen farmers consider as a need is inputs.”
Gradualism		
Partnerships		“.. [] after that it has been an interesting journey, I think. Yeah, collaborating with different partners. So, at a very early age we were able to get some support.”
Rethorizing solution		
Change flexibility		“So, when you approach the farmer, you don't tell him that, you know, if you do a soil analysis your crops are going to do well. Now instead you change the conversation to where do you buy your inputs. Do you know instead of using a lot of this input, you can even reduce the quantity and use this soil analysis.”
Enduring	Adjustable commitment	“So, the solution and its outcomes remain the same but the hows, I think they have changed. How we are going to offer that has changed. Yeah. So, the how of delivering all these technologies already changed.”
Market knowledge		“Yeah! because per farmer, our biggest costs are around marketing and training. And that will take maybe a couple of time. But we also understand that because farmers tend to influence each other, So if we pick a good critical mass, we will eventually break even.”
Experimenting		“Because we have been sort of experimenting with different models. I think it has played to our advantage because then we are trying to get a sweet spot for ourselves. And as I mentioned, we are a precision farming company, that is our niche. And the demand for that service going forward would come from actually both sides.”
Focused learning	Continuous experimentation	“... [] any decision that we made has been informed by the feedback or observation of how our perceived customers are working with it. So, we just look at the farmer and how they have been interacting with our solution. And because we've been able to learn that- Initially we never had, the aspect of after providing recommendations, where the farmers can get inputs and So, we added the layer of inputs. Like yeah, we can do all these soil analyses, we can give you the best recommendations but most importantly, because what you care is about inputs, we kind of added that. And you realize even for us, if we're going to experiment something that, it's a market that people fear because, you know, if the farmers don't have money unless I'm an NGO I shouldn't be there. Um, so which means that you really have to be well funded to run all these small experiments until you get the right business model.”
Interactive feedback		

Lean business

Making do

Available resources

Bricolage principle

“So, some of our, we tend now then to reduce our ambition in execution just because we have to stay lean and spend resources in a constricted way.”

“... [] Because we've had situations where we don't have money- Then what do you do? So, if you have people who really understand that, you know, 'yeah, it's going to be tough until we have this running'- Which means that even when it comes to financial issues, they could be more lenient in making the company work. So, even if you really have this big vision of doing something, if I have money and would want to hire 10 software developers to launch a product in the next five months. But realizing you can't get those resources, then you hire one developer and launch the product in two years.”
