Designing business models to overcome the barriers to renewable energy market creation in developing and emerging countries. Case: Masar Box – a mobile solar power station for electrifying Africa

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Abstract

Despite the recent growth figures in solar photovoltaics (PV) installments, it is not easy to create a market for renewable energy in Africa. Institutional barriers hinder the continent's electrification. This chapter demonstrates how renewable energy companies are constrained by institutions, but how they can design business models to shape institutional arrangements. This is the first empirical study to describe a dynamic approach to business models. The case company Masar relies on a series of actors in its business model. To overcome institutional barriers Masar comes up with technological solutions (e.g. mobility to overcome political barriers, or prepackaging to overcome indigenous resource barriers) and new market practices (e.g., introducing leasing options to overcome financial barriers). The study integrates the role of institutions and institutional arrangements into business model transformation. It also provides an empirical evidence of how companies can experiment and negotiate with resource-integrating actors to develop value propositions that engage actors in transformed market practices. The case also contributes to the diaspora entrepreneurship literature, and the opportunity-driven approach that views diaspora entrepreneurs as institutional change agents. The diaspora entrepreneurs are not simply constrained by institutional environments, but they can drive the market and change institutional arrangements together with other market actors.

Keywords

business model; market creation; renewable energy; developing countries; emerging countries; electrification; solar power; Africa; diaspora entrepreneurship; effectuation

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1. Introduction

There has been a positive trend in renewable energy in 2010s. The cost has come down, and the sector has attracted record-high additions in terms of power and capital. In these terms, Africa is no different from the rest of the world with companies like Desert Technologies, Scatec Solar, and Terra Sola actively developing solar power solutions from ground-mounted installations to rooftops and solar carports. As a result of the investments, new capacity additions of solar photovoltaic (PV) in Africa increased from around 8 gigawatts (GW) in 2009 to around 47 GW in 2015 (IRENA, 2016b). Yet, severe shortage of installed power generation capacity is still reality, particularly in Sub-Saharan Africa. There are approximately 600 million people who lack access to grid-quality electricity in Africa (IRENA, 2016b). Also, the share of renewable energy sources (excluding hydro) remains below 1% of the installed capacity in Sub-Saharan Africa (IRENA, 2018a). The situation is not much better in the Northern Africa. For instance, Egypt's total installed capacity of renewables amounts to 3.7 gigawatts (GW), including 2.8 GW of hydropower and around 0.9 GW of solar and wind power (IRENA, 2018b). This is still far away from the country's renewable energy targets of 20% of the electricity mix by 2022 and 42% by 2035.

Renewable energy has been claimed to have a "huge untapped potential" in the smaller emerging markets in Africa, Asia and Latin America (IRENA, 2018c: 14). In Africa alone, IRENA (2016b) has projected total installed solar PV capacity could reach 70 GW by 2030 (IRENA, 2016a). However, there are some challenges, which need to be overcome before tapping the potential. IRENA (2018c) lists three key challenges to rapid up scaling of

renewable energy as finance and bankability, administrative and capacity, and regulatory barriers. While IRENA (2018c) suggests regulatory changes to scale up renewable energy, this chapter suggests that new business models can also be designed to overcome the challenges for renewable energy market creation.

There are startups like M-KOPA, SolarTurtle, and Masar to overcome the challenges by experimenting with alternative ways to produce and sell solar power. Yet, despite the recent growth figures in solar PV installments, it is not easy to create a market for renewable energy in Africa. In this chapter, it will be demonstrated how renewable energy companies are constrained by institutions, but how they can likewise design business models to shape institutional arrangements. The focus will be on Masar B.V.'s (Masar) attempts to design a business model to overcome the barriers to the creation of an African solar energy market. Masar[1] is a Dutch smart energy startup that provides solar energy solutions in Africa. This case study is based on participant observation, in addition to expert interviews (regional solar companies, international solar financiers, and renewable energy market researchers), conducted over a three-year period (October 2014 – November 2017).

Conceptually, there are four approaches for understanding business models, namely static, transformational, network, and dynamic (Calia et al., 2007; Demil and Lecocq, 2010; Nyström and Mustonen, 2017). The static approach refers to the business model being used as something of a blueprint for describing the components of value creation (Demil and Lecocq, 2010). The transformational approach considers a business model as a concept subject to change, while the company explores the best ways to conduct its business (Demil and Lecocq, 2010). The network approach acknowledges that the resource basis for business models is not company-specific, with network actors providing important resources for

[1] It is worth noting that the author has acted as the Head of Research at Masar B.V. from June 2015 to December 2017.

enabling the business model (Calia et al., 2007), but this approach does not incorporate change per se. The dynamic approach combines both the transformational and network approaches, to explain the capabilities and conditions for change in business models (Nyström and Mustonen, 2017).

This study refers primarily to the dynamic approach for business models. Theoretically, the chapter also builds on Wieland et al.'s (2017) study, which emphasizes the need to combine the institutional foundations of both markets and technologies; in other words, technological innovations and the development of markets as institutions should not be studied in isolation. The Masar case suggests that both the development of business models and the creation of markets are dependent on the institutional arrangements of actors in the renewable energy market, according to a view characteristic to service-dominant (S-D) logic (Vargo et al., 2015; Vargo and Lusch, 2016) and combining S-D logic with effectuation (Kaartemo et al., 2018; Read and Sarasvathy, 2012; Whalen and Akaka, 2016).

While existing academic research has recognized the influence of institutions on renewable energy investments, there has been little interest to date in explaining the creation of renewable energy markets in developing and emerging countries with institutional research approach. While acknowledging the contributions of Leonard et al. (2017), Munro et al. (2016), Nygaard and Dafrallah (2016) and Zhang and White (2016), which help illuminate the co-evolution of entrepreneurial actions and institutional arrangements, this book chapter extends that discussion by showcasing how solar energy companies are not only constrained by institutions—as highlighted by the majority of the publications in the field—but can in fact change their business models and undertake entrepreneurial actions to proactively create and shape markets.

The chapter has been structured as follows.

(a) Analysis of the institutional barriers which limit the creation of renewable energy markets in developing and emerging countries, introducing the idea of *institutional work* in markets, which suggests that companies are not only restricted by institutions but can actively create and shape markets.

(b) A description of the case study in detail, exploring how Masar dynamically changed its business model to overcome the institutional barriers in renewable energy markets in Africa.

(c) A reflection on the findings in the context of our current understanding of renewable energy markets in developing and emerging countries, as well as recent conceptual developments in the literature on business models, and in market creation and innovation research.

2. Institutional barriers and institutional work in renewable energy markets

Rules and norms guide the behavior of renewable energy actors, as has been acknowledged by scholars focusing on the role of governments in boosting renewable energy markets in developing and emerging countries (for example, Blum et al., 2015; Friebe et al., 2014; Kemp and Never, 2017). Typically, this literature assumes that private firms simply accept the existing rules and norms as given. For instance, Frisari and Stadelmann (2015) show that public financial institutions can play a leading role in reducing the cost of concentrated solar power (CSP), by providing concessional loans in countries where the cost of finance is too high. In addition, they note that competitive tariff-setting mechanisms can also support the engagement of private investors in CSP in emerging markets. Similarly, Keeley and Ikeda (2017) emphasize the importance of supportive renewable energy policies in attracting foreign direct investment to developing countries' renewable energy sectors.

But to properly understand the creation of renewable energy markets in developing and emerging countries, the emphasis should not be placed solely on the public sector. Private sector and community engagement are also important (Mallett, 2013), as electrification programs typically require simultaneous entrepreneur-driven processes and government-led power sector reforms to succeed (Dornan, 2014). For instance, Feron et al. (2016) studied rural electrification in Chile and found that the implementation of small-scale off-grid projects was unreliable due to a lack of mandatory regulations and standards, a lack of funding for maintaining the systems, and a lack of community engagement. Sarraf et al. (2013), in turn, concluded that economic, regulatory, financial, and institutional barriers are the main causes of the gap between the potential and installed capacity of renewable energy resources in Cambodia. These studies are in line with others which reveal the most common barriers to creating renewable energy markets in developing and emerging countries (Table 1).

Table 1: Barriers to renewable energy market creation in developing and emerging economies

Barriers to market creation	**Examples**
Political barriers: regulatory, policies, government support, political risks	(Borhanazad et al., 2013; Feron, 2016; Frisari and Stadelmann, 2015; Gabriel, 2016; Karakaya and Sriwannawit, 2015; Sarraf et al., 2013; Shyu, 2012)
Financial barriers: local awareness, affordability, economic, financial	(Borhanazad et al., 2013; Feron, 2016; Gabriel, 2016; Karakaya and Sriwannawit, 2015; Ondraczek, 2013; Otte, 2013; Sarraf et al., 2013; Scott, 2017; Shyu, 2012; Yaqoot et al., 2016)

Indigenous resource barriers: community, partnerships, skilled labor, local capacity, availability of products, spare parts, distribution networks, physical infrastructure and logistics	(Borhanazad et al., 2013; Gabriel, 2016; Klintenberg et al., 2014; Ondraczek, 2013; Scott, 2017; Shyu, 2012; Yaqoot et al., 2016)

Although many scholars take the institutional environment as given, there are others which consider whether renewable energy companies can also engage in what is known as institutional work—"the purposive action of individuals and organizations aimed at creating, maintaining or disrupting institutions" (Lawrence and Suddaby, 2006: 215). Institutional work (Lawrence et al., 2011; Lawrence and Suddaby, 2006) builds on the premise of institutional theory, which holds that people have shared and diffused cognitive schemas which shape their behavior and practices. These schemas or institutional arrangements both enable and constrain collaboration between people and organizations. For instance, people have certain schemas that guide how solar power plants can be installed or how they are typically paid for (e.g., capital expenditure vs. monthly fees). The institutional research highlights the importance of institutional logics— "'the socially constructed historical patterns of material practices, assumptions, values, beliefs and rules by which individuals produce and reproduce their material subsistence, and provide meaning to their social reality" (Thornton and Ocasio, 1999: 804)—in understanding social behavior. This view is not foreign to contemporary marketing thinking.

In marketing, and particularly the markets-as-practice approach, markets are considered to be created and shaped as they are performed. Market practices—activities which contribute to market constitution (Kjellberg and Helgesson, 2007)—construct how markets work and are

represented. Consequently, markets are shaped by the activities and interactions of different practice groups, as well as by translations between practices (Chakrabarti et al., 2013). In other words, markets do not simply pre-exist, but are continuously defined and shaped by various market actors (Kjellberg and Helgesson, 2007).

Although renewable energy business research often takes institutions for granted, some evidence of market actors' institutional work does exist. For instance, Kaartemo (2016) shows how the global photovoltaic (PV) solar market has been created and shaped over decades. Though entrepreneurs have played an important role in this process, Kaartemo notes that other actors have also influenced market development, and that the market is not isolated from the rest of society. Policy-makers have a particularly critical role to play, through legislation and the provision of funding. On the institutional side, the feed-in tariff system—first introduced in Germany in early 2000s—represented a major innovation for accelerating investments in the renewable energy sector, by providing price certainty for energy producers. China also constitutes a telling example under this regard.

The Chinese government played a decisive role in supporting large-scale solar cell production in the early 21st century, which helped a number of Chinese manufacturers to enter the market and rapidly scale up their production. China's Renewable Energy Law promoted the development and utilization of renewable energy since 2005. The law later required electricity companies to buy electricity from independent power producers. Chinese PV panel manufacturers also benefited from low interest rates, favorable land deals, and other subsidies. While these measures might not have been innovative on a global scale, they greatly increased the amount of Chinese solar panel manufacturers, eventually created overcapacity, and lowered the prices.

In the context of developing and emerging countries, Nygaard and Dafrallah (2016) show how the Moroccan utility company, the Office National d'Electricité, has been successful in its rural electrification program. They identify three main contributing factors: i) a clear vision and a continuing political commitment to the plan; ii) an institutional framework which supported the actions of the utility company and its national and international partners; and iii) a finance model which included all national stakeholders and international financial institutions.

Munro et al. (2016), in turn, highlight the success of the community charging station model in renewable energy dissemination in Sierra Leone, by the non-governmental organization Energy For Opportunity. They show how Energy For Opportunity was able to overcome financial and technological barriers by changing the institutional arrangements for energy consumption and earning sufficient community trust to change mindsets toward renewable energy.

Zhang and White (2016) identify three legitimacy-based strategies which solar PV firms have successfully used in China. They note that building legitimacy at the industry level is particularly necessary for early entrants, even more in cases like this. These “explorers” faced the liability of the novelty in an undeveloped market, and so a preliminary work was required to create and shape the institutional arrangements that late entrants (“exploiters”) take as given. While emphasizing the active role that entrepreneurs play in building legitimacy, Zhang and White also acknowledge the important role of the government in promoting and supporting entrepreneurial actions and institutional work.

Leonard et al. (2017) show how a hybrid solar-diesel mini-grid at Tsumkwe village in Namibia achieved sustainability by involving community members in developing and maintaining the system, which used tariffs and prepaid metering. As a result, this project was

able to overcome the challenges characteristic of many similar electrification projects in rural Sub-Saharan Africa.

In general, research on renewable energy markets in developing and emerging countries is plentiful. The studies indicate that the perceived high level of risk, associated with a range of economic, governance and institutional challenges, discourage private sector investments, particularly in the power sector in Sub-Saharan Africa (Bazilian et al., 2012). But these studies typically consider the institutional environment as set, not taking into consideration how solar energy companies and other market actors not only maintain but also create and disrupt institutions. This is due to the limited attention paid to solar energy startups in developing countries. As Zhang and White (2016) note, solar energy startups are not only constrained by the institutional arrangements but partake in the creation of institutions. This will be examined in the following sections, showing how a startup designed and then redesigned its business models in collaboration with other market actors to overcome the institutional barriers to African solar energy markets.

3. The case study: Masar B.V

Masar B.V. is a Dutch smart energy startup that provides solar energy solutions in Africa. The company's vision is to accelerate the continent's electrification and its transition to renewable energy. The main product is Masar Box, a shipping container-based mobile solar power plant which provides up to 100 kWp of solar power, 24 hours a day.

The body of data used in this case study consists of interviews, online discussions with Masar's CEO (3,671 messages), and memos of company observations over a three-year period, starting from September 2014, a week before Masar was formally registered as a company. The observations showed how Masar's business model evolved as a response to the identified technological and market barriers in African renewable energy markets. The case

will analyse the development of Masar's business model in respect of these barriers, providing empirical evidence for a dynamic business model approach and the role of experimentation and negotiation in market creation.

Serial entrepreneur Mo El-Fatatry visited Egypt in 2014, having spent more than ten years living in Finland. He had not seen his family in some time, and so was very happy to be in Egypt. But each day, as he met with his relatives, the electricity would cut out. The problem affected everyone; at times, his father and sister could not work for hours in the morning because of these power cuts. The day Mo left Egypt to return to Finland, the sun was shining brightly. It made no sense to him that there could be an energy shortage in a country so rich in solar energy. Mo began to think about how he might begin solving this problem.

Following his visit to Egypt, Mo arrived back in Finland excited about the business opportunity he had identified. He had noticed that there was a real need for more reliable electricity in Africa, and the whole continent was rich in solar radiation. Mo had heard about new legislation that was on the verge of creating a solar energy boom in Egypt, and he was ready to seize the moment: "[Competition in the] Egyptian market so far zero. The law was passed 2 weeks ago." (CEO, Oct 1, 2014) At that time, the idea was to raise money for solar energy panels, identify free space on roofs and in fields, and install Masar-owned panels there. The business opportunity was very tempting, given the lucrative feed-in tariff introduced by the Egyptian government. "We install a free solar system on your rooftop and pay you 25% of what we make. Egyptians don't need education on getting free money and the government is a guaranteed buyer" (CEO, Oct 1, 2014). In this way, the business model was designed to overcome financial barriers, by relying on the Egyptian government instead of asking African customers to pay for the panels.

Yet, early on, Mo understood the potential barriers facing this business model: “[The biggest hurdles are] guaranteed payment terms by the government and the ability to raise funding in light of a weak economy in Egypt.” (CEO, Oct 1, 2014) Mo realized that venture capitalists typically have an investment horizon of 3–7 years and a strict geographic focus, which might make it challenging to raise millions of euros in a region which had just experienced major political turmoil during the Arab Spring.

The same hurdles which many other entrepreneurs had encountered while attempting to electrify Africa soon affected Masar, too. The Egyptian pound-based, feed-in tariff program lost much of its potential when the tariff was cut for the second round in October 2016 and even more so when Egypt’s central bank floated the pound in November 2016. However, at the same time, the Egyptian government developed the net metering scheme, which made it easier to self-consume and exchange from the renewable energy production. Moreover, it cut the payback time for solar installments from approximately ten years to seven years. Under the new scheme, solar energy companies did not need to interact with government agencies, as power purchasing agreements were signed directly with customers. Along with many other solar energy companies, Masar decided to build on the new net metering scheme—a system that allows individual power producers (consumers and businesses) to sell excess electricity to the grid—and shifted its focus from the public sector to the Egyptian business market. However, Egyptian companies were not willing to cover the capital expenditure for the panels, and raising funds from international investors proved challenging. Masar was therefore facing both political and financial barriers to market creation, just as many other renewable energy companies had before it.

Before Masar locked itself into the original business model, however, the team started to identify other market opportunities. Mo encountered a containerized solar solution in July 2015, and soon became convinced that Masar could build an off-grid business model based

on containerized mobile solar power stations. Masar followed the example of Africa GreenTec, a company who had developed a solar energy container using solar panels and lithium batteries, which enabled energy generation up to 40 kWp. As such, mobile solar stations could be a real game-changer in electrifying Africa.

Understanding that there were first-mover advantages in introducing containerized solar energy to the Egyptian market, Masar secured exclusive rights to distribute Africa GreenTec's containers in North Africa. The move, however, came as too early in a country where the government still subsidized the price of diesel. Diesel was still too cheap in Egypt at that time, 0.20 €/liter. It was expected, however, to rise by 2019 to 0.60 €/liter, offering a real opportunity to Masar. So far, the company could only match the price of diesel KWh, without any saving for the customer, as declared by the CEO (Feb 25, 2016). It seemed promising that their solution would become steadily more price-competitive against fossil fuels as time went on, particularly as Masar had noticed that solar power had gained an economic advantage over diesel every year since the 2008 financial crisis. This encouraged the company to stay in business, focusing on the diesel generator replacement market in Egypt, and later venturing into villages across Sub-Saharan Africa.

The container-based business model required Masar to introduce new market practices. The mobility of these assets was seen as a sort of insurance policy, so that the company could redeploy its Masar Boxes somewhere else if necessary. This was considered beneficial in raising funds. There was a problem in deploying solar power in those countries in the Global Sun Belt, like Egypt, because international investors were typically the driver of solar deployment, and the area was politically unstable. The solution engineered by Masar was the conception of deployment a fully-functional solar power plant in less than 60 minutes. The solution is to pack all the components of a solar power plant (solar panels, inverters, batteries) in one container, ship the container to a preferred location, spread the pre-installed

legs with attached panels on a plain field, and plug the system to the local mini-grid. As a result, it provides a faster way to install (and relocate) solar power station than roof- and ground-mounted solutions that were the institutionalized solutions in the market.

However, the extra costs associated with the mobility were too high for potential financiers to accept. While the solution would become ever more competitive against diesel, mobile solar power stations could not be twice as expensive as the traditional solar energy solutions investors were used to. Market practices could not be changed without the use of better technology, requiring therefore investments in R&D to make mobile solar energy more price-competitive against ground- and roof-mounted solar solutions.

In terms of technology, the company had learnt that lithium batteries were not optimal for the extreme heat experienced in Sub-Saharan villages. In addition, the output needed to be more than 40 kWp if it was to power entire villages. Although the container came prepackaged and required minimal effort from local people to set up, indigenous resources were needed to monitor the system's performance in case something went wrong with the container. Albeit the container was partly able to overcome the identified barriers for electrifying Africa, there was still work to be done in designing a better technological solution.

In 2017, Masar began collaborating with a design office to develop a containerized solution that would have a capacity of up to 100 kWp, using the newest panel (thin film) and battery (Lead Crystal) technologies. This allowed more panels to fit within the standard container and added more years to the battery life cycle in warm conditions, which in turn made the solution more efficient. This all brought the Masar Box closer to the levelized cost of electricity (LCOE) of roof- and ground-mounted solar panels, making Masar more attractive to international investors. It was also necessary to include connectivity for remote monitoring in the Masar Box design, as it was not possible to rely on manual labor in this critical

instance. The new Masar Box was therefore designed with sensors inside the unit, which tracked vital measurements such as heat, humidity and performance, so that it would be clear if batteries were not fully charged, panels were dirty, or the unit required maintenance. Such remote monitoring requires connectivity, and so Masar—as a member of Telecom Infra Project's OpenCellular initiative—began developing wireless access in rural areas in partnership with companies such as Facebook, Deutsche Telekom, Intel and Nokia. With the new solution, Masar also widened its focus from the Middle East and North Africa to the whole African continent. Masar Boxes could be used as sub-stations for providing general internet services across all of Africa.

As of December 2017, Masar serves both on-grid and off-grid customers in Africa. While the company sells panels and batteries to on-grid customers, the Masar Box is currently the company's solution for electrifying off-grid African regions. Yet the mobility of the container means that it will still be useful if the grid expands. In other words, if an off-grid region becomes part of a national grid, it is possible to relocate the Masar Box to another off-grid region in Africa, while Masar also continues to provide its more traditional on-grid solutions. In addition to the current business model, Masar has future plans to use Masar Boxes for providing wireless access, powering water purification containers, and charging electric vehicles, all enabled by its business partners. But as such investments take time, Masar is focusing on a low burn rate and stabilizing business operations until some of the institutional barriers have been overcome and international investors are ready to invest in the company's assets.

The Masar case reveals how companies can overcome institutional barriers through unique technological and market approaches, in an example of a dynamic approach to business model development to incorporate an institutional view. It also provides further empirical evidence of the role of experimentation and negotiation in market creation.

Masar has faced similar barriers to other renewable energy companies, having to overcome the already-mentioned institutional barriers to market creation in developing and emerging countries.

The original business model was heavily reliant on the Egyptian government's support for solar energy. When the feed-in tariff terms were revised and the Egyptian pound was floated, the original business model lost its foundation. Enabled by the new net metering scheme, Masar pivoted toward serving business customers in Egypt. Although this minimized the influence of political barriers, this maintained—if not increased—the financial barriers, as Masar could no longer rely on the Egyptian government to pay for the electricity generated. The startup needed to find a way to make electricity affordable for businesses and to raise funds from international investors for the panels. As international investors were not willing to invest, Masar moved toward a container-based business model that was designed to overcome political, financial, and indigenous resource barriers.

There is a clear linkage between technological innovation and barriers to market creation, as exemplified in the table below.

Table 2: Technological innovations used by the case company to overcome barriers to market creation

Barriers to market creation	**Technological innovations to overcome the barriers**
Political barriers	Masar Box enables the relocation of the solar power plant. If political risks (e.g., devaluation of the national currency, changes in the feed-in tariffs, security) actualize, it is possible, in the worst case, to ship the solar power plant to another country. This is much more

	challenging for roof- or ground-mounted solar power stations.
Financial barriers	Mobility of Masar Box enables leasing of the solar power plant. If the client does not pay for the lease, it is possible, in the worst case, to ship the solar power plant to another client. This is much more challenging for roof- or ground-mounted solar power stations.
Indigenous resource barriers	Masar Box minimizes the need for indigenous resources. As the system in prepackaged and can be remotely monitored, there is no need for local expertise. Roof- and ground-mounted solar power stations need more expertise for installing the system.

The case provides empirical evidence for a dynamic approach to designing business models (Nyström and Mustonen, 2017). The case reveals how the company is embedded in the business environment, constant change, and technological development Thus, it highlights the networked nature of business relationships, as well as strategic agility, adaptability and flexibility, In addition, the case recognizes the role of institutions in value co-creation (Vargo and Lusch, 2016). Hence, a revised definition for dynamic approach to business models is given. The new definition is compatible with both the empirical case as well as S-D logic: the dynamic approach to business models entails a flexible and adaptive attitude towards the company's business model to reconfigure, develop, and adapt the model in response to events, institutions and institutional arrangements in systems of value co-creation: service ecosystems.

Masar's business model has been constantly adapted, a process influenced by various market actors, and, although it is less reliant on political actors than its original model, it is still influenced by political decision-making. Government subsidies (and subsidy cuts) do affect the competitiveness of solar energy compared to diesel. In addition, the study shows how Masar's business model also relies on the expertise of business partners, in a network business approach. The company is a member of business networks such as the Telecom Infra Project, which aims to change the institutional environment and provide an additional resource basis for business model development. Potential financiers were important in shaping Masar's business model, as it was necessary to have a solution that matched the needs of both local customers and international financiers. Investors are still comparing the containerized solution against the LCOE of ground- and roof-mounted systems, and the case demonstrates how technological innovations are still closely interlinked with market innovations (Wieland et al., 2017).

New technologies require new market practices, which makes it important to engage other market actors. The Masar case adds an institutional dimension to Kaartemo et al.'s (2018) proposition that resource integration and value propositions become market offerings if they are agreed upon by market actors. The willingness of market actors to accept value propositions and to integrate resources (e.g., to finance a container or to sign a lease) depends to large extent on the institutional arrangements (or barriers) in a given context. In brief, if companies hope to make value propositions attractive to market actors, they need to either develop value propositions that fit the institutional environment or engage in institutional work to change these institutional arrangements.

Conclusions

As a contribution to the business model literature, this is the first empirical study to describe a dynamic approach to business models (Nyström and Mustonen, 2017). Masar relies on a series of actors in its business model, such as partners developing containerized solar power plants, solar panels and batteries, as well as ubiquitous internet services. Its business model is also influenced by public actors, as governments in Africa can either provide opportunities to businesses or limit their operations. As an active member of key business networks, Masar attempts to alter the institutional environment and secure additional resources for its members. Thus, the study extends the original work of Nyström and Mustonen (2017) by integrating the role of institutions and institutional arrangements into business model transformation. It also provides an empirical evidence of how companies can experiment and negotiate with resource-integrating actors to develop value propositions that engage actors in transformed market practices. Thus, building on S-D logic and effectuation, dynamic business models can be seen as outcomes of constant experimentation with market actors.

The case also contributes to the diaspora entrepreneurship literature, and particularly the opportunity-driven approach that views diaspora entrepreneurs as institutional change agents (Riddle and Brinkerhoff, 2011). The diaspora entrepreneurs are not only doing business based on necessity, but as a result of recognizing business opportunities; they are not simply constrained by institutional environments, but they can actively drive the market and change institutional arrangements together with other market actors This study shows how institutional conditions affect the internationalization efforts of diaspora entrepreneurs (Rana and Elo, 2017).

Companies need to analyze the institutional barriers relevant to their own business. Some of these barriers can be overcome through technological solutions (e.g. mobility to overcome political barriers, or prepackaging to overcome indigenous resource barriers), whereas others

require the initiation of new market practices (e.g., introducing leasing options to overcome financial barriers). Often, new technological solutions and market practices are closely interlinked. In any case, it is important to understand the business models of other market actors, to ensure the viability of one's own model (Heikkilä et al., 2015) by making value propositions which will engage other actors in market-shaping. To boost market creation and to institutionalize innovative solutions (here, a mobile solar power plant), collaboration with similar service providers may be useful, as other companies are likely to encounter similar struggles when trying to change market practices.

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