



Built to scale? How sustainable business models can better serve the base of the pyramid

Itzel Palomares-Aguirre ^{a,*}, Michael Barnett ^b, Francisco Layrisse ^a, Bryan W. Husted ^a

^a Tecnológico de Monterrey, EGADE Business School, Mexico

^b Rutgers University, Rutgers Business School-Newark & New Brunswick, USA

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ABSTRACT

One of the greatest challenges for sustainable business models is achieving a scale of operations that is adequate to meet the quantity and depth of needs in their markets. In this paper, we examine scaling of sustainable business models at the base of the pyramid (BOP). Using within- and cross-case analyses, we study the sustainable business models of three firms that provide affordable housing for people with very low incomes in Mexico. Our analyses reveal the importance of community engagement as well as constraints on the ability to stimulate market forces when serving the very poor. These findings suggest that the literature on sustainable business models should be modified to account for the essential roles of community engagement and government collaboration in lieu of reliance on market forces in enabling social enterprises to scale in order to better serve the very poor.

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1. Introduction

As clarified in a report by the United Nations, adequate housing is fundamental to human life: “The right to life cannot be separated from the right to a secure place to live, and the right to a secure place to live only has meaning in the context of a right to live in dignity and security, free of violence” (Farha, 2016, p. 11). Yet large portions of the world’s population remain without access to adequate housing (UN-Habitat, 2016). In Mexico alone, it is estimated that 4.3 million new houses need to be built to meet basic needs (Torres, 2006). Of course, the poorest – those at the base of the pyramid (Prahalad and Hart, 2002) – populate this large swath of unmet need. Having a low and unstable income, people at the base of the pyramid (BOP) do not qualify for the traditional loans necessary to acquire a house. So how can their needs be met?

The private sector has responded with the development of sustainable business models that “enable social entrepreneurs to create social value and maximize social profit; of significance is the business model’s ability to act as [a] market device that helps in creating and further developing markets for innovations with a

social purpose” (Boons and Lüdeke-Freund, 2013, p. 16). Yet despite increasing attention to their development and deployment, the collective promise of business models that resolve social and environmental problems has not been fully realized. Real social impact requires that business models achieve sufficient scale, but often such models are not scalable (Christensen et al., 2006).

We define scalability as the ability of a social business to increase the impact of a given program for more beneficiaries, while maintaining financial stability to ensure survival. Achieving both objectives allows a social business to continue its social mission, while being profitable enough to scale up in the long term. Scalability is probably the central issue for sustainable business models if they are indeed to have a significant social impact (Christensen et al., 2006). Lyon and Fernandez (2012, p. 64) point out that “the activities of social enterprises tend to be localized and small (in scale.” If a social problem is large, such as the lack of adequate housing, potential solutions need to be scalable.

The challenge of scaling is well-exemplified by *Patrimonio Hoy*, a program focused on providing affordable building material for self-construction to people with limited financial resources (CEMEX, 2017). Developed by Mexican cement multinational CEMEX, this program has been widely cited as an example of how a private company can help to alleviate the problem of inadequate housing without government support (Calton et al., 2013; Dahan et al., 2010; Subrahmanyam and Gomez-Arias, 2008). CEMEX originally

* Corresponding author.

E-mail addresses: A00604665@itesm.mx (I. Palomares-Aguirre), mbarnett@business.rutgers.edu (M. Barnett), pancho@itesm.mx (F. Layrisse), bhusted@itesm.mx (B.W. Husted).

targeted the BOP, but the program failed to grow significantly. As a result, CEMEX was unable to sustain focus on the poorest and eventually moved to the higher end of the BOP and the middle of the pyramid, because these people had greater purchasing power. Given the inability of a company with CEMEX's massive resources to maintain focus on the BOP market, it is evident that the challenges of reaching the poorest are daunting.

In this paper, we seek to understand how sustainable business models can be scaled successfully to serve the needs of those at the BOP. The SCALERS model by Bloom and Chatterji (2009) identified seven organizational capabilities necessary for successful scaling: staffing, communicating, alliance building, lobbying, earnings generation, replication, and stimulating market forces. We undertake within- and cross-case analyses of three firms engaged in housing construction at the BOP in Mexico and find that while many aspects of the established SCALERS model are key to successful scaling, the model requires adaptation when applied at the very base of the BOP, a market that has not yet been examined within the scaling literature (Bloom and Smith, 2010; Bocken et al., 2016). Based on our findings, we put forth a revised set of seven factors, which we term "RESCALE", that better explain scalability at the BOP. We conclude by discussing the implications of these findings for research and practice.

2. Literature review

To understand how sustainable business models can be successfully scaled at the BOP, we draw from three literatures: the BOP literature, the sustainable business model literature, and the scalability literature. We briefly review each one below.

2.1. BOP literature

In their seminal article, Prahalad and Hart (2002) estimated that around four billion people were in the lower level of the economic pyramid; that is, at the bottom or "base of the pyramid." Income is the basic unit by which people are classified as being part of the BOP (Subrahmanyam and Gomez-Arias, 2008). Some authors use the 1500–2000 USD annual income per capita proposed by Prahalad and Hart (2002), while others employ a threshold of 1 or 2 USD per day (Kolk et al., 2014). Regardless of the measure employed, there are many people at the BOP who have very low incomes and lack access to products and services needed to meet basic human needs.

The massive needs of people at the BOP have long been known, but it was not until the beginning of the 21st century that scholars started to discuss the BOP as a new business opportunity. Firms faced strong competition in developed economies and so started to look to potentially unattended markets in emerging economies dominated by BOP consumers (Seelos and Mair, 2005). The first calls for serving BOP markets were aimed at multinational corporations, which were potentially able to solve some of the problems faced by people at the BOP (Prahalad and Hammond, 2002).

However, a recent literature review of articles published on the BOP provided some important insights that challenge conventional wisdom: (1) small and local firms rather than big multinationals target the BOP more frequently; (2) BOP consumers are in most cases recipients of existing products adapted to suit their needs, rather than being co-inventors of new products; and (3) people at the BOP are mostly consumers, rather than producers or employees (Kolk et al., 2014). In 2007, the World Resources Institute and the International Finance Corporation conducted a large-scale study aimed at understanding the needs of the approximately four billion people worldwide living at the BOP (Hammond et al., 2007). The study found that 57.9% of spending by people at the BOP was on

food, followed by energy (8.7%) and housing (6.6%) (Hammond et al., 2007). Regarding housing, many people at the BOP are unable to provide official documentation of their home ownership (Hammond et al., 2007). This situation limits governmental support, access to credit, services delivery (water or electricity), and even the transfer of this asset to future generations (Hammond et al., 2007).

2.2. Sustainable business models literature

The concept of the business model emerged during the 1990s with the rise of internet-based firms (Boons and Lüdeke-Freund, 2013; Shafer et al., 2005; Zott et al., 2011). The growing interest in business models has generated multiple definitions. However, scholars generally describe a business model as a representation of the different business relations a firm has in order to implement a strategy that creates value by attending to customers' needs (Zott et al., 2011). The basic elements of a business model are the customer value proposition, a profit formula, and key resources and processes (Johnson et al., 2008). Business models should be difficult to imitate and should depict the relationships between the firm, its customers, and its suppliers (Teece, 2010).

Muhammad Yunus and his colleagues distinguish three main types of businesses: (1) profit-maximizing businesses that seek financial profit maximization and the repayment of invested capital, (2) not-for-profit organizations that do not seek the recovery of invested capital and seek social profit maximization, and (3) social businesses that seek both the repayment of invested capital or self-sustainability and social profit maximization (Yunus et al., 2010). The key to this third type of business is the simultaneous creation of both economic and social value (Seelos and Mair, 2007).

How can economic and social value be created together? Social entrepreneurs have emerged to answer this question by generating business models to satisfy basic human needs that traditional institutions and approaches have inadequately addressed (Seelos and Mair, 2005). A sustainable business model seeks to maximize social profit (Boons and Lüdeke-Freund, 2013), but firms that adopt a sustainable business model are also interested in generating financial revenues, since they do not usually receive donations or support as charities or foundations do. However, in order to generate systemic change, the sustainable business model must also be scalable (Christensen et al., 2006), which is the key focus of this article.

2.3. Scalability literature

Lack of scalability is a major challenge for sustainable business models (Bocken et al., 2016; Christensen et al., 2006). Though many social enterprises have successfully served local market needs, relatively few have successfully scaled to meet the needs of a larger market (Bocken et al., 2016). Scalability has traditionally been conceptualized as replication or expansion, which is achievable once a firm has standardized elements of its business model (Bradach, 2003; Uvin et al., 2000). Standardizing elements of a sustainable business model is especially challenging; all the more so when dealing with the BOP. Although consumers at the BOP may share some common characteristics, such as their limited income, addressing their needs often requires taking into account a range of environmental factors and so necessitates the design of tailor-made solutions (Whitney and Kelkar, 2004).

Scalability can be conceptualized along at least two dimensions: width, which is the number of people reached by the initiative; and depth, which addresses the substantiveness of the social impacts on each beneficiary (André and Pache, 2016; Bloom and Chatterji,

2009). Taken together both dimensions capture the quantity and quality of the social impact.

A key issue in the scaling literature is determination of the factors that stimulate successful scaling. Bloom and Chatterji (2009) identified seven organizational capabilities that foster scaling: staffing, communications, alliance building, lobbying, earnings generation, replication, and stimulating market forces. Their model is commonly referred to by the acronym SCALERS, formed by the first letter of each of the seven capabilities. Let us examine each of the organizational capabilities in turn.

Staffing refers to the ability of the organization to acquire sufficient qualified human capital, either as employees or volunteers (Becker, 1964; Bloom and Chatterji, 2009). Communication is the ability of the organization to inform its key stakeholders, such as beneficiaries and donors, of its objectives and progress in meeting those objectives (Bloom and Smith, 2010). Alliance building occurs when an organization generates win-win outcomes with other partners or organizations, instead of trying to accomplish its goals alone (Bloom and Chatterji, 2009). The use of alliances allows the firm to achieve more than what it could have done alone. Lobbying refers to the ability of an organization to work with the government, by receiving financial support or passing legislation favorable to its social cause (Bloom and Chatterji, 2009; Bloom and Smith, 2010). Earnings generation consists of the ability of the organization to obtain financial resources from three principal sources: (1) revenues from selling products/services, (2) donations, and (3) grants, subsidies, and other sources (Bloom and Chatterji, 2009). Replication is the capacity of the firm to implement its initiatives in different locations, while maintaining control and coordination (Bloom and Smith, 2010; Christensen et al., 2006). Finally, stimulating market forces is the ability of the organization to demonstrate that its initiatives can generate profits for other firms, save money for customers who acquire the products/services it offers, and obtain the market's confidence that the social problem being attacked will be solved (Bloom and Chatterji, 2009).

To the best of our knowledge, the SCALERS model has only been tested in the United States (Bloom and Smith, 2010). Although Bocken et al. (2016) study the challenge of scaling at the BOP in India, their focus on social business strategies rather than on organizational capabilities does not directly relate to the SCALERS model. Thus, the applicability of SCALERS to the BOP has yet to be assessed.

3. Research method

This study seeks to understand how sustainable business models may be scaled to serve the massive needs of those at the BOP. Given the complexity of the factors that may affect successful scaling in this setting, qualitative case study methods are used for the analyses.

3.1. Context

Mexico provides an appropriate context in which to study sustainable business models at the BOP, given the high level of poverty and massive need for adequate housing. In 2012, the National Council for the Evaluation of Social Development Policy (CONEVAL) estimated that 53.3 million people in Mexico (45.5% of total population) lived in poverty. From this group, 11.5 million people (9.8% of total population) lived in extreme poverty; that is, with less than 3 USD per day in urban areas and less than 2 USD in rural areas (CONEVAL, 2010). In rural parts of Mexico, many houses do not comply with minimal legal standards: 35.6% have dirt floors, 47.1% have fragile walls, and only 24.4% have access to the water system (Flores Rodríguez, 2009). Substandard housing, in which the

number of inhabitants exceeds the 2.5 persons per room standard for acceptable housing, underpins additional social problems such as domestic violence (Flores Rodríguez, 2009).

3.2. Case selection

Cases were selected following the guidelines proposed by Eisenhardt (1989). Initially, cases of sustainable business models in firms from multiple Latin American countries and industries (e.g. clean energy, consumer products, and housing) were considered, but the focus was reduced to one country and industry in order to compare the firms' levels of scalability. Given the importance of adequate housing for people living at the BOP and the significant needs of the Mexican housing market (as explained in the prior section), the Mexican housing industry was selected as the focus of this study.

Firms selected for the case analyses met these five criteria: (1) the firm's principal activity must be housing; (2) the firm must target the BOP; (3) the firm must be Mexican, with its primary activities in Mexico, so that the cases face similar environmental and institutional challenges; (4) the firm must employ a sustainable business model as defined in section 2.2; and finally (5) the selected firms must exhibit variation in scalability.

Potential cases were reviewed according to the above criteria. Three cases were found that met all of these criteria. In terms of the variation in scalability, one firm failed to scale significantly, another scaled deep, while another scaled wide. "[G]iven the limited number of cases which can usually be studied, it makes sense to choose cases such as extreme situations and polar types in which the process of interest is 'transparently observable'" (Eisenhardt, 1989, p. 537).

The selected firms are small and local, offer an existing product that has been tailored to the BOP, and target the BOP as their consumers. Although the three firms work in the same industry and country, they have significant differences in their sustainable business models, which were analyzed to identify characteristics that allowed them to scale with different levels of success. Table 1 provides basic data on these three firms: *Casa para Ensamblar*, *¡Échale! a tu Casa*, and *MIA*.

3.3. Data collection

Data collection drew upon multiple sources. Primary data were obtained directly from the firms, with initial contacts beginning in 2012 and subsequent interviews, telephone calls, onsite visits, and questionnaires thereafter. Secondary data were obtained from external documents. The questionnaires and secondary data are described in greater detail next.

Open-ended questionnaire. An open-ended questionnaire was sent via email to the three firms in August 2016. The questionnaire was answered in all cases by the general manager. In addition, emails and phone calls, which are identified in the text as personal communication, were exchanged in order to clarify some of the information provided or to obtain more detail when necessary. The following data covering the years 2011–2015 were obtained:

- Homes, measured as the number of complete houses built per year;
- Rooms, measured as the number of home improvements built per year, which usually consist of adding an additional room to the house;
- States with presence, which is the number of states in Mexico in which the firm has built homes or rooms;
- Sales, measured in millions of Mexican pesos;

- Direct employment, which is the number of employees directly working for the firm; and
- Indirect employment, which is the number of temporary employees hired by the firm.

Firms' websites and other secondary sources. Additional information about the firms and their main products was obtained from their Internet sites and YouTube channels. The amount of information, detail, and date of last update varied across firms.

3.4. Data analysis

Following Eisenhardt (1989), both within-case and cross-case analyses were conducted. The within-case analysis is based on comprehensive write-ups for each company (Eisenhardt, 1989, p. 540) and pattern matching was used as the specific analytic technique (Yin, 2003). Pattern matching involves juxtaposing an empirical case with a predicted set of outcomes. The predicted relationships were drawn from the seven organizational capabilities of the SCALERS model developed by Bloom and Chatterji (2009). Pattern matching determined the extent to which these organizational capabilities were necessary for the scaling that was present in each case. The within-case analysis also revealed the importance of an additional factor for scale depth, community engagement, that was not considered in the original SCALERS model.

The cross-case analysis was conducted by creating a table to display the data of each case comparatively in terms of scaling and the seven organizational capabilities from the SCALERS model as well as the emergent capability of community engagement (Yin, 2003). The cross-case analysis helped to build theory by comparing the similarities and differences of the cases (Miles et al., 2014).

4. Findings

Below are the results of the within- and cross-case analyses.

4.1. Within-case analysis

This section presents the results of the within-case analyses for the three firms: *Casa para Ensamblar*, *¡Échale! a tu Casa*, and *MIA*. It begins with a brief description of each firm and then examines the presence or absence of the organizational capabilities identified by

Bloom and Chatterji (2009). The data for the organizational capabilities are drawn from the questionnaires.

4.1.1. Casa para Ensamblar

4.1.1.1. Description. *Casa para Ensamblar* was established in 2010 to develop housing with adequate size and characteristics for people at the BOP (A. Anguiano, personal communication, August 25, 2016). Since its inception *Casa para Ensamblar* has developed housing solutions that are affordable for the poor, both with and without government subsidies. Its most important innovation is the development of a prefabricated housing model (A. Anguiano, personal communication, August 25, 2016). This model is the basis of the firm's name, which in English means, "House to Assemble."

One of the distinctive features of this model is the materials, which may represent 40 percent of the cost of a new home (*Casa para Ensamblar*, 2017). The founder of *Casa para Ensamblar* developed a construction material called CPM, which is composed of 55 percent scrap wood, 40 percent polypropylene, and 5 percent additives such as cellulose fiber (*Casa para Ensamblar*, 2017). The material is easy to handle during construction, does not need further finishing such as painting, and requires low maintenance (*Casa para Ensamblar*, 2017). Houses are assembled by fitting the CPM onto specially designed posts without need for any additional material such as cement to bind the pieces together (BBVA Momentum, 2013).

The prefabricated materials allow the company to deliver between twelve and fifteen houses on a single truck, which reduces transportation costs (BBVA Momentum, 2013). Also, the building system permits three people without prior construction knowledge to assemble the house in five days on average (BBVA Momentum, 2013). The firm relies on a manufacturer to produce its construction material (A. Anguiano, personal communication, August 25, 2016). The supplier's factory has an installed capacity of 50,000 homes per month (BBVA Momentum, 2013). Houses designed by *Casa para Ensamblar* are modular, which means they are prepared to expand according to customer needs and financial capacity (*Casa para Ensamblar*, 2017). Since the construction model is based on a do-it-yourself approach, *Casa para Ensamblar* is planning to offer a "house-in-a-box" concept in which the consumer can acquire the house at a retail outlet and receive technical guidance if necessary (A. Anguiano, personal communication, August 25, 2016).

Table 2 presents information for *Casa para Ensamblar* for the years 2011–2015. This information shows a pattern of relatively slow but steady growth. While this firm has consistently grown, it remains a small player, serving only two states and building only a

Table 1
Comparative case summary.

	<i>Casa para Ensamblar</i>	<i>¡Échale! a tu casa</i>	<i>MIA</i>
Founding year	2010	1997 as NGO; 2008 as a for-profit firm	Preceding firm founded in 2005; current firm in 2009
Innovation	Development of a new construction material called CPM, composed of scrap wood and a recycled polymer CPM	Uses a machine to make bricks in-situ called Adoblock	Patented progressive rural housing which builds houses from top-down
Main materials used for construction		Adoblock	Multiple materials that adapt to each project's needs
Type of construction	Self-construction	Self-construction, strongly based on community support	Self-construction and turnkey projects
Building time	5 days	3–4 months	3–4 months
People needed	3 people	Community members employed by firm during construction period	Works with house recipients (self-construction) or sends staff members (turnkey projects)
Government subsidy (CONAVI)	No	Yes	Yes

Source: Personal communication with firms' managers. (A. Anguiano, personal communication, August 25, 2016), (F. Piazzesi, personal communication, August 25, 2016), (G. Jaime, personal communication, August 25, 2016).

Table 2
Casa para Ensamblar data.

	2011	2012	2013	2014	2015	Total 2011–2015
Homes	12	35	67	110	267	491
Rooms ^a	0	0	0	0	0	0
States with presence	1	1	1	2	2	
Sales (000,000 pesos)	0.6	1.9	3.6	6.1	17.6	29.8
Direct employment	4	4	4	4	14	30
Indirect employment ^a	0	0	0	0	0	0

^a Casa para Ensamblar builds only complete homes, not individual rooms, and has no indirect employment because the homes are prefabricated.

Source: Questionnaire (A. Anguiano, personal communication, August 25, 2016)

few hundred homes. This suggests that its business model lacks scalability.

4.1.1.2. Organizational capabilities. Staffing. The company has not been able to successfully build a team. During the first four years of the period analyzed, the staff was composed of four employees and no indirect staff members (A. Anguiano, personal communication, August 25, 2016).

Communication. Casa para Ensamblar is highly dependent on the CEO and founder for its communication, which has limited its ability to persuade other stakeholders to support the organization (A. Anguiano, personal communication, August 25, 2016).

Alliance building. The firm relies on one manufacturer of the CPM material that is used to build the houses. No additional partnerships or alliances are in place (A. Anguiano, personal communication, August 25, 2016).

Lobbying. Casa para Ensamblar negotiates with local and state governments for funding. These funds have been used especially for houses in disaster-affected zones (BBVA Momentum, 2013).

Earnings generation. Earnings are largely generated through sales. As of 2015, sales were 17.6 million pesos (A. Anguiano, personal communication, August 25, 2016).

Replicating. The construction model has been replicated in new geographical areas given the low transportation costs of construction materials (A. Anguiano, personal communication, August 25, 2016).

Stimulating market forces. The firm has not created initiatives that encourage other people or institutions to serve the public good while pursuing their interests (A. Anguiano, personal communication, August 25, 2016).

4.1.2. ¡Échale! a tu Casa

4.1.2.1. Company description. ¡Échale! a tu Casa started as a not-for-profit organization in 1997. However, in 2008 the firm became a social enterprise (Echalemex, 2013). ¡Échale! defines itself as a social enterprise that assists in self-construction projects for families that are not eligible for government housing programs (Échale a tu casa, 2017). The company has developed a model that includes social inclusion, financial education, access to credit, and technical training (F. Piazzesi, personal communication, August 25, 2016).

The model of self-construction is based on communities (Ashoka México, Centroamérica y el Caribe, 2013). Contrary to some other housing projects, the construction of many houses simultaneously is required for the project to be profitable. The minimum number of houses required to commence building in a community is thirty (Échale a tu casa, 2017). During the construction phase, the families that will receive a house participate in the construction and receive remuneration for their work (Echalemex, 2013). An average of five temporary jobs per house are created (F. Piazzesi, personal communication, August 25, 2016).

The houses are built using a special brick called Adoblock, which is fabricated locally by the community that will be implementing a housing project (F. Piazzesi, personal communication, August 25, 2016). ¡Échale! provides the machine that is needed for the production of the Adoblocks and trains the community in how to use local materials to produce them (F. Piazzesi, personal communication, August 25, 2016). Producing the bricks locally reduces construction costs by 25 percent (F. Piazzesi, personal communication, August 25, 2016).

Working with the community at large is an important component for the success of this project. ¡Échale! organizes a local housing committee formed by the beneficiaries (F. Piazzesi, personal communication, August 25, 2016). The purpose of the committee is to have periodic meetings to follow up on the development of the program. The community is trained through a workshop developed by ¡Échale! that includes financial education (Ashoka México, Centroamérica y el Caribe, 2013). The design of a community housing project is based not only on the weather and terrain conditions, but also takes into consideration local customs and habits (F. Piazzesi, personal communication, August 25, 2016). The community members help expand the program by advertising its benefits to other family members and friends (F. Piazzesi, personal communication, August 25, 2016). These activities constitute community engagement, which is defined as a “pattern of activities implemented by firms to work collaboratively with and through groups of people to address issues affecting the social well-being of those people” (Bowen et al., 2010, p. 297).

Table 3 presents basic sales and scaling information for ¡Échale a tu Casa! for the years 2011–2015.

There is no evidence of sustained scale width in terms of the number of houses and/or rooms built. During the period for which data was available, the numbers increase and decrease in response to external circumstances, such as election years. However, this case does illustrate scale depth. Not only does the project reach 109,668 beneficiaries, but it involves those beneficiaries by making them part of the construction process of their homes. In that sense, the continual increase in the use of indirect employees – the beneficiaries themselves – indicates that the program has scaled deeply. As noted in the description of the business model, often entire communities are engaged in ways that increase social ties within the community, an important impact that goes beyond the basic provision of housing. Although community engagement has been discussed previously in the BOP and business model literature (Bowen et al., 2010; Stubbs and Cocklin, 2008), it has not been associated with the issue of scaling.

4.1.2.2. Organizational capabilities. Staffing. The company has a staff of 44 people on average which has allowed it to coordinate an average of 20,000 people from the communities that help to construct the Adoblocks (F. Piazzesi, personal communication, August 19, 2016).

Table 3
¡Échale! a tu Casa data.

	2011	2012	2013	2014	2015	Total 2011–2015
Homes	1000	455	1482	738	1379	5054
Rooms	853	6500	1112	0	0	8465
States with presence	1	16	10	6	9	
Sales (000,000 pesos)	46	54	71	76	65	312
Direct employment	38	38	42	49	55	222
Indirect employment	20,000	20,800	21,000	23,160	24,708	109,668

Source: Questionnaire (F. Piazzesi, personal communication, August 25, 2016)

Communicating. ¡Échale! has a communications team in place that helps to persuade other stakeholders to support their organization (F. Piazzesi, personal communication, October 18, 2016).

Alliance building. The firm has built alliances with the sugar cane associations in order to reach communities. It also created a council of community members at each location that aids in coordinating the different activities (F. Piazzesi, personal communication, October 18, 2016).

Lobbying. The firm uses funds provided by the federal government (CONAVI) to cover about 20–30 percent of the cost of each house. It also negotiates with state and municipal governments for additional funding (F. Piazzesi, personal communication, August 19, 2016).

Earnings generation. Sales increased from 46 million to 65 million pesos during the study period (F. Piazzesi, personal communication, September 9, 2016).

Replicating. The model is replicable because the Adoblocks are made from local raw materials. The machines for making Adoblocks are easily transported from one site to another (F. Piazzesi, personal communication, August 25, 2016).

Stimulating market forces. The firm has not created initiatives that encourage other people or institutions to serve the public good while pursuing their interests (F. Piazzesi, personal communication, August 25, 2016).

4.1.3. MIA

4.1.3.1. Company description. The firm began in 2005 with the name Tecnología en Construcción CEPTC SA de CV. In 2009 the company changed its name to Mejoramiento Integral Asistido SA de CV (MIA) (G. Jaime, personal communication, May 19, 2015). Its mission is “to provide high quality and affordable housing solutions to families in rural and semi-urban areas” (MIA, 2009). To achieve this mission, the firm provides different services such as financial management, materials, and construction supervision.

In order to provide affordable housing to people at the BOP, MIA developed a strong network of suppliers, which allows access to different types of materials (G. Jaime, personal communication, May 19, 2015). This diversity in supply is translated into different types of housing projects, depending on the specific needs of the customer (G. Jaime, personal communication, May 19, 2015). This diverse supplier network differentiates MIA from the other firms in the industry that have standardized housing models or materials.

MIA considers the government to be its main customer, although each house is to be inhabited by a BOP family (G. Jaime, personal communication, February 19, 2015). MIA obtains federal and local governmental funding that helps subsidize around 90 percent of the value of the house (G. Jaime, personal communication, May 19, 2015). The construction model of the company has evolved with the changing housing regulations established by the Mexican government. In its early years, the company developed and patented a phased construction model for rural houses (G. Jaime, personal communication, May 19, 2015). This model allowed the house to be built in four independent stages, from the top down (roof-floor-walls-accessories). The advantage was that the project allowed the beneficiary to acquire funds gradually while being able to use the home in an earlier stage. Even during the first stage, the roof could serve as a shelter, warehouse, or even temporary housing. However, one of the disadvantages was that the projects often took a long time to finish. In later years, the Mexican government began to require that companies using federal funds deliver a house in a period no longer than four months (G. Jaime, personal communication, May 19, 2015). Due to this change in legislation, MIA responded by developing smaller homes that could be delivered in the time frame required by the government.

Table 4
MIA data.

	2011	2012	2013	2014	2015	Total 2011–2015
Homes	290	1253	540	1278	3175	6536
Rooms	0	1301	0	3000	1825	6126
States with presence	3	3	1	4	7	
Sales (000,000 pesos)	59	54	92	214	263	682
Direct employment	n/a	10	43	44	52	149
Indirect employment	n/a	100	500	600	1500	2700

Source: Questionnaire (G. Jaime, personal communication, August 25, 2016)

Table 4 presents sales and scaling information for MIA for the years 2011–2015.

MIA provides the clearest case of scale width. They exhibit a continuous increase in the number of houses and/or rooms built. Although ¡Échale! and MIA are both building similar numbers of houses, MIA achieved this level much more rapidly than ¡Échale!.

4.1.3.2. Organizational capabilities. Staffing. The company has gradually increased the number of direct and indirect employees in order to meet labor requirements as the firm grows (G. Jaime, personal communication, August 23, 2016).

Communicating. MIA has a communications team in place that enables it to persuade other stakeholders to support the organization (G. Jaime, personal communication, August 25, 2016).

Alliance building. The firm has built alliances with different suppliers, which allows it to customize the construction projects according to specific needs. It also works with non-government organizations such as Habitat for Humanity (G. Jaime, personal communication, May 19, 2015).

Lobbying. MIA negotiates with the federal government (CONAVI) to obtain funds for subsidizing 40 to 50 percent of the cost of the houses. It also works with local governments for additional funding amounting to another 40 percent of the cost (G. Jaime, personal communication, May 19, 2015).

Earnings generation. Sales increased from 59 million to 263 million pesos from 2011 to 2015 (G. Jaime, personal communication, August 23, 2016).

Replicating. MIA has a broad network of suppliers in different regions that allow it to apply its solutions to different areas (G. Jaime, personal communication, August 23, 2016).

Stimulating market forces. The firm has not created initiatives that encourage other people or institutions to serve the public good while pursuing their interests (G. Jaime, personal communication, August 25, 2016).

4.2. Cross-case analysis

Cross-case comparisons were performed using the SCALERS questionnaire proposed by Bloom and Smith (2010) and in accordance with Eisenhardt (1989, p. 540) recommendation “to select categories or dimensions, and then look for within group similarities coupled with intergroup differences.” Table 5 compares the evidence of the three cases for the strength and/or kind of scaling as well as the relevant organizational capabilities. Based on the prior within-case analysis, a new dimension, community engagement, which was particularly important for deep scaling in the case of ¡Échale!, was added.

From the seven organizational capabilities derived from the SCALERS model (Bloom and Chatterji, 2009) plus the community engagement capability, both similarities and differences among the three cases (Miles et al., 2014) can be seen. The three firms all engage in lobbying, demonstrate some level of replication, and are

Table 5
Cross-case analysis.

Dimension	<i>Casa para Ensamblar</i>	<i>¡Échale! a tu Casa</i>	<i>MIA</i>
Scaling	Low Slow growth in houses built	Deep Extensive use of indirect employees	Wide Continuous increase in number of houses/ rooms built
Staffing	Difficulty growing staff beyond founders	Large staff allowed coordination of an average of 20,000 people from communities	Gradually increased number of direct and indirect employees to meet requirements as firm grew
Communication	Highly dependent on CEO and founder, which limited ability to get stakeholder support	Team used to persuade stakeholders to support organization	Team used to persuade stakeholders to support organization
Alliance building	Relies on one supplier; no additional partnerships in place	Built alliances to reach communities; created council of community members at each location to coordinate activities	Built alliances to customize projects; works with non-government organizations
Lobbying	Negotiates with local and state governments for funding	Negotiates with the federal government to subsidize cost of houses and works with local and state governments for additional funding	Negotiates with the federal government to subsidize cost of houses and works with local and state governments for additional funding
Earnings generation	Sales increased from 0.6 to 17.6 million pesos from 2011 to 2015	Sales increased from 46 to 65 million pesos from 2011 to 2015	Sales increased from 59 to 263 million pesos from 2011 to 2015
Replication	Prefabrication model allows for replication; low cost to transport materials	Local sourcing of materials allows for replication; machines for making Adoblocks easily transported	Broad network of suppliers enables replication across geographic areas
Stimulating market forces	No evidence	No evidence	No evidence
Community engagement	Does not involve the community	Involves beneficiaries in building process; entire community participates	Does not involve the community

Source: Based on questionnaires and personal communication with firms' managers (A. Anguiano, personal communication, August 25, 2016), (F. Piazzesi, personal communication, August 25, 2016), (G. Jaime, personal communication, August 25, 2016).

successfully generating earnings. In addition, in none of the three cases was stimulation of market forces detected. That is, the firms did not create initiatives to encourage other people or institutions to serve the public good, while pursuing their private interests.

However, there are also some important differences. *Casa para Ensamblar* does not have full staffing, communications, and alliance building capacities, while *¡Échale!* and *MIA* do. The fact that *Casa para Ensamblar* was the least able to scale deep or wide suggests that these elements are necessary for scalability. Despite its possession of a promising new construction technology, *Casa para Ensamblar* was unable to scale adequately along either dimension.

MIA stands out as the firm that can scale wide by growing in the number of houses and rooms built. It has also expanded its presence geographically despite elections and changes in state governments, which can affect support for housing programs like those of *MIA*, since they depend heavily on government subsidies. *¡Échale!* was less successful than *MIA* in lobbying government and thus generating government funds to support the model. Nevertheless, both have grown at the BOP based on government support.

Despite the apparent novelty of the *Casa para Ensamblar* model, and the very successful model of *MIA*, the SCALERS dimensions (Bloom and Chatterji, 2009) fail to capture a unique aspect of the *¡Échale!* model: the involvement of the community. Although *MIA* is very efficient and successful at lobbying the government, and *Casa para Ensamblar* is very innovative, *¡Échale!* engages the community and empowers its beneficiaries in ways that foster self-reliance. Projects by *¡Échale!* deliberately involve the community in the construction of homes. Because of this community engagement, *¡Échale!* has successfully scaled deep by creating social relationships that tie communities together even after the houses are built.

In conclusion, *MIA* is probably the most successful in terms of achieving scale width. However, *¡Échale!* appears to be more successful in achieving scale depth because of its ability to engage and empower people more than the other two cases.

5. Discussion and conclusions

How can sustainable business models be scaled successfully to serve the needs of those at the BOP? The three cases provide critical insights into this important question. Although *Casa para Ensamblar* has the most innovative technology in terms of construction, that technology is not sufficient to enable the firm to scale wide or deep. The low level of staffing, communications, alliance building with other organizations, and government lobbying has limited earnings and scaling of the model.

The cases of *¡Échale!* and *MIA* both demonstrate scaling, but of different kinds. *MIA* exemplifies the common approach to scaling by increasing the number of houses built largely through a model that is compatible with important subsidies from the federal government. One may criticize the *MIA* model for not being a financially sustainable business model because of its reliance on government support, yet even the experience of *Patrimonio Hoy* by CEMEX (Calton et al., 2013; Dahan et al., 2010; Subrahmanyam and Gomez-Arias, 2008) mentioned in the introduction suggests that a pure business model, devoid of government support, cannot provide housing for the poorest of the poor.

In contrast, *¡Échale!* has successfully scaled deep by gradually and consistently increasing the number of indirect employees; that is, beneficiaries who contribute their own labor to the project. This reliance on the community and its own labor partially substitutes for the funds provided by the federal government upon which *MIA* depends. However, this community involvement generates benefits in terms of the social relationships that deepen and lengthen the potential impact of *¡Échale!* in a community.

Our findings make a number of contributions to the literature. First, they add to the BOP literature by stressing that private initiative at the BOP has limits. Although the BOP literature has found interesting evidence for the role of private enterprise in improving conditions at the BOP (Prahald and Hammond, 2002; Prahald and Hart, 2002; Seelos and Mair, 2007), our firms serving the housing needs of the BOP have discovered the limits of private initiative and shown that it is difficult to stimulate market forces. However, at least in regard to housing, these constraints can

be overcome through collaboration with government and/or the local community.

Second, although the sustainable business model literature discusses community engagement as a specific strategy for community development, it has failed to appreciate the role of community engagement in scaling in order to create systemic change (Bowen et al., 2010; Stubbs and Cocklin, 2008). The findings of this paper demonstrate that private business needs either government collaboration or community engagement for sustainable business models to create systemic change.

Finally, the paper contributes to the literature on scaling by suggesting that the original SCALERS model proposed by Bloom and Chatterji (2009) needs to be adapted when analyzing scaling at the base of the pyramid. Specifically, stimulating market forces may not be needed for scaling at the very base of the BOP, but engagement with the community is needed, especially for deep scaling. Thus, we suggest a new acronym, RESCALE (replication, earnings generation, staffing, communication, alliance building, lobbying, and engagement with the community), to model scaling at the BOP.

Certainly this study is not without its limitations. We utilize three cases to evaluate the applicability of the original model by Bloom and Chatterji (2009). Although these cases demonstrate the limitations of the model (stimulating market forces) and point to new organizational capabilities relevant to scaling (community engagement), the results are suggestive, not definitive. The context of the study – the Mexican housing industry – provides a useful way to control for numerous exogenous factors related to industry and institutional context, but these cases do not establish the external validity of the findings and their generalizability to other industries and contexts. Consequently, these limitations provide important avenues for future research by using additional methods, such as large-scale surveys, in other industries and countries to establish external validity.

The lesson for practitioners and policy makers from these three cases is that housing initiatives at the BOP require collaborative engagement, either with the government or the local community. Although other kinds of BOP initiatives documented in the literature have been developed through purely business mechanisms, the development of a sustainable business model for housing at the very base of the BOP does not seem possible without these important kinds of collaborations. Thus, to serve the massive needs of the poorest of the poor, it appears necessary to RESCALE.

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