VidaGás: delivering better health to Northern Mozambique with LPG

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Abstract

Purpose – The purpose of this paper is to document the manner in which a pro-poor company can deliver ongoing health benefits and improve environmental sustainability in a manner that addresses child and maternal mortality (in line with millennium development goals 4, 5 and 7).

Design/methodology/approach – Field research in Mozambique including 12 in-depth interviews with key personnel from December 2006 to January 2007.

Findings – First, clear threats to the success of VidaGás’ pro-poor business model encompass insufficient liquefied petroleum gas (LPG) supply and storage facilities; poor industrial and commercial infrastructure in Northern Mozambique; inadequate training of retailers in LPG use; and inadequate consumer knowledge of the benefits of LPG. Second, key innovations employed by VidaGás to overcome these obstacles consist of the introduction of a novel cold chain to safeguard medicines; a complex supply chain to ensure timely delivery; and the exploitation of local knowledge and expertise to expand the uptake of LPG by Mozambicans.

Practical implications – The case study focuses on a business problem with significant development implications. The challenge is to ensure a reliable supply of LPG in Northern Mozambique. To meet this challenge, VidaGás must achieve its stated goal of becoming a revenue-generating entity within three years. In order to create a viable market for LPG, VidaGás must not only increase the uptake of LPG by poor consumers, it must expand LPG market access to commercial consumers, while raising additional capital.

Originality/value – The paper contributes to the literature on social entrepreneurship and demonstrates how to link for-profit business imperatives with development goals.

Keywords Mozambique, Liquefied petroleum gas, Energy sources, Healthcare

Paper type Case study

1. Introduction

While the literature on “social economy” is dominated by case studies and theories about best practice, Pope contends that it is quite difficult to find any “robust evidence of their value and contribution” to the discipline of development studies and the communities that development studies is designed to serve (Pope, 2007; Downing, 2005; Haugh, 2005; Jones and Keogh, 2006; Kerlin, 2006; Martin and Osberg, 2007). This case study serves as a partial response to this line of criticism. It does so by documenting the innovations employed by a specific private-public sector partnership in Mozambique and connecting those innovations to the social enterprise literature.

A second concern motivates this research. The existing literature on business and development, social entrepreneurship, and the myriad ways in which standard or novel business models can transform the material conditions of the poor remains rather slender, despite a number of initiatives and related research. In 1997, Prahalad and Hart
(2002) produced a working paper entitled *The Strategies for the Bottom of the Pyramid*. “Not a single journal would accept the article for publication” Prahalad (2006, p. 1) recalls. “It was too radical. Reviewers thought it did not follow the work of developmental economists. Nobody noticed that we were offering an alternative to the traditional wisdom”. When it was finally published, Prahalad and Hart (2002) laid bare a set of deeply and widely shared assumptions held by large multinational corporations (MNCs), and then carefully and methodically dismantled them. Much of the conventional wisdom turned on a set of inaccurate assumptions about the ability and the willingness of the poor to pay for quality products, services and technology. Prahalad and Hart’s work precipitated a sea change in both the assumptions and practices of business *vis-à-vis* development. In fact, the poor are willing to pay, and willing to pay more than their middle class counterparts, for essential goods and services. The United Nations Development Programme (UNDP, 2004, pp. 7-8) notes:

> Across the world the story is the same – poor consumers pay more than rich consumers for basic services. In Mumbai, slum-dwellers in Dharavi pay 1.2 times more for rice, ten times more for medicine and 3.5 times more for water than do middle class people living at the other end of the city on Bhulabhai Desai Road.

This so-called “poverty penalty” flows from a combination of local monopolies, inadequate access, poor distribution and powerful brokers. The penalty is severe and the evidence suggests that the poor pay five to 25 times what the rich pay for the very same services (Prahalad, 2006). As one author puts it: “If you break the economic and physical bottlenecks of distribution you can reach huge, previously neglected markets […] millions of small sales can, in aggregate, add up to big profits” (Anderson, 2006). In purchasing power parity (PPP) terms, the Indian economy alone is worth US$3 trillion. A total of nine developing countries including China, Brazil, South Africa, India and Mexico – make up 90 per cent of the developing world’s PPP. That PPP is worth US$12.5 trillion. The PPP of these nine developing countries is larger than the combined PPP of Japan, Germany, France, Italy and the UK (Prahalad, 2006, p. 10). The Prahalad view can no longer be viewed as unorthodox. In a short space of time, his view, coupled with the empirical evidence that the poor are in fact a potential source of huge profits has shifted the dominant discourse on the connections between business science and development.

In that first article, Prahalad and Hart offered Exhibit 1, a triangle with four tiers (Figure 1). Tier four is the market under scrutiny. While these consumers have an average income of less than US$1,500 per year, the bottom – or the base – of the economic pyramid represents some four billion consumers (Prahalad and Hart, 2002). Asia now houses half the world’s people (in other words, half the world’s “consumers”) and half the world’s fastest growing economies ((The) Economist, 2007). No wonder MNCs now view India and China as preferred markets for their goods.

Another shift in thinking occurred at roughly the same time:

![Figure 1. Four billion consumers at the bottom of the pyramid (BOP)](image-url)
Once perceived as part of the problem, business is increasingly (even grudgingly in some circles) admired for its dynamism, its market-discipline, its incentives for efficiency and innovation, and its economically self-sustaining character (Harvard Business School, 2005; Collier, 2007; Yunus, 2003).

Unlike many other actors, the UNDP has, for the last decade, also viewed the indigenous private sector as an engine for development. The UNDP’s commission on the private sector and development produced a landmark report entitled: *Unleashing Entrepreneurship: Making Business Work for the Poor*. As a result of that report, the UNDP put together a subsequent initiative (in which we took part) to produce 50 in-depth, field-based case studies in the developing world that fit that paradigm. However, the UNDP’s conception of the relationship between the private sector and development does not limit itself to viewing the poor as a lucrative market opportunity for multinational firms (Jenks, 2008). It goes further. When the UNDP speaks of growing inclusive markets (GIM), it contemplates shared wealth and redistributive markets and economies (Jenks, 2008).

What is more, the UNDP is using its vast UN family of 23 international agencies, as well as UN staff in 185 countries, to create bridges between international financial institutions, the private sector and entrepreneurs in developing countries. Its development agenda is specifically focused on achieving the UN millennium development goals (MDGs) through private sector involvement (UNDP, 2008).

This VidaGás case study was originally commissioned as part of the GIM initiative. The purpose of the GIM initiative and related research is to test the proposition that social enterprises conceived, in the main, as for-profit business ventures can produce direct social benefits for consumers, producers and employees (UNDP, 2008; Hamann *et al.*, 2008). The GIM initiative illustrates where and how business is making a direct contribution to development goals; and its research demonstrates how such businesses enable individuals to expand their choices and to live lives, they have reason to value (Sen, 1999). Against this background, the case investigates an economically successful for-profit company that simultaneously generates profits while delivering significant development benefits (primarily in health) for poor communities in Northern Mozambique. At the end of the article, we assess the lessons that can legitimately be drawn from the case and suggest how such lessons ought to inform the burgeoning literature on social enterprise linked to development.

### 2. Methodology

Field research was conducted in Mozambique. The research consisted of a dozen interviews with VidaGás personnel and representatives from Fundação para o Desenvolvimento da Comunidade (FDC) at two sites (Maputo and Pemba, Cabo Delgado, Mozambique) in December 2006 and January 2007. Several telephone interviews also took place with VillageReach staff. The information gathered from these interviews was supplemented by more general research regarding liquefied petroleum gas (LPG) and market access in locations with limited physical infrastructure. The authors also reviewed the history of the partnership initiative as reflected in various memoranda of understanding and business plans.

In terms of methods, we believe that bounded, in-depth case studies provide greater insight into many phenomena than do thinner analyses of larger samples (McMillan and Schumacher, 2001). Indeed, a significant and relatively novel body of literature
supports the use of case studies for controlled-comparison and in-depth investigations of research questions (Yin, 2003; van Evera, 1997; Neuman, 2007).

3. Health and energy
In a country with a mere 500 doctors for a population of almost 20 million, initiatives that can effectively expand the reach of adequate healthcare are in short supply (The World Bank, 2008). Addressing the shortage of doctors is just one challenge. Meeting the demand for a dependable form of fuel on which clinics and hospitals can rely to provide effective healthcare has proven just as demanding.

In Northern Mozambique, health clinics lack reliable fuel to provide lighting for surgery and routine procedures. While accidents and births take place at all hours, most clinics can only treat their patients and perform surgery during daylight hours. Moreover, the lack of dependable fuel hampers immunization efforts. Vaccines for immunization require refrigeration within a fixed temperature range. Kerosene refrigerators, in common use in rural Mozambique, frequently break down. Compromised vaccines must then be discarded. Without proper immunization, many children die of such preventable diseases as measles, polio and hepatitis (Dabis and Ekpini, 2002; WHO, 2005).

The connection between appropriate fuel resources, morbidity and mortality is not limited to the ability of hospitals and clinics to function effectively. Most households in this region depend upon wood or charcoal for cooking. The burning of so-called “biomass” fuels increases the susceptibility of individuals to respiratory infections, asthma, and complications in pregnancy (e.g. low birth weight babies or stillbirths) (Bruce et al., 2006; WHO, 2006a; Rehfuess et al., 2007; Ezzati, 2005). As Ezzati (2005, p. 104) observes:

The large disease burden, and its concentration in women and children in poor households, have helped identify indoor air pollution from solid fuels as a major concern in global health. The use of biomass fuels not only deleteriously affects health; it undermines the conditions for existence. The absence of alternative fuel sources has also led to deforestation. The deforestation of local mangrove forests has, in turn, imperilled the local commercial fishing industry – a chief source of food and income for many members of the community. The health and economic welfare of residents, access to healthcare, and the environmental sustainability in Northern Mozambique, clearly depends on a reliable source of “cleaner” fuel.

A large number of politicians and actors in civil society recognized these problems. In 2002, stakeholders gathered to launch a pilot project in the province of Cabo Delgado in Northern Mozambique designed to address the challenges. Partners included the former first lady and minister of education, Graça Machel; a Seattle-based non-governmental organization (NGO), VillageReach; Northern philanthropists willing to back the start-up; the Ministry of Health in Mozambique (MISAU) and the Governor of the pilot province; and, significantly, a community foundation, FDC with expert knowledge of the northern Mozambican population and local conditions.

The partnership created a new for-profit venture called VidaGás. A propane distribution company, VidaGás began to sell LPG to consumers in the country’s north while cross-subsidizing the LPG provided to health clinics in Cabo Delgado. To be successful over the long term, VidaGás must become a viable company capable of supporting the essential interventions in health clinics. The case study suggests that this public-private venture – and the use of LPG provided by VidaGás has improved
the quality of health services provided to patients in Northern Mozambique. VidaGás provides reliable refrigeration of vaccines, necessary lighting for surgery, and the energy required for the safe sterilization of medical instruments and syringes. At the same time, the company serves as an example of a pro-poor social enterprise capable of achieving long-term financial success.

4. Country context
The healthcare system in Northern Mozambique is undermined by three fundamental factors: poor infrastructure (roads, vehicles and electricity), insufficient human resources, and the absence of coherent problem-solving systems. Cabo Delgado – the northern-most province in Mozambique and the province selected for the pilot venture has the ignominious distinction of possessing the highest child mortality rates in the country. While the under-five mortality rate is 89 per 1,000 live births in the capital city, Maputo, it is a staggering 241 in Cabo Delgado. In sharp contrast, Canada’s under-five mortality rate is six per 1,000 live births (Government of the Republic of Mozambique, 2005; DFID, n.d.; WHO, 2006b).

VillageReach and FDC, in partnership with the MISAU, found the solution to Cabo Delgado’s healthcare problems required a combination of interventions. First, the partners identified LPG-powered fridges and lamps as resources that would be easy for healthcare workers to use and to maintain. Second, they procured a fleet of dedicated vehicles to deliver essential items to clinics. Third, they trained staff to deliver LPG, medicines and related supplies. This training was supplemented by a system of supportive supervision in which field teams would work with clinic employees each month to build their facility management and technical skills. Fourth, the partners created a logistics platform and delivery system that allowed for the timely ordering, procurement and transport of vaccines, medicines, supplies and propane to clinics. The partners identified a set of key metrics to monitor and evaluate the project. Data are collected monthly from the 251 clinics served by the partners. These metrics have proved critical in helping to pinpoint problems in the overall system and its constituent parts (Hannibal, 2007).

The knock-on effect of the healthcare initiative was felt almost immediately by the clinics. Clinic staff members could expand both immunization and general healthcare efforts. To support this initiative, VidaGás began to sell and supply LPG to large commercial and industrial consumers in Cabo Delgado: hotels, restaurants (eight hotels and six restaurants as of March 2007), and the commercial prawn operation in Pemba (the capital of the province). VidaGás is now targeting small and medium enterprises and households for LPG use in urban and peri-urban areas in Northern Mozambique (Hannibal, 2007).

5. VidaGás company overview
VidaGás Limitada is a limited liability company for-profit private company, founded in 2002 by FDC and VillageReach, and based in Pemba. VidaGás’ core business is to sell and distribute LPG to rural, urban and peri-urban residents in Northern Mozambique. Its broader social vision is to marry the Mozambican need for reliable energy to a commitment to using cleaner, alternative forms of fuel that will improve environmental conditions, generate employment and advance the general socio-economic development of Mozambicans in the region.

The company’s LPG distribution plant became operational in November 2002. VidaGás now distributes LPG to clinics, households and businesses.
VidaGás has expanded its operations to Nampula province and soon plans to service the province of Zambezia. On the back of its LPG sales and distribution network, it now sells a range of other commercial products: freezers and refrigerators (for sale to health clinics, restaurants and other commercial operations); large gas ovens (for restaurants); a three burner stove; a four burner stove; a two burner stove; a single burner stove; and, LPG lamps (VidaGás Domestic Gas, n.d.).

VidaGás has thus far created 23 direct jobs and generated indirect employment in related markets. As the consumption of LPG expands, retail outlets (selling VidaGás LPG) will step into further diversify the sale of the gas. Given the nature of LPG, VidaGás sees women (who do most of the cooking), cooperatives of fishermen, farmers and artisans as target consumers of LPG.

The competition in LPG is weak. VidaGás sells LPG in 5.5 kg cylinders. These cylinders are generally purchased for household use. The primary competition – GALP Energia, Portugal – distributes LPG in 11 and 45 kg cylinders. Moreover, GALP’s distribution occurs only at its petrol (gasoline) stations and through a limited number of other small retailers. Petrogás also sells 11 and 45 kg cylinders of LPG. However, Petrogás is considering leaving the market due to insufficient sales (Mozambique News Agency, 2006; United States Agency for International Developement (USAID), 2005).

Despite the absence of real LPG competition, various forms of traditional biomass will continue to restrict VidaGás’s overall market size. VidaGás must also overcome a number of barriers to market entry and expansion. These barriers encompass insufficient storage facilities for LPG; a weak industrial and commercial infrastructure in Northern Mozambique; inadequate training of retailers in LPG use; and a lack of consumer knowledge about the benefits of LPG. The current price of LPG is also an impediment, especially given the population’s economic constraints: the annual gross national product (GNP) per capita of the province is estimated at $97 (USAID, 2005).

6. LPG and its benefits

More than half the world’s population – 3.2 billion people – still burn coal and biomass fuels such as wood, dung and crop residues to meet their basic energy needs […] Preventing deaths caused by polluted indoor air must no longer be delayed […] the use of cleaner fuels, such as LPG, biogas or other modern biofuels, can eliminate current indoor air pollution (WHO, 2006a; Rehfuess et al., 2007).

Autogas, propane and butane are typical names for LPG. LPG is used for heating and cooking and creating other forms of fuel. It is, for example, compatible with internal combustion engines. LPG is often referred to as a “green” fuel because it emits less greenhouse gas emissions than other fuels: LPG vehicles emit about 20 per cent less carbon dioxide than gasoline powered vehicles. It is also lead-free, sulphur-free, clean burning, effectively odourless and highly portable. Its ease of portability means that LPG is well-suited for use in rural areas by women who transport and use fuel for cooking. However, LPG remains a non-renewable, fossil fuel (ConocoPhillips, 2008; Scottish Environmental Protection Agency, 2007).

VidaGás currently provides LPG to 88 health clinics in Cabo Delgado. These clinics serve 1.5 million people. Its market and services have recently expanded to 163 clinics in the neighboring province of Nampula. Between the two provinces, VidaGás now serves a total population of over five million. Of greater importance, given the original purpose of the partnership initiative, participating clinics in Cabo Delgado province reported
a 47 per cent increase in the number of children immunized. This increase is a direct function of the introduction of VidaGás’ LPG-based cold chain and the accompanying logistics platform created by VidaGás’ two NGO partners: FDC and VillageReach (as noted earlier: the cold chain describes the network of freezers and refrigerators and coolers or cold boxes used in the transport and storage of vaccines within a set range of 35.6-46.4°F (2-8°C). If vaccines are exposed to heat or freezing temperatures, they lose their effectiveness and must be discarded. An unbroken cold chain is an essential component of any vaccination programme) ((The) World Bank, 2003).

The increased efficacy of the sterilization process for medical instruments is also critical. Each clinic houses a steam sterilizer. This autoclave uses hot steam to sterilize medical equipment: clinic workers now rely upon a propane-powered burner to heat up the steam sterilizers. As Hannibal (2007) observes:

If they did not have the LPG, clinic workers would gather wood and start a wood fire to heat up the sterilizer – taking valuable time away from the clinic, polluting the clinic area with wood smoke, and contributing to deforestation.

Before VillageReach and FDC’s involvement, the public health clinics in Cabo Delgado experienced a regular shortage of essential drugs. Most maternal deaths globally result from infection and hemorrhage due to complications in pregnancy. Oral antibiotics and rehydration solutions can stave off infection and overcome the deleterious effects of blood loss (Costello et al., 2006; Rosenfield et al., 2007). However, such medicines need to be ordered, supplied and stocked. As Rosenfield et al. (2007, p. 1396) write:

It is essential that pregnant women in whom complications develop have access to the medical interventions of emergency obstetrical care. Programs to make such care more widely available involve upgrading rural health centers and referral hospitals and stocking them with the necessary drugs, supplies, and equipment, such as magnesium sulfate for eclampsia, antibiotics for infection, and basic surgical equipment for cesarean sections.

The supply chain introduced by the partners means that stocks of these essential medicines are more reliable. The reliable fuel supply, the cold chain, and the improved distribution of medicines all directly support the progressive policies of the MISAU, the UN MDGs, and ultimately, improved public health in Mozambique (DFID, 2005; UNDP, 2007).

7. Indicators of success
The following indicators are used by the partners to assess the success of the project.

7.1 Refrigerator reliability
Of the 88 refrigerators in 88 clinics served in Cabo Delgado in 2005 and 2006, a nominal number of repairs were reported following the introduction of LPG. Only 2 per cent required repair in 2006. Prior to the creation of VidaGás, the majority of clinic refrigerators would break down annually.

7.2 Vaccine wastage rates
Quantitatively, closed-vial vaccine wastage rates are tracked to monitor effectiveness. The resulting rates for Cabo Delgado’s clinics are consistently low: below 3 per cent for each type of vaccine. VidaGás also tracks another category of wastage called open-vial wastage. This form of wastage occurs when a vial of vaccine is opened. If doses are not
administered within the WHO-prescribed timeframe (six hours for reconstituted tuberculosis and measles vaccines and four weeks for other vaccines), then the vials must be discarded. In the clinics served by the project, open-vial wastage rates range from 6 to 29 per cent. That puts these clinics within internationally accepted standards. Prior to VidaGás and the use of LPG, the clinics did not keep track of wastage rates. Based on the interviews conducted, it can be assumed that the rate of wastage was quite high due to the unreliability of the refrigerators.

7.3 Data collection
Field teams gather data from healthcare workers on a monthly basis. The data is sent to the VillageReach office in Seattle where monthly reports are generated for a set of key metrics at the 251 clinics served. The importance of accurate data in a post-civil war context – in which data systems and record-keeping fell into total disrepair – cannot be over-emphasized.

7.4 Integrity of supply chain
Based on data provided by the clinics, medical supplies are ordered by the MISAU, and transported to a MISAU warehouse shared by staff of VillageReach and FDC in Pemba. The vaccines are kept cold in LPG-powered refrigerators. Three drivers collect the supplies from the warehouse and embark on a two-week mission to deliver fuel, medicines, syringes and related items to each of the 88 clinics in the province of Cabo Delgado. Similar teams are deployed to the 163 clinics in the province of Nampula. Staff members repair refrigerators and other essential equipment. Communities have also been outfitted with bicycles or motorcycles in case deliveries are urgently needed between visits by the lead drivers (Hannibal, 2007; VillageReach web site, 2007a, b).

8. Challenges to establishing a market for LPG
The long-term success of LPG as a reliable fuel source for healthcare clinics will require greater economies of scale. Given the current operating structure of VidaGás, its break-even point is estimated at sales of 25-30 tons per month. The company is currently selling only 14 tons of LPG per month. To achieve its target of 25-30 tons per month, VidaGás is serving customers in Nampula. However, this expansion naturally raises the current break-even point. That point now stands at 50 tons per month (USAID, 2005).

LPG sales in Mozambique from 2000 to 2005 indicate a steady increase in LPG use, followed by a slight decline in 2006 “owing to upstream shipping constraints in South Africa, which supplies Mozambique” (Hannibal, 2007). In addition to the general challenges of doing business in Mozambique, a range of specific impediments to expanded LPG sales need to be overcome ((The) World Bank, 2007). These challenges are as follows.

8.1 Infrastructure and supply of LPG to Northern Mozambique
LPG is not produced in-country. Neighbouring South Africa supplies Mozambique with LPG (produced in a natural gas separation plant). LPG is shipped overland by rail and truck to the capital of Maputo. The delivery of all LPG imported from South Africa is coordinated by Importadora Moçambicana de Petróleos (IMOPETRO) (a cooperative company that operates on behalf of its members). VidaGás procures LPG through IMOPETRO by the container load (ten tons) (USAID, 2005). The next leg of the trip entails traversing the distance between Maputo and Pemba (also a port): 2,700 km (1,677 miles).
The roads between Cabo Delgado and Maputo are in poor condition. Only 10 per cent are paved; 60-70 per cent of the unpaved roads are barely passable. The rail network is also in a state of decay. Such a weak transportation infrastructure translates into higher price points for LPG. The price of LPG at the Maputo port is $785 per metric ton – significantly higher than international prices. Moreover, $15 is added by IMOPETRO to cover operational costs. Transport costs from Maputo to Pemba further increase the final price in the north. In addition, South Africa lacks adequate physical storage space for large quantities of LPG. This limitation, in turn, restricts Mozambique’s supply of LPG and results in significant fluctuations in price (USAID, 2005). While reducing Mozambique’s reliance on its neighbor might appear attractive, Mozambique’s low GNP may curtail its ability to develop large-scale distribution networks for LPG in the north and in the interior. At the same time, the relative poverty of its residents limits the capacity of VidaGa’s to ramp up production and distribution (UN, 2005). Although the local currency has strengthened in the last couple of years, between 1998 and 2003 it lost more than half of its value against the US$. According to USAID (2005, p. 9, section 2):

This drop in the value of the currency has important implications for the use of non-traditional fuels such as LPG, which are more expensive compared to charcoal and firewood, which have traditionally been used in households especially in the poorer provinces of the country.

8.2 Consumer pricing and energy efficiency of LPG
If the aforementioned barriers can be overcome, then a sizeable consumer market may well await. A 5.5 kg cylinder or container of LPG would be the optimal choice for households and provide fuel for up to two weeks. The cost of the cylinder is $11. By comparison, an equivalent amount of charcoal costs $33 (USAID, 2005).

8.3 Consumer behaviour and perceptions
In 2005, USAID funded a market research study of 400 households in Pemba, Cabo Delgado. The purpose of the survey was to gain insight into those factors that influence residents’ attitudes towards cooking, lighting and heating. The survey revealed that most residents thought LPG was too expensive and that they were unaware of its multiple benefits. Most Mozambicans were concerned with LPG’s suitability for cooking (e.g. often consumers like the taste associated with wood burning fuel). Consumers also evaluated the product in terms of its affordability, availability, convenience, ease of use and safety. In an interview in 2007, one LPG customer in Pemba, Ester Ferreira, stated that she would recommend it to others because “LPG is faster (than firewood), cleaner and more efficient” (interview with Ester Ferreira, LPG customer in Pemba, January 16, 2007). In spite of the negative associations attached to LPG’s safety and price, 80 per cent of respondents indicated that they would be willing to try LPG under the right conditions (USAID, 2005). The USAID study revealed other forms of uncertainty regarding the use of LPG. Only 36 per cent of respondents knew that LPG was available through VidaGa’s. Just half of those surveyed understood that LPG could be used for cooking or lighting, and 79 per cent of those surveyed believed LPG to be toxic, explosive or dangerous (USAID, 2005). The price of LPG and its continued availability were cited as potential problems by 50 per cent of respondents. USAID observed: “This points to the need for an intensive (multi-media marketing) campaign to make people aware of the uses and benefits of LPG” (USAID, 2005). Respondents suggested a variety of methods that would expand consumers’ knowledge about LPG:
direct campaigning and demonstrations, as well as word of mouth through local community leaders and women (USAID, 2005).

9. Opportunities to scale-up and increase profitability
VidaGás can achieve financial sustainability – and thus accomplish its primary goal of improved healthcare. However, to do so, company representatives must clear a number of complex hurdles and meet several important targets in a risk-averse economic investment climate.

9.1 Maritime harbour
A USAID (2005) study suggests that a new maritime harbour in Nacala, off the coast of Nampula, could be used by all of the companies that operate in the northern region of Mozambique. USAID estimates the cost of the required investment at roughly $1.5 million. Such a harbour would reduce transport costs and increase reliability.

9.2 Expansion to other northern provinces
Both Nampula and Niassa have slightly higher per capita incomes than the populations in Cabo Delgado. Taken together, the two provinces have a population of 4.5 million. If VidaGás were able to establish the requisite distribution and sales networks in these provinces, then the “potential for LPG sales in Nampula/Niassa could well be in the region of 100 tons per month” (USAID, 2005). That figure doubles VidaGás’ current break-even point – and suggests a clear strategy for any viable business plan.

9.3 Microfinance
The experiences of another Lusophone country may prove instructive for VidaGás. About 35 years ago, Brazilian companies wishing to penetrate the interior rural markets of Brazil with LPG began microfinance schemes. Companies financed both the LPG stove and cylinder with an agreement that the money would be paid back within a one to two-year period. Because the upfront costs of purchasing a stove and cylinder can be prohibitive, the initial financing of those setup costs can make LPG a more attractive option for consumers. A recently introduced micro-lending scheme makes the start up purchase-price of LPG and LPG-related products more affordable to members of the community VidaGás serves.

9.4 Government subsidy and regulation
The Indian Government subsidizes LPG as a fuel for households. As of 2001, an estimated 18 per cent of households in India (roughly 34 million households) used LPG for cooking. The Brazilian Government offers a subsidy to low-income families at a rate of an estimated $3 per month. This subsidy enables 4.5 million families to benefit from a cleaner, healthier fuel (USAID, 2005). A subsidy is but one potentially necessary intervention on the part of the state in this public-private initiative. At the moment, Mozambique lacks the requisite legislation to regulate bottling, storage, safety, use and distribution of LPG. A legal framework governing the use of LPG is necessary to ensure consumer protection and quality control.

10. VidaGás’ critical success factors
This public-private partnership initiative can be deemed a success if we measure VidaGás’ (clear and current) capacity to improve the healthcare outcomes of residents
in Cabo Delgado. However, the ultimate success of the venture rests on the sustainability of VidaGás as a supplier of alternative fuel. Those who might wish to replicate the achievements of VidaGás in other environments should pay particular attention to a number of critical success factors:

10.1 The deployment of a reliable fuel
LPG has demonstrated that it is a superior product: it generally outperforms competitor fuels in terms of price, storage, safety, efficiency and environmental sustainability.

10.2 Raising sufficient capital
Although the financial capital to launch this start-up venture was secured through a small number of local Seattle NGOs, additional partners emerged as the project evolved. Among these new partners are the Hunter Foundation of Scotland, the Dutch Government’s bilateral organization and anonymous donors.

10.3 The design and the deployment of an effective cold and supply chain
The improved supply chain designed by VillageReach and FDC has enabled VidaGás to move people and goods through a regular monthly cycle that anticipates stocks, supplies, equipment, maintenance and other needs. Yet, as most development projects illustrate, the difference between brilliant on-paper planning and on-the-ground execution can be stark. The successful implementation of the cold chain against the background of poor physical transport and infrastructure, logistical challenges and a lack of human resources (which define the context in Northern Mozambique) was nothing short of astonishing. This achievement is testimony to the vision and ingenuity of VillageReach’s founder, Blaise Judja-Sato, and the staff of FDC and VillageReach.

10.4 A local partner with key knowledge and expertise
A fourth critical success factor was the intervention of Mrs Graça Machel. In her home country, Mrs Machel is more famous, even more revered than her husband, Mr Nelson Mandela. Mrs Machel brought in the strongest local partner around: FDC. FDC’s staff enabled VidaGás to succeed through their tacit understanding of how business and politics in Mozambique actually work, coupled with understanding of the development needs, knowledge and behaviour of local residents.

If VidaGás can build on its healthcare networks, then it has the potential to survive as an independent privately-held company that – in addition to making a profit – also achieves vital health, employment, environmental and social development goals. However, the need to make a profit to sustain the more lofty goals cannot be underestimated. VidaGás and its partners must realize growth in the household cooking and heating market, as well as the medium to large-scale commercial market for generators, refrigerators and freezers, in order to succeed.

11. Discussion
What kinds of larger lessons does this case study of a BOP style venture offer for both management theory and the international development literature? First, this research illustrates the value of social networks in extending the business and building a foundation of consumer support. For example, FDC uses social networks (comprised mainly of women who “endorse” LPG as a product and educate neighbors about
its benefits) to spread the word in the local communities of Northern Mozambique that the stoves powered by LPG are safe, efficient, clean and superior to using wood or kerosene for cooking. Sustaining and expanding those networks will be necessary if VidaGás is to enlarge its customer base.

Second, the case illustrates the value and challenges of multi-actor and multi-sector partnership. Companies that seek to reach BOP consumers must collaborate much more intimately and intensively than with top of the pyramid markets, as other cases have illustrated (Hamann et al., 2008). Much of the time Governments or NGOs are involved in these ventures, and they come with their own mandates and objectives. Such partnership is both energy-intensive and time-consuming. The VidaGás case illustrates that these partnerships can be brokered among northern and southern NGOs and developing country governments to good effect, with each actor playing a distinct role in the process; a Seattle-based NGO raises capital while the Maputo-based NGOs use specialized local knowledge of BOP consumers to explain why they should switch from kerosene stoves to those powered by LPG sold by VidaGás. The MISAU removes bureaucratic impediments and injects much needed political will into the initiative.

Third, the case demonstrates that a company with dual business and social purpose imperatives can succeed. This company operates in one of the poorer regions of the world. VidaGás' success depends on the buying power of the BOP. At the same time, LPG yields highly significant health and environmental benefits. Moreover, the VidaGás business model accomplishes these aims through its core business activities and not as an unintended consequence of its normal operations.

12. Implications for the success of BOP ventures

In considering a range of business ventures that seek to contribute to development or poverty alleviation – sustainable social entrepreneurship – what does success look like for a BOP company? We briefly discuss four elements for such a successful BOP “formula” and then assess VidaGás against these criteria.

12.1 Overcoming regulatory hurdles and start-up costs

Businesses in developing countries often face infrastructural and human capacity constraints of an order of magnitude greater than those in the industrialised world (Luiz, 2006). Mozambique ranks 135 out of 178 countries in terms of the World Bank’s annual Ease of Doing Business survey for 2008 (an improvement from 140th in 2007). The World Bank estimates that specific business procedures take 113 days in Mozambique – compared to an average of 16 days in the organisation for economic co-operation and development countries ((The) World Bank, 2008). Such legal, bureaucratic hurdles are head-spinning. BOP ventures are meant to take root in some countries where a small transaction can be likened to a Herculean feat (such as securing legal title from a traditional leader for example). Just getting going in this environment is an achievement. VidaGás has met this criterion.

12.2 Employing problem-based innovation

Different types and levels of innovation are a characteristic feature of BOP enterprises. Many such companies have innovation encoded in their DNA. Such entrepreneurship – on the African continent and elsewhere – displays a thrilling array of problem-solving activity. Entrepreneurs in BOP environments profiled reveal a willingness to take
the necessary risks; to adapt to market conditions; to identify profit making ventures while
developing their own conceptions of how their businesses can serve communities (Branzei
and Valente, 2008; Branzei and McKague, 2008; Wheeler et al., 2005). To meet this criterion,
a company must be able to devise some kind of solution to a social or economic
impediment. VidaGás overcame weak infrastructural and human resource constraints
through an alternative energy solution married to a novel cold chain and supply chain.

12.3 Achieving a social development impact (with multiple spinoffs)

To be met, this criterion requires some demonstrable social benefit: employment for a
large number of people at the BOP; significant increases in income level for employees
(moving them to the next income bracket); creating essential products or providing
services that would be consumed by the BOP at affordable prices; or, making credit
available to allow other BOP entrepreneurs to become business owners. VidaGás sells
an alternative fuel that enables poor consumers to avoid environmentally hazardous,
unhealthy, conventional fuel. It creates new direct employment and jobs in related
industries. At the same time, it plows profits back into the support of public health
clinics in the region in which it operates.

12.4 Realising long-term profitability

This criterion operates as a dramatic filter. Grassroots initiatives started by
entrepreneurs can, with the right ingredients, lead to financial success and take pilot
ventures to scale. But they must be able to sustain those operations over the long-term.
To date, VidaGás has broken even. Its long-term financial sustainability and success is
not yet fully assured, however.

13. Conclusion

This case depicts a multi-sector partnership that moved to establish a revenue-generating
company with a view to putting profits back into health clinics serving poorer
populations in Northern Mozambique. The case makes the following contributions to the
social enterprise literature. It provides some evidence of the company’s value and
contribution to the discipline of development studies and the communities that such
policies and initiatives are designed to serve (Pope, 2007). It demonstrates how business
can advance development goals by employing innovative strategies (especially the
MDGs, such as preventing child mortality). It illustrates how businesses can enlarge
individual agency and choice by offering meaningful alternatives to existing goods or
services (e.g. employment, green fuel).

Our conclusion, based on this case and our involvement in the GIM initiative and
related research, is that for BOP ventures to be successful (and by this we mean financially
sustainable over the long-term), they must be fully conceived as for-profit initiatives. The
prototype for success that emerges from these case studies is that of a business model that
is self-sustaining through profits: in other words, a company that delivers social benefits
to consumers through its core business activities (Hamann et al., 2008).

This case also documents the ability of social entrepreneurs to solve problems often
associated with poverty: inadequate infrastructure and human capacity constraints.
VidaGás also illustrates how entrepreneurs can overcome other common structural
hurdles in BOP environments: high risk, high barriers to entry and difficulty accessing
capital or credit. We conclude – even with the jury still out on VidaGás’ long-term
success – that alternative models to reaching the BOP are bearing fruit. Unlike the conventional wisdom that businesses invariably exploit the poor, some business opportunities actually enable the poor to expand their human capabilities in line with accepted conceptions of development as freedom and as flourishing (Sen, 1999; Nussbaum and Sen, 1993; Nussbaum, 2007).

References


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Further reading


FDC (2008), available at: www.fdc.org.mz


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